



**ASCE Palm Beach Branch
C43 West Basin Storage Reservoir
2022 Design and Construction Review**

Shawn Waldeck, P.E.
Jacobs Engineering Inc
April 12, 2022





Joe Albers Way North
McKernan Hwy West

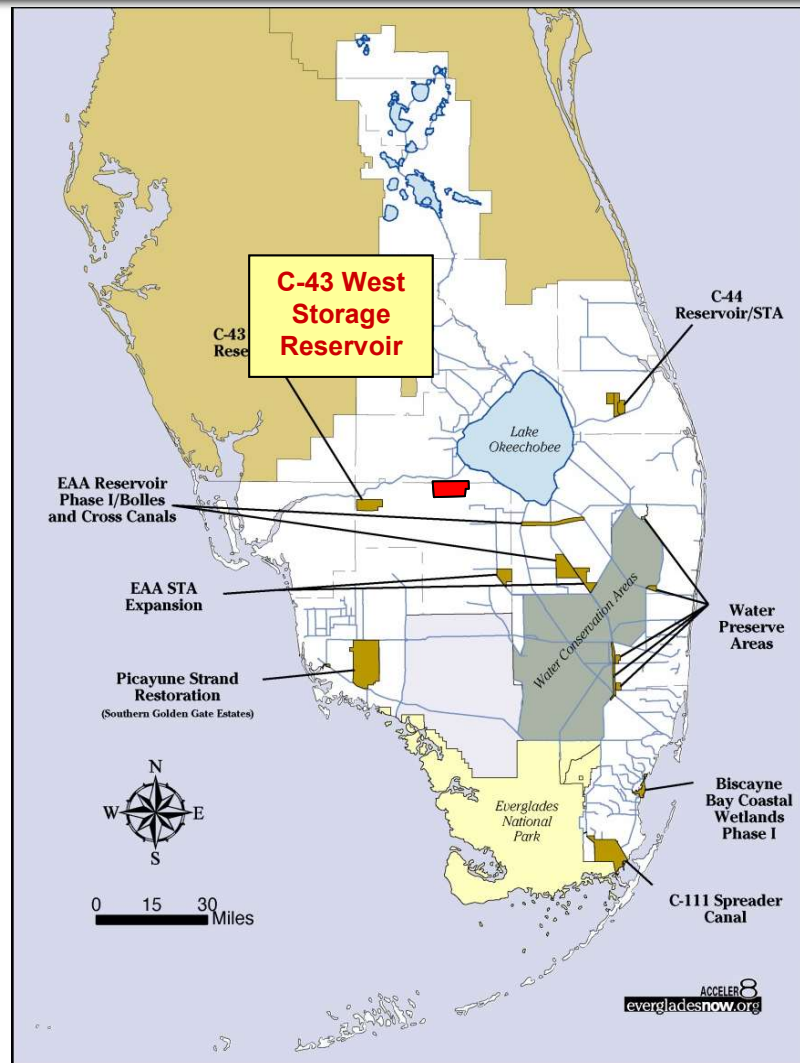


Team



- **Owner: SFWMD**, Joe Albers, PE – Project Manager, Jim Orth PE – Incoming PM, John Creswell, PE – Construction Manager
- **Federal Sponsor: US Army Corps of Engineers Jacksonville District**
- **EDC: Black and Veatch/Terracon**
- **Site Manager – JTech (Jacobs and Tetra Tech)**
- **Contractor Package 3: Harry Pepper and Associates**
- **Contractor Package 4: Lane/Salini C43 WMB JV**

Project Location



Project Purpose



Caloosa Belle - "Invasion of the Algae Mega bloom"

Improve timing and distribution of flows to the Caloosahatchee Estuary

Project Purpose



- Original CERP Project – Acceler8
- 170,000 acre-feet of storage
- Capture wet season flows
- Release during dry season to maintain MFLs
- Improve salinity regimes in the estuary

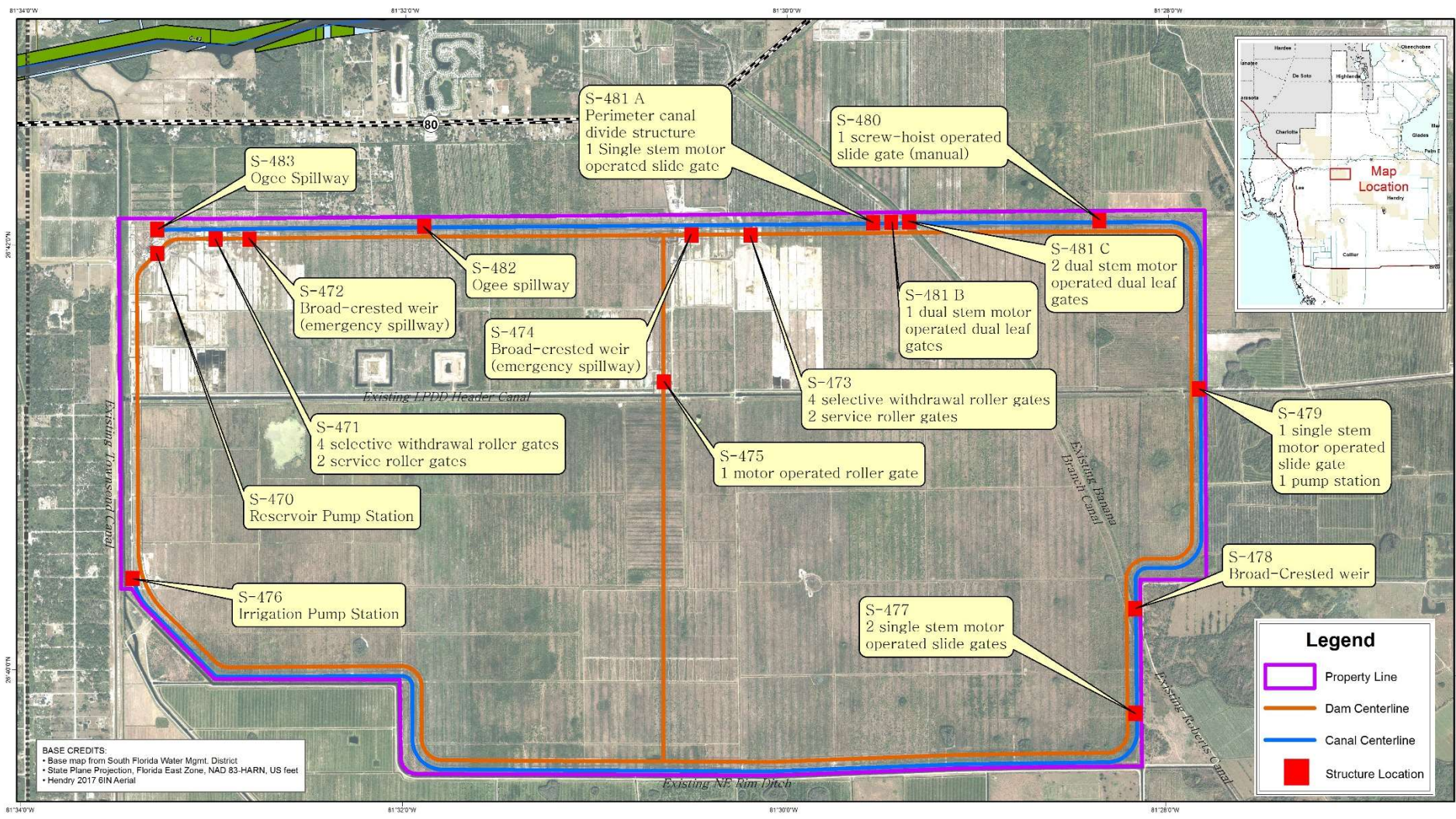


Contract Value and Schedule



Contract Package	Value	Scheduled Completion
Package 1 – Pre Load and Demo	\$11.0 M	August 2017
Package 2 – S476 PS	\$11.5 M	August 2018
Package 3 – S470 PS	\$58.5 M	May 2022
Package 4 - Reservoir	\$523 M	December 2023
Total Project	\$604 M*est	December 2023

Project Overview – Reservoir Infrastructure



Design



- Originally completed in 2008 in Acceler8
- Redesign 2015 – 2018
- Updates to Dam Safety Criteria
- IEPR
- VE
- Corps ATR
- Corps RMC
- Consequence, Ops Plan, EAP underway

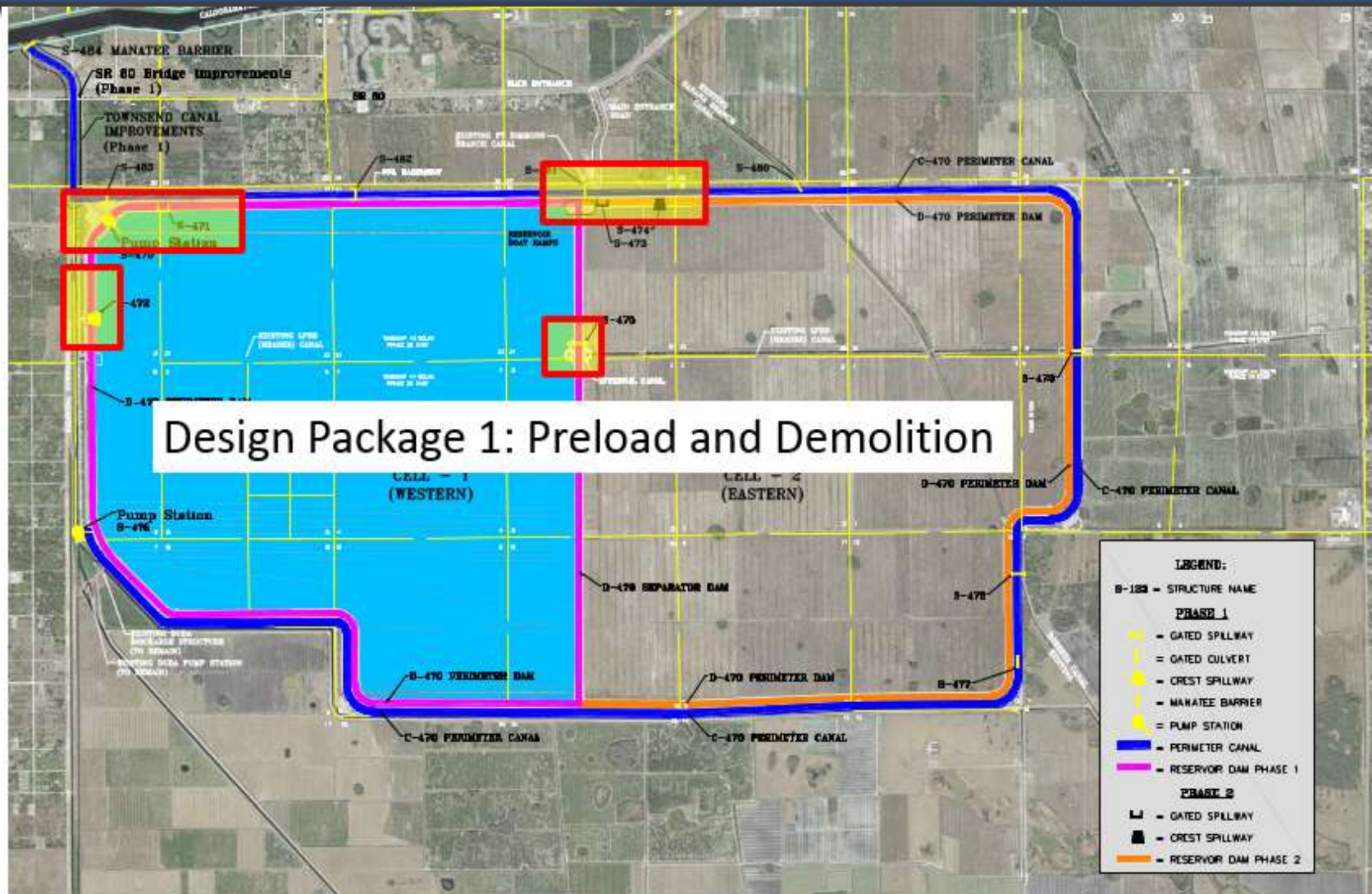
Construction

SFWWM



- 4 major packages
- 2 minor packages
- Corps coordination and CGM65
- Packages 1 and 2 100% complete
- Package 3 – S470 Pump Station 95% Complete
- Package 4 – Dam Underway

Package 1 Delivery



Package 1 Preload and Demolition



Embankment Preload Settlement

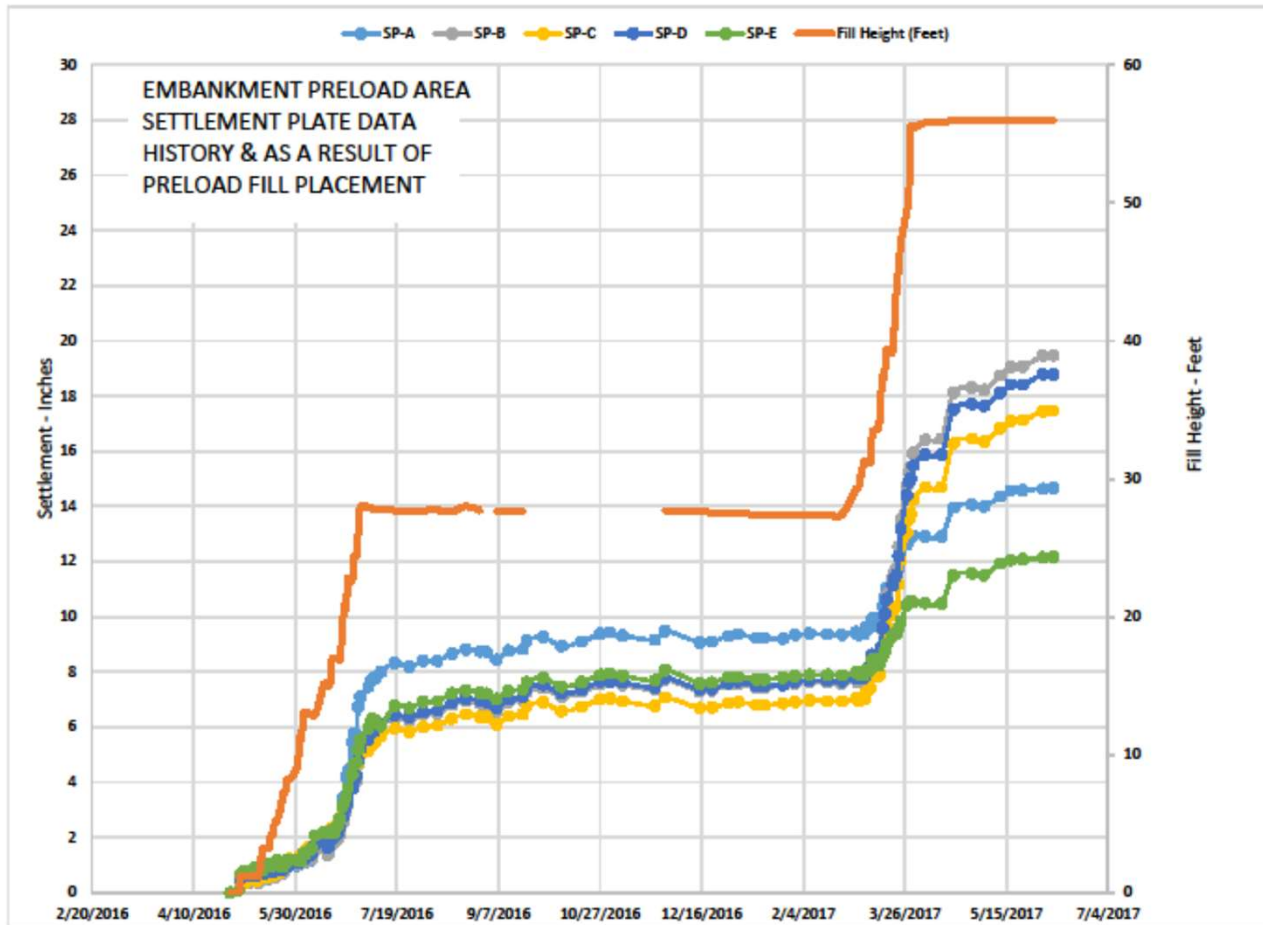
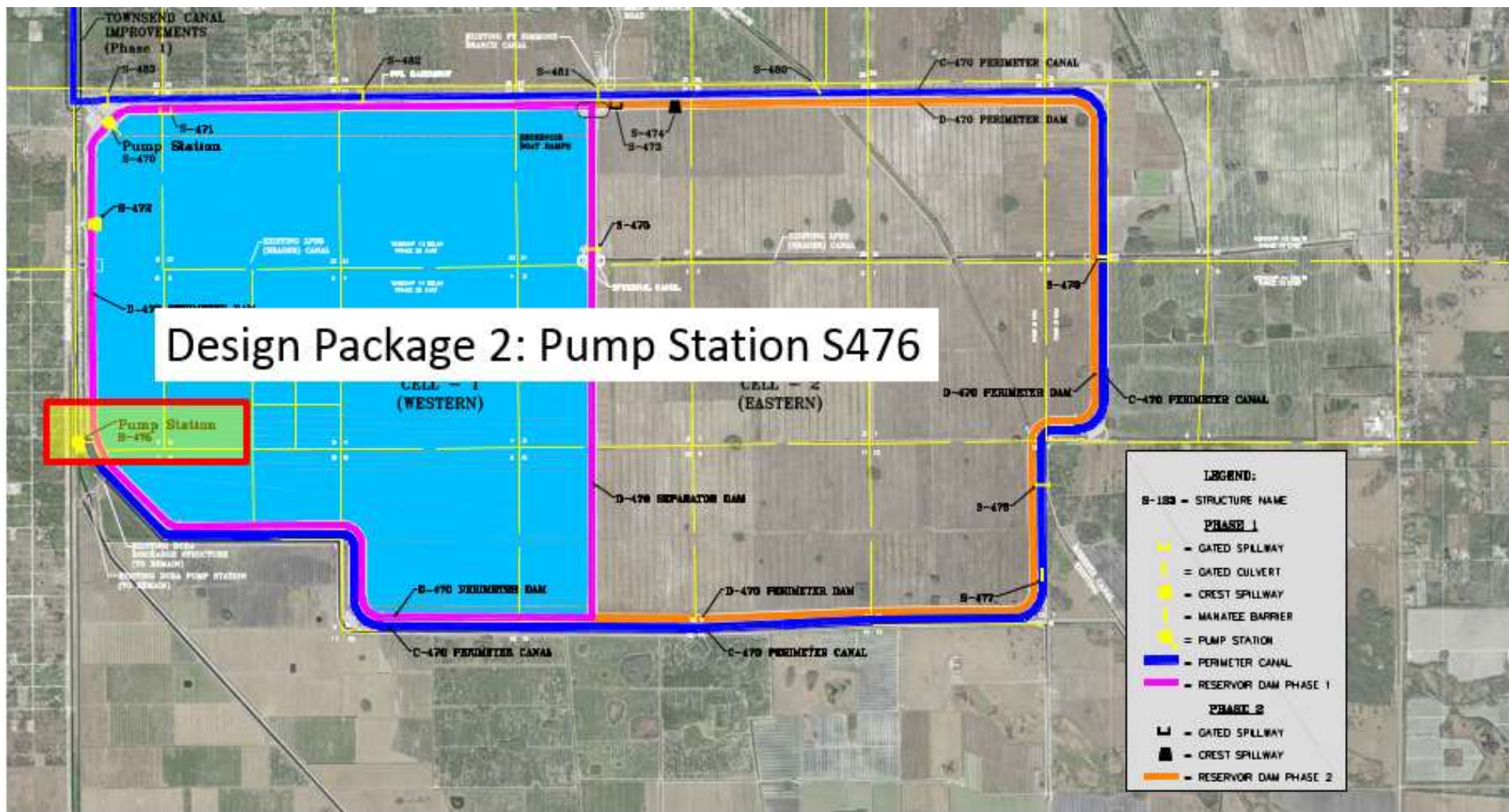


FIGURE 1A

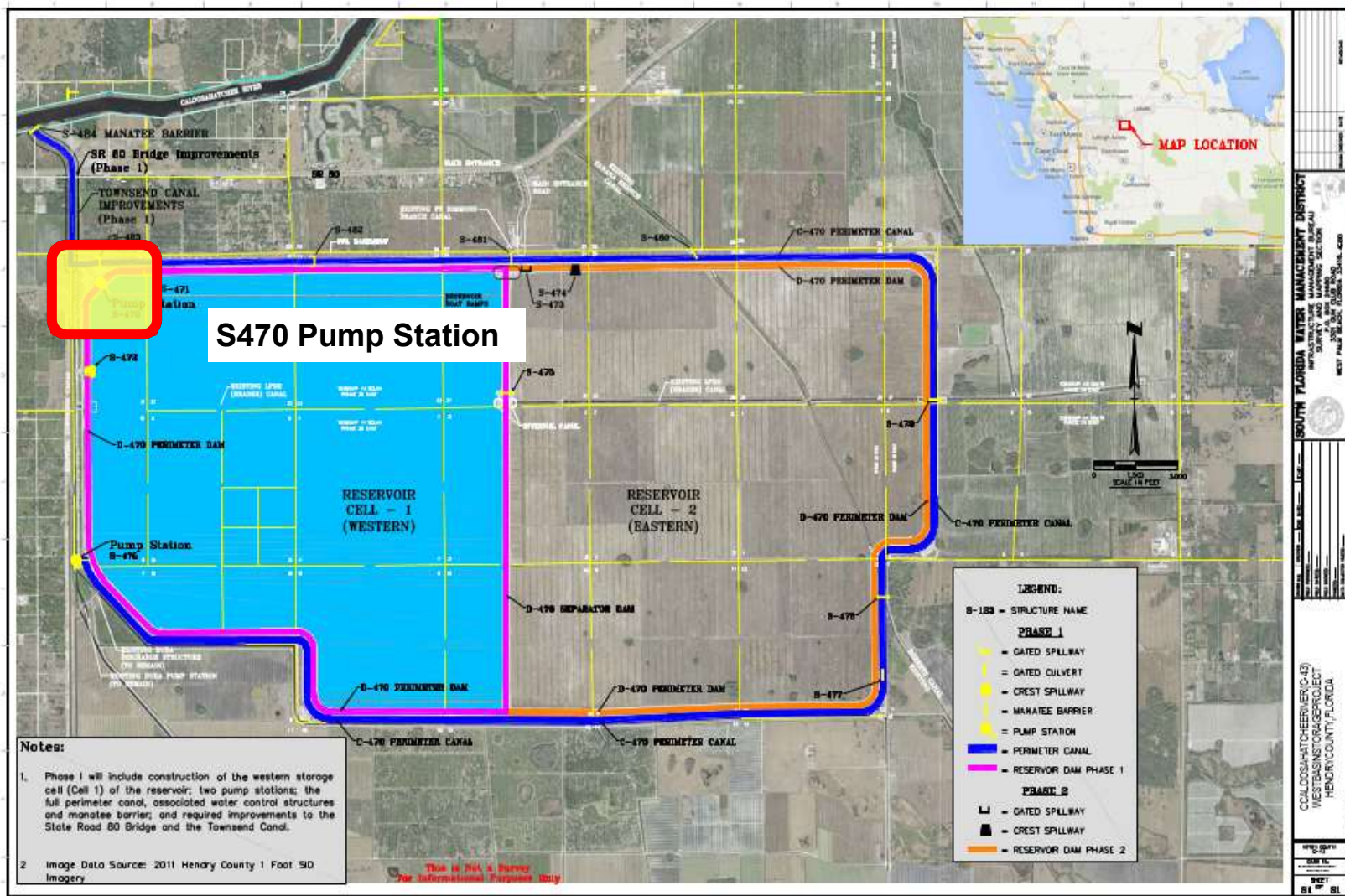
Package 2 Delivery



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Package 3 Delivery





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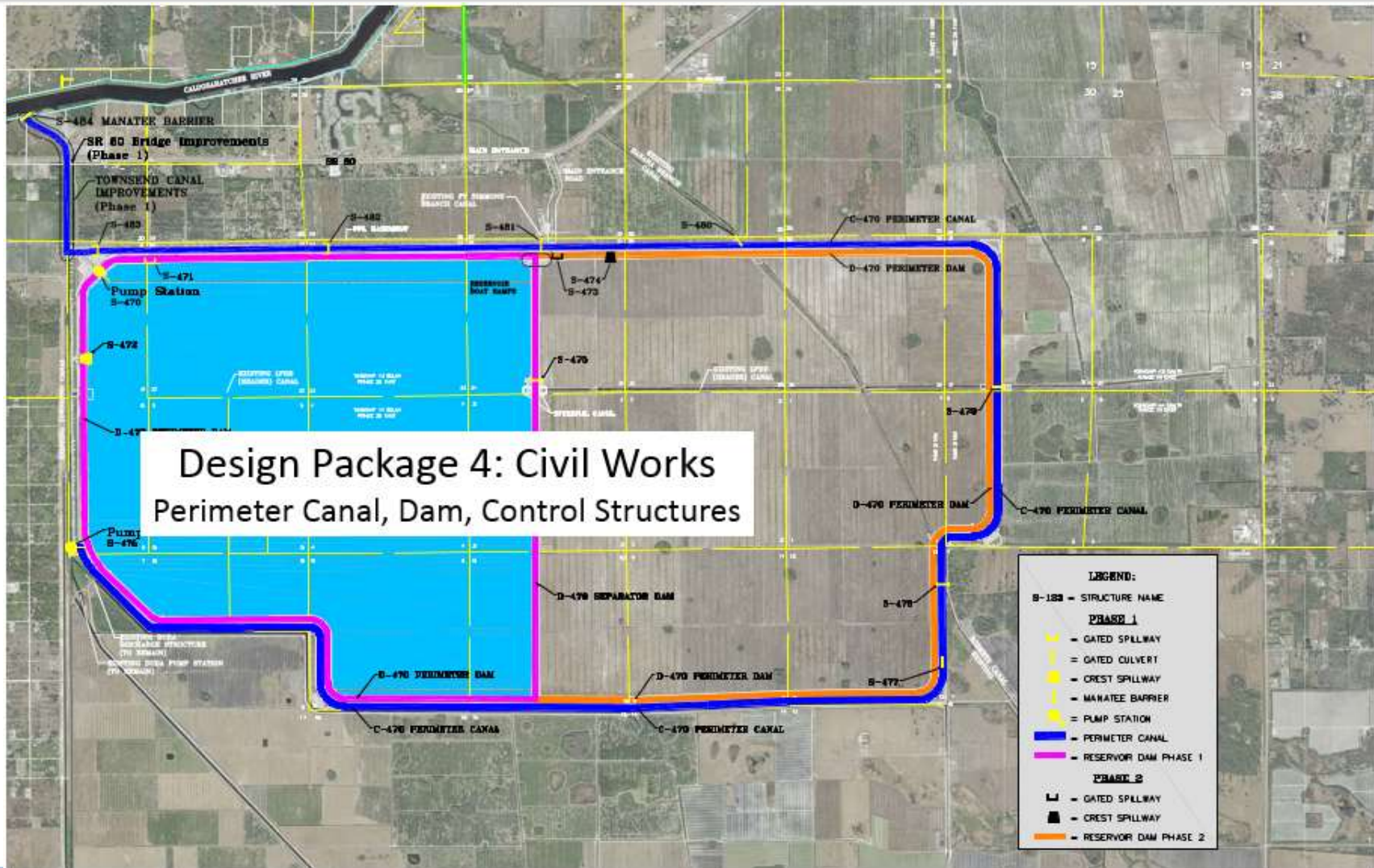
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Package 4 Delivery



Design Package 4: Civil Works
Perimeter Canal, Dam, Control Structures

- LEGEND:**
- B-188 - STRUCTURE NAME**
- PHASE 1**
- GATED SPILLWAY
 - GATED CULVERT
 - CREST SPILLWAY
 - MANATEE BARRIER
 - PUMP STATION
 - PERIMETER CANAL
 - RESERVOIR DAM PHASE 1
- PHASE 2**
- GATED SPILLWAY
 - CREST SPILLWAY
 - RESERVOIR DAM PHASE 2

Dam and Canal Typical Section

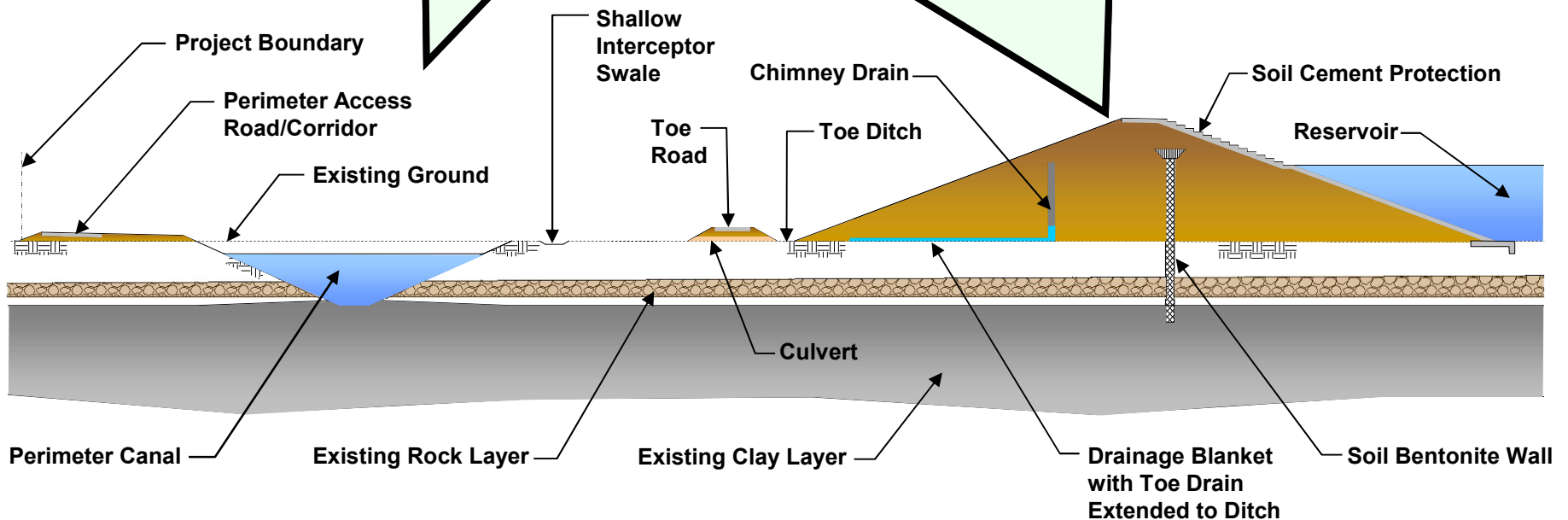


Perimeter Canal

- Approximate 110' top width
- Varying bottom width
- Varying bottom elevation
- Length: 14.7 Miles
- Excavation Volume: 3.1 M CY

Earth Dam

- Dam Height: 27 - 38 Feet
- Length: 16.3 Miles
- Crest Width: 14 feet
- Water Depth: 15 - 25 Feet
- Embankment Volume: 16.1 M CY
- Slurry Wall: 4.2 M SF
- Seeding: 590 AC
- Soil Cement: 980 K CY



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Soil Bentonite and Blanket Drain



Soil Bentonite Wall



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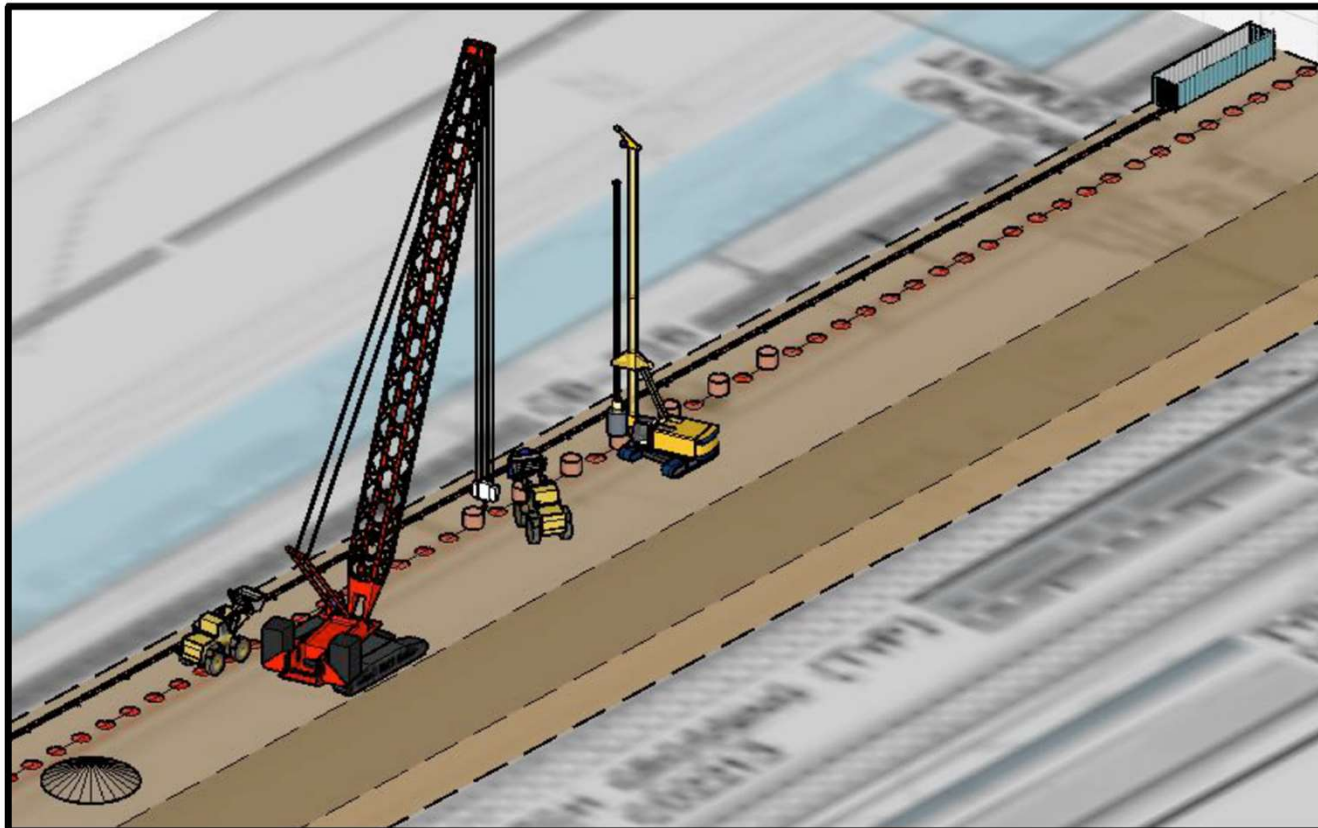
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SB Wall through Rock



Pressure Relief System



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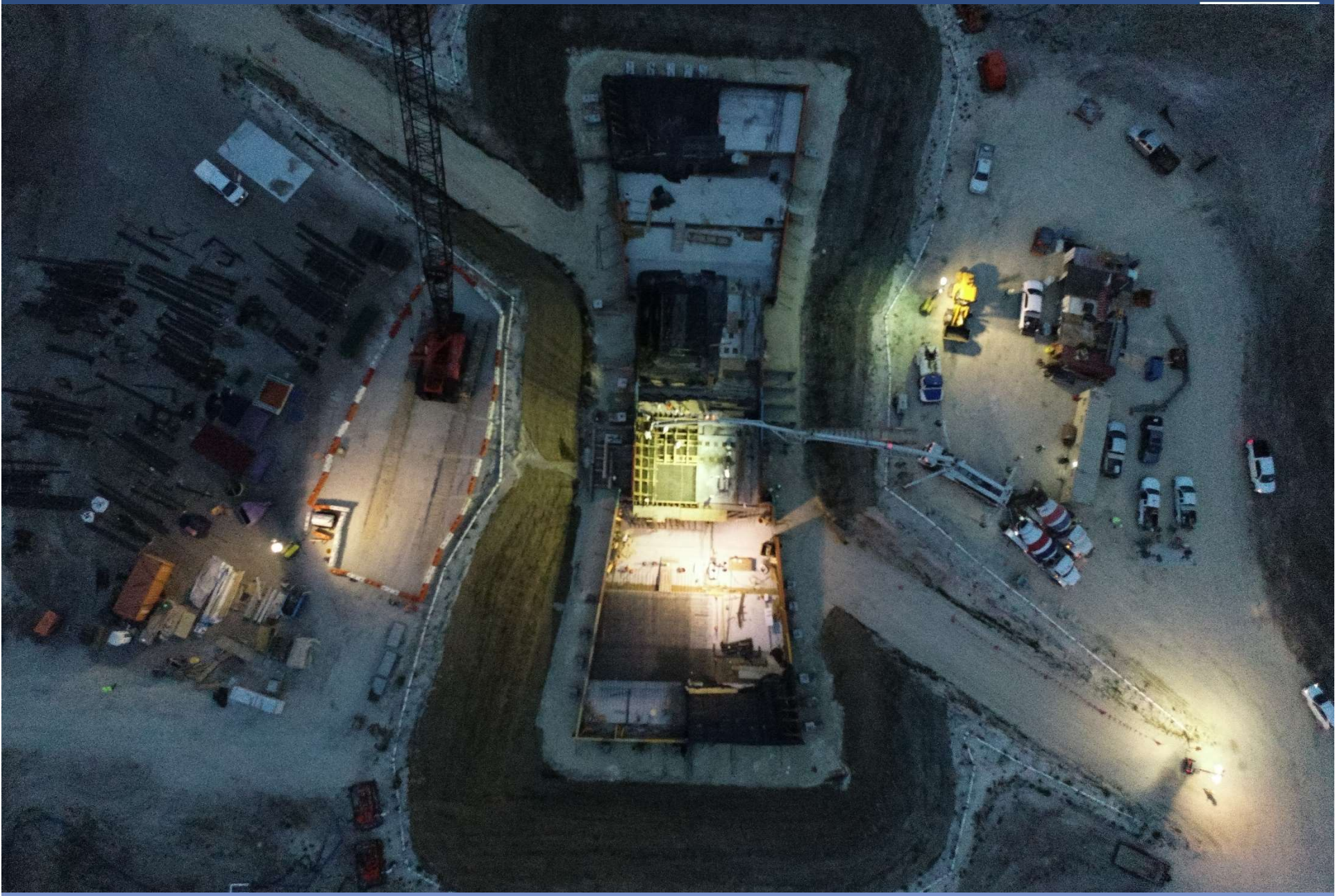
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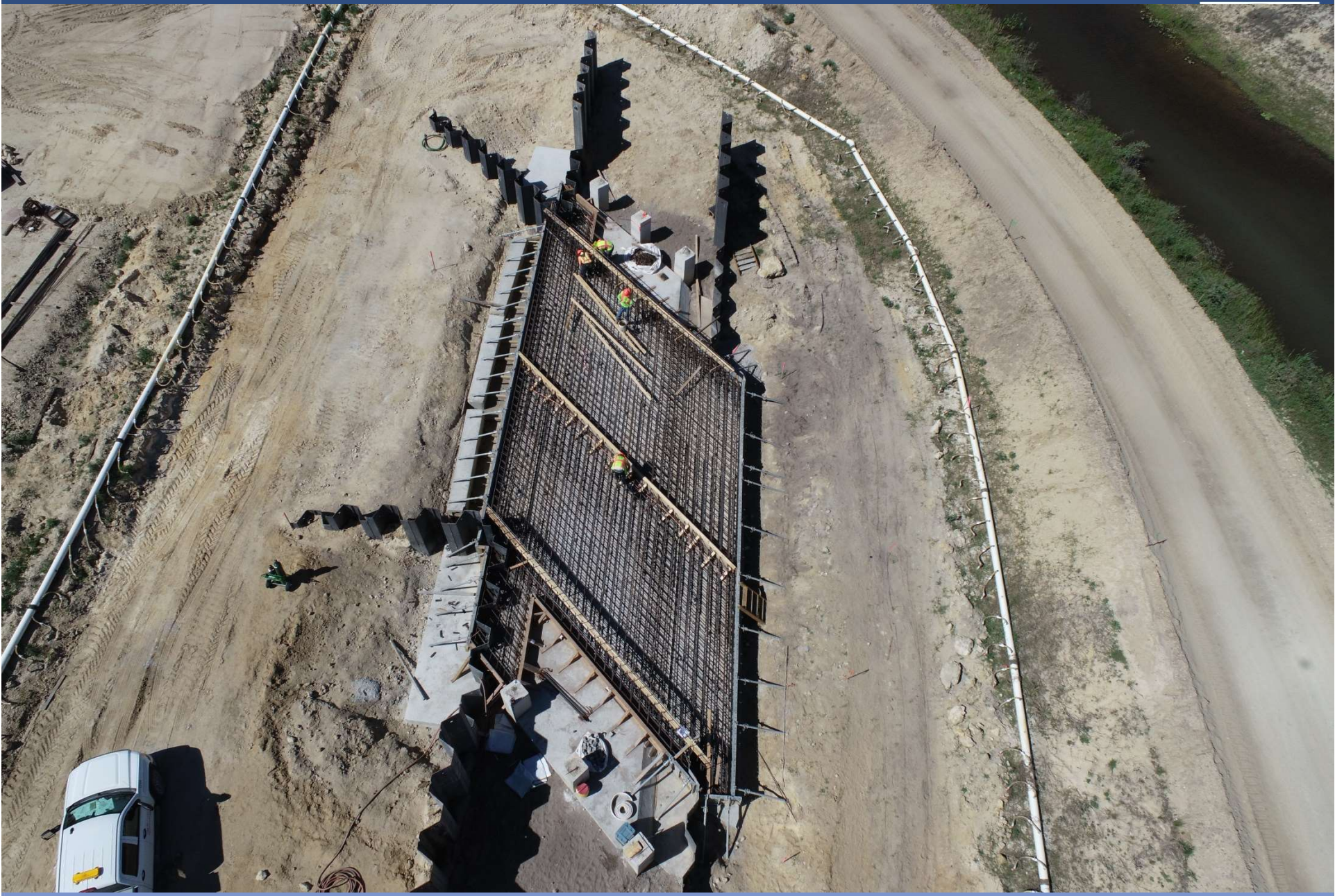


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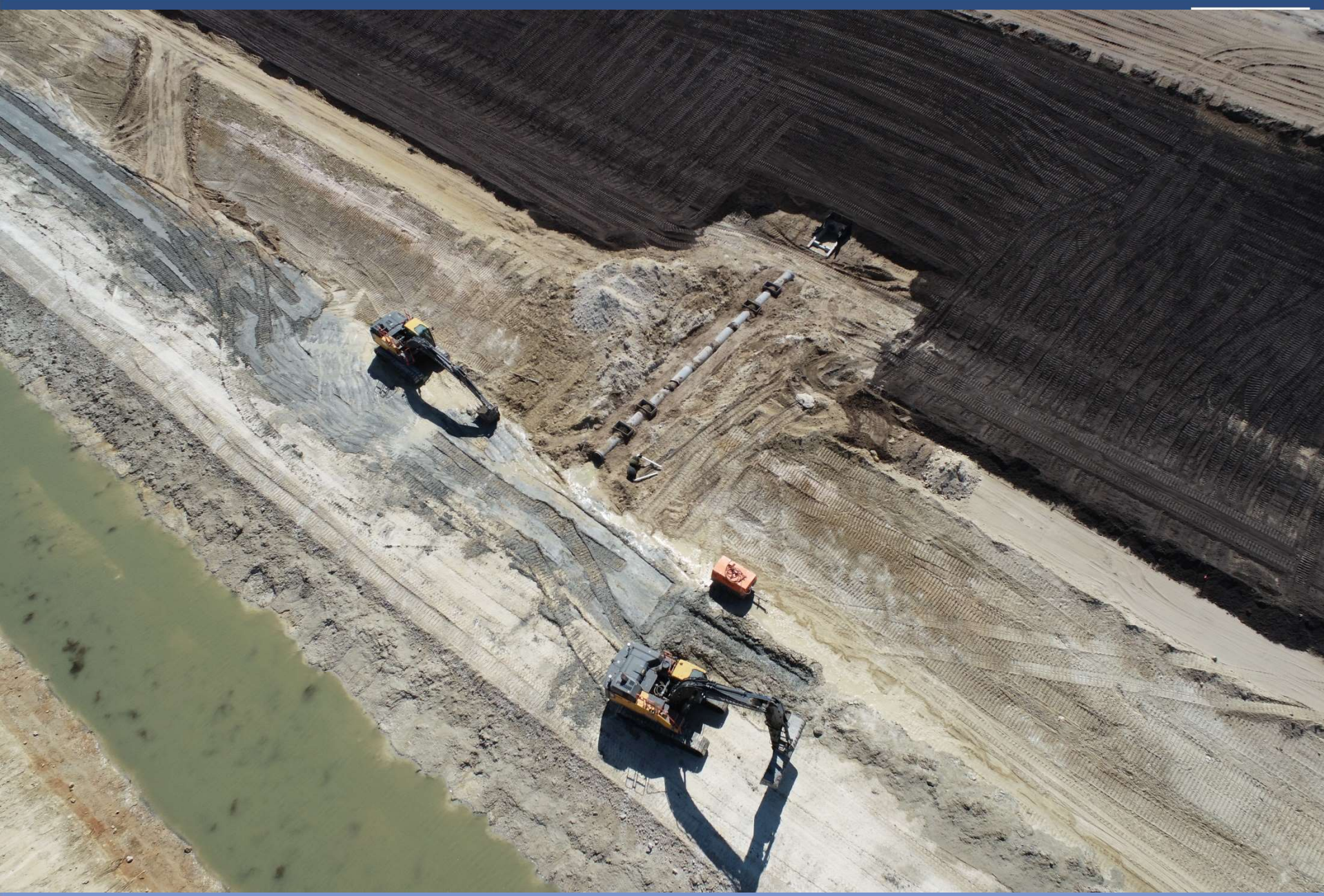
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QA/QC

SFWWM

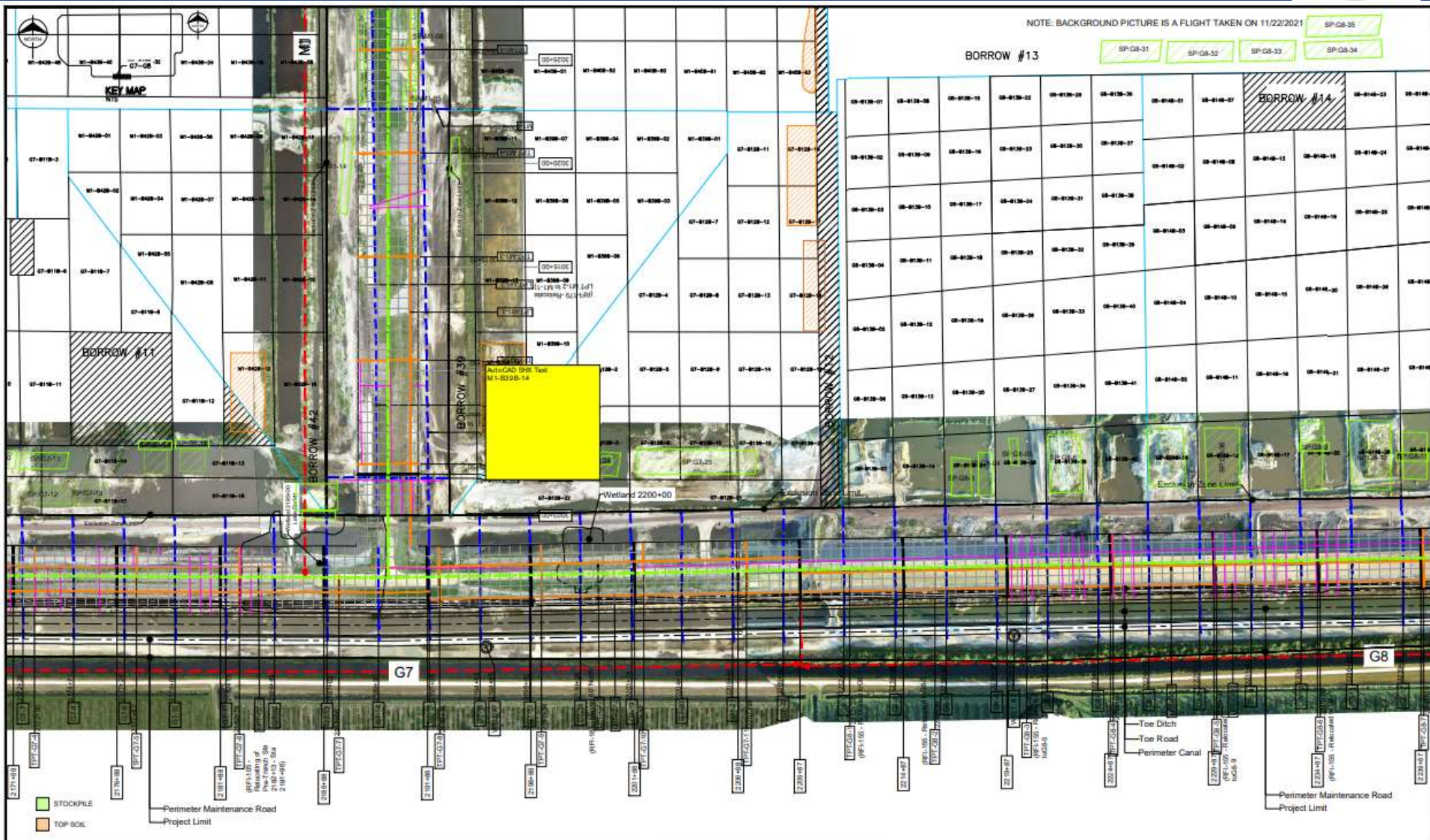


- Contractor Quality Control - Robust
- Quality Assurance – Spec
 - DFOW
 - Work Plans
 - ITPs
- QMS
- SIMDAMS
- QA Lab – USACE Validated
- QC Lab in planning

Master Layout



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NOTE: BACKGROUND PICTURE IS A FLIGHT TAKEN ON 11/22/2021

SP-G8-35
SP-G8-31
SP-G8-32
SP-G8-33
SP-G8-34

Legend

- Perimeter Dam Center Line
- Primary Borrow Area Limit
- 500' Block
- Buried Conduit Removal
- Completed Proof Rolling Area
- Code TPT: Transversal Pre-Trench
- Code LPT: Longitudinal Pre-Trench
- 10th Row Ditch
- Pre Trench
- Swales
- M Monitoring Well #1 - 12
- PT-G8-1 Segment Progress
- G8-1 Segment Progress
- SP-G8-1 Stockpile Segment Progress
- X Points Grid 50x50

PROJECT NAME: C-43 WEST CALOOSAHATCHEE BASIN STORAGE RESERVOIR PACKAGE 4	EMPLOYER: SOUTH FLORIDA WATER MANAGEMENT DISTRICT	CONTRACTOR: LANE salini impregilo CAT WATER MANAGEMENT BUILDERS	DESIGNER: BLACK & VEATCH
DATE: 10/26/2021		TITLE: Master Layout Segment G7-G8 Updated 11/22/2021	
SCALE: 1" = 40'		DATE: 11/22/2021	
PROJECT NUMBER: 1610116116	AREA: 1610116116	DATE: 11/22/2021	PROJECT NUMBER: 1610116116

Data System Components – QA Dashboard

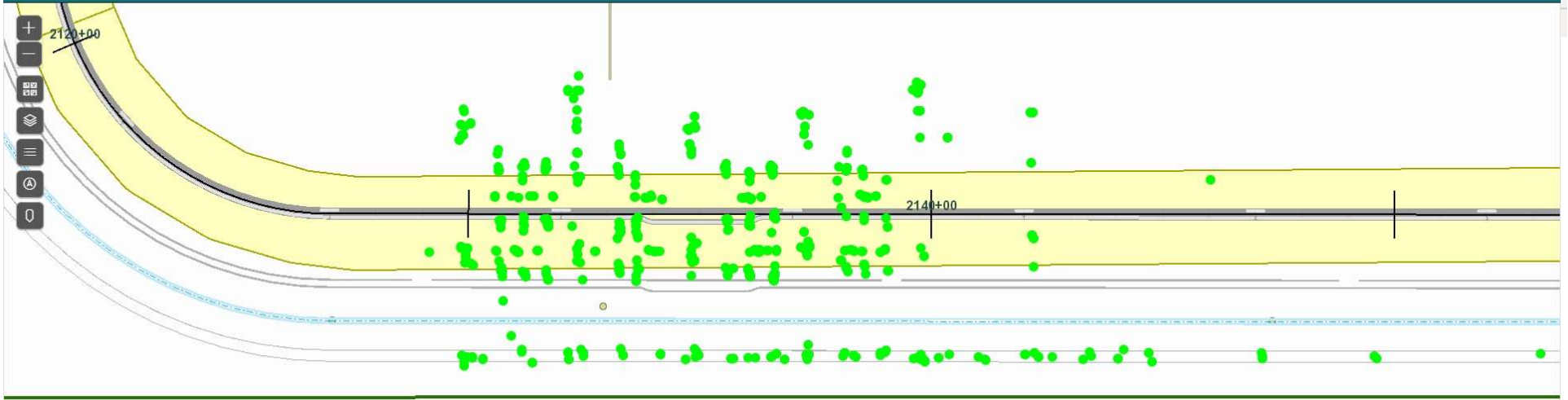


Browser tabs: - SFWMD.C43.Web.UI | c43uitest.azurewebsites.net/Geo

Browser address bar: c43uitest.azurewebsites.net/Geo

Browser tabs: Apps | South Florida Wat... | e-Builder Members... | JacobsConnect | C43 Reservoir | KFL LABEL23 | Riverbend Resort | C43 - QA Dashboard | Radise - QMS | 3DR Site Scan | DBHYDRO C43 Rain... | USGS Current Cond... | LaBelle, FL Weather... | Jacobs- ArcGIS

C43 QA Dashboard | IDR | DFOW | Geotechnical | Field | Lab



Scale: 60 m / 200 ft

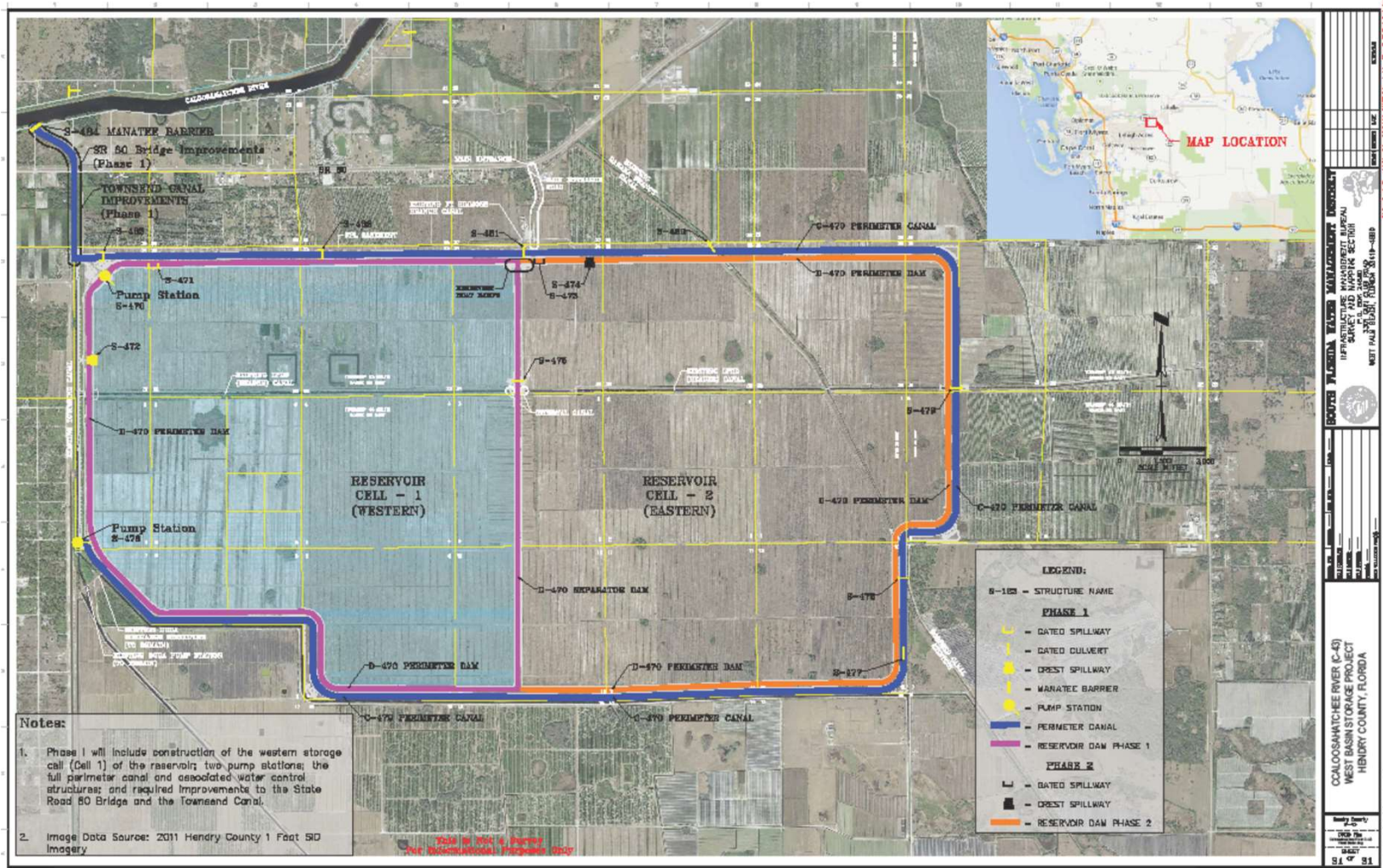
1433 Records

Test Date	Test Purpose	Status	Has Ever Failed	Test Type	District Test N...	Proctor Id	Material	Geotechnical Sec...	Test Location
03/16/2020	QA	P	No	Nuclear Gauge	ACT-0675 R1	7829	Subgrade	G6	PRT-G6-11/2139+06/5â€™ In of DCI
03/16/2020	QA	P	No	Nuclear Gauge	ACT-0678 R1	7829	Subgrade	G6	PRT-G6-12/2138+53/132â€™ Out of
03/16/2020	QA	P	No	Nuclear Gauge	ACT-0696	7800	Embankment Fill	G6	PRT-G6-10/2138+54/108â€™ Out of
03/16/2020	QA	P	No	Sand Cone	ACT-0696 SC	7800	Embankment Fill	G6	PRT-G6-10/2138+54/108â€™ Out of
03/16/2020	QA	P	No	Nuclear Gauge	ACT-0681	7861	Embankment Fill	F1	Perimeter Road/2289+09
03/16/2020	QA	P	No	Sand Cone	ACT-0681 SC	7861	Embankment Fill	F1	Perimeter Road/2289+09
03/16/2020	QA	P	No	Nuclear Gauge	ACT-0687	7706	Embankment Fill	G4	Perimeter Road/2074+38
03/16/2020	QA	P	No	Sand Cone	ACT-0687 SC	7706	Embankment Fill	G4	Perimeter Road/2074+38

CONGRATS Joe!



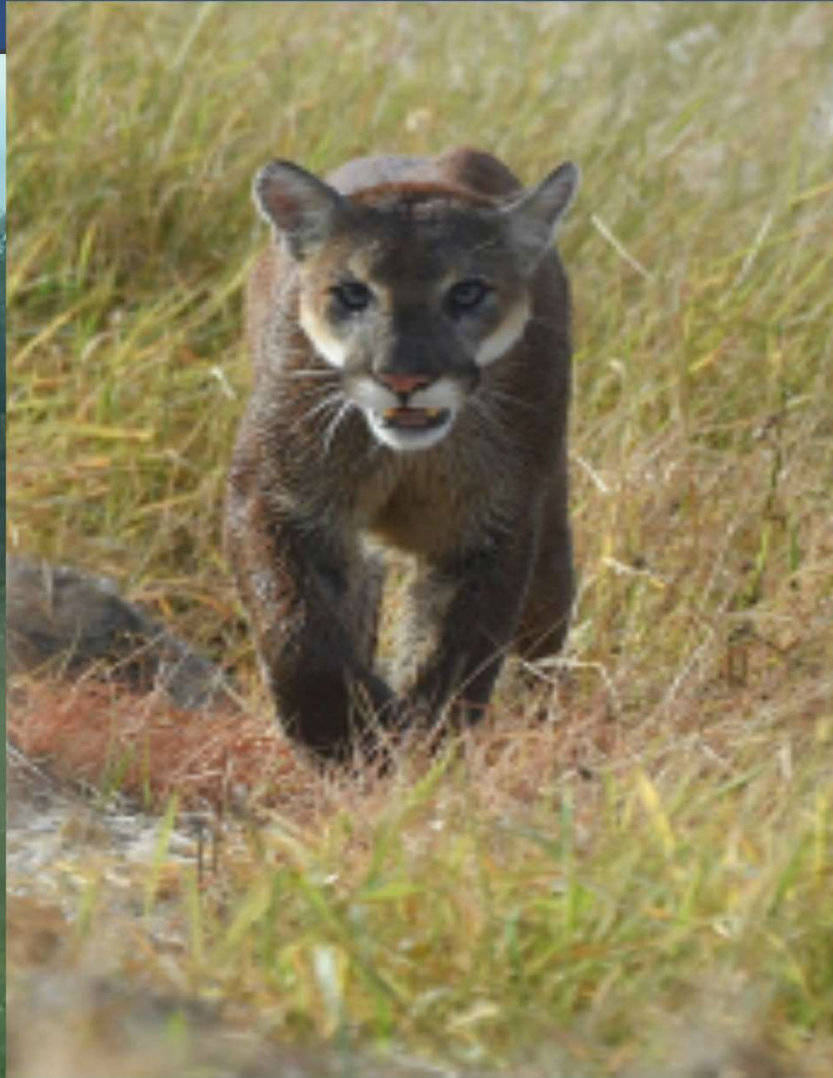
Project Location



Protected Species



Protected Species



Protected Species



Protected Species



Thank You !

SFWWM



Package 1 - Preload Mound Construction



Package 1 - Preload Mound Construction



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Package 1 - Preload Mound Construction



Package 2 – S476 Pump Station



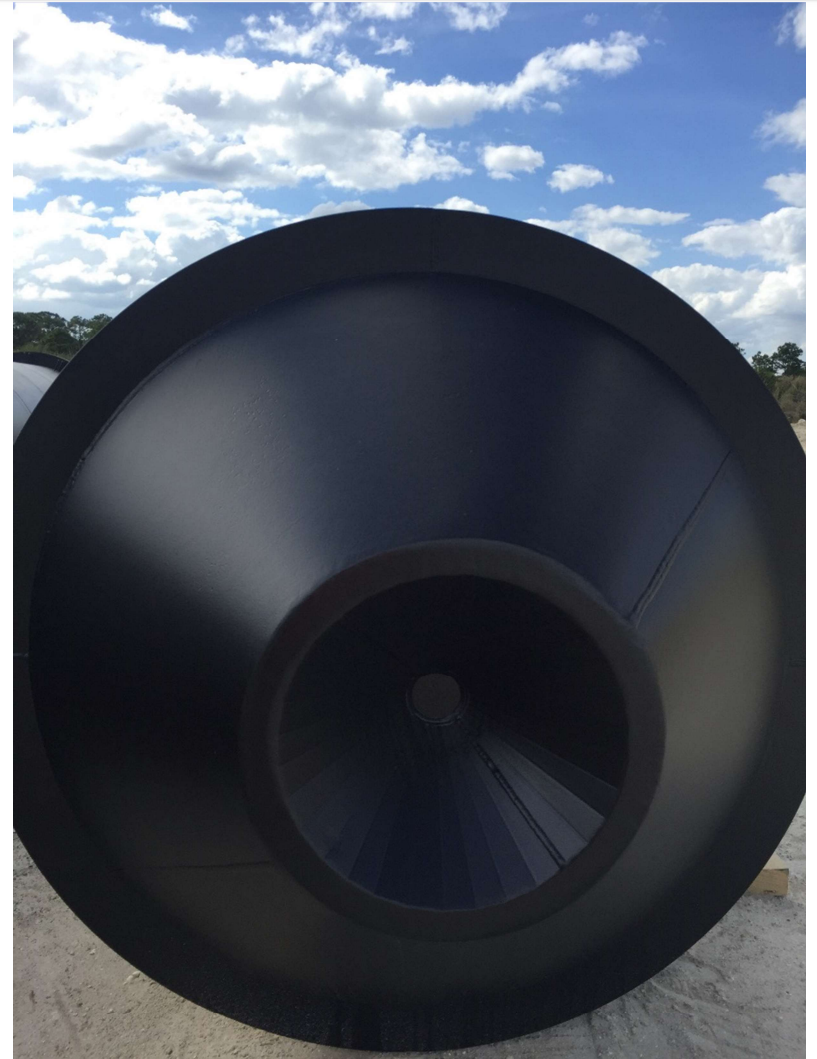
Package 2 – S476 Pump Station



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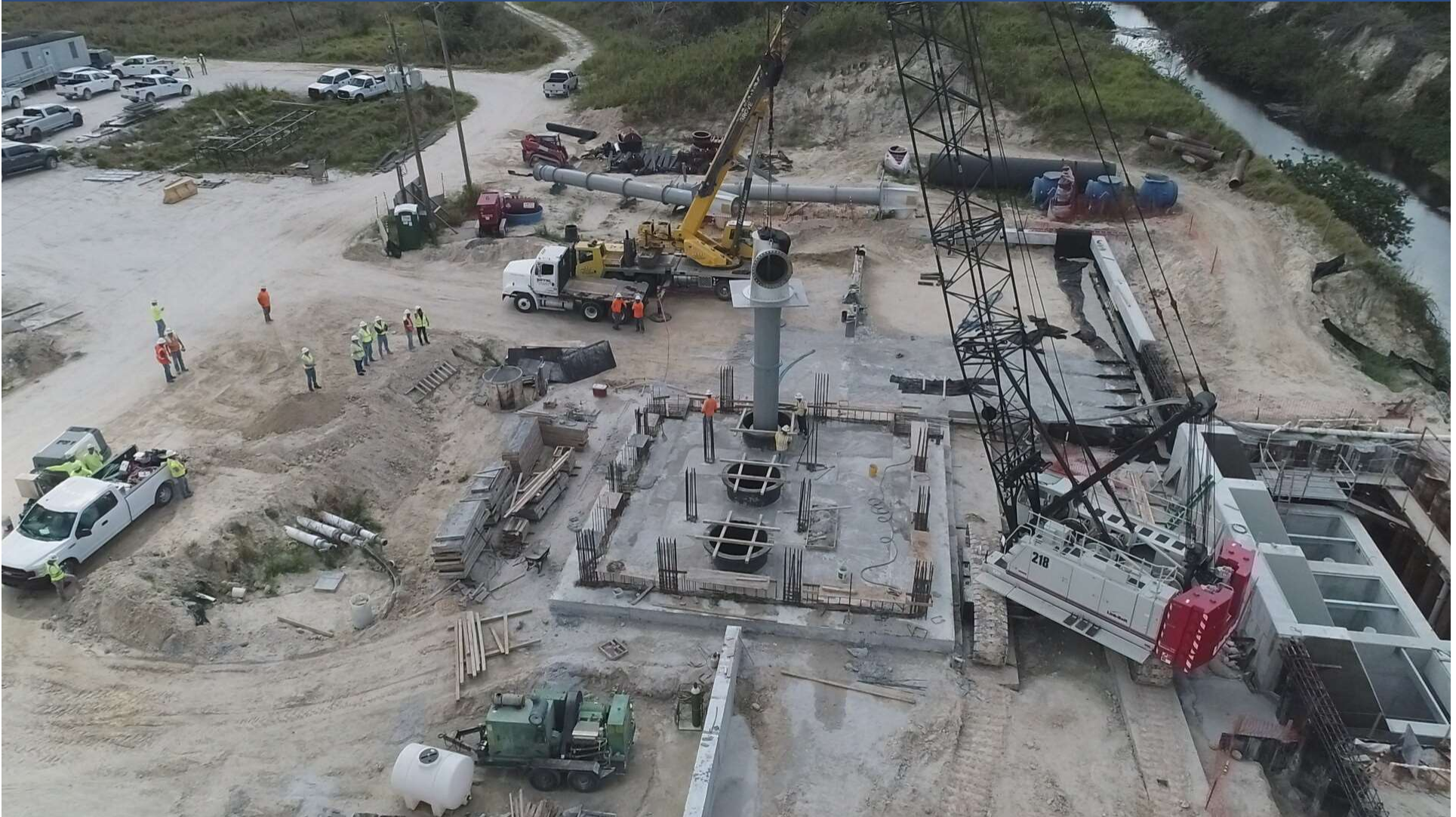
Package 2 – S476 Pump Station



Package 2 – S476 Pump Station



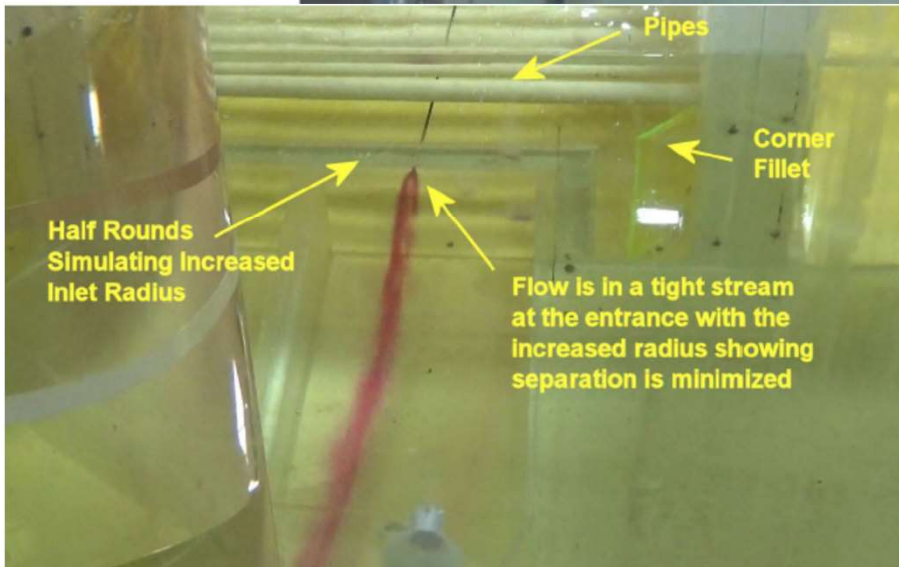
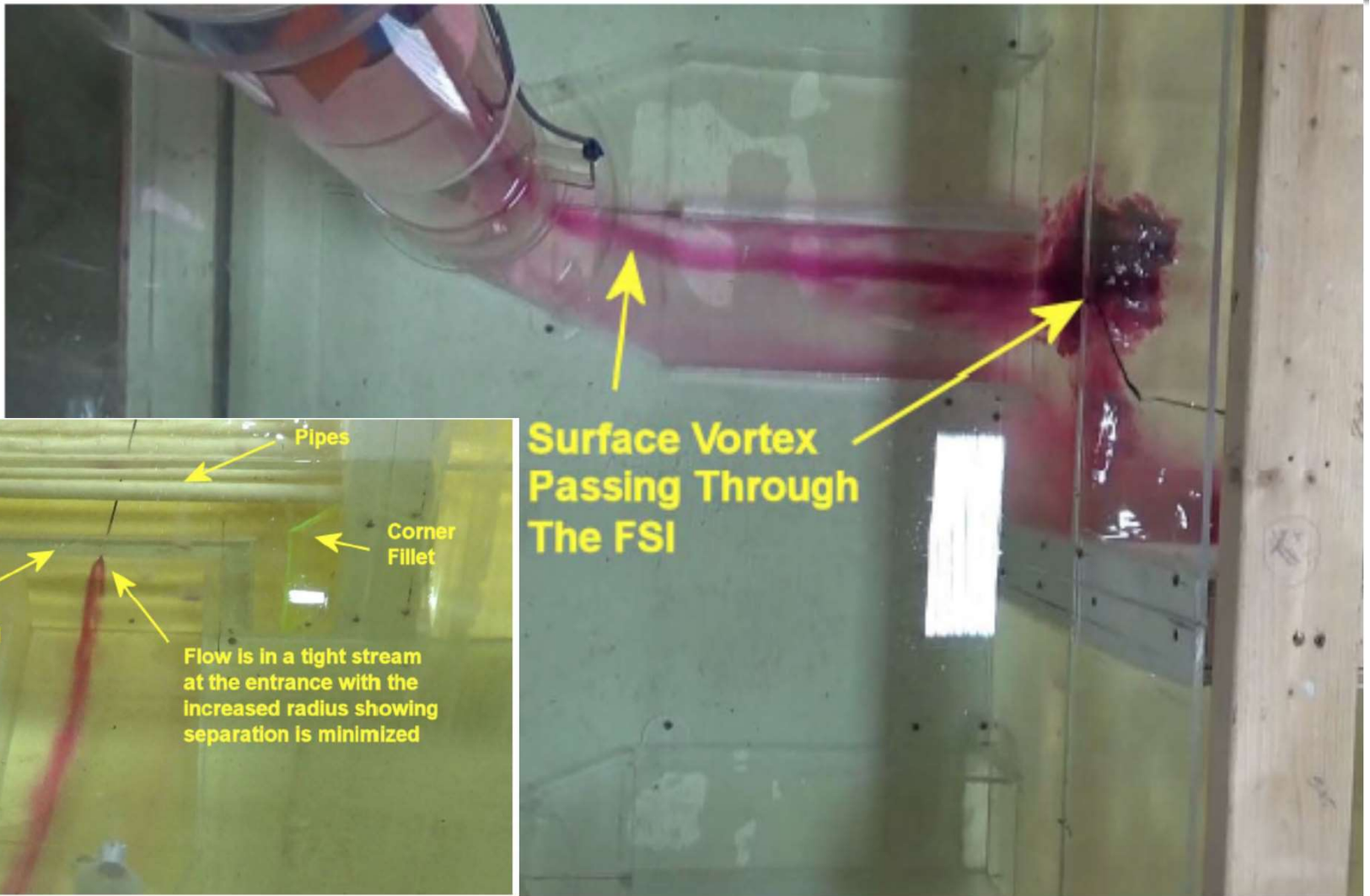
Package 2 – S476 Pump Station



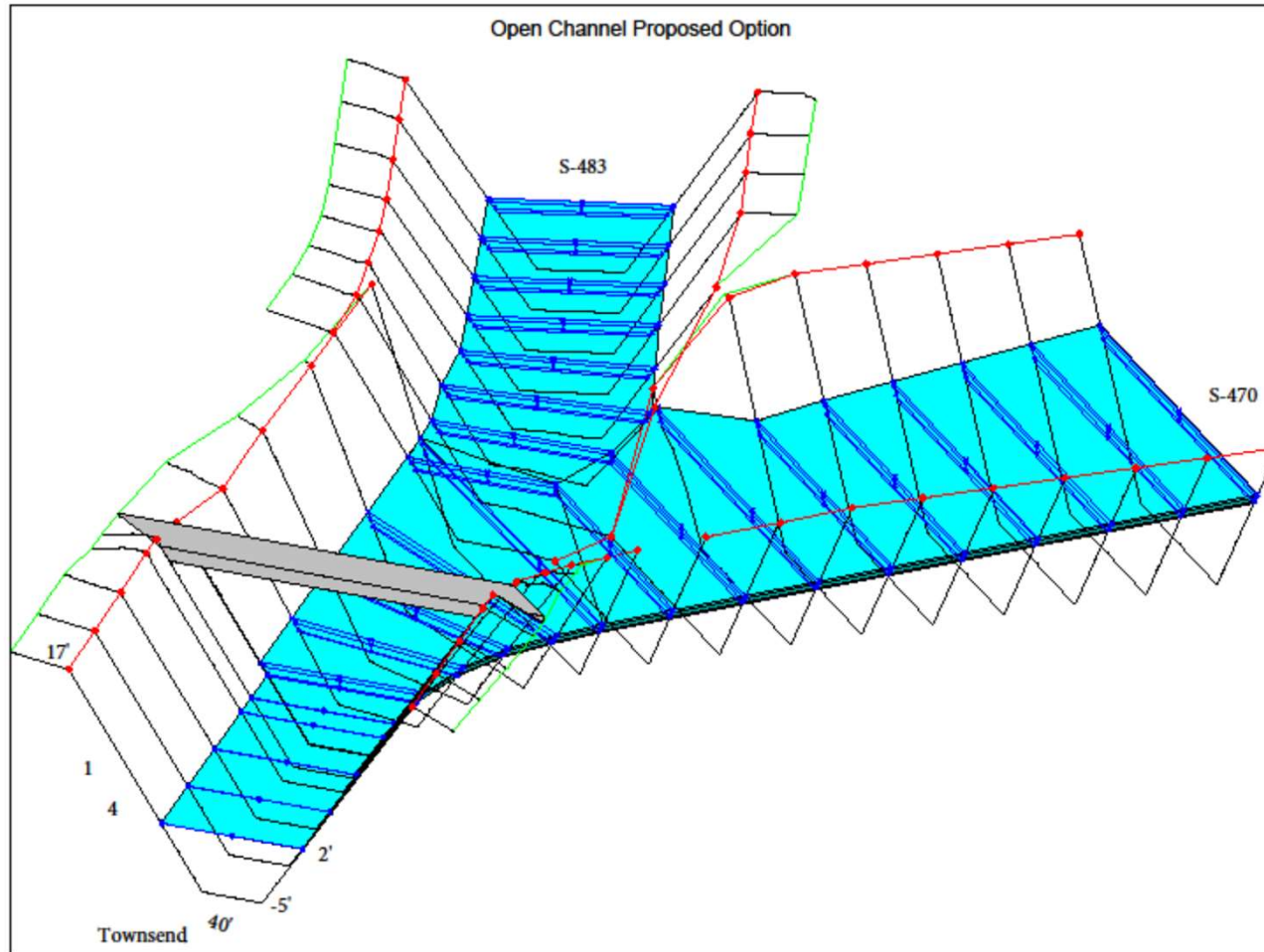
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Physical Pump Model Test



CFD Model Sections



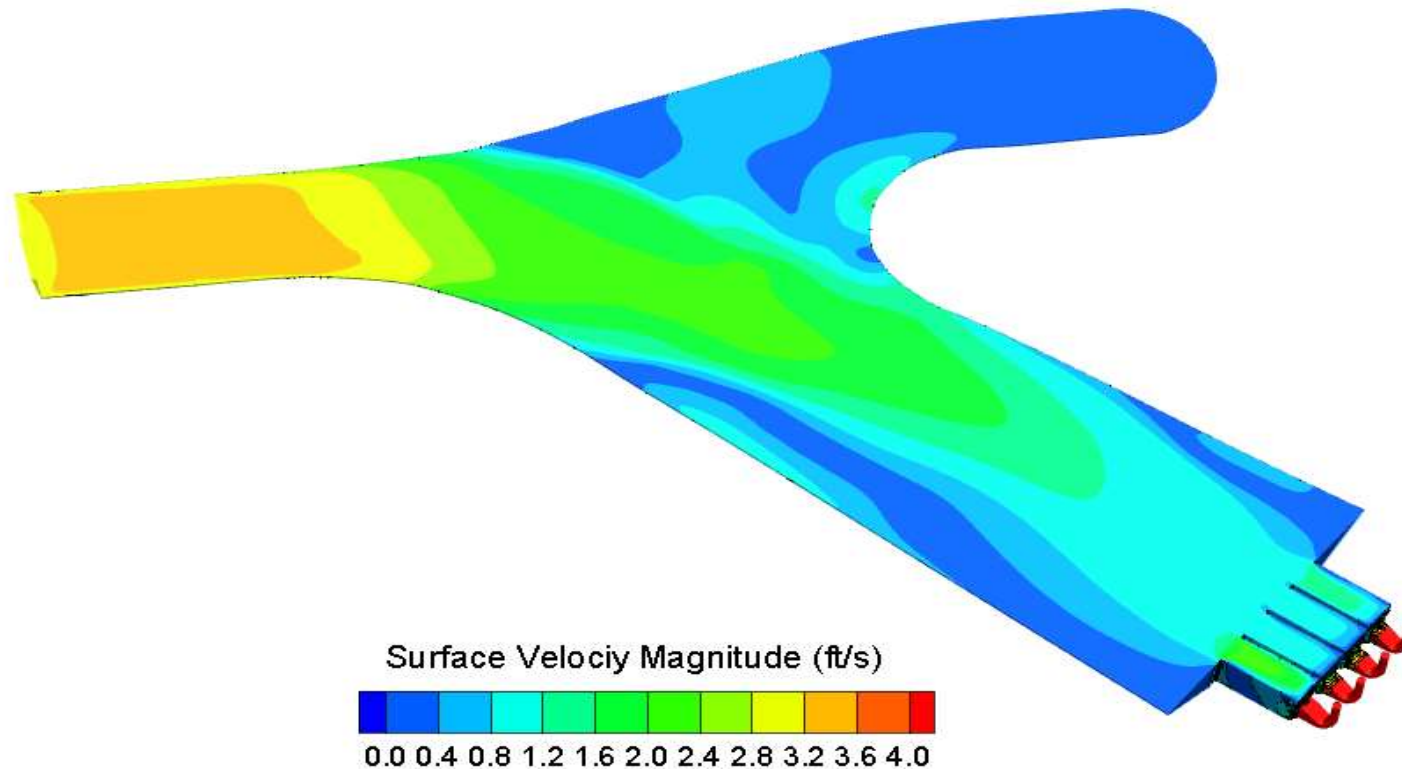
Inflow Canal Free-Surface Velocity Contours



S470 Pump Station Inflow Canal Surface Velocity Contours

(S470 Pump Q=1500 cfs, S483 Pump Station Q=0 cfs, Water Surface El.=20 ft NAVD)

EL=2.0 ft NAVD



- Surface velocity contours of inflow canal velocity is about 3.5 ft/s.
- The velocity contour shows the approach flow to the pump intake is not evenly distributed. Intake..

Package 3 Design Challenges

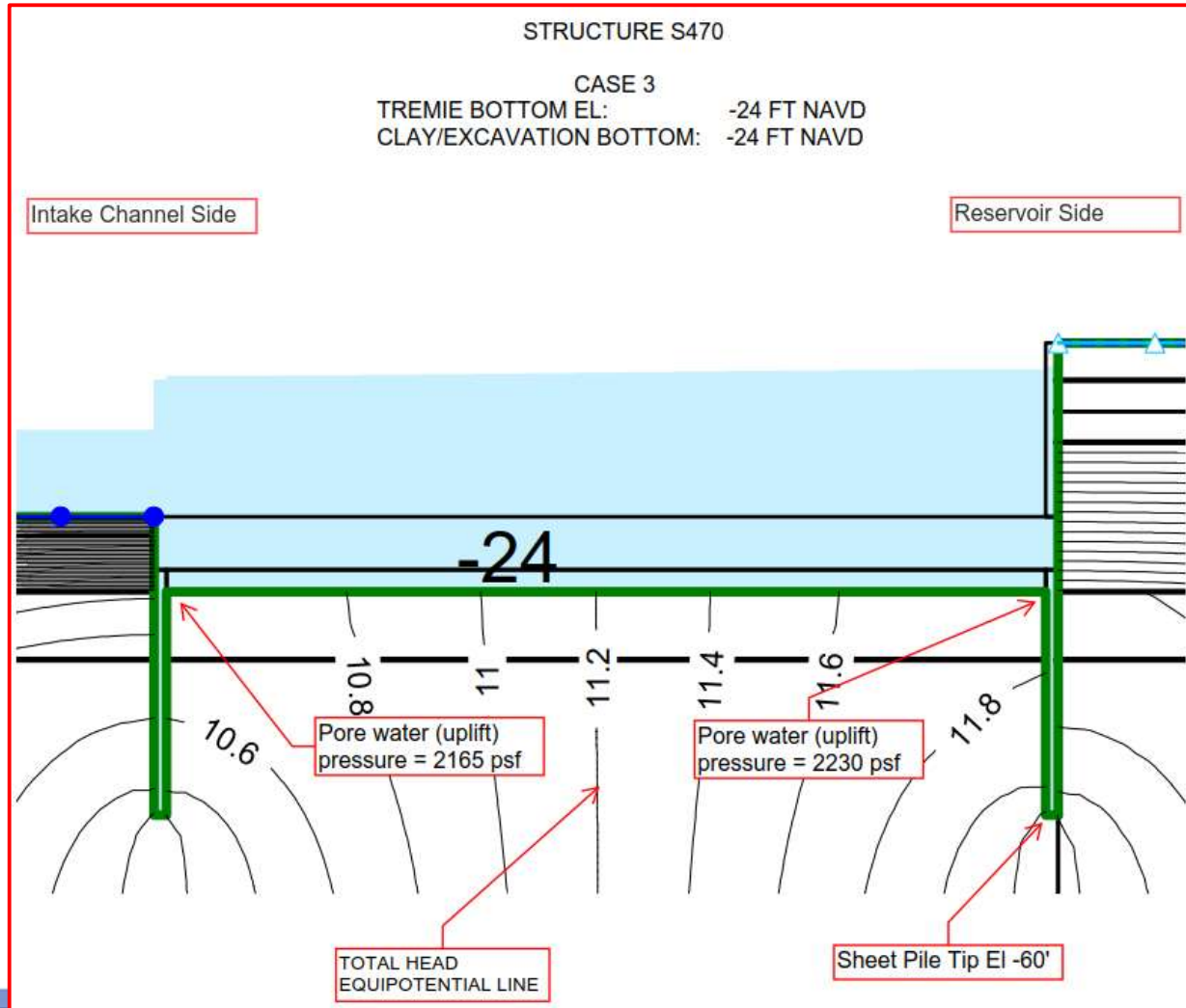


- Redesigned from A8 for Electric Power
 - Dedicated Electrical Feeder Transmission Line
- Local Access Bridge across Intake Canal
- Intake Canal Optimization
- SR-80 Bridge Stabilization and FDOT Permit
- Manatee Structure – Removed from design - Discussions with FWC/FWS ongoing.
- Townsend Canal Conveyance Capacity – local agricultural owner concern
- Microwave tower primary communications

Geotechnical



• S-470 UNDER-SEEPAGE HEAD PRESSURES



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Geotechnical – Townsend Canal Improvements at SR-80

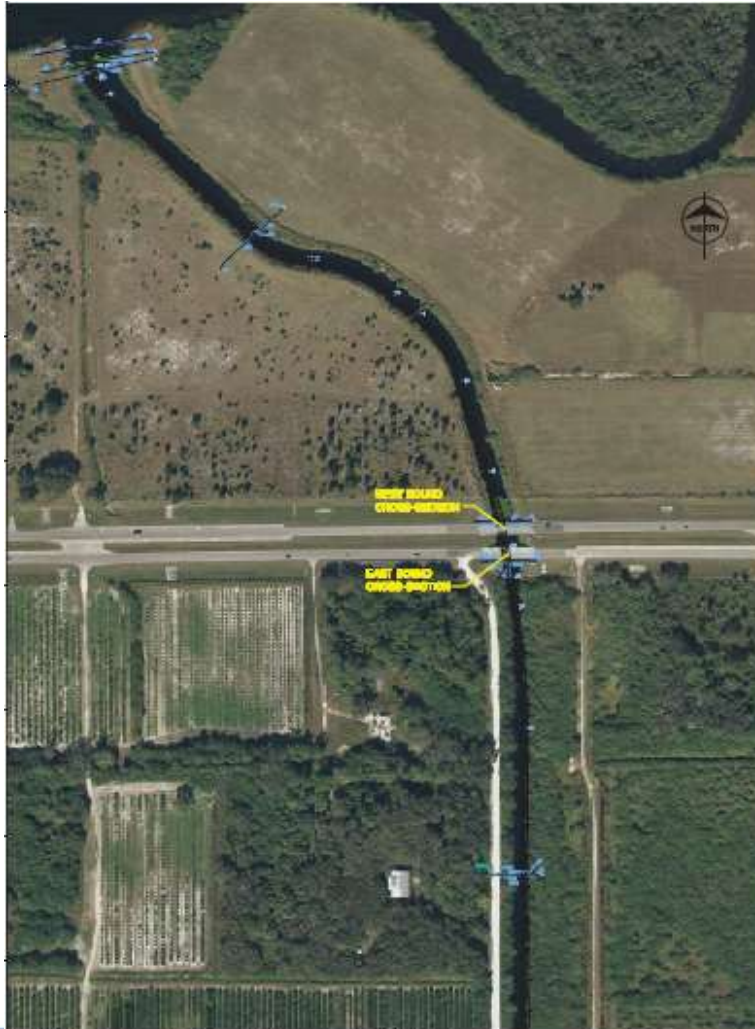


EROSION PROTECTION OPTION

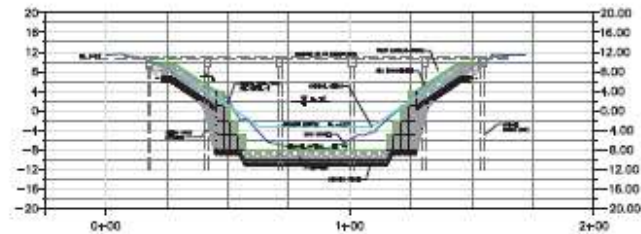
Geotechnical – Townsend Canal Improvements at SR-80



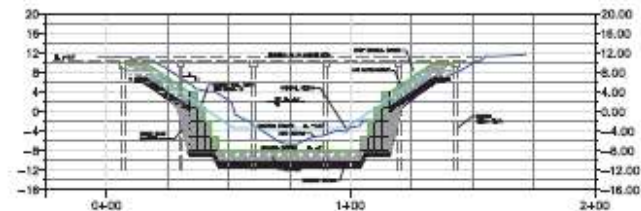
■ CANAL IMPROVEMENTS



PLAN
BY T. W. HALLZ



WEST BOUND CROSS SECTION



EAST BOUND CROSS SECTION

The consultant, contractor or other parties associated with this project shall comply with Florida Statutes Chapter 112. These plans are the property of the District and shall be returned and maintained in a confidential manner. Failure to do so constitutes a violation of contract/MSA party not performing was necessary for this project is prohibited.

Geotechnical

SFWWM



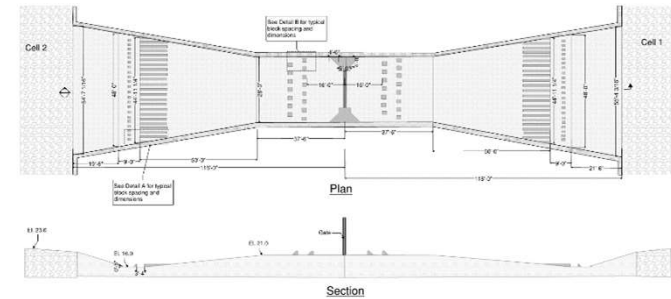
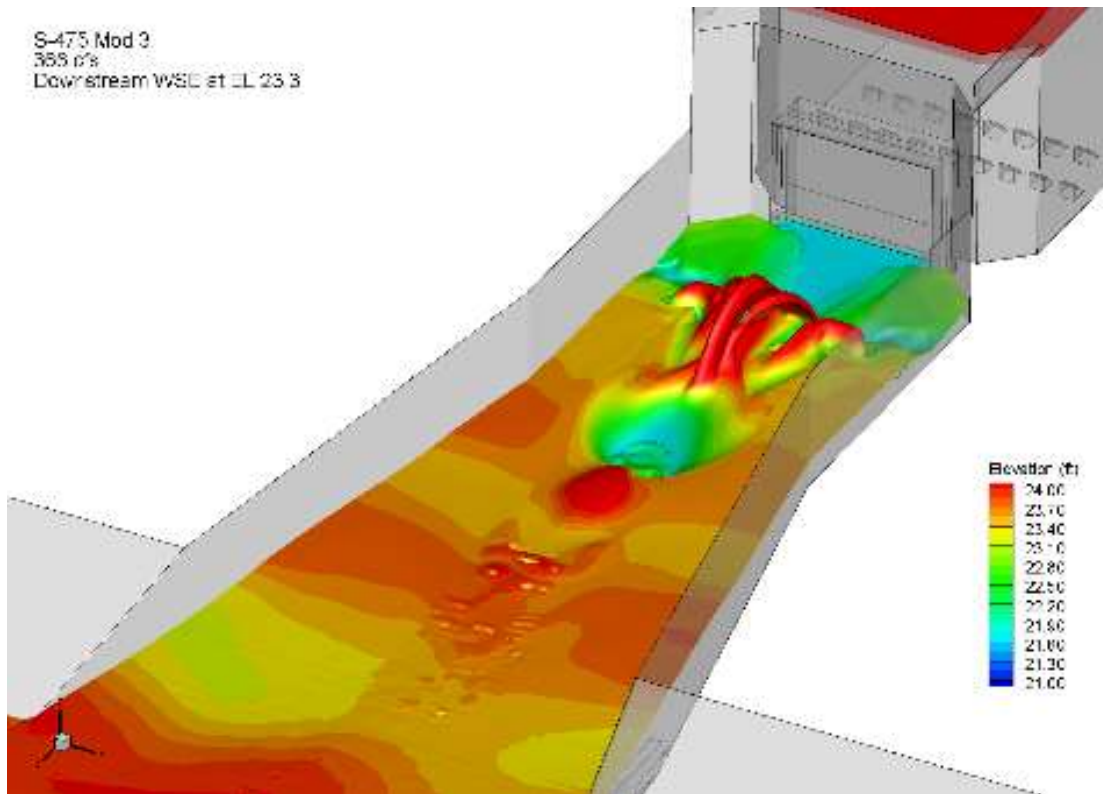
GENERALIZED SUBSURFACE PROFILE

Depth Below Grade (feet)	Elevation (feet-NAVD)	Material Description	Relative Density/ Consistency
0 to 6	+16 to +10	SAND (SP)	Loose
6 to 16	+10 to 0	Weathered LIMESTONE, SAND, Silty SAND, Clayey SAND, Sandy SILT (SP, SM, SC, ML)	Weakly Cemented, Very Loose to Loose
16 to 40	0 to -24	CLAY (CH)	Firm to Stiff
40 to 56	-24 to -40	Silty, Clayey SAND (SM, SC)	Medium Dense to Dense
56 to 100	-40 to -84	SAND and Silty SAND (SP, SM)	Medium Dense to Very Dense

Package 4 Components



S-475 Mod 2
 385 cfs
 Downstream WSD at EL 23.3

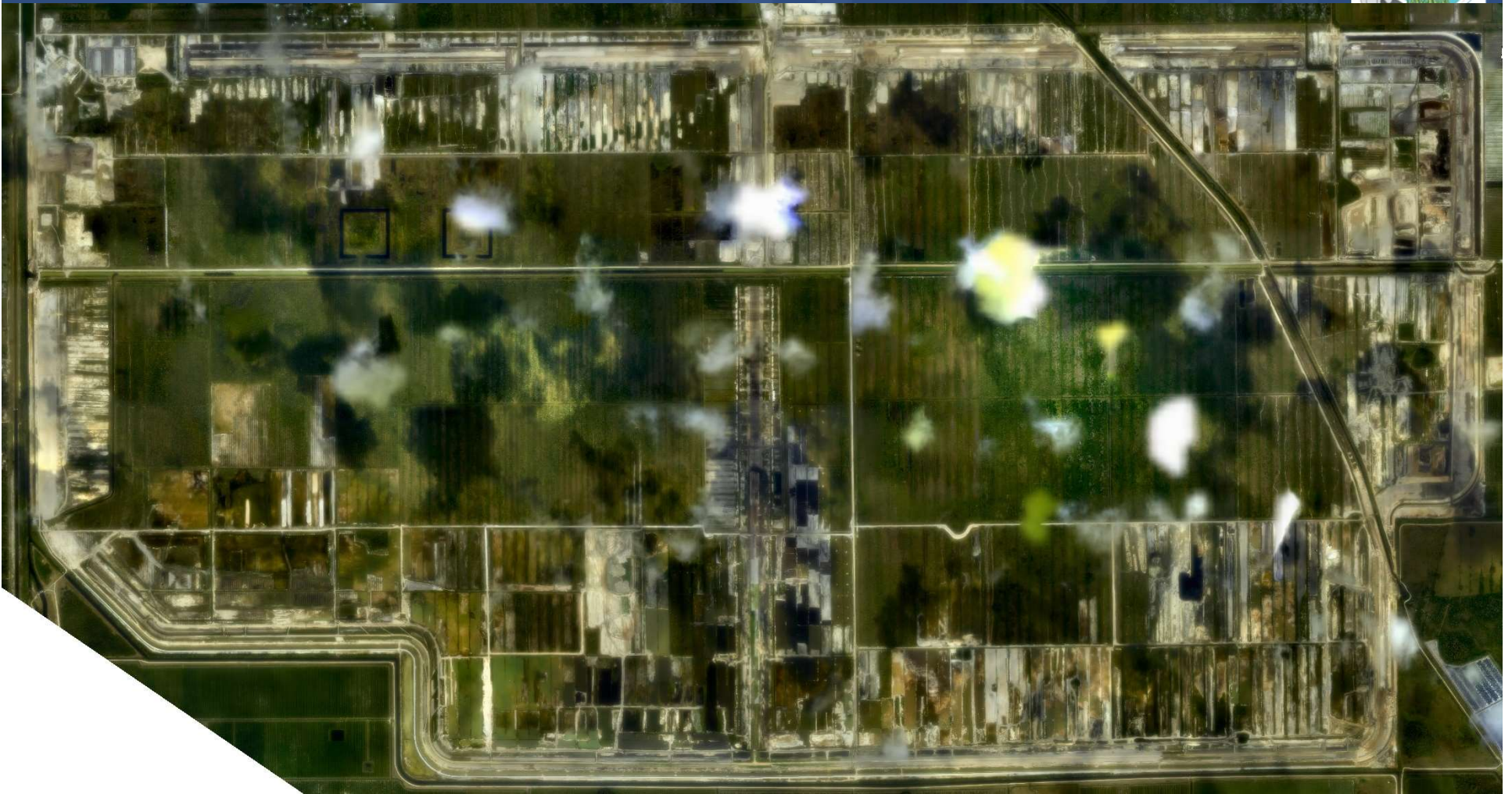


Package 4 Design Challenges



- Include Pump Station Discharge
- Stair-Step soil cement eliminated from 2008 design
- Freeboard/Overwash Analysis Update
- VE Study Completed
- Hydraulic Seawall

Aerial Surveys and Tracking



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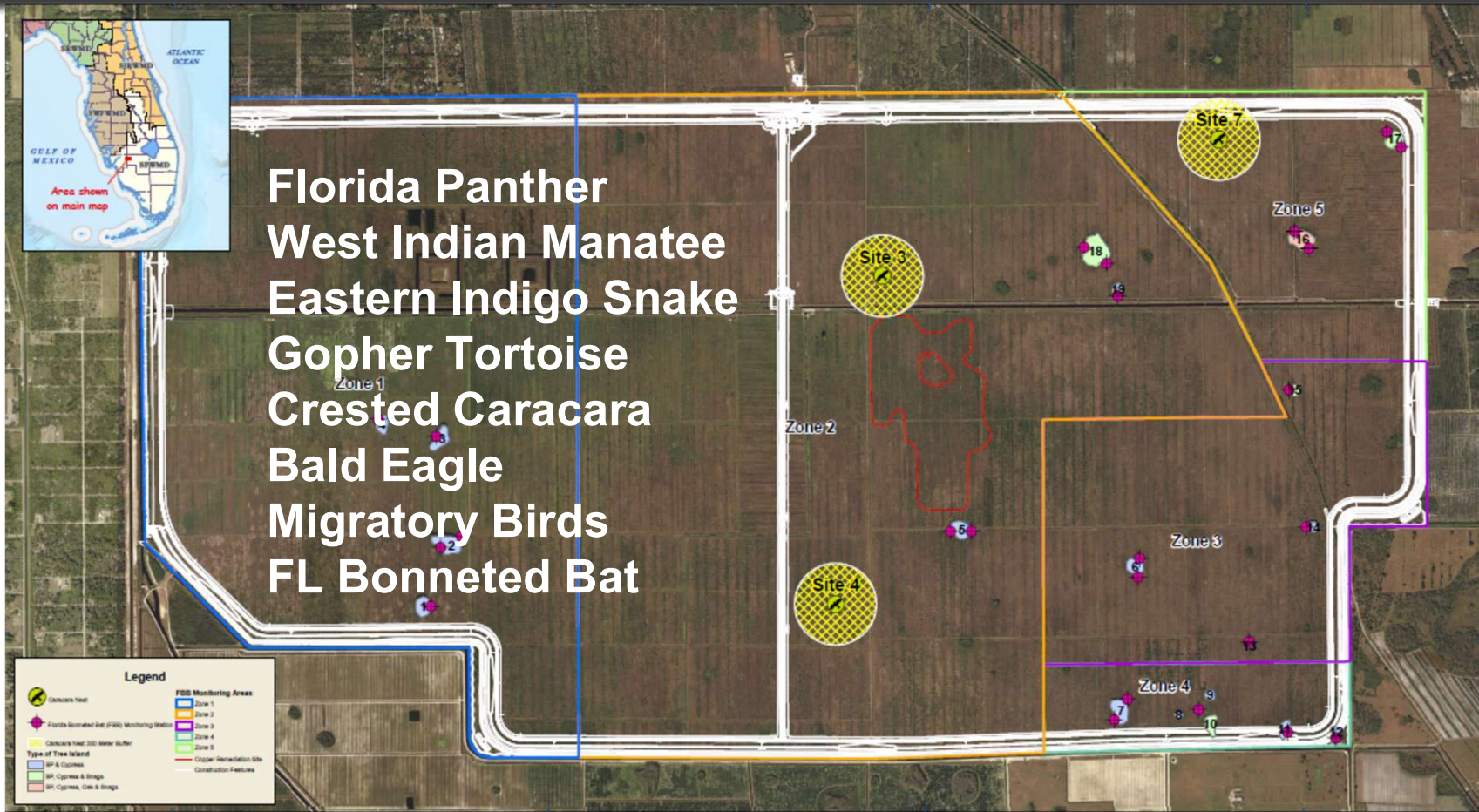



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Protected Species

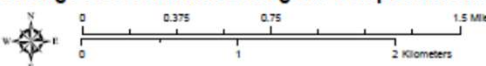




BASE CREDITS:
State plane projection, Florida east zone, NAD 83-HARN, US feet.

South Florida Water Management District
3301 Gun Club Rd., West Palm Beach, Florida 33406
(561) 686-8800; www.sfwmd.gov

C-43 West Storage Reservoir and Biological Component Planning Map

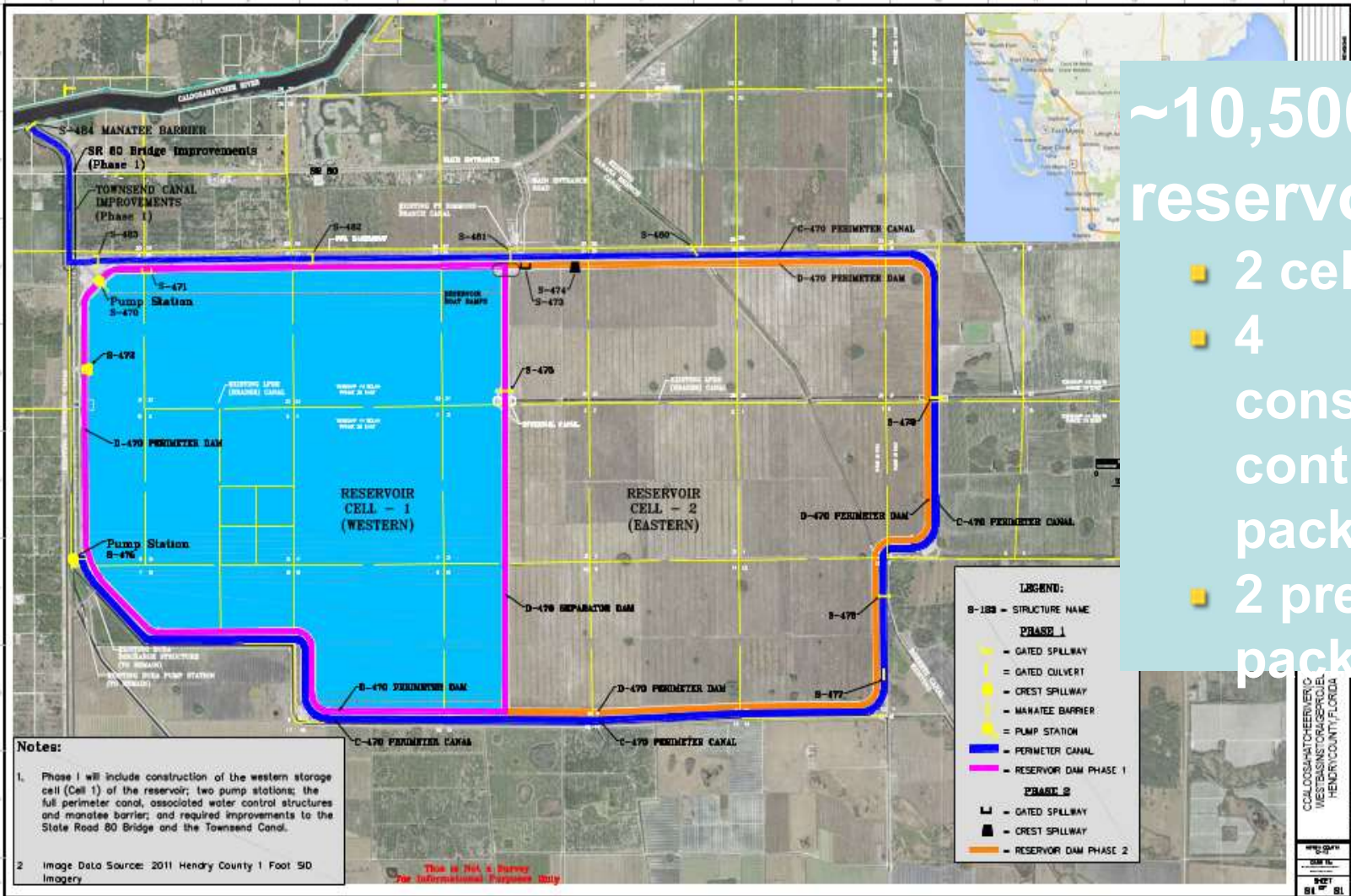


Map Date: January, 2017

IMPORTANT DISCLAIMER:
This map is a conceptual or planning tool only. The South Florida Water Management District does not guarantee or make any representation regarding the information contained herein. It is not enforceable or binding, and does not affect the interests of any persons or properties, including any present or future right or use of real property.

User Name: apeters Remedy Ticket: 00045848 Map Produced on Date: 1/20/2017 10:23:13 AM \\ad.sfwmd.gov\dfsroot\GIS\GIServer\transition\drone_tests\C43_Nov16\ArcMap\C-43_BaseMap_BiotsBats\C-43_FBB_Caracara_RemediationBU.mxd

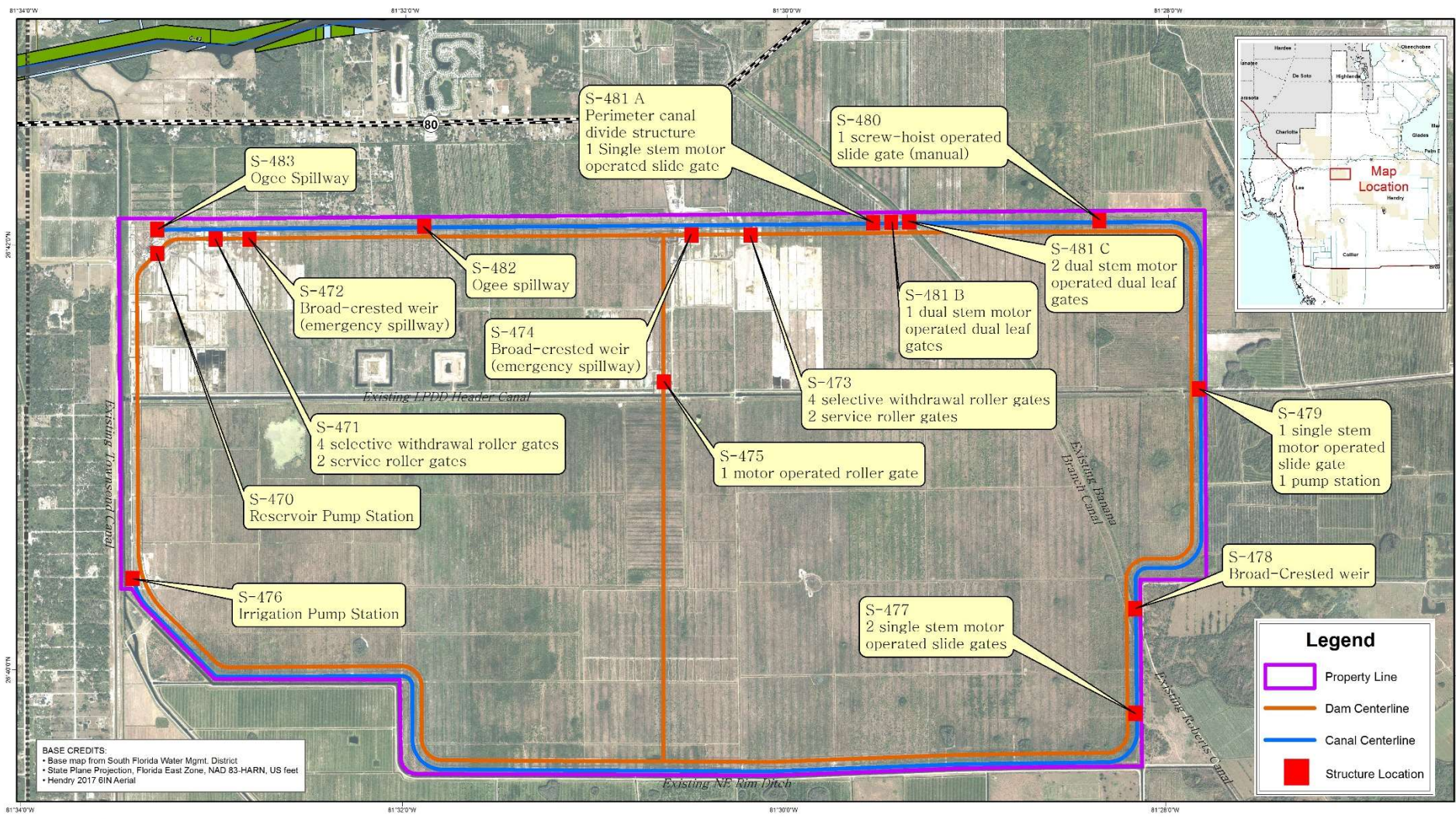
Project Delivery Plan



~10,500 acre reservoir

- 2 cells
- 4 construction contract packages
- 2 prep packages

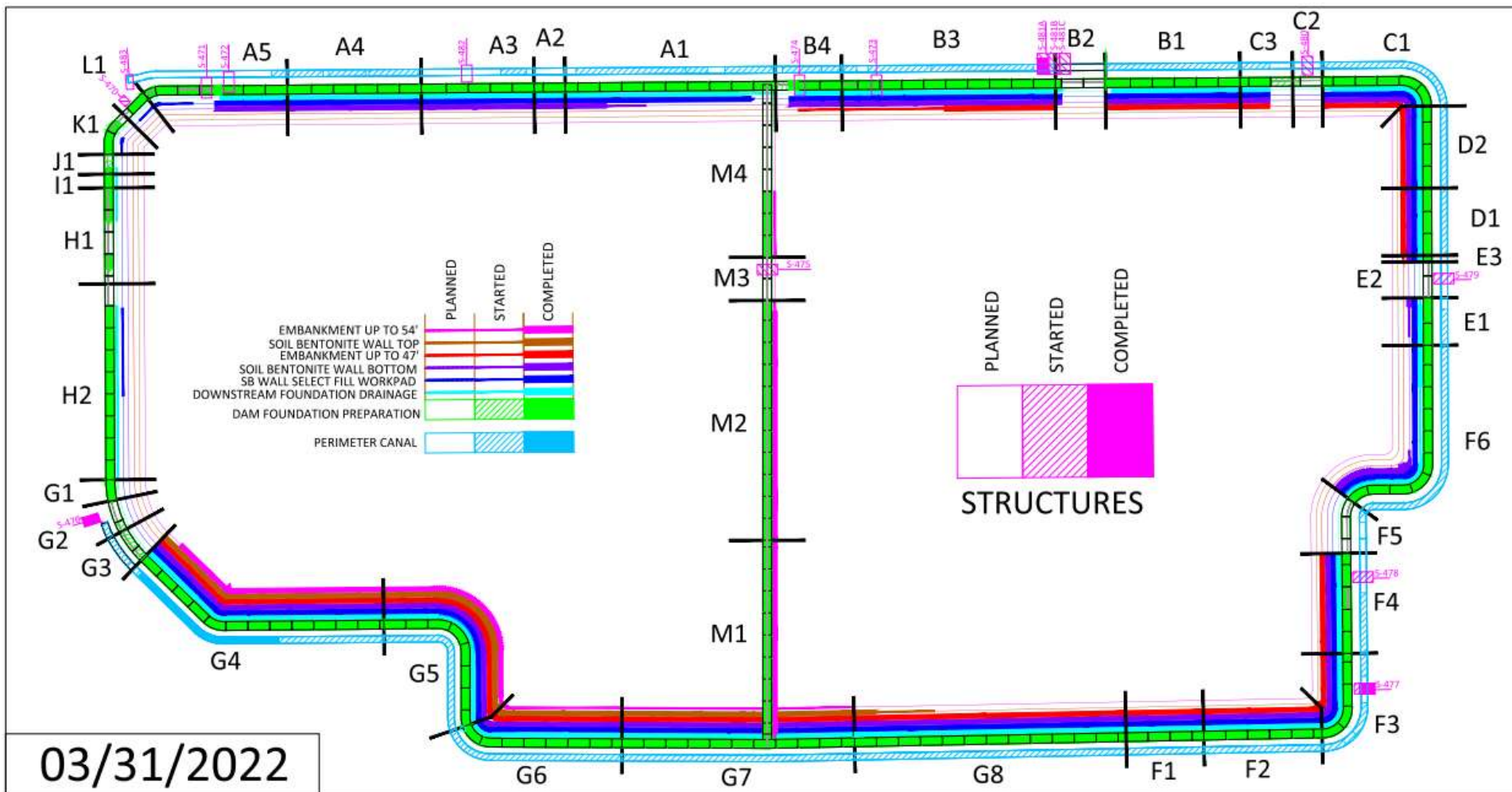
Package 4 Components



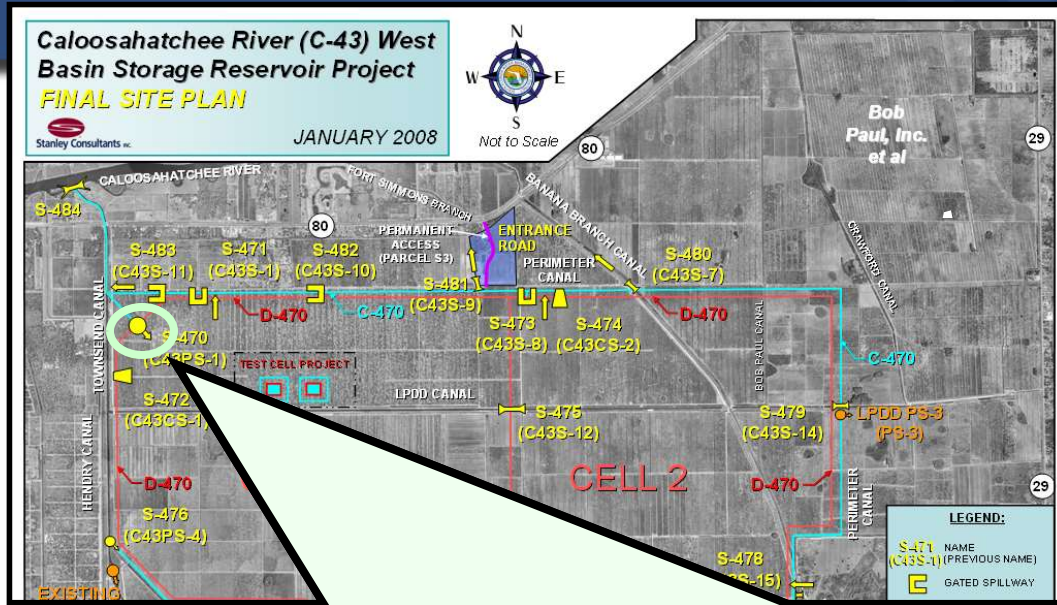
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Current Construction Status

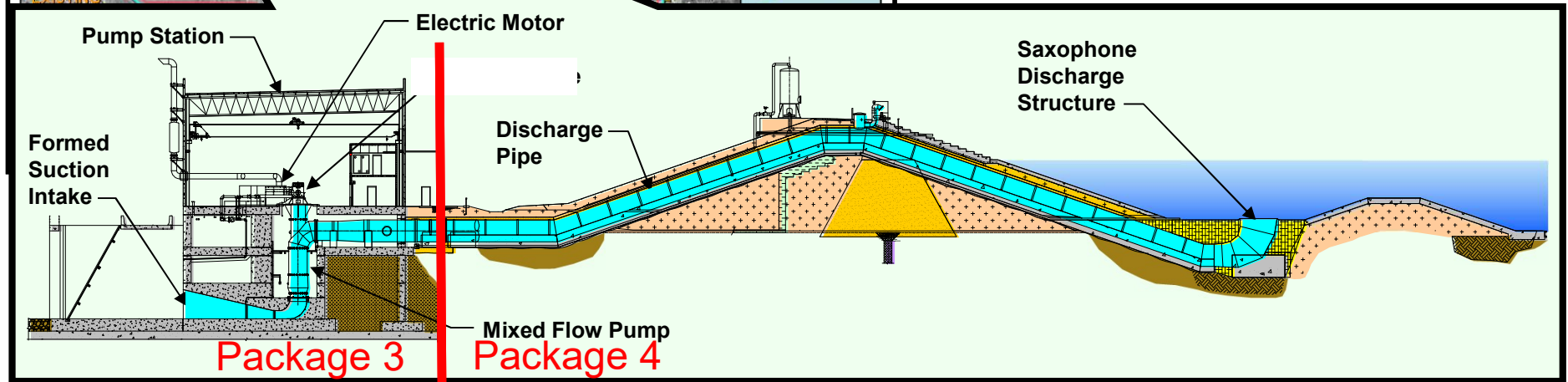


Inflow Pump Station S470



S-470

- 4 - 375 cfs VMF Pumps
- Electric Motor Driven
- Design TDH: 42 feet
- 2500 hp
- Duperon Style Trash System



Pump Station and Discharge