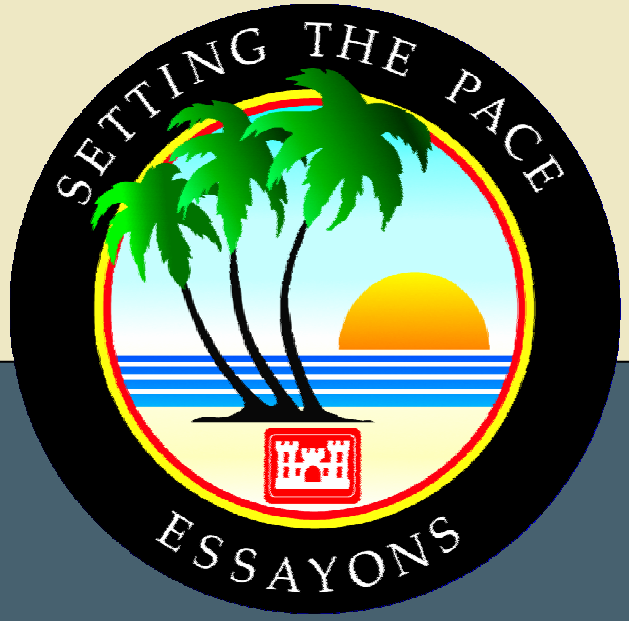


OBERMEYER GATED SPILLWAY S381

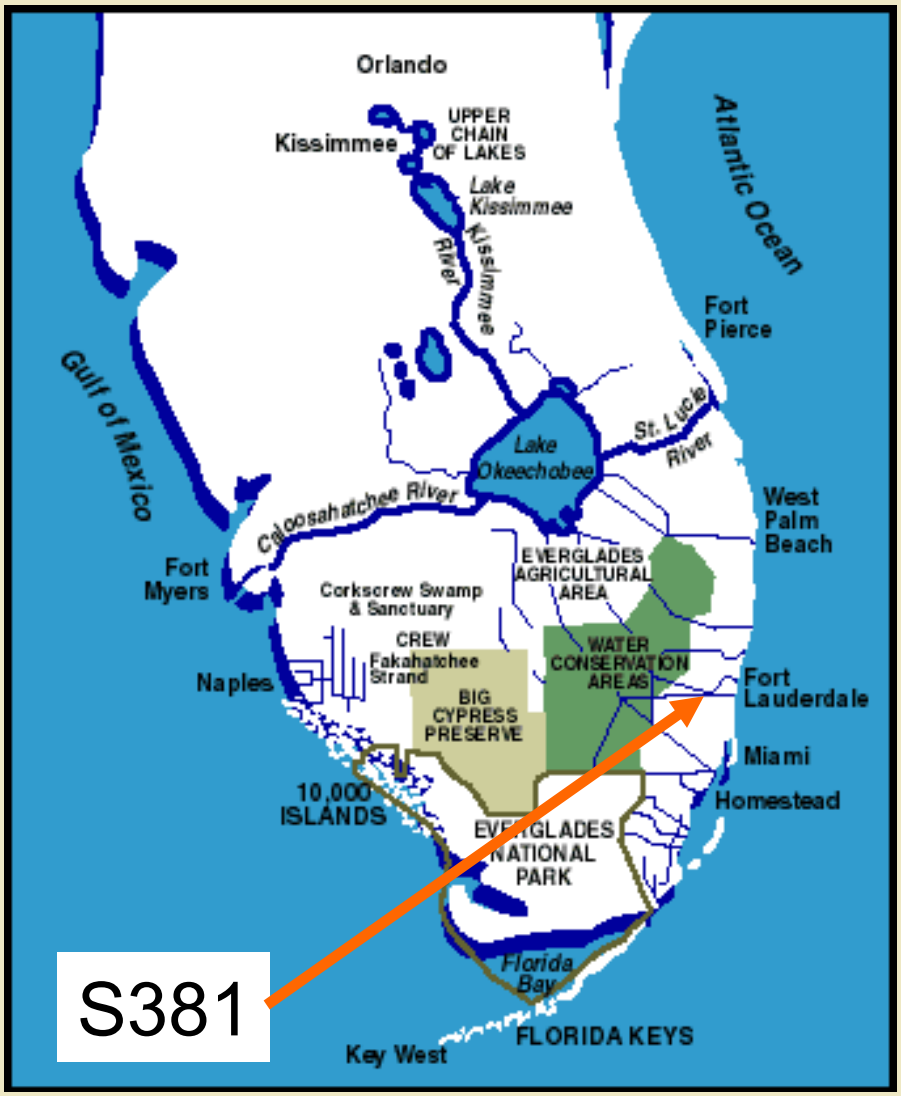
Jacksonville District 2005

General Information

- S381 is a 3 bay broad crested spillway structure equipped with Obermeyer gates that was completed in March 2005 for $5.5 million
- Designed as a water quality structure
- Purpose is to prevent urban runoff from communities west of Ft. Lauderdale from flowing west to water conservation areas
- 2,880 CFS discharge capacity

General Information (Cont.)

- Spillway is located along the C-11 Canal in Southeast Florida, west of Fort Lauderdale, Florida.



Background Information

- The original design called for a 2 bay vertical lift gated/ogee weir spillway structure in C-11 canal.
- Vertical lift gate structure was under construction.

Problems with Old Design

- Topography in area very flat, heavily developed
- Problems and concerns surfaced with the hydraulic design
- Local drainage districts upstream of the spillway realized that the 6” head differential created across structure meant more potential flooding than without project condition
- H&H design approach was for water quality - did not perform modeling of the watershed area to the east for flooding

Solution

- Decision made to abandon vertical lift gate design and redesign structure as an Obermeyer gated spillway (nearly zero head loss across structure)
- First time use for Jacksonville District
- Terminated existing construction contract
- Spillway was redesigned through an AE task order. HDR, Engineering Inc. did the new design and had previously designed one of these spillways in FL.
- NTP for construction contract was issued in October 03 and structure was completed in March 05.

Obermeyer Hydro, Inc. - Ft. Collins, CO

In business since fall ’88

Corps Work:

1) McHenry – Illinois – Fall 2001- Flood Control
2) Algonquin - Illinois – Fall 2001- Flood Control
3) Lake Traverse – Minn. – Winter 2001- Reservoir outlet
4) Flint – Michigan – Fall 2000- Water Diversion
5) Clinton Weir – Michigan – Fall 96 – Diversion
6) Saylorville Lake- Iowa – Fall 93 – Flood Control

Obermeyer Gate Details

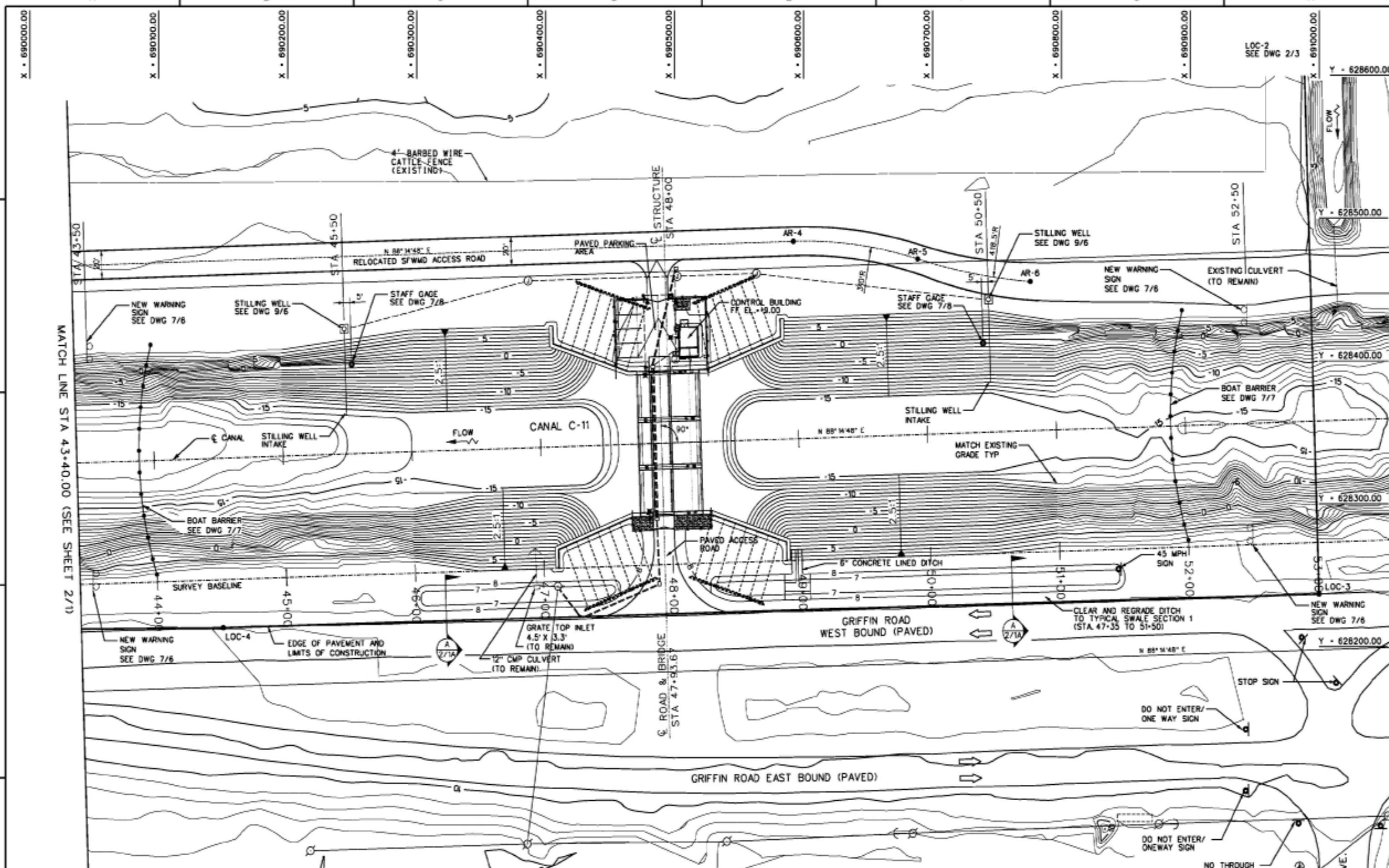
- Gates consist of two gate panels per bay supported by reinforced air bladders on the down stream side.
- Gates are raised and lowered by inflating or deflating the reinforced air bladders with compressed air.
- Gates are a bottom hinged system that are attached to the foundation with a row of anchors bolts.
- By controlling the air pressure in the bladders, the water elevations can be accurately maintained within the control range (full inflation to full deflation).

Obermeyer Gate Details (Cont.)

- Restraining straps keep gate from overturning in a reverse head condition
- Lower O&M costs associated with Obermeyer gates compared with vertical lift gate spillways.
- Cleaner water discharge with Obermeyer gates verse vertical lift gate spillways since discharge is over the top instead of from the bottom.
- OHI provides design services (calculations, drawings, etc.) for the gates.

Sole Source Issue

- Sole source justification was required by Contracting Division in order to use Obermeyer gates.
- HDR performed up to 70% of design until sole source approval.

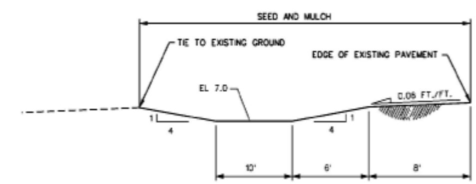


NOTE:

1. FOR RELOCATED ACCESS ROAD CONTROL POINTS, SEE DWG 2/1A

2. FOR LOC CONTROL POINTS, SEE DWG 1/5.

ITEM	DESIGNATION	NORTHING	EASTING	ELEVATION	STATION	OFFSET	DESCRIPTION
CONTROL POINTS	AR-1	628,419.56	689,686.70	N/A	N/A	N/A	℄ RELOCATED SFWMD ACCESS ROAD
	AR-2	628,443.79	689,795.94	N/A	N/A	N/A	℄ RELOCATED SFWMD ACCESS ROAD
	AR-3	628,462.32	689,892.44	N/A	N/A	N/A	℄ RELOCATED SFWMD ACCESS ROAD
	AR-4	628,483.74	690,592.11	N/A	N/A	N/A	℄ RELOCATED SFWMD ACCESS ROAD
	AR-5	628,471.42	690,688.62	N/A	N/A	N/A	℄ RELOCATED SFWMD ACCESS ROAD
	AR-6	628,455.88	690,775.99	N/A	N/A	N/A	℄ RELOCATED SFWMD ACCESS ROAD



TYPICAL SWALE SECTION

SCALE: NTS

SCALE: 1"= 30'-0"

US Army Corps of Engineers Jacksonville District

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JACKSONVILLE, FLORIDA

HDR ENGINEERING, INC.
2202 N. WEST SHORE BLVD.
SUITE 250
TAMPA, FL 33607
CA 4213

Dated: AUGUST 2002

CADFILE NO. 402-38,333

Scale: AS SHOWN

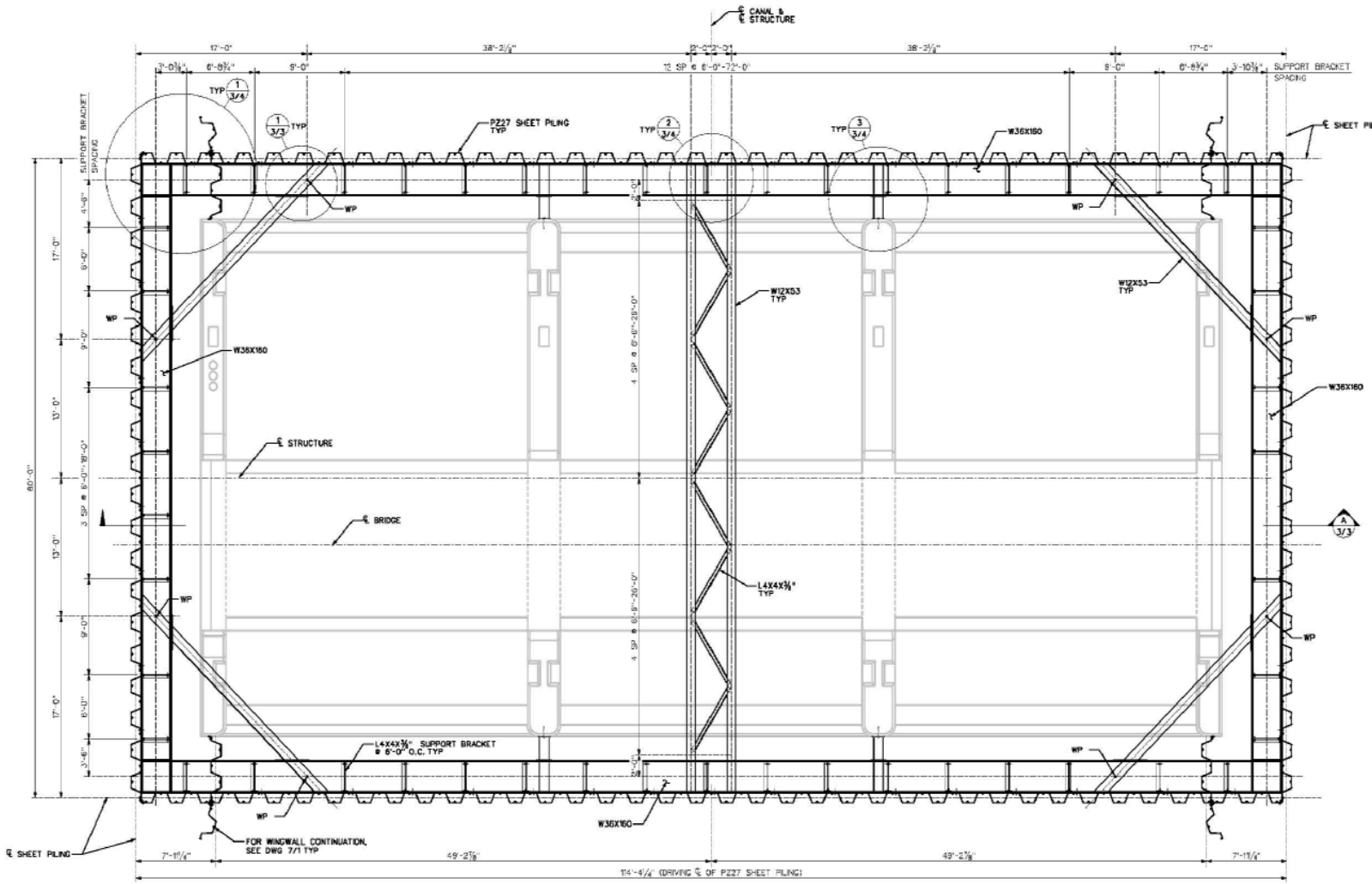
CENTRAL AND SOUTHERN FLORIDA ECOSYSTEM
CRITICAL RESTORATION PROJECT
WESTERN C-11 BASIN PHASE 2
SPILLWAY 381
SITEWORK
FINAL SITE PLAN

DRAWING NO.

2 / 1A

Braced Cofferdam

- Required construction of work platform and diversion channel
- Bottom of foundation approx 20’ below water surface
- Required blasting to get sheets through limestone



COFFERDAM PLAN
SCALE: 1/4"=1'-0"

SCALE: 1/4" = 1'-0"

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SUITE 200
TAMPA, FL 33607
CA 4313

D.O.FILE NO. 402-38.333

CENTRAL AND SOUTHERN FLORIDA ECOSYSTEM CRITICAL RESTORATION PROJECT

WESTERN C-11 BASIN PHASE 2

SPILLWAY 3R1
COFFERDAM
COFFERDAM PLAN

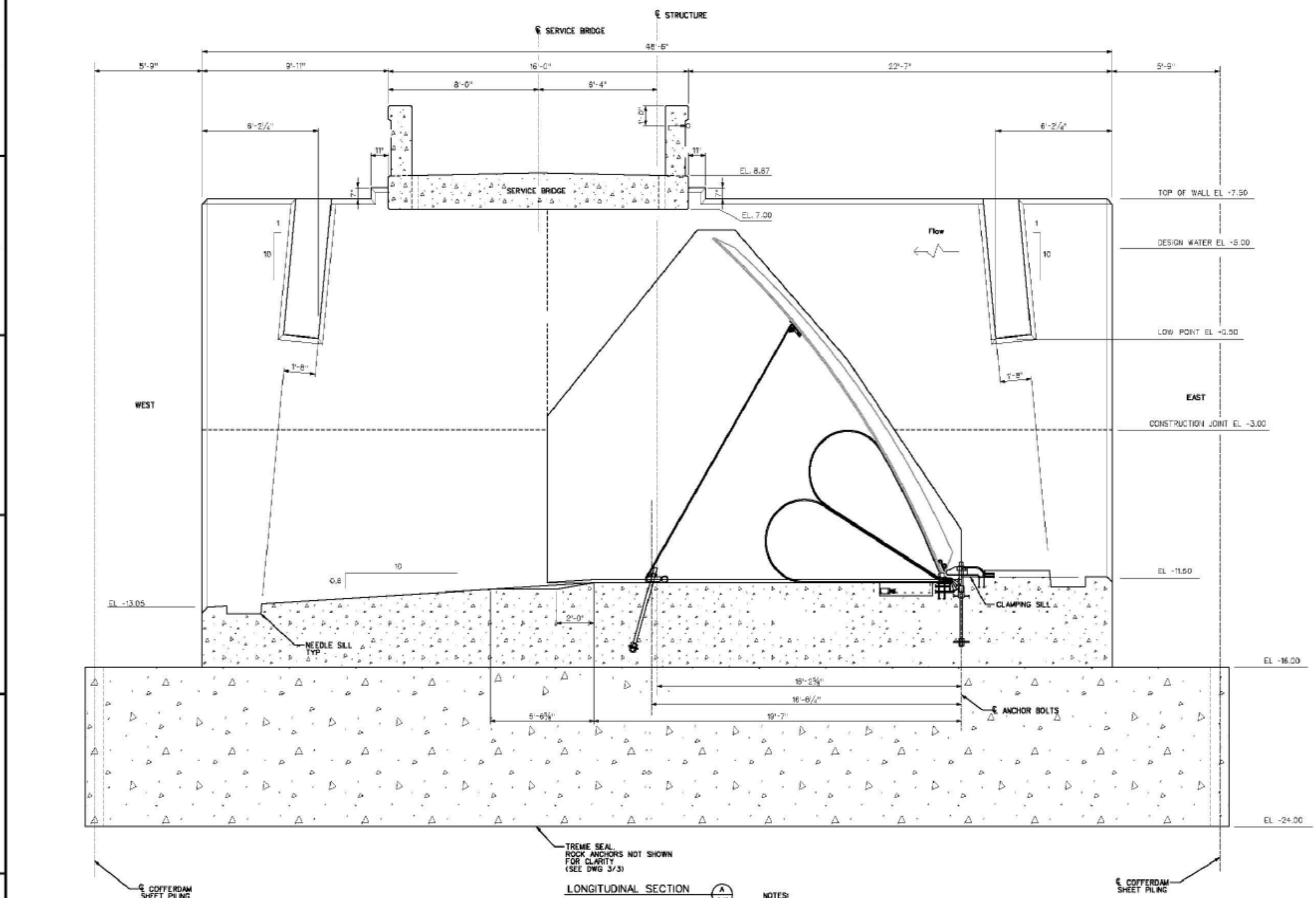
DRAWING NO.
3 /1

Tremie Seal

- 8’ thick concrete seal placed by tremie to allow construction in dry
- Rock anchors used to reduce thickness of tremie and to anchor spillway structure

Spillway Structure

- 101’-6” long X 48’-6” wide overall
- Exterior walls 2’-6” thick
- Interior walls 3’-3” thick
- Walls designed to allow dewatering of any bay
- Foundation 3’-0” to 4’-6” thick
- Integral flat slab bridge helps to brace walls



LONGITUDINAL SECTION (A 4/1)

NOTES:

1. THE HORIZONTAL CONCRETE CLAMPING SURFACE EXTENDING 7" DOWNSTREAM OF MAIN ANCHOR BOLT CENTERLINE AND 9" UPSTREAM OF MAIN ANCHOR BOLT CENTERLINE SHOULD BE LEVEL WITHIN ¼" FROM WALL TO WALL.
2. ALL DIMENSIONS TO WITHIN +-⅛" OF TRUE POSITION.
3. ANCHOR BOLTS TO BE PLUMB AND PERPENDICULAR TO EACH ABUTMENT PLATE +-1/16 ".
4. COORDINATE THE PLACEMENT OF ALL ANCHOR BOLTS AND EMBEDED PLATES WITH O.H.L.
5. FOR GATE DETAILS, SEE DRAWING NO'S. 6/1 THRU 6/3.
6. FOR REINFORCING DETAILS, SEE DRAWING NO'S. 5/1 THRU 5/6.

SCALE: ½" = 1'-0"

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SUITE 250
TAMPA, FL 33607
CA 4213

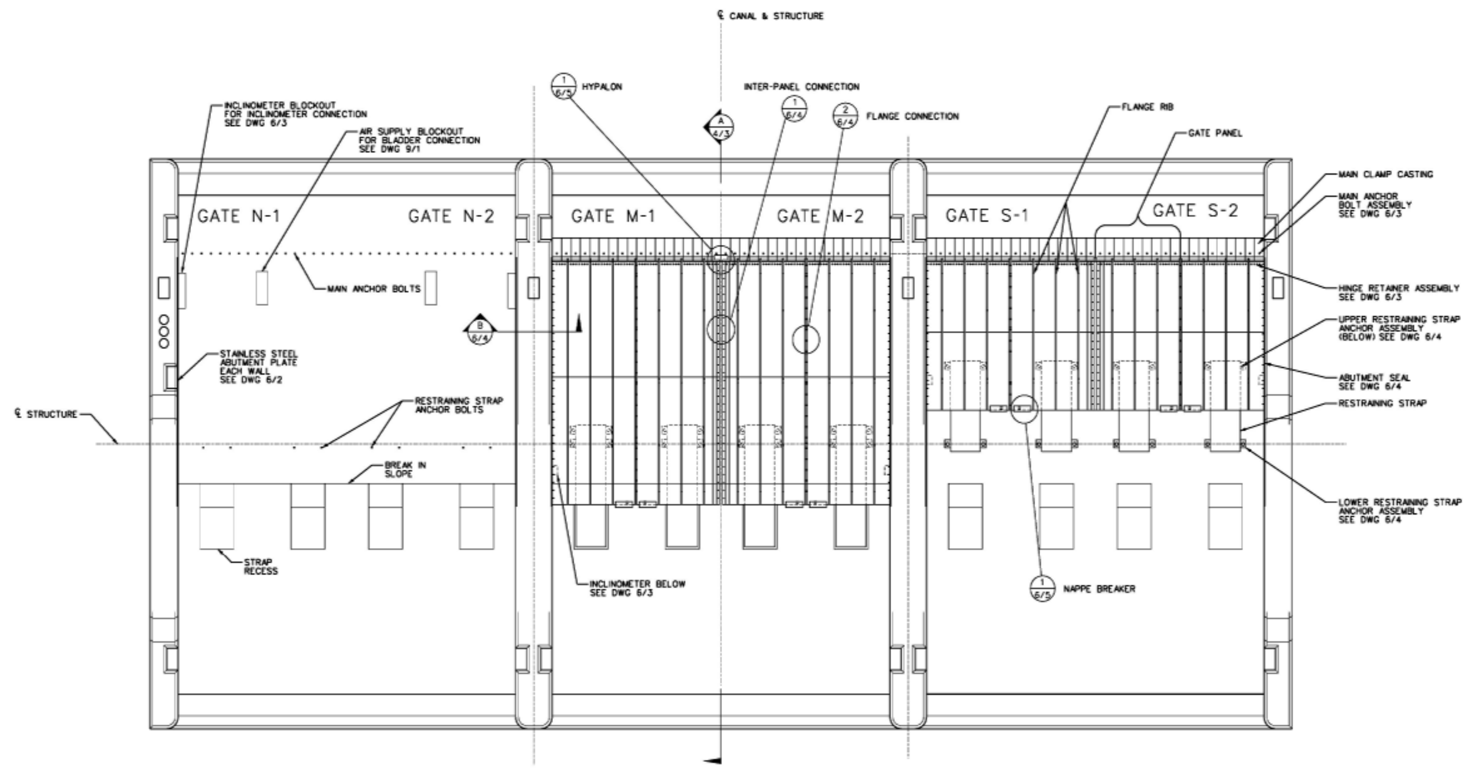
Designed by: F. WALTER
Date: AUG 2002
D.O.FILE NO. 402-38,333

CENTRAL AND SOUTHERN FLORIDA ECOSYSTEM
CRITICAL RESTORATION PROJECT
WESTERN C-11 BASIN PHASE 2
SPILLWAY 381
CONCRETE
LONGITUDINAL SECTION

DRAWING NO.
4 /3

Design Criteria

- Structure designed to allow for dewatering of one bay at a time for maintenance
- Structure designed for a maximum water elevation of 5.00
- Designed for reverse head condition.
- Rock anchors designed for maximum overturning and sliding stability.



PLAN VIEW

NOTES:

1. BRIDGE AND HAND RAILS NOT SHOWN FOR CLARITY.
2. ALL LABELED ITEMS ARE TYPICAL UNLESS OTHERWISE STATED.
3. NORTH BAY SHOWN PRIOR TO GATE INSTALLATION.
4. MIDDLE BAY SHOWN WITH GATES IN THE DOWN POSITION.
5. SOUTH BAY SHOWN WITH GATES IN THE UP POSITION.
6. EACH GATE CONSISTS OF 2 MIRRORED GATE PANELS. FOR ASSEMBLY PURPOSES PANELS WILL BE PAIR STAMPED PRIOR TO SHIPPING.

SCALE: 1/4" = 1'-0"

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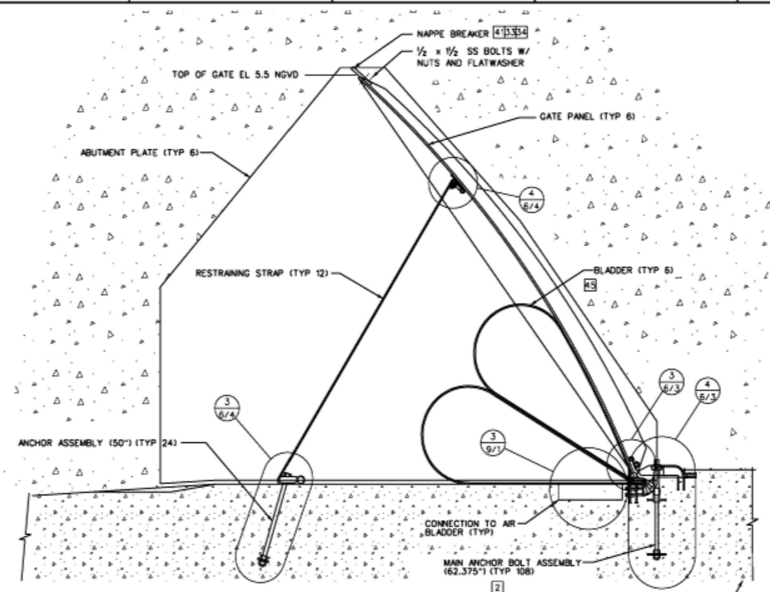
TAMPA, FL 33607
CA 4213

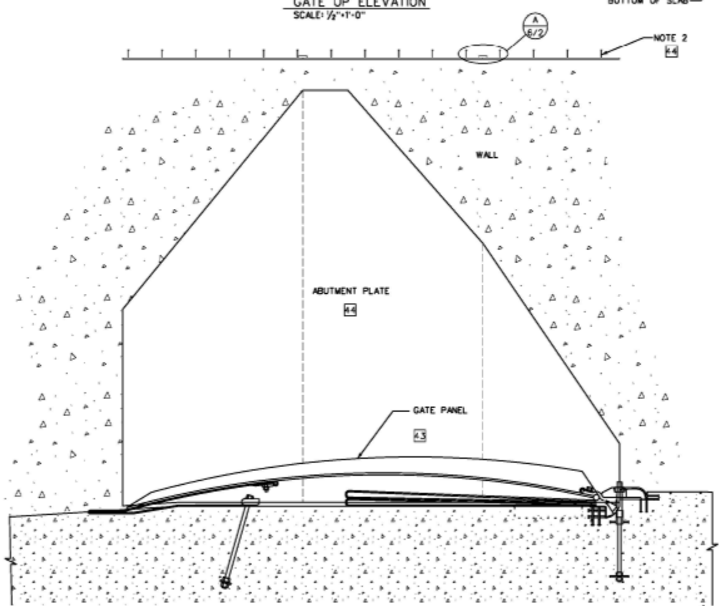
Designed by: B MEYER
Dwn by: LGD
Ckd by: SJM
Scale: AS SHOWN
Date: DECEMBER 2002
D.O.FILE NO. 402-38,98

CENTRAL AND SOUTHERN FLORIDA ECOSYSTEM
CRITICAL RESTORATION PROJECT
WESTERN C-11 BASIN PHASE 2
SPILLWAY 381
OHI BOTTOM HINGED PNEUMATIC GATE
GATE PLAN

DRAWING NO.
6 /1



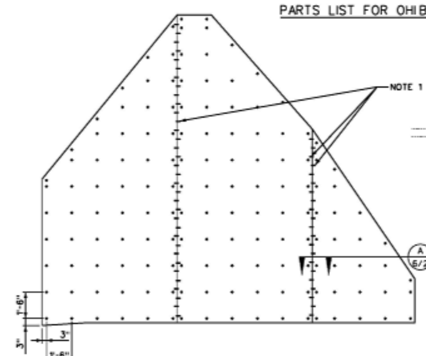
GATE UP ELEVATION
SCALE: 1/2"=1'-0"



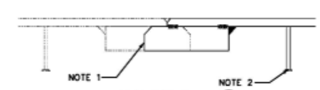
GATE DOWN ELEVATION
SCALE: 1/2"=1'-0"

ITEM	ANCHOR ASSEMBLY & CLAMP	SHEET	WEIGHT	QUANTITY
1	2.5" UNC BRONZE NUT	6/3	6	108
2	MAIN ANCHOR BOLT ASSEMBLIES (62.375")	6/3	103	108
3	20' 304 SS 4" CLAMPING SILL PLATE	6/3	188	3
4	10' 304 SS 4" CLAMPING SILL PLATE	6/3	94	3
5	20' 304 SS 9" BY 6" BLADDER WEDGE PLATE	6/3	715	3
6	10' 304 SS 9" BY 6" BLADDER WEDGE PLATE	6/3	357	3
7	MAIN CLAMP CASTINGS 6" WEDGE 45 33/64	6/3	230	108
8	HINGE FLAP (APP. 15' X 14.75" X 1.5")	6/3	223	6
9	BLADDER WEDGE AREA CONCRETE SHAPING FORMS	6/3	10	3
	RESTRAINING STRAP ANCHOR & CLAMPS			
10	2.0" UNC X 50" 304 SS RS ANCHOR ASSEMBLIES	6/4	64	24
11	2.0" UNC SS NUTS	6/4		24
12	2.0" SS FLAT WASHERS	6/4		24
13	2.0" UNC X 5" LONG BOLT (GATE)	6/4		12
14	36" X 9.5" X 3" RS CLAMP A36 (LOWER)	6/4	290	12
15	36" X 9.5" X 3" RS CLAMP A36 (UPPER)	6/4	290	12
16	NYLON ROD 1 3/8" X 24"	6/4		24
17	RESTRAINING STRAPS (APP. 16' X 24" X .75")	6/4	137	12
	AIR SUPPLY CONNECTIONS			
18	1" BRASS BLADDER FITTING	9/1		6
19	1" NPT 250 PSIG CAST BRASS ELBOW	9/1		6
20	1" NPT X1" BRASS HOSE BARB	9/1		6
21	3/4"-1.5" SS HOSE SCREW CLAMPS	9/1		24
22	1" 16M3K-XTF 3,000 PSIG GATES HOSE	9/1		20
23	1" NPT X 1" SS HOSE BARB	9/1		6
24	3.0" X 1.0" NPT SS BUSHING	9/1		6
25	3.0" SS WELD BY NPT ELBOW	9/1		6
	GATES			
26	5/8" SS UNC NUTS FOR INTER PANEL SEALS	6/3		380
27	5/8" SS UNC FLAT WASHERS FOR INTER PANEL SEALS	6/3		380
28	1.25" UNC SS NUTS FOR HINGE RETAINERS	6/3		305
29	1.25" SS UNC FLAT WASHERS FOR HINGE RETAINERS	6/3		305
30	1.25" UNC X 4.0" LONG SS BOLTS FOR FLNG RIB	6/4		138
31	1.25" UNC SS NUTS FOR FLANGE RIB	6/4		138
32	1.25" SS FLAT WASHERS FOR FLANGE RIB	6/4		138
33	1/2" X 1.5" UNC SS HEX BOLTS FOR NAPPE BRKR	6/2		48
34	1/2" SS FLAT WASHERS FOR NAPPE BREAKER	6/2		48
35	3/8" UNC X 1.5" LONG ALLAN SCREWS	6/3		14
36	INCLINOMETER	6/3	3	6
37	SEAL RETAINER (SETS)	6/3	54	12
38	ABUTMENT SEALS (APP. 22' X 7.25" X 1.1")	6/4	83	6
39	INTER-PANEL SEALS (APP. 22' X 8" X .75")	6/4	63	3
40	HYPALON PIECES (12" X 36")	6/5	2	12
41	NAPPE BREAKER (APP 18" X 6" X 1.5")	6/2	7	12
42	HINGE RETAINER (APP. 24" X 1.25" X 3")	6/5	25	48
43	GATE PANELS (6 SETS)	6/2	8950 (EACH)	12
	ABUTMENTS			
44	ABUTMENT PLATES (6 SETS OF 3 PIECES)	6/2	3031 (EACH)	6
	US: 470: M: 1381: DS: 1180			
	BLADDERS			
45	BLADDERS (APP. 15' X 11' X 4")	6/2	2540	6
	COMPRESSOR PACKAGE			
46	COMPRESSOR: ROTARY IR UP25-125-BM	8/2	1203	2
47	STARTUP KIT			2
48	PRE-FILTER: IR HE 375	9/2		1
49	IR HE 375 FILTER ELEMENTS	9/2		1
50	DRYER: IR TS250	8/2	310	1
51	ACCUMULATOR TANK: 240 GALLON	8/2	520	1
52	AUTOMATIC DRAIN VALVE EDV 2000	9/2		1
53	2" FULL PORT BRONZE SOFT SEAT BALL CHECK VALVE			1
	MISCELLANEOUS			
54	AIR CONTROL CABINET (PAINTED) (NOTE 3)	9/3	860	1
55	3/8" X 4" ADHESIVE ANCHOR	9/3		4
56	MUFFLER	9/2	26	1

PARTS LIST FOR OHIBOTTOM HINGED PNEUMATIC GATE



ABUTMENT PLATE STUD DETAIL
SCALE: NTS



SECTION A (A 6/2)
SCALE: NTS

NOTES:

1. ABUTMENT PLATE SECTIONS TO BE SHIPPED WITH WELD LUGS ON STAGGERED 12" CENTERS. FIELD WELD AND GRIND PER OHISPECIFICATION.
2. NELSON STUDS PRE-WELDED TO ABUTMENT PLATES.
3. SEE DWG 9/3 FOR AIR CONTROL CABINET CONTENTS AND DETAILS.

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JACKSONVILLE, FLORIDA

HDR

HDR ENGINEERING, INC.
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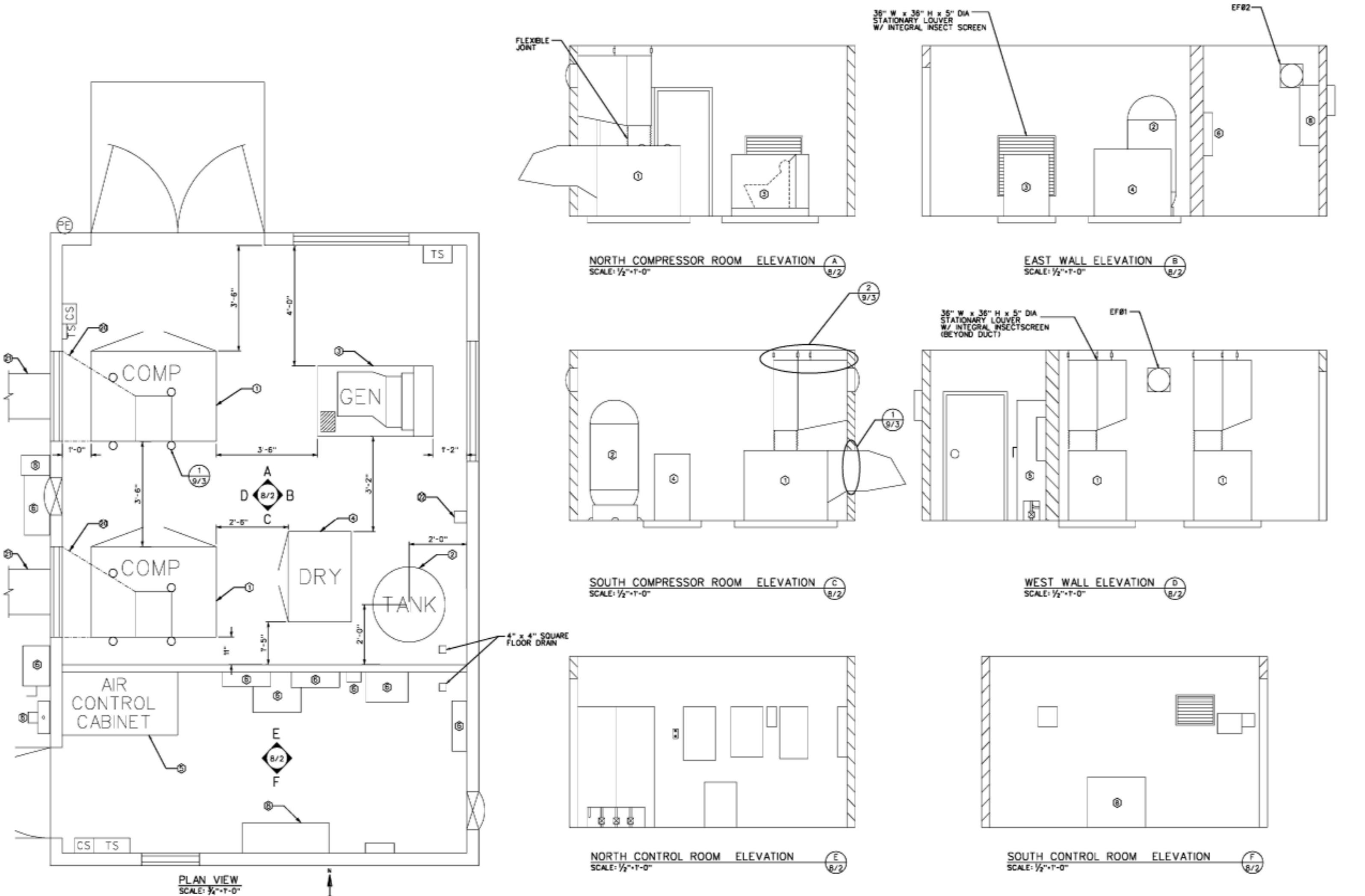
SUITE 250
TAMPA, FL 33607
CA 4213

Scale: AS SHOWN
Date: DECEMBER 2002

CENTRAL AND SOUTHERN FLORIDA ECOSYSTEM
CRITICAL RESTORATION PROJECT
WESTERN C-11 BASIN PHASE 2
SPILLWAY 381
OHI BOTTOM HINGED PNEUMATIC GATE
GATE DETAILS - 1 OF 4

DRAWING NO.
6 /2



① IR UP25-125 COMPRESSOR 52L X 36W X 42.5H [46]
② AIR STORAGE TANK 30D X 72H [51]
③ ONAN 7179 GENSET (7KW) GENERATOR 48L X 30W X 37H
④ IR MODEL TS250 AIR DRYER [49] 36L X 26W X 40H
⑤ AIR CONTROL CABINET [54] 25L X 48W X 72H
⑥ ELECTRICAL EQUIPMENT SEE DRAWING 10/5
⑧ SWFMD PLC/SCADA CABINET 36W x 30H x 12L
⑳ FABRICATED EXHAUST DUCT
㉑ FABRICATED INTAKE HOOD
㉒ LPGAS SENSOR
㉓ IR HE 350 PREFILTER

NOTES:
1. PROVIDE UNIT WITH DISCONNECT SWITCH.
2. PROVIDE WITH SOLID STATE SPEED CONTROLLER.
3. PROVIDE THERMOSTAT SET AT 90°F TO EXHAUST FAN. EF-2
4. PROVIDE WALL SWITCH TO OVERRIDE THERMOSTAT.

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SUITE 250
TAMPA FL 33607
CA 4213

Scale: AS SHOWN
Dated: DECEMBER 2002
402-38J98

CENTRAL AND SOUTHERN FLORIDA ECOSYSTEM
CRITICAL RESTORATION PROJECT
WESTERN C-11 BASIN PHASE 2
SPILLWAY 381
ARCHITECTURAL
CONTROL BUILDING INTERIOR ELEVATIONS AND DETAILS

DRAWING NO.
8 /2

Construction Photos


Link-Belt
5. 11. 2004 14:18


CHEVROLET
5. 11. 2004 14:03


10. 19. 2004 10:43


10. 19. 2004 10 : 53


10. 19. 2004 10:52


10. 19. 2004 10:52


3. 9. 2005 11:03


AirCare
Ingersoll Rand
AirCare
Ingersoll Rand
3. 9. 2005 10:28


Detector
AirCare
IR Ingersol
3. 9. 2005 10:28


3. 9. 2005 10 : 23


3. 9. 2005 10:25

Miscellaneous Contract Details

- Local sponsor (SFWMD) requested SST gates and abutment plates to reduce future O&M costs
- Bid Schedule – Fixed cost bid item provided for Obermeyer services and equipment:

  Includes equipment

  Transporting equipment to site

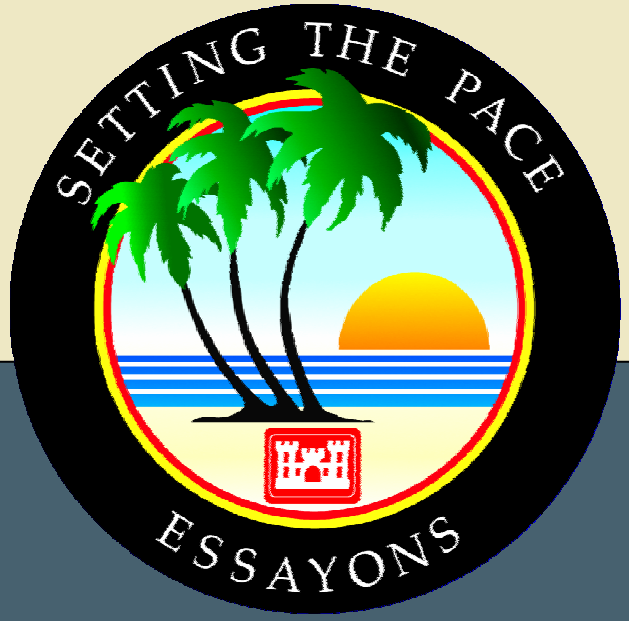
  Providing on-site installation services
- Cost for 6 gates all OHI supplied material ~ $1,000,000
- OHI parts warranty – 2 years

Final Comments

1. Jacksonville's H&H Branch has adopted these structures and proposed them on several future projects

2. Lower profile spillway structure that is mechanically much simpler due to no operating platform and may possibly save money

3. Use of this product successfully resolved a design dilemma for the Jacksonville District



OBERMEYER GATED SPILLWAY S381

Jacksonville District 2005

Video Presentation

Shows several of their installations

Benefits discussed include

- Drop gates without power (during floods)
- Gates can be independently operated
- Does not use hydraulic fluids
- Gates up to 10 meters tall
- Versatile, numerous applications