

Water Preserve Areas Feasibility Study
Selected Plan
Seep3a design region (WCA-3A Seepage Management Area)

Levee, Canals, Earth and Sitework
Submission to EN-C

Original Submission: 21 January 2001

Revised Submission: 31 January 2001

1. Cost estimates are needed for design features associated with the WCA-3A Seepage Management Area within the Water Preserve Areas (WPA) Feasibility Study. This cost estimate will be used as the Selected Plan in the study.
2. The point of contact for this request is Mr. Keith Jones, at extension 1127. Let me know if I can be of more assistance.

Attachments Provided:

1. Spreadsheet Analysis Report - 3 pages (revised)
2. Geotechnical Data and Assumptions - 3 pages (revised)
3. 11" x 17" Layout Drawings - 4 pages
 - Site Layout (levees.dgn) - 2 pages (north and south) shows design and cross section location
 - Alignments/Locations (levees.dgn) - 2 pages (north and south) shows levee and canal centerlines, distances and areas used for calculation
4. Cross Section Profiles - 1 page
5. Seep3a Design Region Scope - 2 pages
 - Contains a comprehensive list of design and cost feature

**Water Preserve Areas Feasibility Study
Levees and Canals Summary of Material Quantities
WCA-3A Seepage Management and/or seep3a Design Region (revised 1/30/01)**

	Gross Volume cu-yds	Rock Volume cu-yds	Overburden Volume cu-yds	InRoads Volume cu-yds
Excavated Materials				
Conveyance or Seepage Canals	3551407	2206456	1344951	4201431
F&W Littoral Shelves	0			
Intake and Discharge Basins	0			
Degraded Roads and Levees	11745			
Totals	3563152	2206456	1344951	4201431
Amount reusable= 90%	3206837	1985811	1210456	
Amount spoil= 10%	356315	220646	134495	
Quality Construction Material Required				
Fill Material Requirements	85603			126220
Spoil Material Disposal Areas				
Wind Breaks	0			
Borrow Pits/Mined Lakes	1058063			
Fill Areas	44902			
Totals	1102965			
Spoil Material Generated				
Excavated Materials	356315			
Totals	356315			

Notes:

Note: Due to the close proximity of US-27, earthwork will include 29000' in length of stormwater runoff design from US-27. The design will require earthwork grading to create a dry storage swale approximately 1' deep. Assume 20-30' width along the 29000' length. Assume one 10' long concrete weir every 500' (57 required).

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Excavation Requirements

Rock at Elevation = 2.0 ft-NGVD and below

Conveyance or Seepage Canals	Length feet	Inside Slope 1V on ?H	Outside Slope 1V on ?H	Bottom Width feet	Average Ground ft-NGVD	Canal Invert ft-NGVD	Canal Cut Depth feet	Cross Section Area sqft	Gross Volume cu-yds	Rock Volume cu-yds	Overburden Volume cu-yds	InRoads Length cu-yds	InRoads Volume cu-yds
C-500A													
S-502A to S-502	540	0.0	1.0	130.0	6.0	-8.0	14	1918	38360	27000	11360		
S-502 to S-501	2350	1.0	1.0	110.0	6.8	-8.0	14.8	1847	160761	104444	56316		
S-501 to S-500	29005	1.0	1.0	110.0	8.1	-8.0	16.1	2030	2180972	1289111	891861	32333	1378916
S-500 to S-500B	1120	2.0	2.0	40.0	8.6	-8.5	17.1	1269	52633	26569	26064		
S-500B to S-500C	3480	2.0	2.0	40.0	10.1	-8.5	18.6	1436	185074	82553	102521	2245	155951
C-500A Total	36495								2617799	1529678	1088122	34578	1534867
C-502A													
S-502B to S-502	540	0.0	1.0	130.0	6.0	-8.0	14	1918	38360	27000	11360		
S-502 to S-504A	1790	1.0	1.0	120.0	6.6	-8.0	14.6	1965	130283	86185	44098		
S-504A to S-500A	32590	1.0	1.0	100.0	7.6	-8.0	15.6	1803	2176722	1327741	848982		
S-500A to I-75 Canal	645	1.0	1.0	100.0	10.6	-8.0	18.6	2206	52698	26278	26420		
C-502A Total	35565								2398063	1467204	930859	35600	2666564
New Conveyance Canal Totals	72060								5015863	2996881	2018981		
Existing Canals													
Existing L-37 Borrow Canal	28575	1.0	1.0	60.0	8.1	-8.0	16.1	1225	1296681	740833	555847		
Existing US-27 Borrow Canal													
1st Section/Southern	5860	1.0	1.0	40.0	7.0	-1.0	8	384	83342	27998	55344		
2nd Section/Northern	9110	1.0	1.0	30.0	6.8	0.0	6.8	250	84433	21594	62839		
Existing Canals Totals	43545								1464456	790425	674030		
Note1: Existing L-37 and US-27 Borrow Canals are subtracted from totals because they are along the new alignments of C-500A and C-502A													
New Conveyance Canals minus Existing Borrow Canals													
Totals									3551407	2206456	1344951		4201431
F&W Littoral Shelves	Length feet	Width feet	Area Acres		Average Ground ft-NGVD	Invert ft-NGVD	Cut Depth feet	Cross Section Area sqft	Gross Volume cu-yds				
Totals	0		0.0						0				
Note: There are no Fish and Wildlife shelves along these canals because the additional area used would impact existing wetlands.													
Intake and Discharge Basins	Area sqft	Area Acres			Average Ground ft-NGVD	Invert ft-NGVD	Cut Depth feet		Gross Volume cu-yds				
Totals		0.0							0				
Degraded Roads	Length feet	Width feet	Area Acres		Average Ground ft-NGVD	Surface Elevation ft-NGVD	Cut Depth feet	Cross Section Area sqft	Gross Volume cu-yds				
FPL east to west maintenance access road	2275	20.0	1.0		8.2	9	0.8	16	1348				
Degrade Levees	Length feet	Inside Slope 1V on ?H	Outside Slope 1V on ?H	Top Width feet	Average Ground ft-NGVD	Top of Levee ft-NGVD	Levee Height feet	Cross Section Area sqft	Gross Volume cu-yds				
L-37 near S-500	680	3.0	3.0	12	8.1	18.0	9.9	413	10397				
Totals	2955								11745				

**Water Preserve Areas Feasibility Study
Levees and Canals Summary of Material Quantities
WCA-3A Seepage Management and/or seep3a Design Region (revised 1/30/01)**

Fill Material Requirements

Levees	Length feet	Inside	Outside	Top Width feet	Average	Top of	Levee Height feet	Cross	Gross Volume cu-yds	InRoads Length cu-yds	InRoads Volume cu-yds
		Slope 1V on ?H	Slope 1V on ?H		Ground ft-NGVD	Levee ft-NGVD		Section Area sqft			
L-502A west of C-502A	32150	3.0	3.0	12	7.5	8.5	1.0	15	17861	35600	126220
L-502A east of C-502A	910	3.0	3.0	12	6.3	8.5	2.2	41	1379		
New L-37 tie-in levee	3190	3.0	3.0	12	9.2	20.0	10.8	480	56654		
Tie-in levee southeast of S-500A	1870	3.0	3.0	12	8.7	12.0	3.3	72	5005		
Divide levee north of I-75	330	3.0	3.0	12	10.5	20.0	9.5	385	4703		
Totals	38450								85603	35600	126220

Wind Breaks	Length feet	Inside	Outside	Top Width feet	Average	Top of	Levee Height feet	Cross	Gross Volume cu-yds
		Slope 1V on ?H	Slope 1V on ?H		Ground ft-NGVD	Levee ft-NGVD		Section Area sqft	
Totals	0								0

Borrow Pits/Mined Lakes	Area sqft	Area acres	Bottom	Finished	Fill Depth feet	Gross Volume cu-yds
			Depth ft-NGVD	Depth ft-NGVD		
#1	196740	4.5	-20.0	0.0	20.0	145733
#2	132520	3.0	-20.0	0.0	20.0	98163
#3	70540	1.6	-20.0	0.0	20.0	52252
#4	969535	22.3	-20.0	0.0	20.0	718174
#5	59050	1.4	-20.0	0.0	20.0	43741
Totals		32.8				1058063

Fill Areas	Length feet	Width feet	Area sqft	Area acres	Average	Finished	Fill Depth feet	Gross Volume cu-yds
					Ground ft-NGVD	Height ft-NGVD		
East of S-502B/West of US-27 FPL Maintenance Access Roads			294010	6.7	5.8	8.5	2.7	29401
North/South Access Roads	29030	12.0	348360	8.0	7.7	8.5	0.8	10322
East/West Lateral Access Roads	11880	12.0	142560	3.3	7.7	8.5	0.8	4224
Raise C-11 North Bank from S-9A to S-502	1910	15.0	28650	0.7	7.6	8.5	0.9	955
Totals	42820			18.7				44902

***Geotechnical Data and Assumptions to Use for
Feasibility Level Cost Estimates (Amended 1/27/01)

Design Region: seep3a

Notes:

1. Design region features for this area are mainly excavation of conveyance canals (minor levee L-502A only on C-502A).
2. L-502A contains flows in conveyance canal C-502A and is designed with minimal height so as minimize impacts on existing wetlands.
3. Overtopping of L-502A is a **remote event** and does not present a hazardous risk.

Compaction Factor for Sandy Overburden:

Answer: 0.85

Swell Factor for Sandy Overburden:

Answer: 1.10

Compaction Factor for Rock:

Answer: 0.85

Swell Factor for Rock:

Answer: 1.30

Material Makeup of Levee Embankment:

Answer: Material may be utilized from the sand and gravel overburden excavated for the seepage canals/Fish refugia. If additional material is required, crushed rock should be utilized. This material must be crushed to a maximum particle size of 3 inches or less in order to utilize for levee construction. **It is estimated that overburden exists from ground surface to elevation +2. From +2 to elevation -15 feet NGVD limestone bedrock will be encountered with intermittent Sand lenses. At elevation -15 and deeper, mostly hard limestone is in place.**

*** Assumptions based upon limited subsurface information and prior projects, as of 1/27/01

Special Levee Construction Design Criteria:

Foundation Treatment:

Answer: None

Seepage Control

Answer: None

Slope Protection:

Answer: Upstream and downstream embankment perimeter will be grassed for erosion protection.

Where the material will come from?

Answer: Material for L-502A will be obtained from:

1. Usable excavated material from adjacent conveyance canal C-502A. This material will contain sand, clay, peat and limestone according to available drill logs.

Excavation Procedure/Technique and/or Blasting Requirements (at this location only):

Answer: Assume some blasting of rock will be required (Rios from EN-G will supply blasting patterns/plan). After initial rock blasting some additional ripping will be required with backhoe with ripper attachment. Following blasting and ripping, normal excavation equipment may be utilized.

Percentage of Usable Excavated Material: Since the Levee L-502A will be designed as a dam and is not critical with respect to loss of life or much property damage should it fail, the percentage of usable excavated materials can be raised to 90%.

Percentage of Usable Excavated Overburden Soil Material:

Answer: Assume 90% of the material can be reused. The remaining 10% should be disposed of onsite or at an approved disposal area. Using excess unsuitable material to build wind breaks, boat ramps or to flatten interior slopes is recommended also. The distribution of overburden soil versus rock is detailed above in red.

Percentage of Usable Excavated Rock Material:

Answer: Assume 90% of the material can be reused. The remaining 10% should be disposed of onsite or at an approved disposal area. Using excess unsuitable material to build wind breaks, boat ramps or to flatten interior slopes is recommended also. The distribution of overburden soil versus rock is detailed above in red.

Other Considerations:

If additional rock material is required to construct C-11, a rock crushing plant may be setup within the Seepage management area to process excavated rock material prior to placement. Conveyor systems or multiple crushing plants may reduce the overall hauling costs.

Assume overburden soils have a unit weight of 115 pcf while limestone has unit weight of 145 pcf for hauling purposes.

When constructing the levee, the Contractor will be required to utilize 12 inch lifts which then will be compacted down to 10 to 11 inches. Compaction requirements will be to 98% maximum dry density based upon standard proctor compaction tests or a nuclear density meter. Also, control of excessive moisture shall be the responsibility of the Contractor.

Geotechnical Instrumentation:

NOTE: This instrumentation is required for monitoring and operational safety of project features within the design region.

1. Shallow Depth Piezometers (\pm 5.0 feet from natural grade)

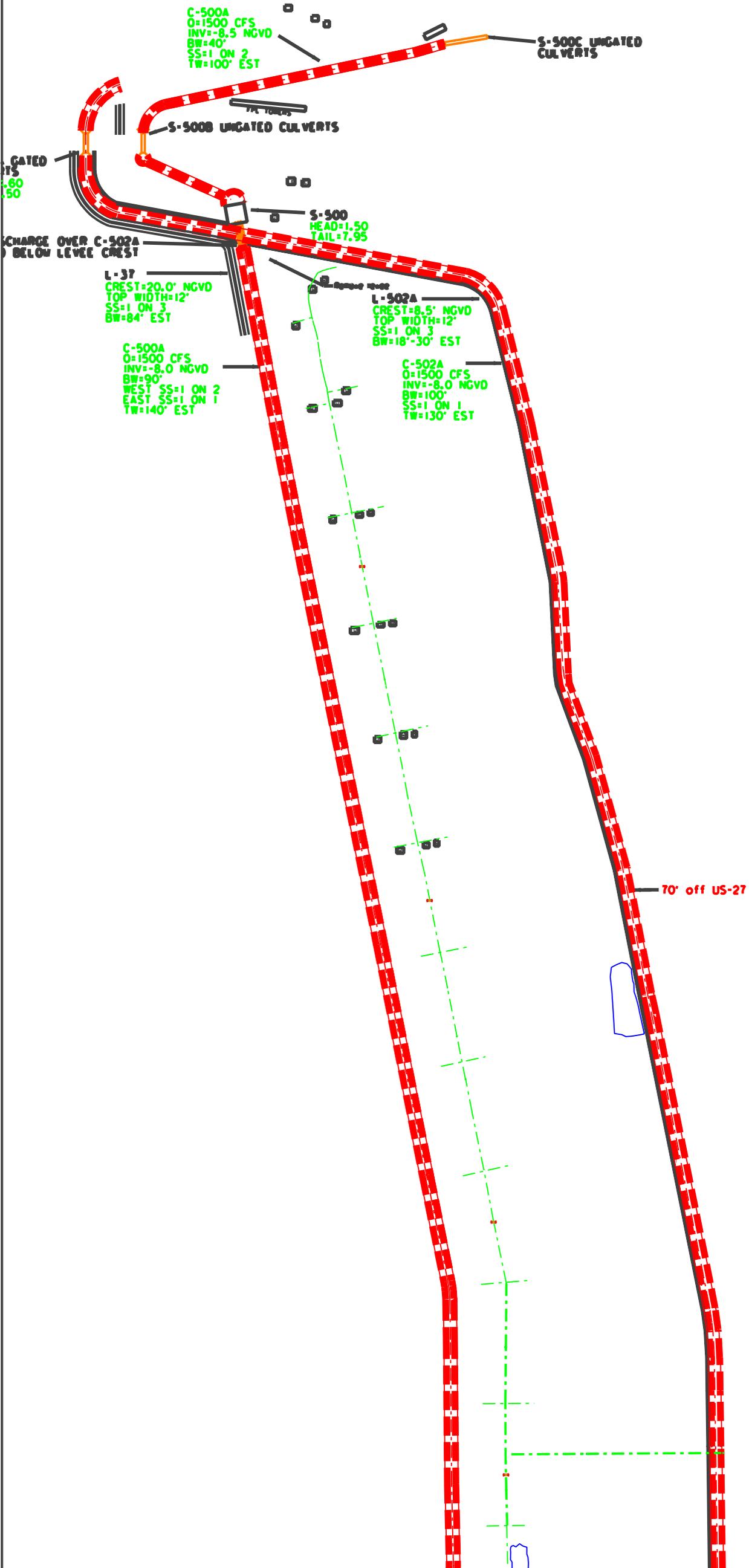
Answer: None

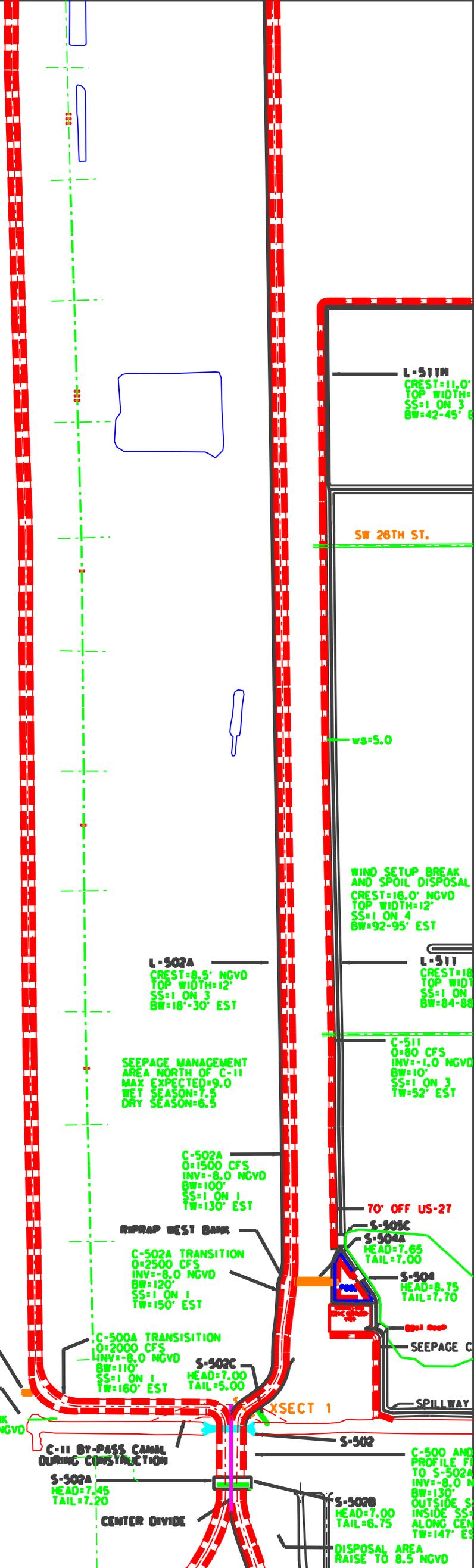
2. Medium Depth Piezometers (greater than 5.0 and less than 50 feet from natural grade) None

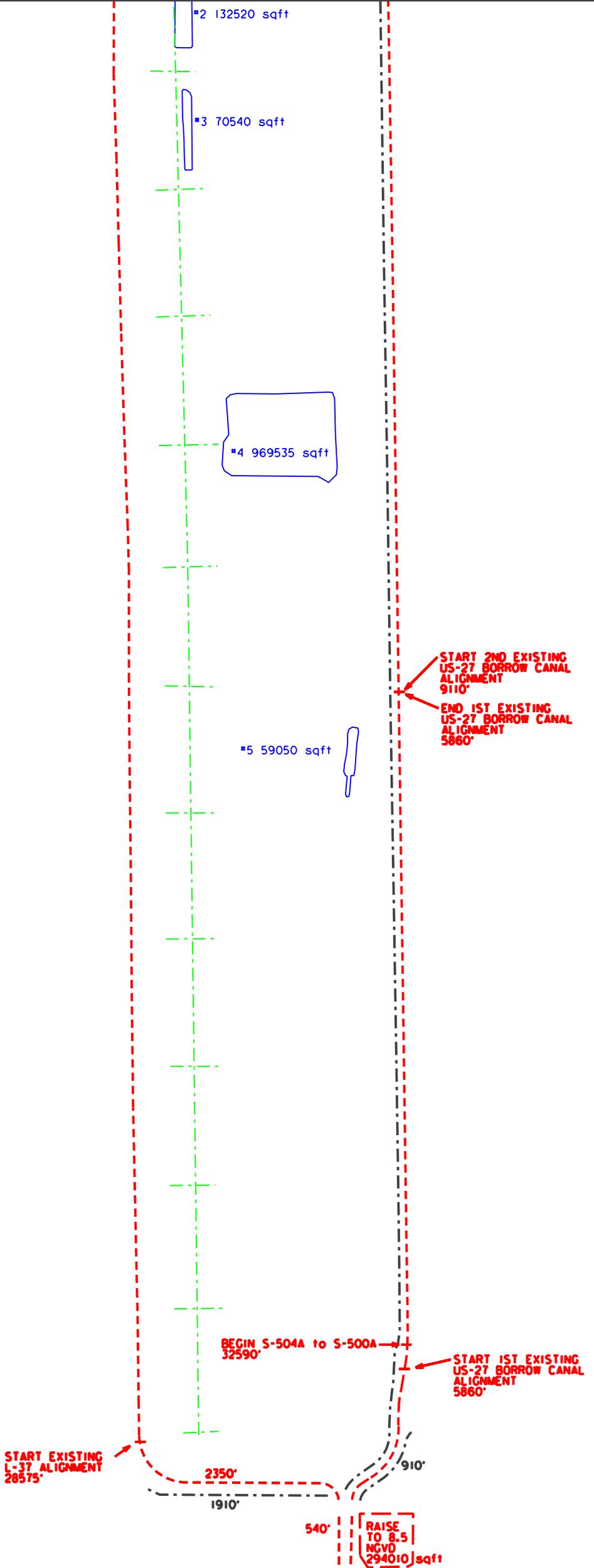
3. Deep Depth Piezometers (greater than 50 feet from natural grade) None

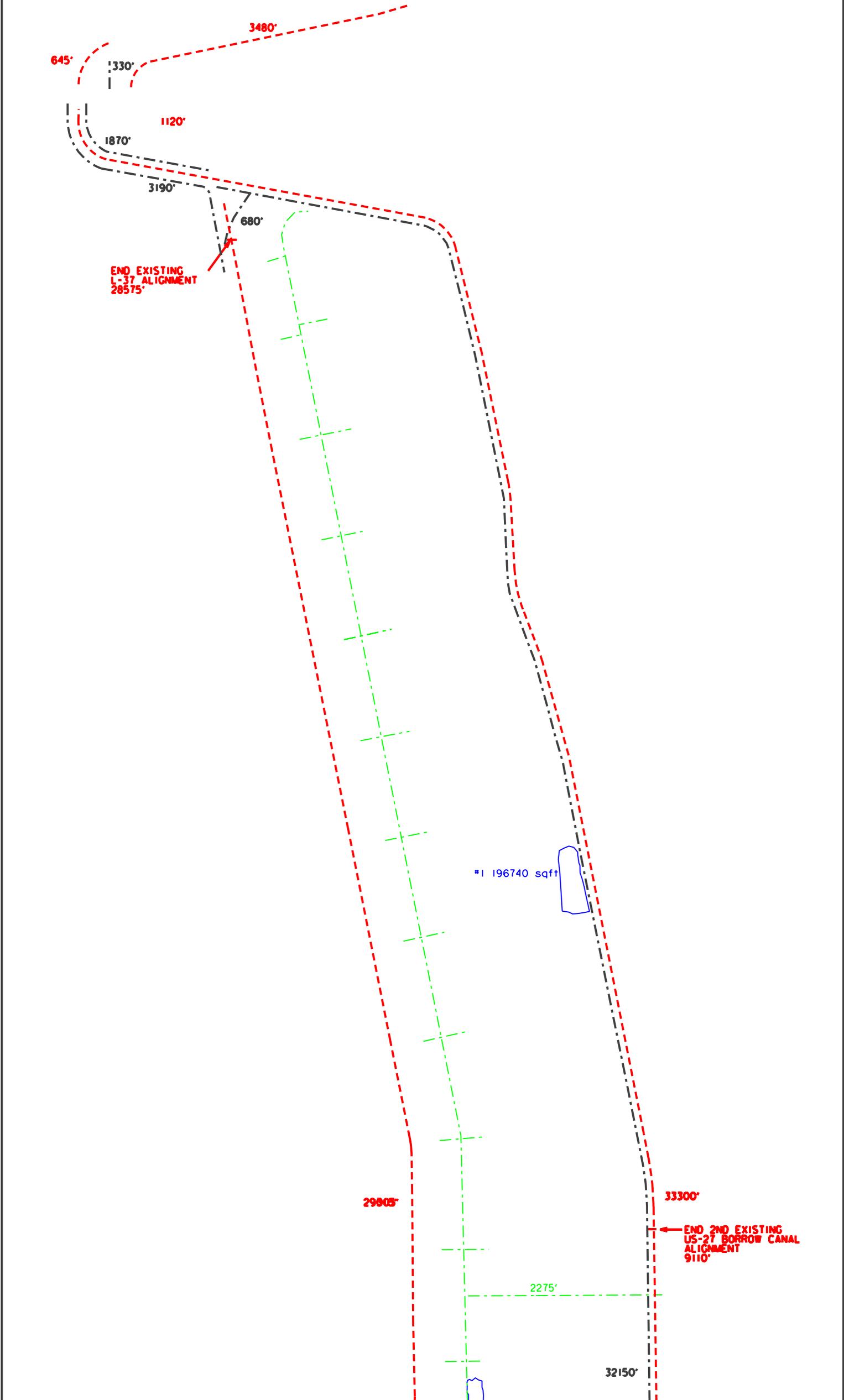
4. Inclinometers - None

5. Others

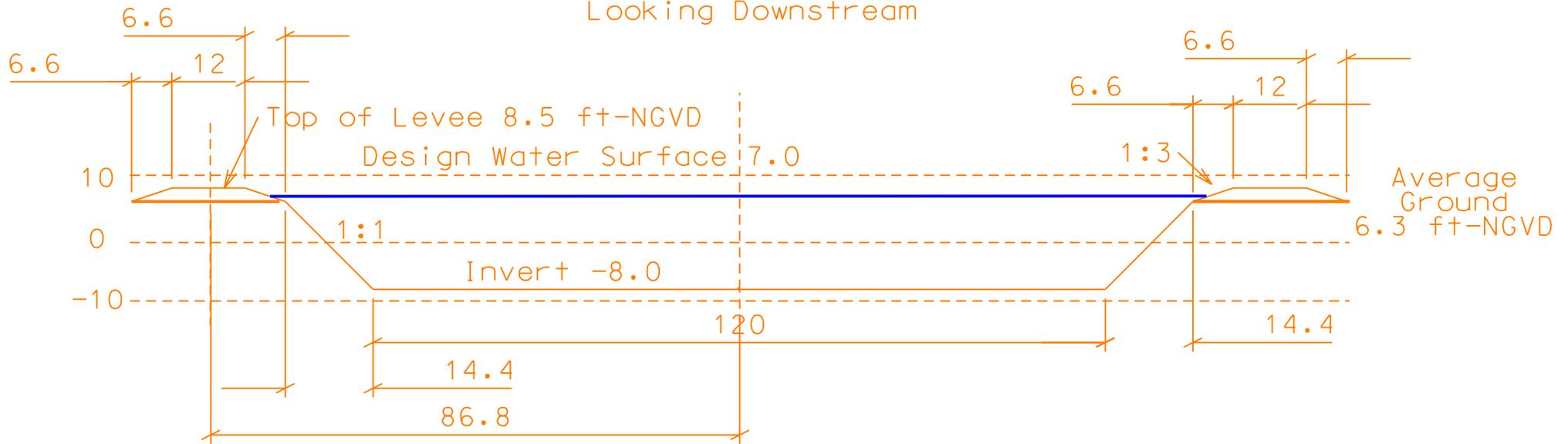








Xsection 1
C-502A near S-502B
Looking Downstream



Design Region: seep3a (WCA-3A Seepage Management Area)

Design:

a) Design conveyance canals, levees, gated culverts, gated spillways, tunnels, siphon and a pump station.

Pumps:

1. S-500

Siphons:

1. S-502

Spillways:

1. S-502A

2. S-502B

NOTE: Griffin Road will be rerouted over S-502A and S-502B service bridge. This design will eliminate the need to bridge over C-500 and C-502.

Gated Culverts:

1. S-500A - See Note #2

2. S-501

3. S-502C

Un-Gated Culverts:

1. S-500B - See Note #2

2. S-500C - See Note #2

Levees:

1. L-502A

2. L-37 - Extension at northern end in proximity of US-27/I-75 interchange

Canals:

1. C-500A

2. C-502A - Due to the close proximity of US-27, earthwork will include 29000' in length of stormwater runoff design from US-27. The design will require earthwork grading to create a dry storage swale approximately 1' deep. Assume 20-30' width along the 29000' length. Assume one 10' long concrete weir every 500' (57 required).

Notes:

1. ROW - Eastern boundary limits begins approximately 70' from US-27 northbound lane.

2. S-500A, S-500B and S-500C configuration is based on a Type, Size and Location Study No.1 done by URS Group, Inc.

recommendation in A/E Services Contract DACW17-99-D-0048,
January 2001

Utilities:

1. Fiber optics along west side of US-27
2. FPL high power transmission lines
3. Phone and electric in northwestern section of interchange
4. Petroleum pipe in northwestern section of interchange