Water Preserve Areas Feasibility Study
Selected Plan
acme design region (Acme B STA)

Levee, Canals, Earth and Sitework
Submission to EN-C
Original Submission: 9 March 2001

1. Cost estimates are needed for design features associated with the Acme B STA 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 – 1 page
2. Geotechnical Data and Assumptions – 3 pages
3. 8 1/2″ x 11″ Layout Drawings – 2 pages
   - Site Layout (levees.dgn) – shows design
   - Alignments/Locations (levees.dgn) – shows levee and canal centerlines, distances and areas used for calculation, and cross section location
4. Cross Section Profiles – 3 page
5. Acme 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
Acme B STA

Excavated Materials		Gross Volume cu-yds	Rock Volume cu-yds	Overburden Volume cu-yds
Conveyance or Seepage Canals		245429	0	245429
Intake and Discharge Basins	(See Note 1)	15050	1267	13783
Totals		**260480**	**1267**	**259213**
Amount reusable=	**70%**	**182336**	**887**	**181449**
Amount spoil=	**30%**	**78144**	**380**	**77764**
Quality Construction Material Required				
Fill Material Requirements		**192540**		

Excavation Requirements

Rock at Elevation = **3.8** 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
Seepage Canal C-505											
Northern Boundary	5150	3.0	3.0	5.0	13.0	5.0	8	232	44252	0	44252
Eastern Boundary	1670	3.0	3.0	5.0	13.0	5.0	8	232	14350	0	14350
Southern Boundary	4480	3.0	3.0	5.0	13.0	5.0	8	232	38495	0	38495
Western Boundary	3205	3.0	3.0	5.0	13.0	5.0	8	232	27539	0	27539
C-505 Totals	**14505**								**124636**	**0**	**124636**
STA Canals											
Discharge Canal	3180	3.0	3.0	10.0	12.5	4.0	8.5	302	35539	0	35539
Cell A Distribution Canal	1455	3.0	3.0	10.0	12.5	4.0	8.5	302	16261	0	16261
Cell A Deep Zone Trench	1455	3.0	3.0	5.0	12.5	6.0	6.5	159	8582	0	8582
Cell B Distribution Canal	1635	3.0	3.0	10.0	12.5	4.0	8.5	302	18273	0	18273
Cell B Deep Zone Trench	1460	3.0	3.0	5.0	12.5	6.0	6.5	159	8611	0	8611
Collection Canal	3000	3.0	3.0	10.0	12.5	4.0	8.5	302	33528	0	33528
STA Canal Totals	**12185**								**120794**	**0**	**120794**
Totals	**26690**								**245429**	**0**	**245429**

Intake and Discharge Basins	Area sqft	Area Acres	Average Ground ft-NGVD	Invert ft-NGVD	Cut Depth feet	Gross Volume cu-yds	Rock Volume cu-yds	Overburden Volume cu-yds
S-533 Intake	42775	1.0	12.5	3.0	9.5	15050	1267	13783
Totals		**1.0**				**15050**	**1267**	**13783**

Fill Material Requirements

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	InRoads Length cu-yds	InRoads Volume cu-yds
L-505											
Northern Boundary	5020	3.0	3.0	12	12.5	20.0	7.5	259	48108		
Eastern Boundary	3290	3.0	3.0	12	12.5	20.0	7.5	259	31529		
Southern Boundary	4465	3.0	3.0	12	12.5	20.0	7.5	259	42790		
Western Boundary	3090	3.0	3.0	12	12.5	20.0	7.5	259	29613		
L-505I East/West	4810	3.0	3.0	12	12.5	17.5	5	135	24050		
L-505I North/South	3290	3.0	3.0	12	12.5	17.5	5	135	16450		
Totals	**23965**								**192540**		

[***]Geotechnical Data and Assumptions to Use for Feasibility Level Cost Estimates (Amended 3/08/01)

Design Region: ACME STA

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: Core borings from STA 1-E were reviewed to determine borrow sources. Specifically, CB-362-1 was reviewed since it is located at the southwestern corner of the proposed STA. Material may be utilized from the sand and gravel overburden excavated for the seepage canals/Fish refugia. A majority of the material will be excavated from inside the impoundment. It is estimated that sand and gravel overburden exists from ground surface to elevation 3.8 feet NGVD. From 3.8 feet to elevation –2.7 feet NGVD hard sandy limestone bedrock will be encountered with intermittent Sand lenses. From –2.7 feet NGVD to –46.7 feet NGVD, silty-Sand is present.

Special Levee Construction Design Criteria:
Foundation Treatment:
Answer: Remove top 18 inches of overburden for levee width. In addition, assume 1% of levee length requires removal of 36 inches of overburden.

Seepage Control:
Answer: None required.

[***] Assumptions based upon limited subsurface information and prior projects, as of 3/8/01

Slope Protection:

Answer: Grass upstream and downstream slopes similar to other WPA impoundments.

Where the material will come from?

Answer: Material will be obtained from onsite excavation of embankment soils.

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.

Other Considerations:

-- 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.

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

Percentage of Usable Excavated Overburden Soil Material:

Answer: Assume 70% of the material can be reused. The remaining 30% 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 70% of the material can be reused. The remaining 30% 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.

Geotechnical Instrumentation:

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

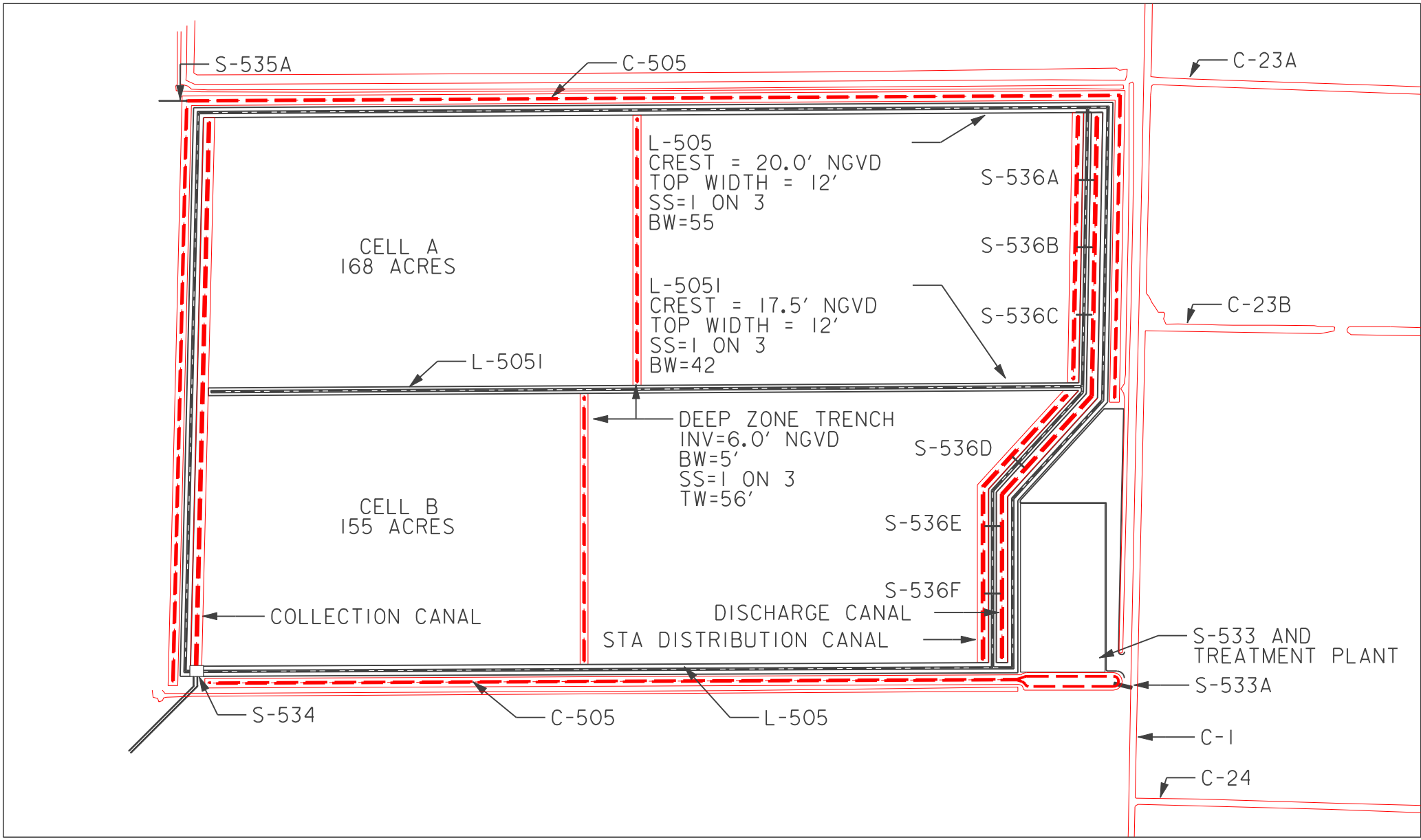
1. Shallow Depth Piezometers (∓ 5.0 feet from natural grade)
   Answer: Assume 4 shallow piezometers.

2. Medium Depth Piezometers (greater than 5.0 and less than 50 feet from natural grade): Assume 4 medium depth piezometers.

3. Deep Depth Piezometers (greater than 50 feet from natural grade): Assume none required.

4. Inclinometers – Assume none required.

5. Others



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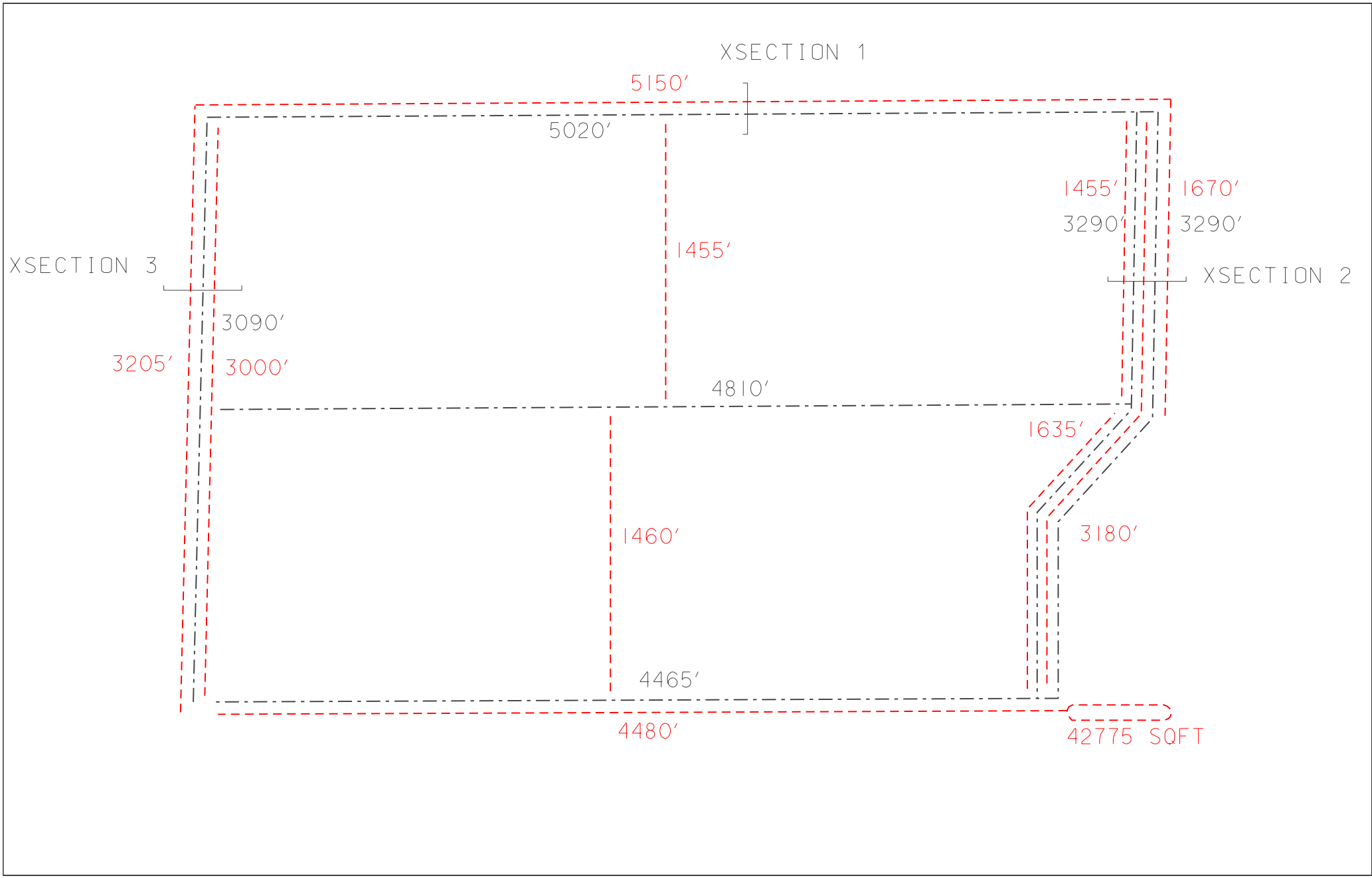

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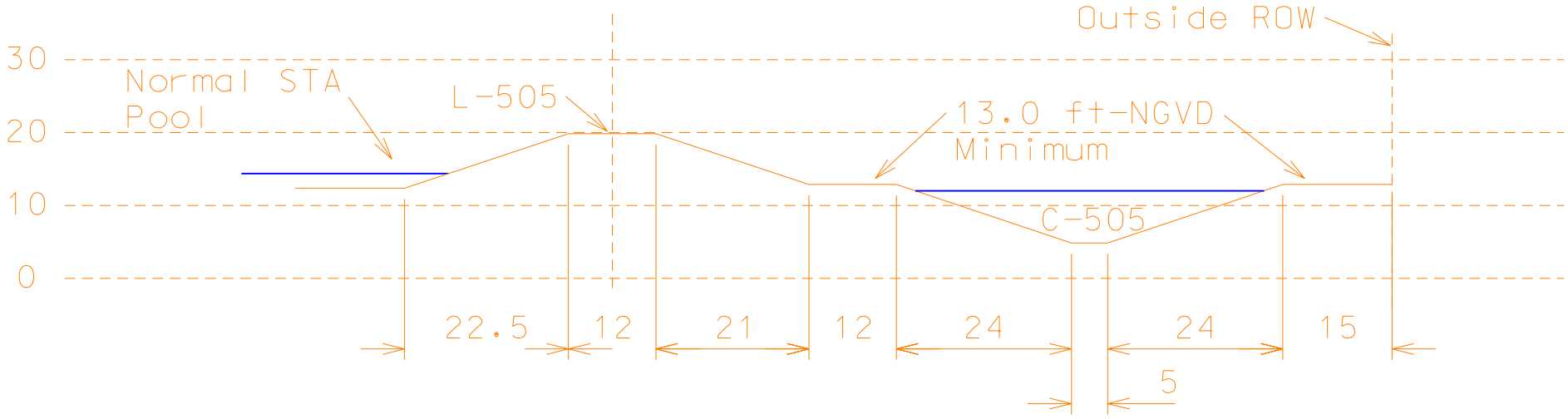
Xsection 1 of Acme STA
Northern Boundary (Typical)
Looking West



Design Elevations (ft-NGVD)
Top of Levee L-505 20.0
Maximum STA Pool 16.5
Normal STA Pool 14.0-15.0
Average STA Ground 12.5
Seepage Canal Optimum 11.8-12.0
Bottom of Seepage Canal 5.0

Preliminary Design Slopes
Outside Levee Slope = 1V:3H
Inside Levee Slope = 1V:3H
Seepage Canal Slope = 1V:3H

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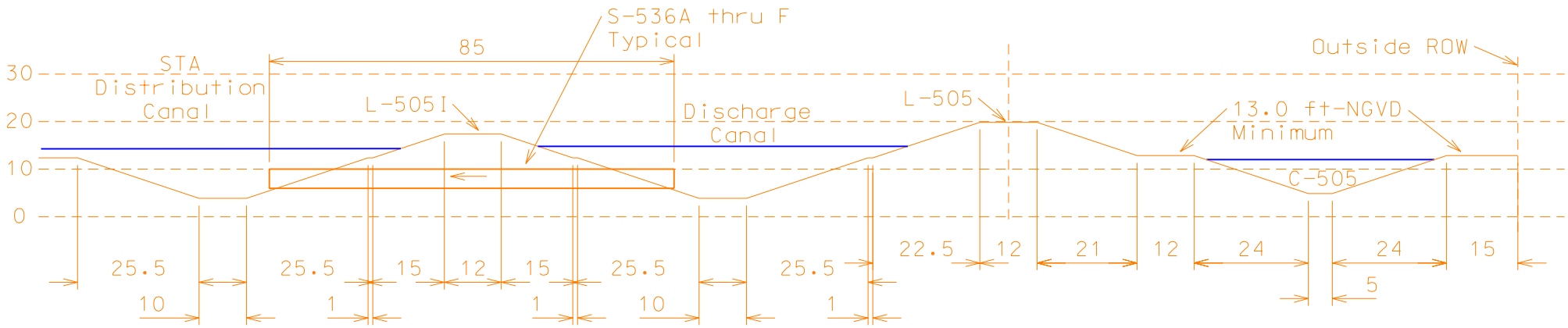
Xsection 2 of Acme STA
Eastern Boundary
Looking North



Design Elevations (ft-NGVD)
Top of Levee L-505 20.0
Top of Levee L-505I 17.5
Maximum Discharge Canal 17.0
Maximum STA Pool 16.5
Normal Pool 14.0-15.0
Average STA Ground 12.5
Seepage Canal Optimum 11.8-12.0
Bottom of Seepage Canal 5.0

Preliminary Design Slopes
Outside Levee Slope = 1V:3H
Inside Levee Slope = 1V:3H
Seepage Canal Slope = 1V:3H

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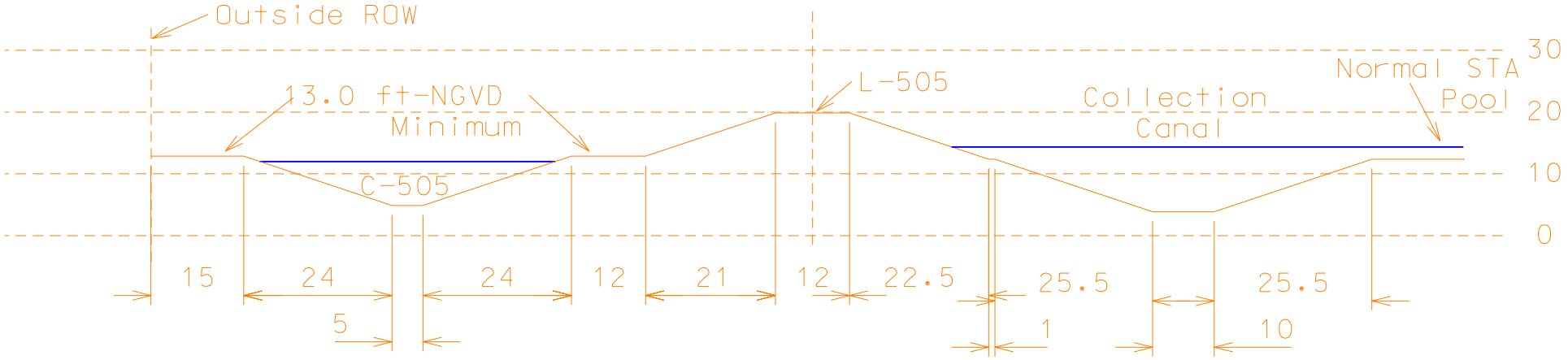
Xsection 3 of Acme STA
Western Boundary
Looking North



Design Elevations (ft-NGVD)
Top of Levee L-505 20.0
Maximum STA Pool 16.5
Normal STA Pool 14.0-15.0
Average STA Ground 12.5
Seepage Canal Optimum 11.8-12.0
Bottom of Seepage Canal 5.0
Bottom of Collection Canal 4.0

Preliminary Design Slopes
Outside Levee Slope = 1V:3H
Inside Levee Slope = 1V:3H
Seepage and Collection Canal Slope = 1V:3H

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Design Region: acme (Acme B Basin)

Design:
a) Design levees for 8′ deep impoundment. Consider future ASR systems retrofit in design. Plug C-26 on southern boundary.
b) Design gated culverts and a pump station for an 8′ deep impoundment.
c) Rebuild Acme Improvement District structure #66 approximately 3800 feet west of current location with an un-gated 72″ concrete culvert, 50′ length.
d) Construct a soil-cemement-bentonite/polymer liner across the entire impoundment which is approximately 600 acres. The soil-cement-bentonite/polymer liner will be 1 foot thick and shall be mixed in place with conventional scrapers, graders or other similar equipment.
e) Design levees for 4′ deep STA. Allow area for chemical treatment plant.
f) Design pump stations for inflow and discharge for STA.
g) Design seepage control and compartment water level control structures for STA.

Acme B Impoundment
Design Elevations (Ft-NGVD)
Top Of Levee 32.0
Surcharge Pool 27.0
Full Pool (Spillway Invert) 25.2
Normal Pool 24.0
Average Impoundment Ground 16.0
Excavation Max Depth 10.0

Storage Area = 575 Acres
Normal Pool Depth = 8 Feet
Storage = 4600 Acft

Pumps:
1. S-531 Impoundment inflow pump
2. S-533 STA inflow pump
3. S-534 STA discharge pump

Gated Culverts:
1. S-532 Impoundment discharge control structure
2. S-535 STA seepage control structures
3. S-536 STA compartment level control structures

Un-gated Culverts:
1. Acme #66 – Access to impoundment and features from the northern boundary.

Levees:
1. L-505 STA impoundment levee
2. L-505I STA internal compartment levee
3. L-506 Impoundment levee

Canals:
1. C-505 STA seepage canal along outside boundary
2. C-505I STA internal distribution canals

Facilities:
1. Chemical pre-treatment facility prior to flowing through STA marsh

Utilities:
1. Phone and electric

Issues:
1. Chemical treatment plant design can possibly be obtained from SFWMD.
2. Conveyance between impoundment and STA has been stated as being appropriate.
3. Basin flood protection levels dependant on a combination of several factors including basin removal rates, impoundment drawdown rates and allowable drawdown routes and times.