

175069 ①

CERTIFICATION # PA 89-25

WETLAND RESTORATION AND CREATION PLAN

FOR

MYRTLE SLOUGH BASIN ON THE CECIL M. WEBB WILDLIFE MANAGEMENT AREA

CHARLOTTE COUNTY, FLORIDA

INDEX OF DRAWINGS

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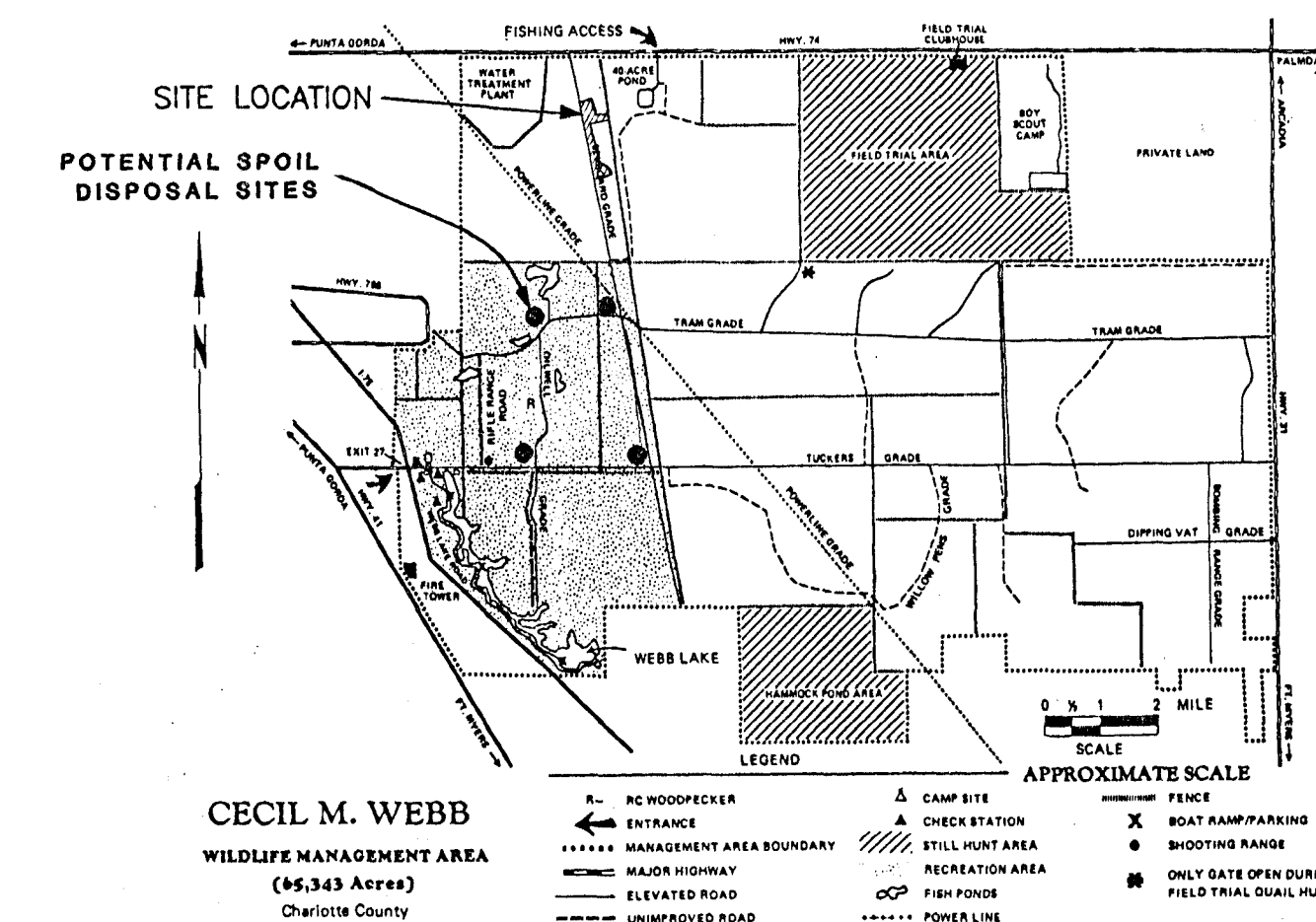
SEGMENT 1, 1A, & 2 - HARDEE POWER STATION TO LEE SUBSTATION

PREPARED FOR

SEMINOLE ELECTRIC COOPERATIVE, INC.

16313 NORTH DALE MABRY HIGHWAY
P.O. BOX 27200
TAMPA, FLORIDA 33688-2000

LOCATION MAP



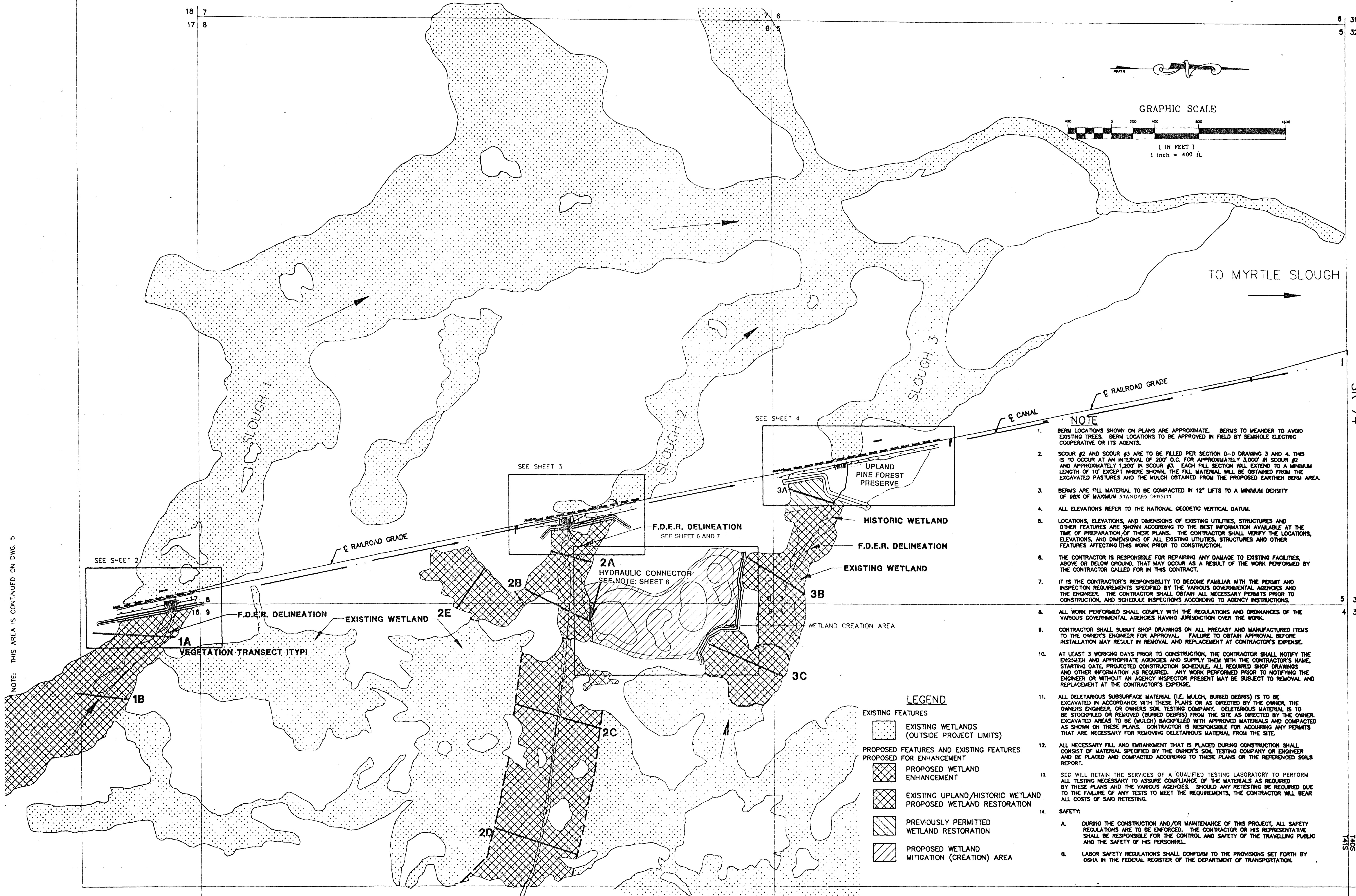
A CILCORP Company

Environmental
Science &
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NOVEMBER 9, 1992

5840 WEST CYPRESS STREET, SUITE A
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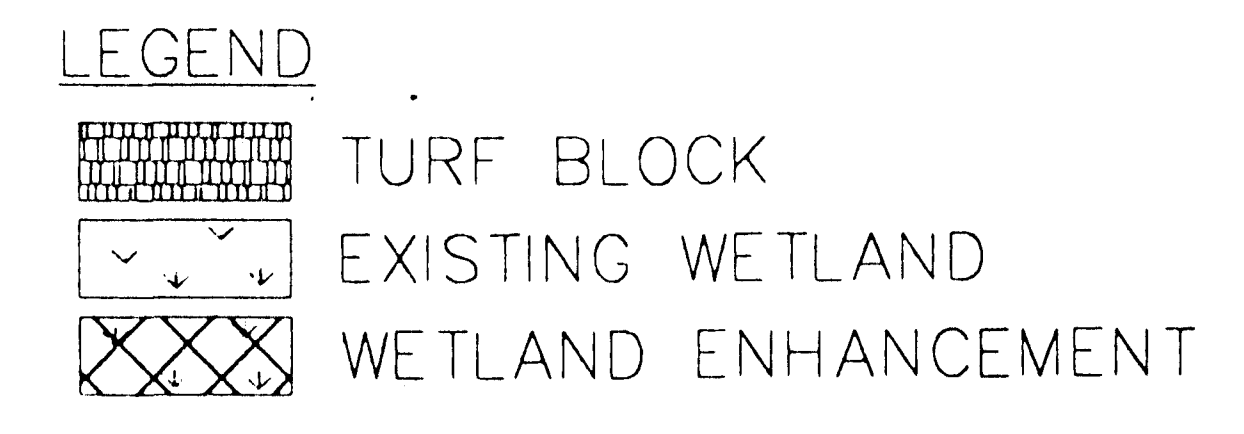
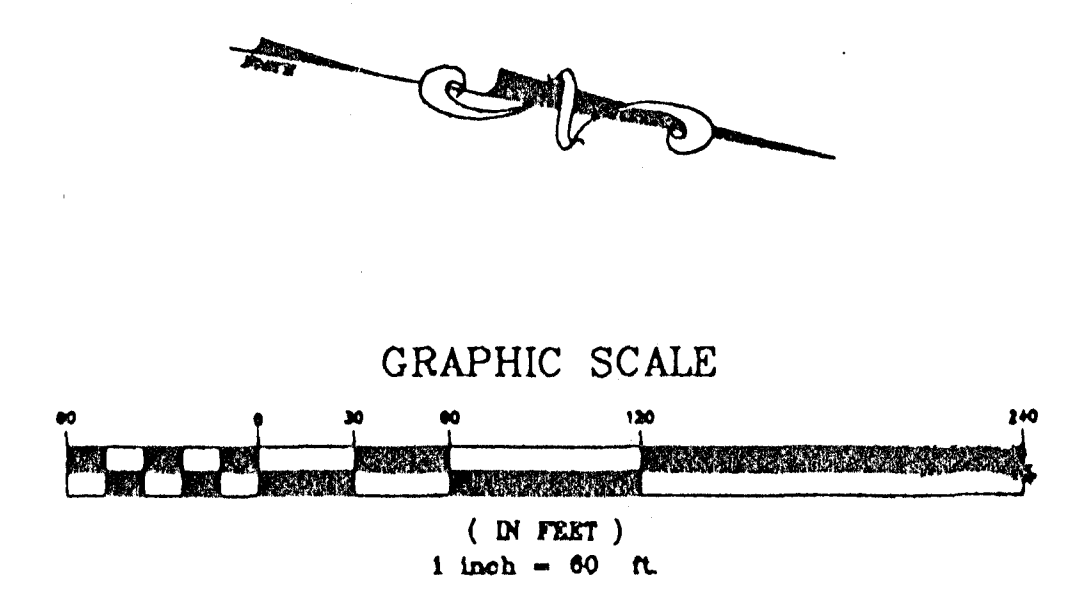
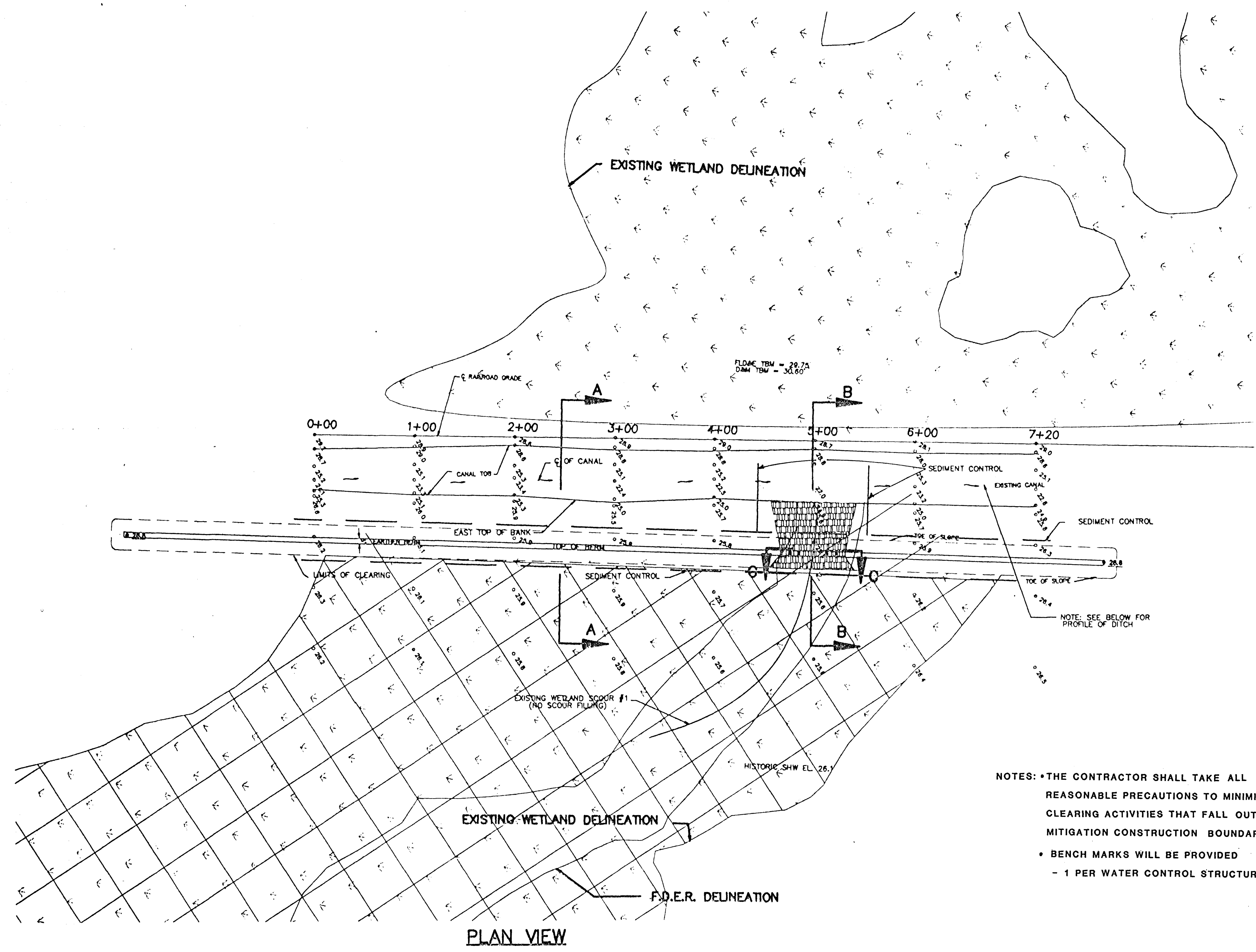
NOTE: ORIGINAL SOURCE OF DESIGN AND SURVEY
DATA DAMES AND MOORE- APRIL 1992

REVISION DATE: NOVEMBER 9, 1992

KEY PLAN AND NOTES

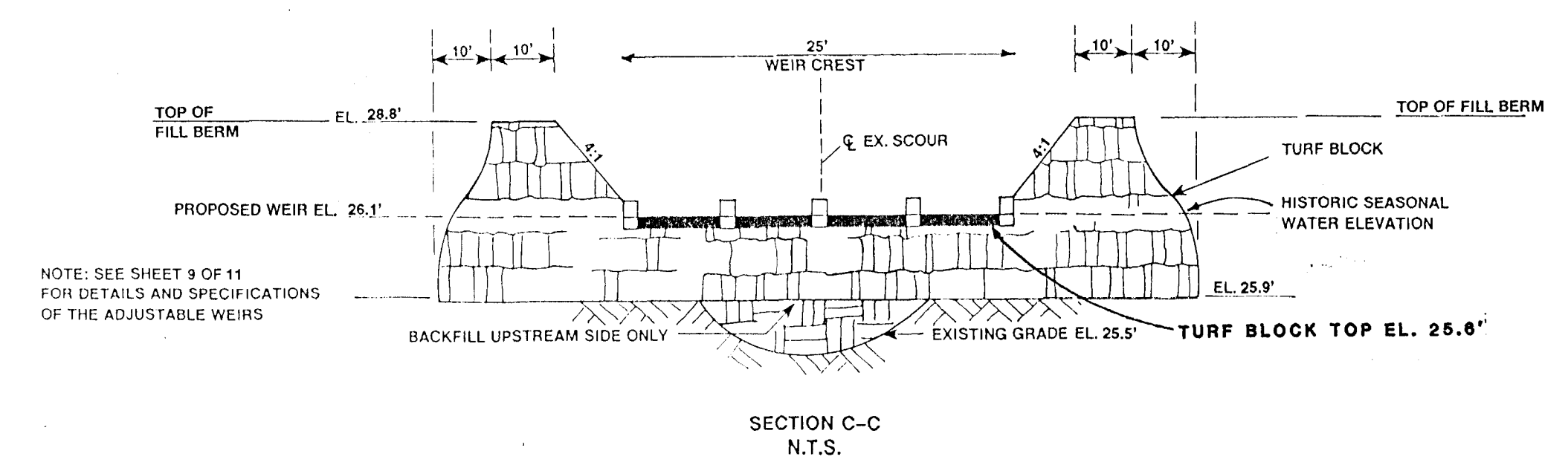
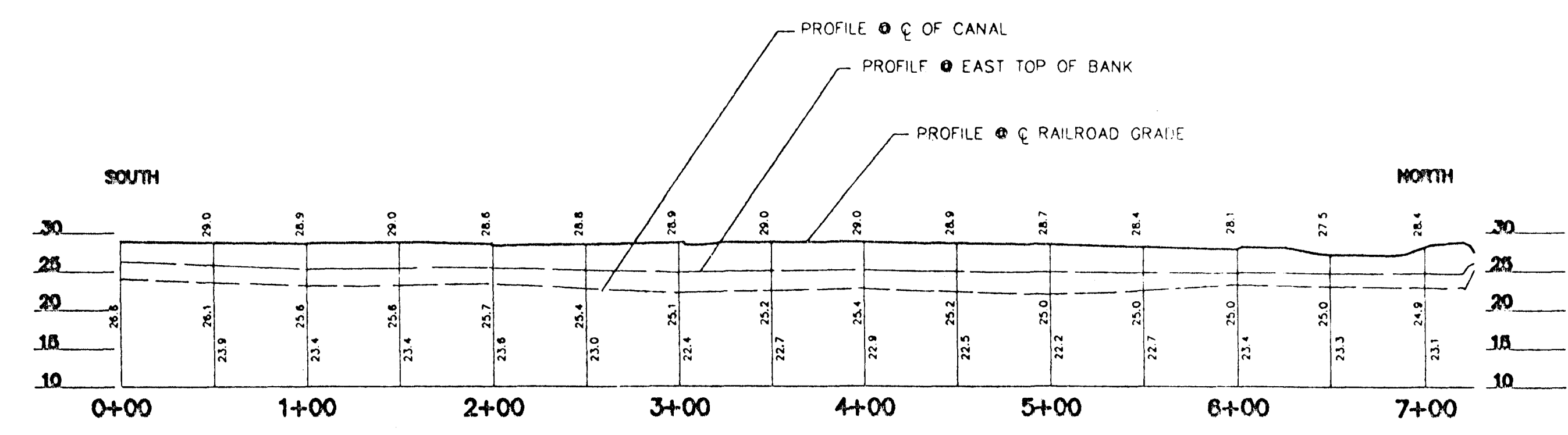
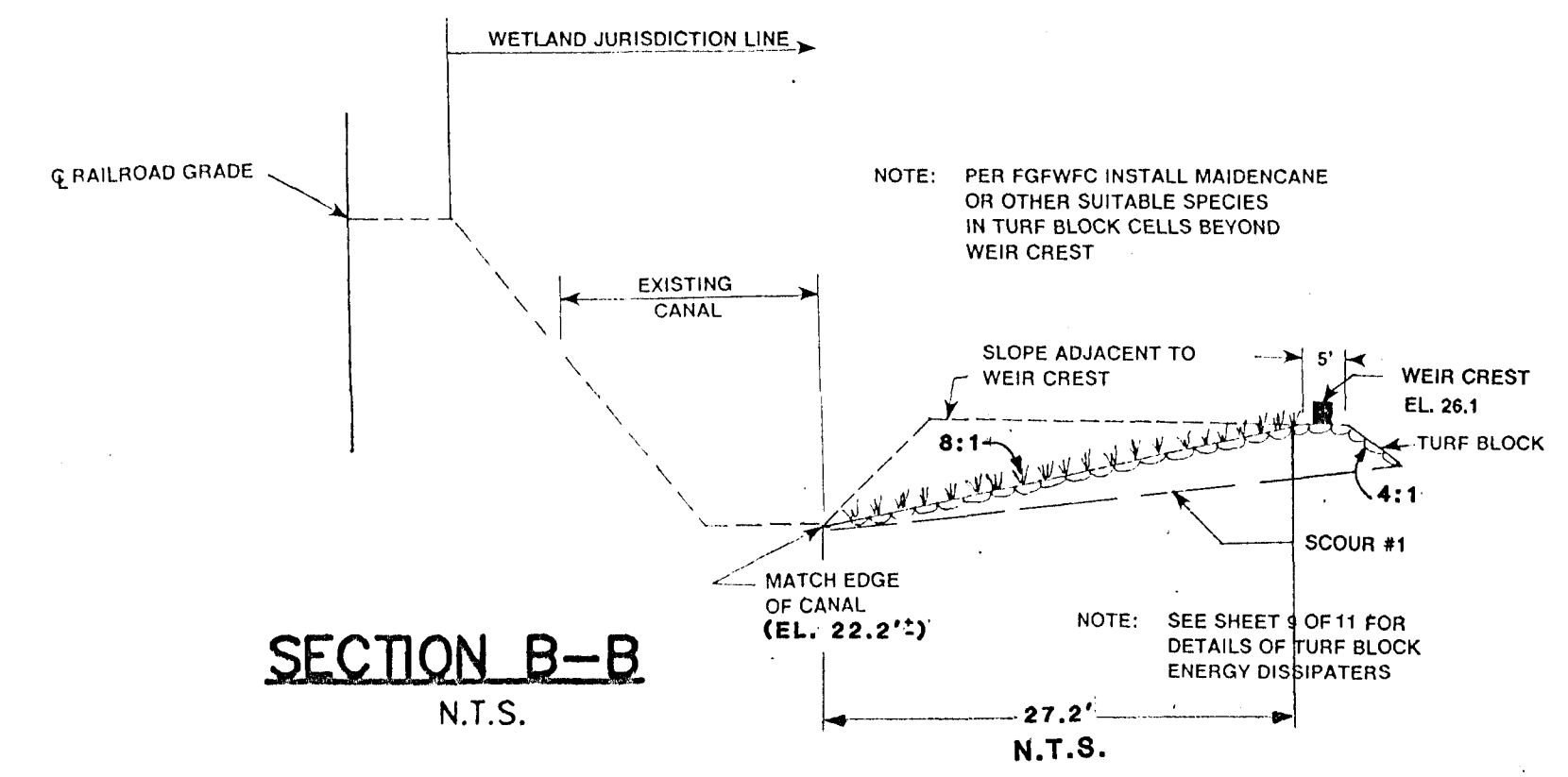
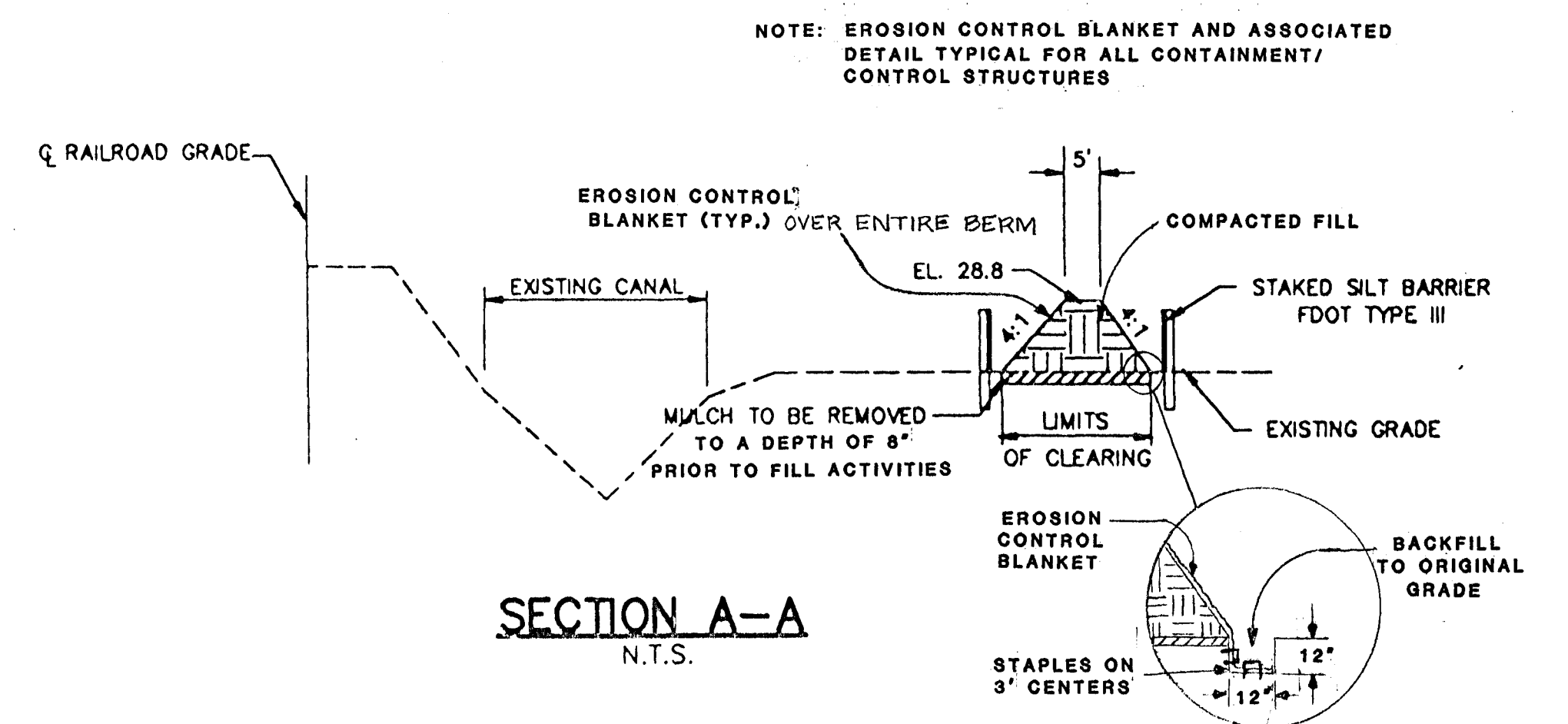
WETLAND RESTORATION AND CREATION
FOR
SEMINOLE ELECTRIC COOPERATIVE
16313 NORTH DALE MABRY HIGHWAY
TAMPA, FLORIDA 33688-2000 (813) 963-0094

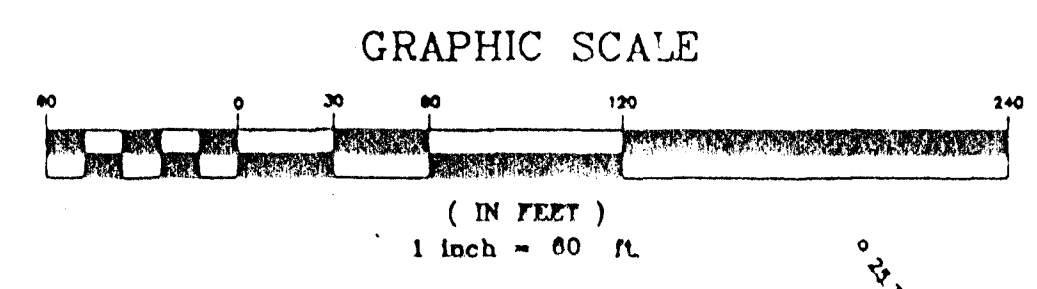
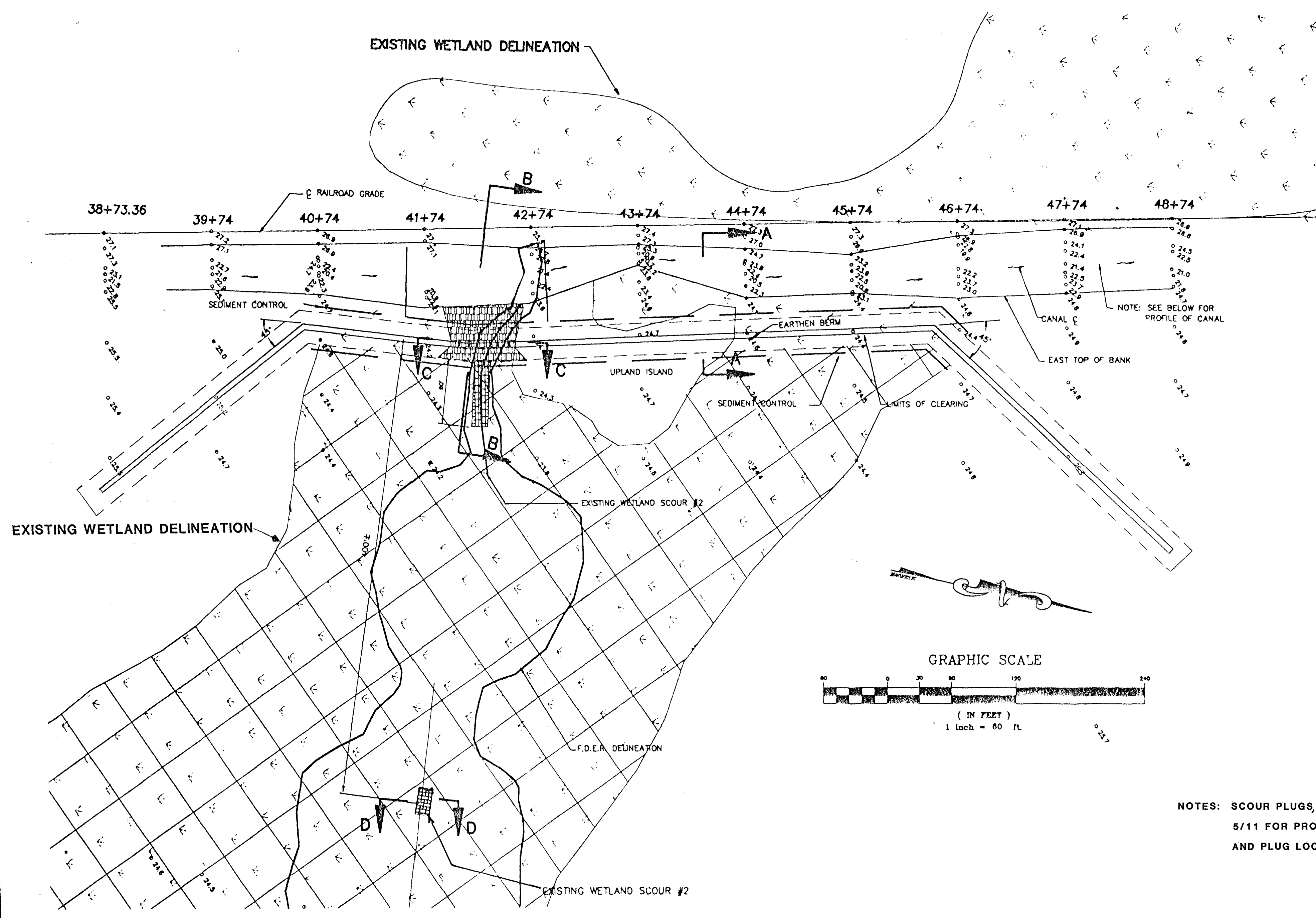
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NOTES: • THE CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO MINIMIZE CLEARING ACTIVITIES THAT FALL OUTSIDE MITIGATION CONSTRUCTION BOUNDARIES

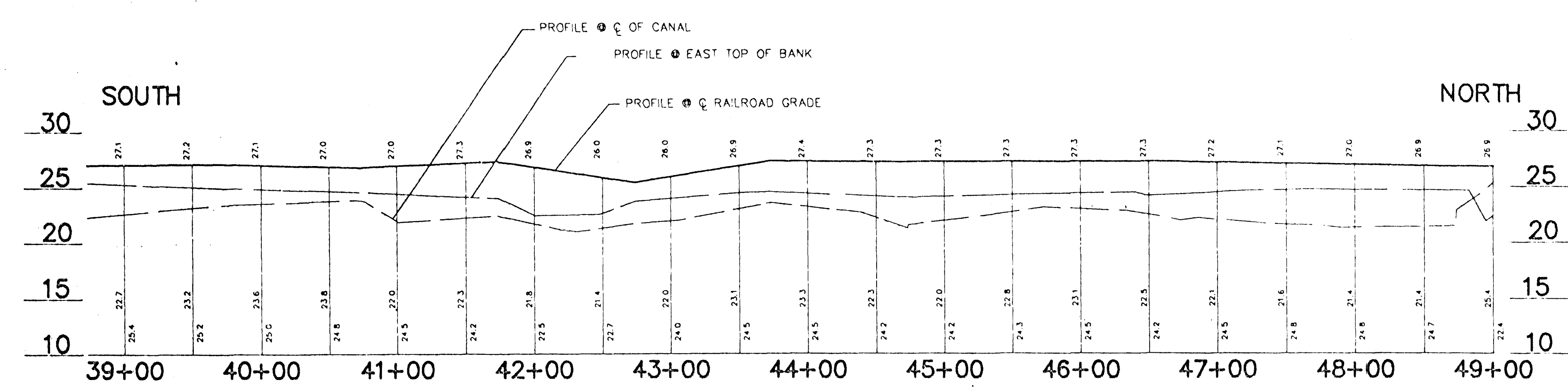
• BENCH MARKS WILL BE PROVIDED - 1 PER WATER CONTROL STRUCTURE





NOTES: SCOUR PLUGS, REFERENCE SHEET
5/11 FOR PROFILE AND CROSS-SECTIONS,
AND PLUG LOCATIONS

PLAN VIEW

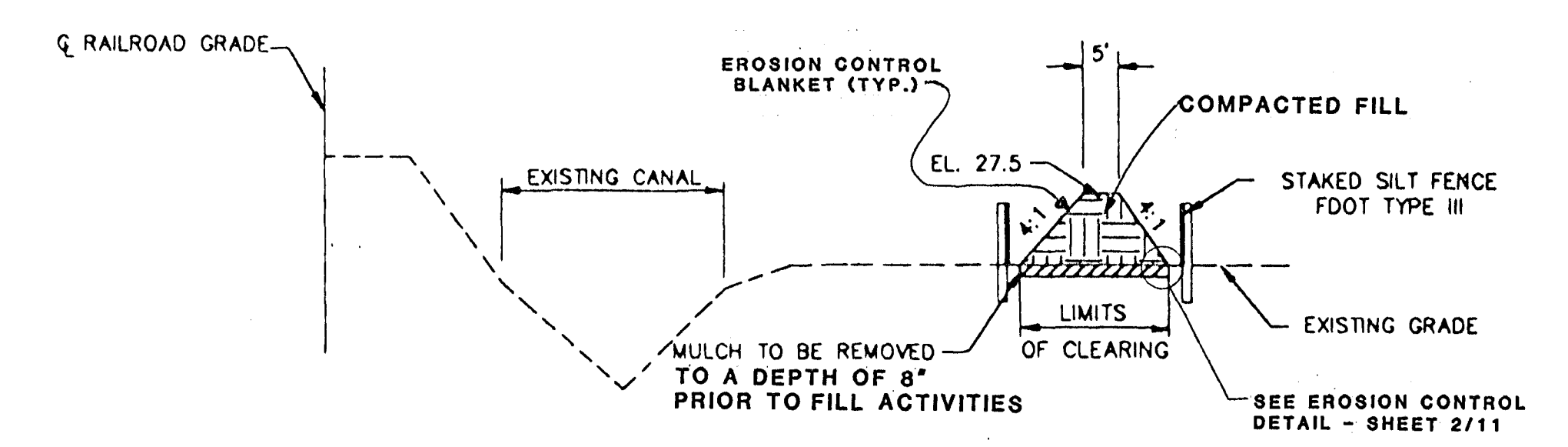


CANAL PROFILE

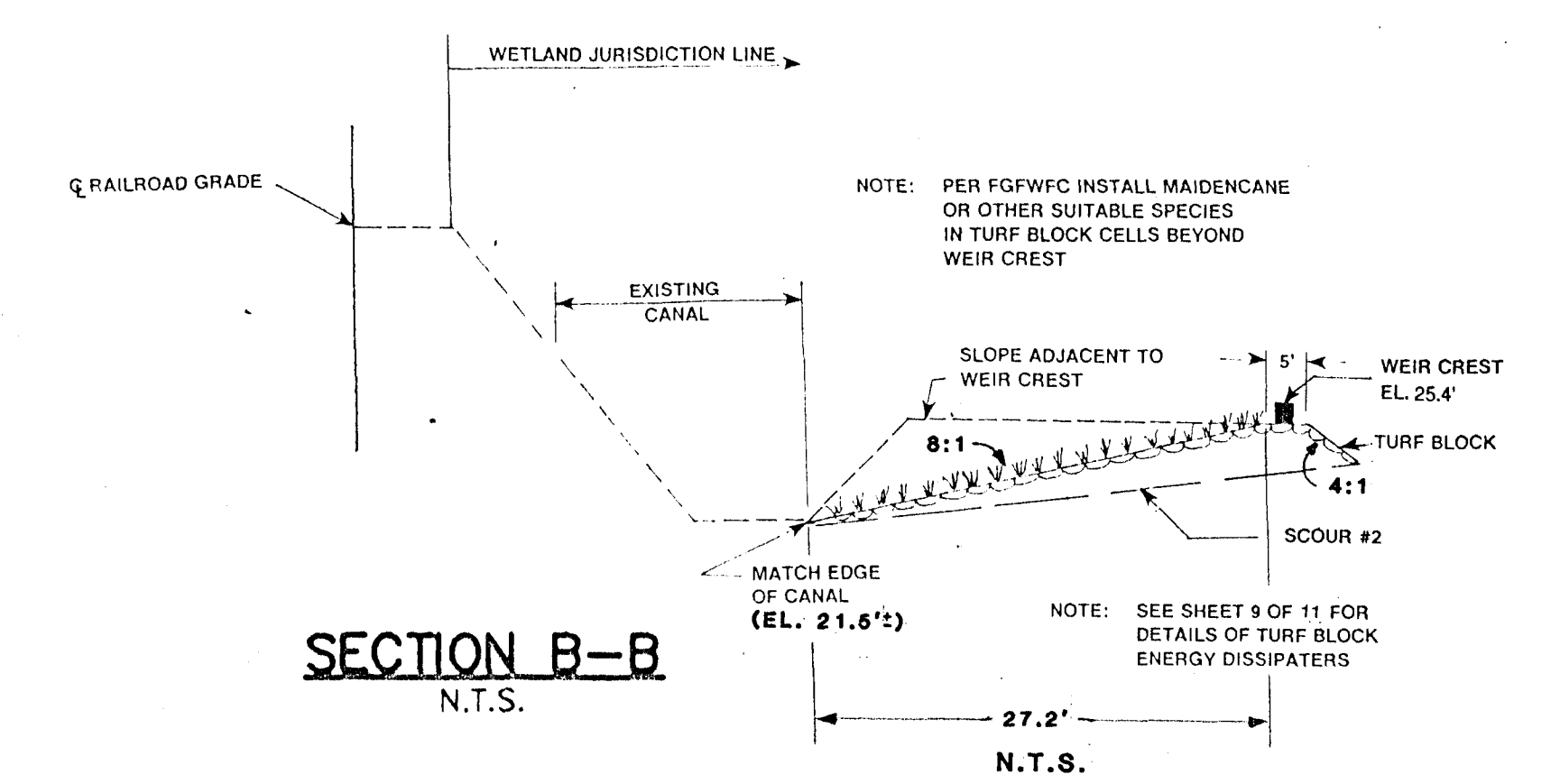
NOTE: ELEVATIONS SHOWN ABOVE HAVE BEEN
INTERPOLATED FROM AVAILABLE SURVEY DATA (SEE PLAN VIEW)

LEGEND

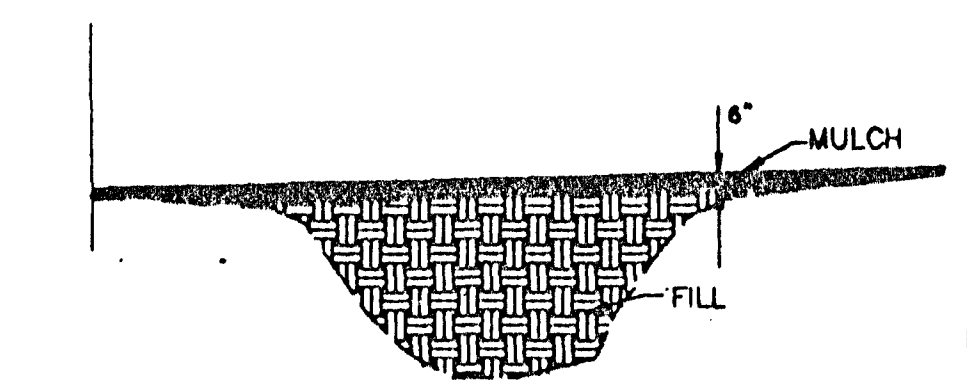
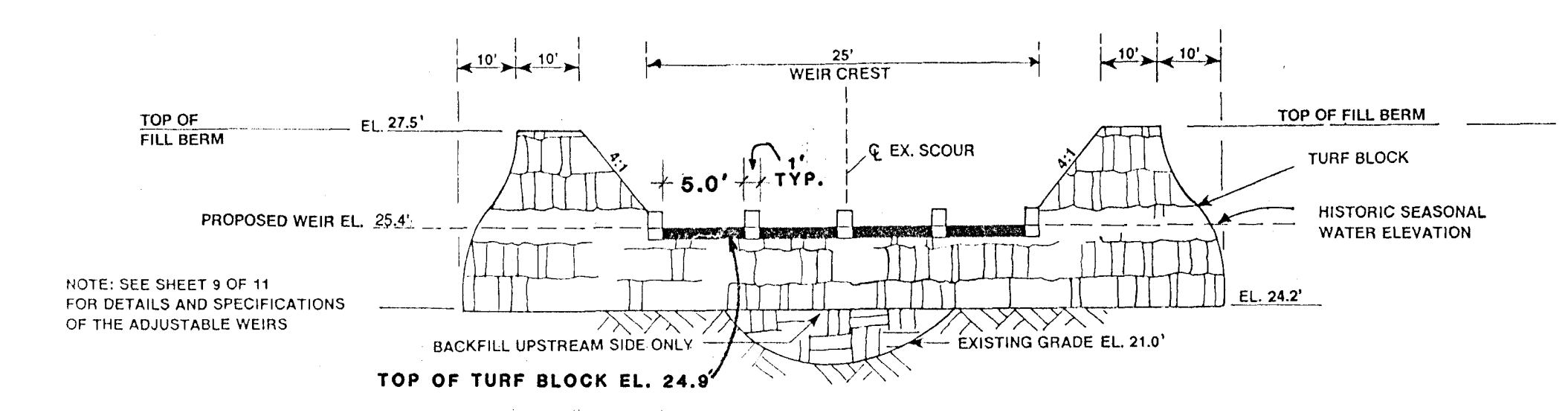
- TURF BLOCK
- EXISTING WETLAND
- WETLAND ENHANCEMENT
- SCOUR FILL



SECTION A-A
N.T.S.

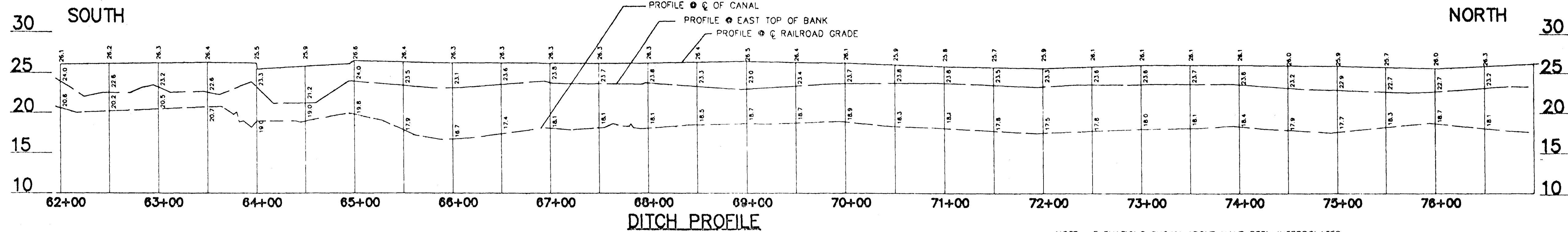


SECTION B-B
N.T.S.

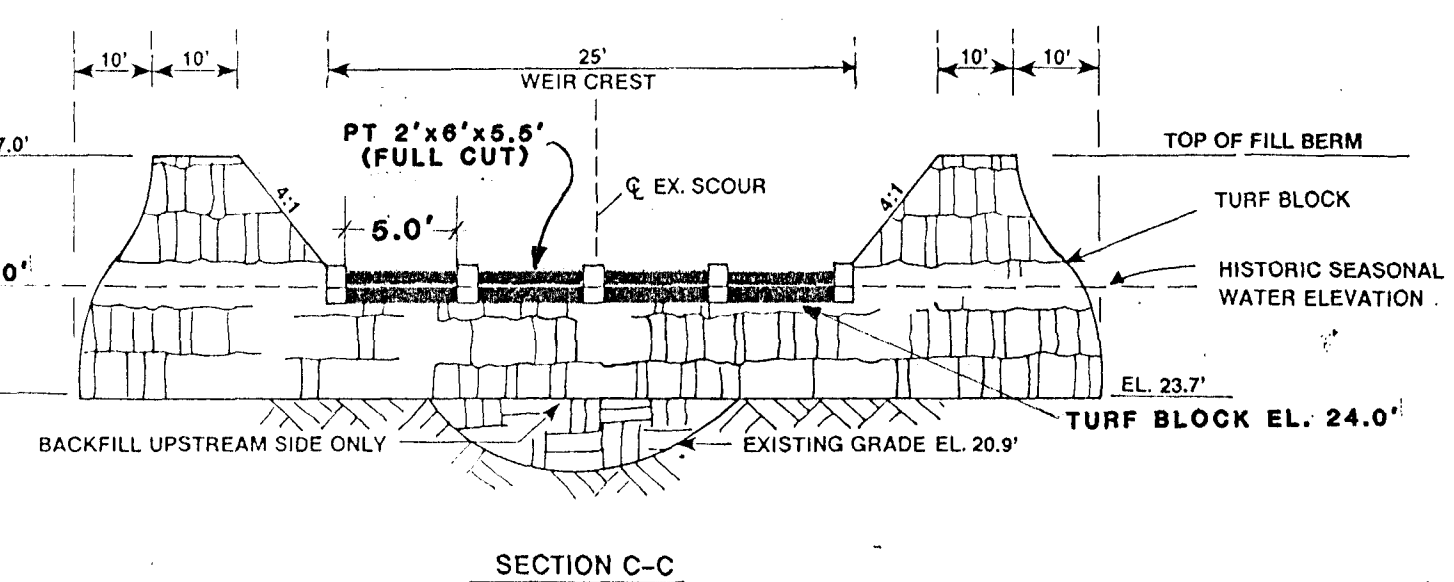
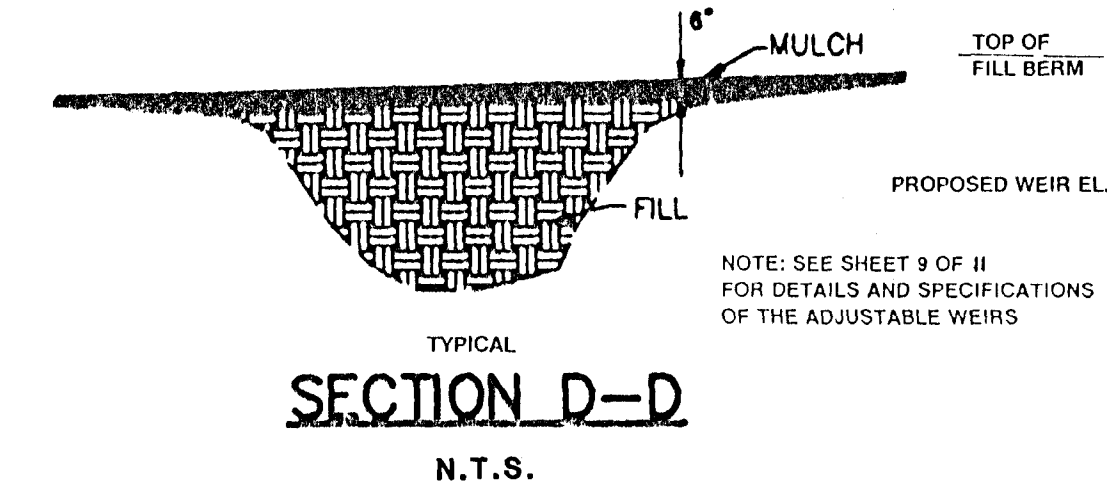
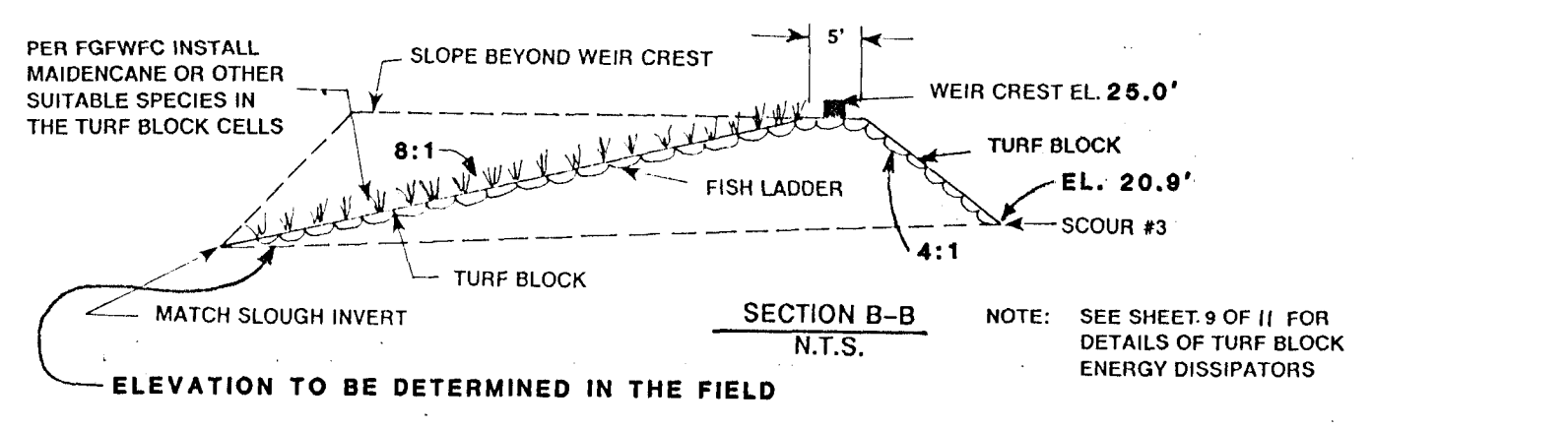
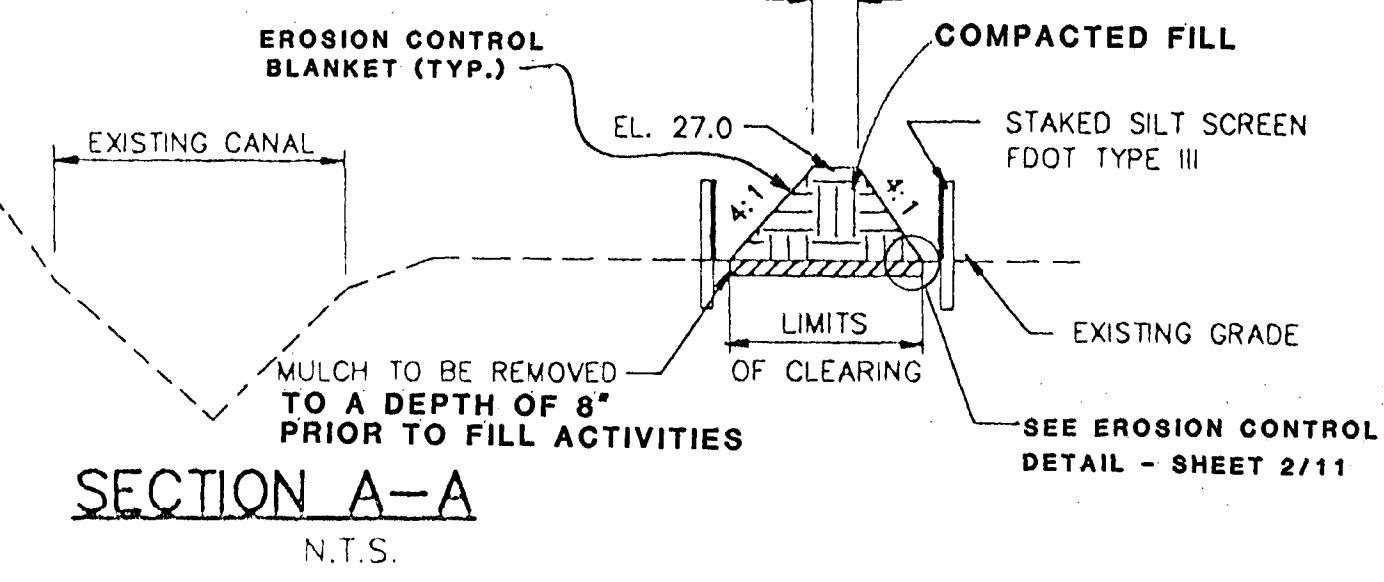
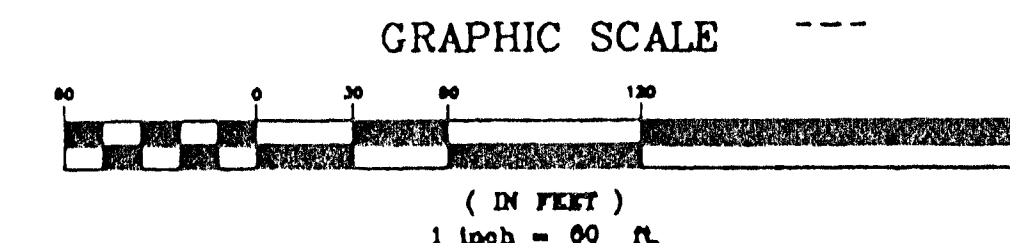
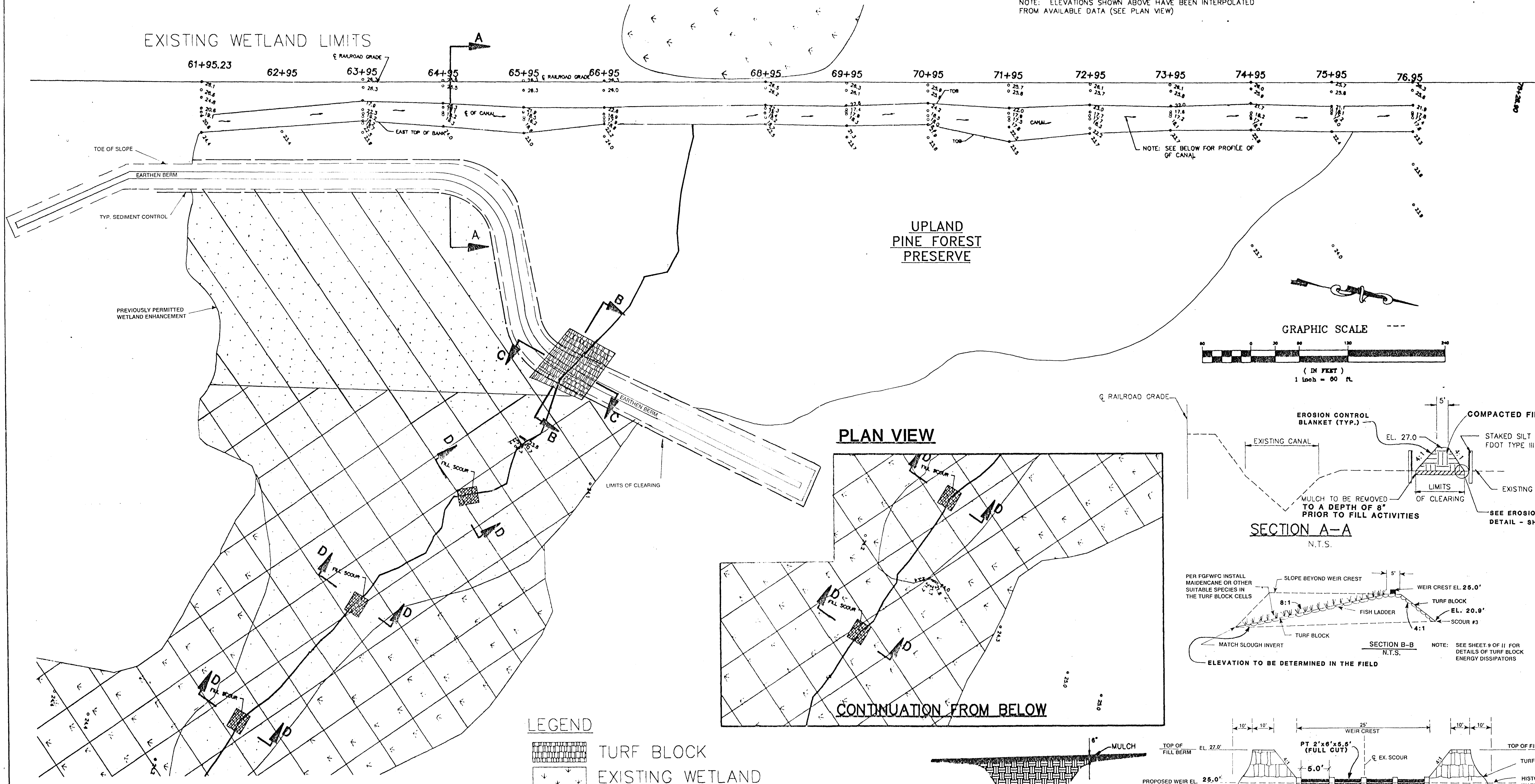


SECTION D-D
N.T.S.

NOTE: ORIGINAL SOURCE OF DESIGN AND SURVEY
DATA DAMES AND MOORE- APRIL 1992



EXISTING WETLAND LIMITS



- LEGEND**
- TURF BLOCK
 - EXISTING WETLAND
 - WETLAND ENHANCEMENT
 - SCOUR
 - SCOUR FILL
 - EXISTING UPLAND/HISTORIC WETLAND

REVISION DATE: NOVEMBER 9, 1992

SLOUGH NO. 3

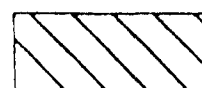
WETLAND RESTORATION AND CREATION
FOR
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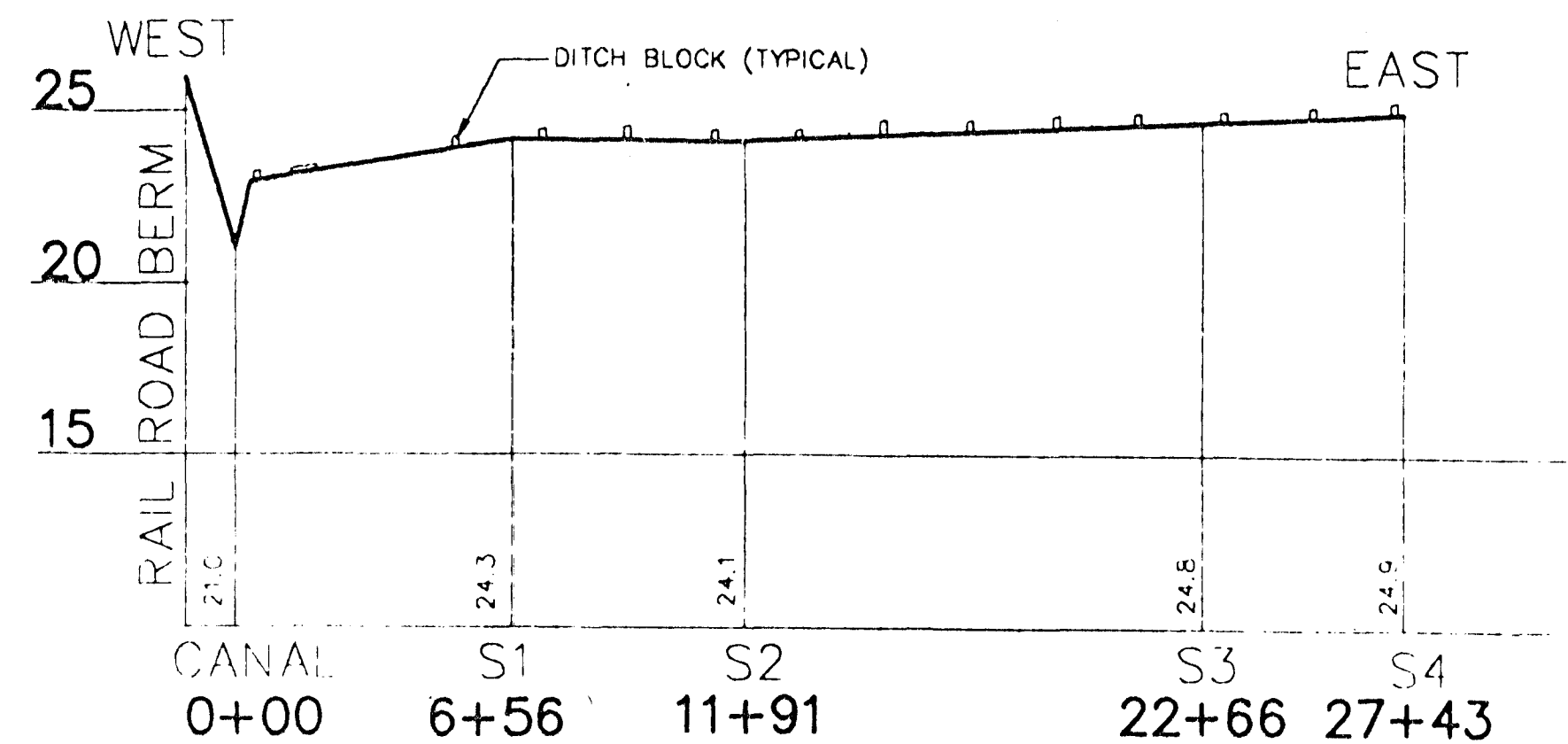
FEB 04 1993

WETLAND RESTORATION PLAN ACREAGE AND ACREAGE CREDITS PROVIDED BY THE
C.M. WEBB W.M.A. RESTORATION PLAN FOR SEMINOLE ELECTRIC COOPERATIVE.

SEGMENT 1 - HARDEE POWER STATION TO VANDOLAH SUBSTATION
WETLAND RESTORATION PLAN FOR WETLAND CLEARING

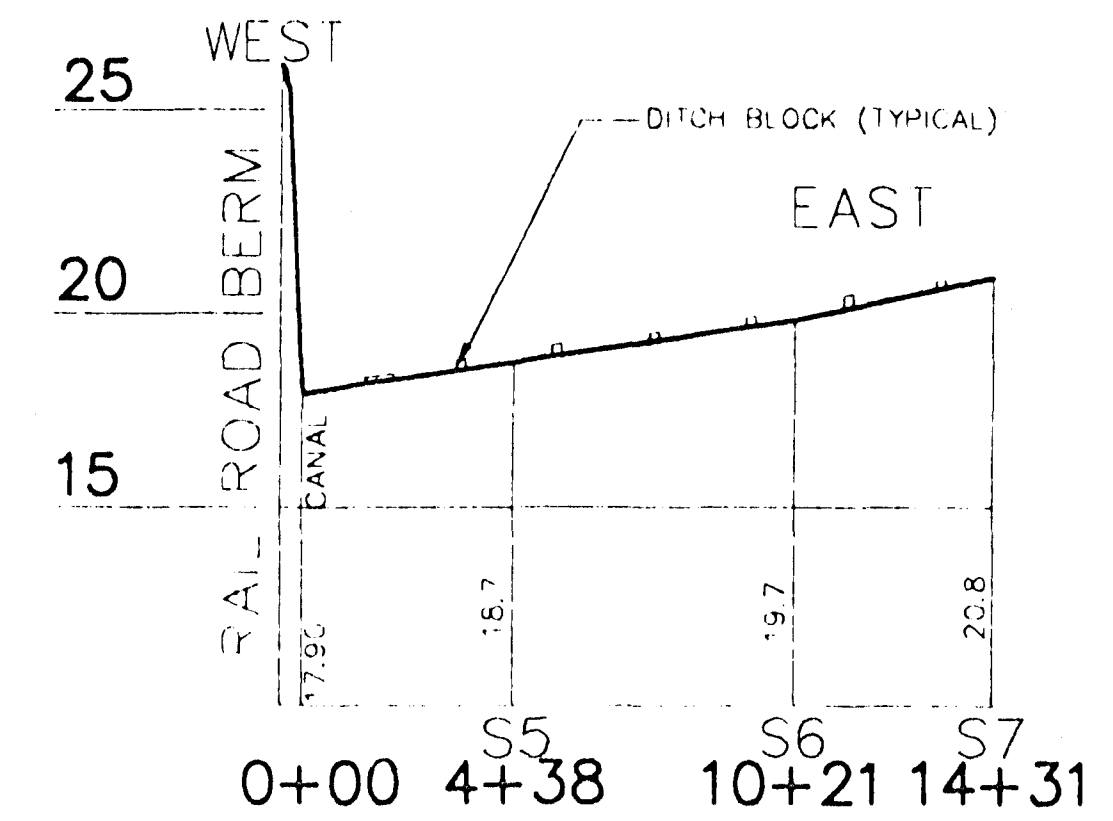


SEGMENT 1A VANDOLAH SUBSTATION TO ARCADIA P.I. 37
WETLAND RESTORATION PLAN FOR WETLAND CLEARING OF SEGMENT 1A



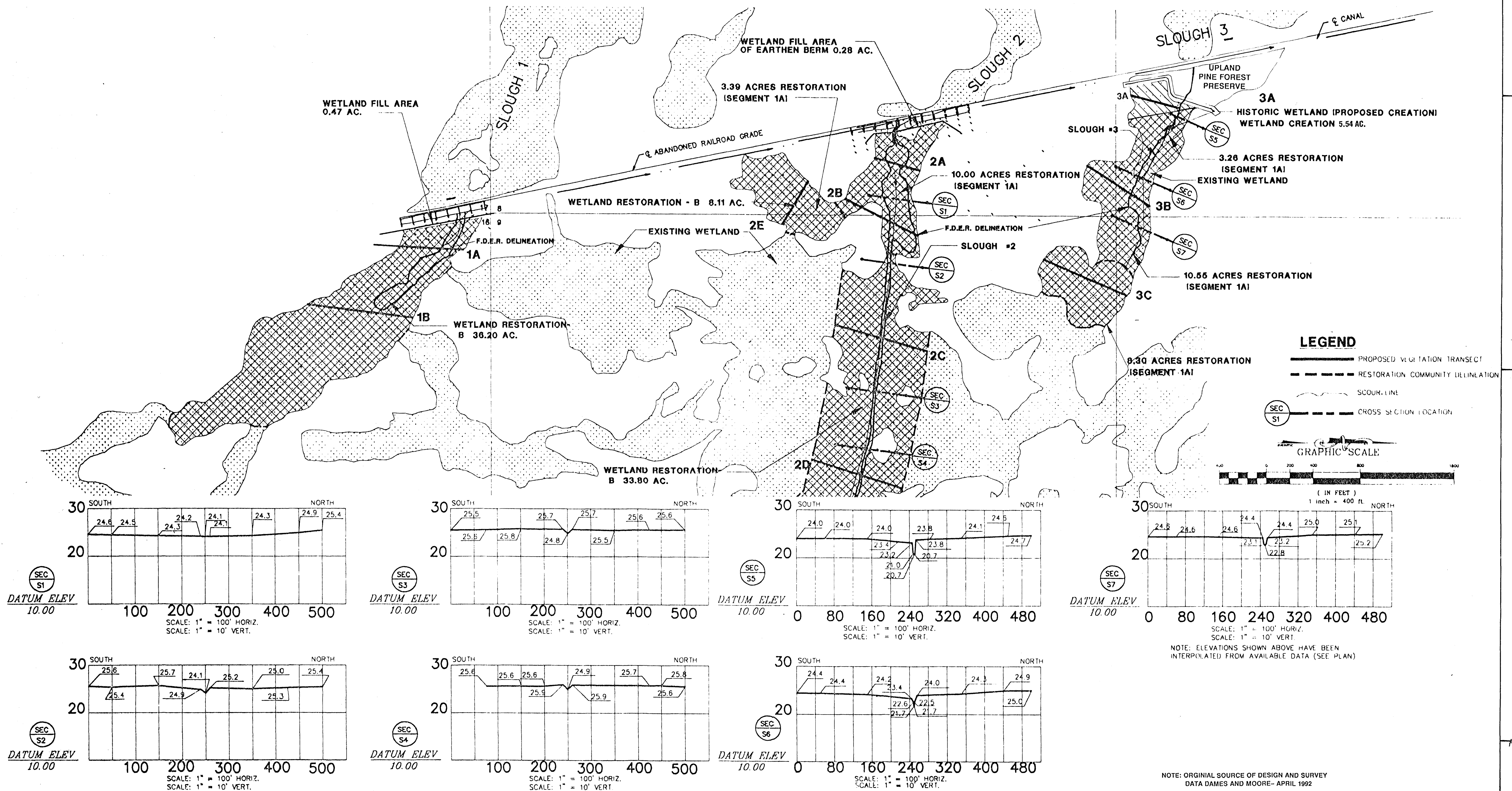
SLOUGH #2 SCOUR PROFILE

NOTE:
1. ELEVATION SHOWN ABOVE HAVE BEEN INTERPOLATED FROM AVAILABLE DATA (SEE PLAN)
2. STATIONING FOLLOWS APPROXIMATE CENTERLINE OF WETLAND SCOUR. STATIONING STARTS FROM CANAL CENTERLINE.



SLOUGH #3 SCOUR PROFILE

NOTE:
1. ELEVATION SHOWN ABOVE HAVE BEEN INTERPOLATED FROM AVAILABLE DATA (SEE PLAN)
2. STATIONING FOLLOWS APPROXIMATE CENTERLINE OF WETLAND SCOUR. STATIONING STARTS FROM CANAL CENTERLINE.



RESTORATION PLAN
DETAILS

WETLAND RESTORATION AND CREATION
FOR
SEMINOLE ELECTRIC COOPERATIVE
16313 NORTH DALE MABRY HIGHWAY
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REVISION DATE: NOVEMBER 9, 1992

DATE	DESCRIPTION	APPROVED	DATE	DESCRIPTION	APPROVED
10/2/92			11/6/92		
11/6/92			11/6/92		
11/6/92			11/6/92		
11/6/92			11/6/92		

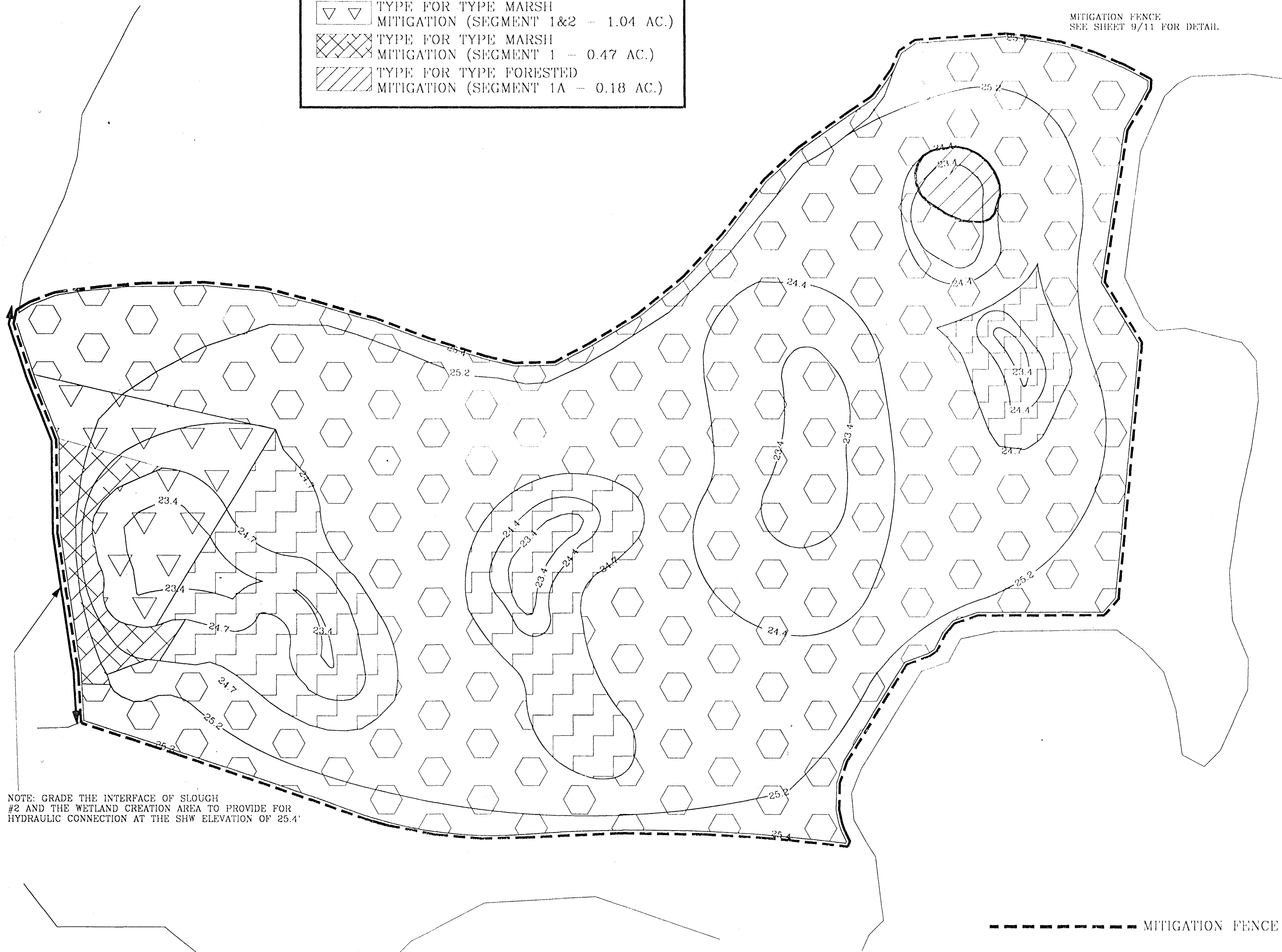
WETLAND CREATION
AREA OVERALL PLAN

WETLAND RESTORATION AND CREATION
FOR
SEMINOLE ELECTRIC COOPERATIVE, INC.
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TAMPA, FLORIDA 33607
PH 207-2735 FAX 207-2722

LEGEND:

- NON TYPE FOR TYPE MARSH
MITIGATION (3.23 AC.)
- NON TYPE FOR TYPE FORESTED
MITIGATION (16.57 AC.)
- TYPE FOR TYPE MARSH
MITIGATION (SEGMENT 1&2 - 1.04 AC.)
- TYPE FOR TYPE MARSH
MITIGATION (SEGMENT 1 - 0.47 AC.)
- TYPE FOR TYPE FORESTED
MITIGATION (SEGMENT 1A - 0.18 AC.)



SCALE: 1" = 80'

SWFWMD
MITIGATION ACREAGE SUMMARY

SEGMENT	FORESTED		MARSH		TOTAL
	Type-for-type	Non Type-for-type	Type-for-type	Non Type-for-type	
HARDEE-VANDOLAH	0	0	0.47	1.46	1.93
SQUIRRELS	0	4.49	0	0	4.49
VANDOLAH-P.I. 37	0.18	13.95	0	0	14.13
P.I. 37-LEE	0	3.97	1.04	0.56	5.57
BERMS	0	0	0	1.13	1.13
TOTAL	0.18	22.41	1.51	3.15	27.25
ACREAGE REQUIRED	0.18	(22.41-6.69*) = 15.72	1.51	3.15	20.56

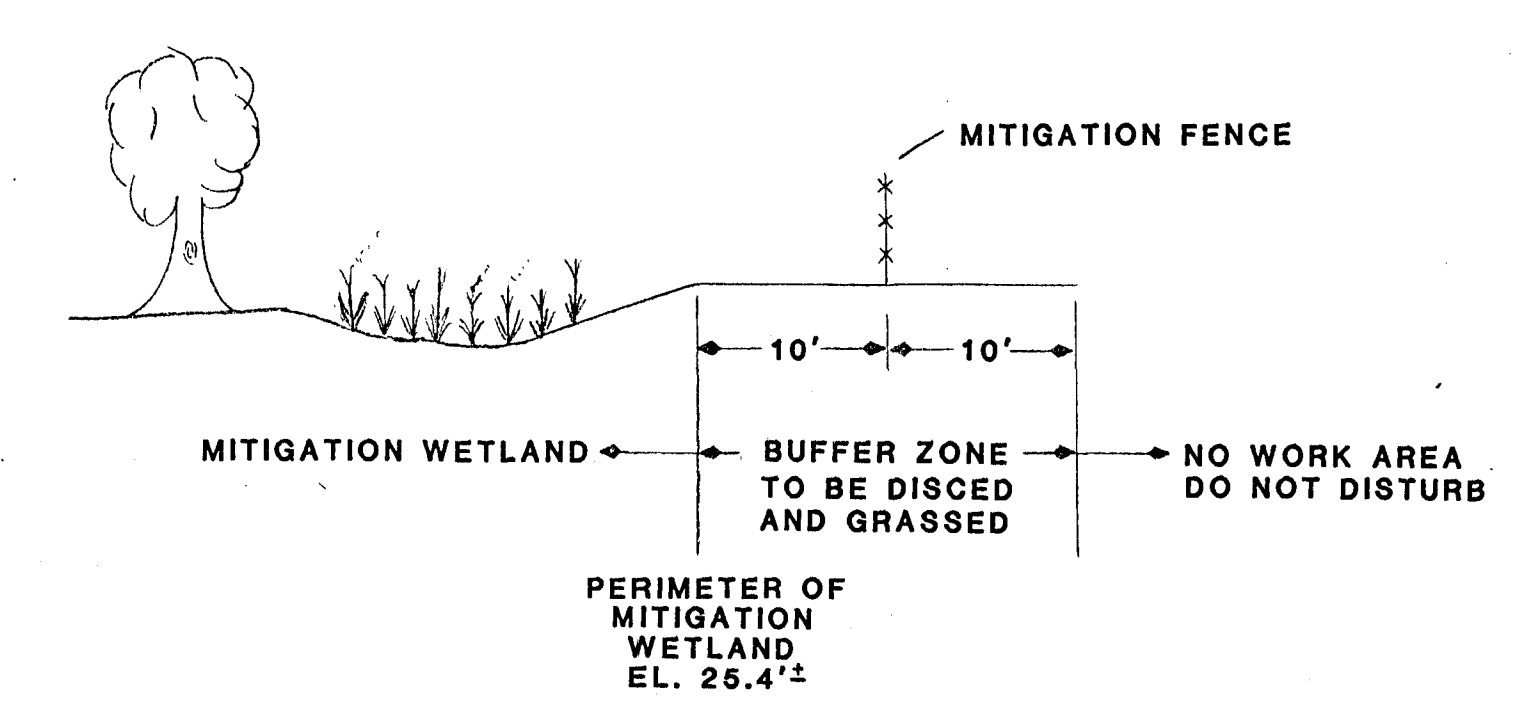
* Acreage credit from slough restoration.

MITIGATION DESIGN TOTALS

	FORESTED		MARSH		TOTAL
	Type-for-Type	Non Type-for-Type	Type-for-Type	Non Type-for-Type	
SWFWMD	0.18	15.72	1.51	3.15	20.56
SFWMD	0	0.77	0	0	0.77
SUBTOTAL	0.18*	16.49	1.51**	3.15	21.33
DESIGN TOTALS	16.75 ACRES	(FORESTED)	4.75 ACRES	(MARSH)	21.50 ACRES
EXTRA ACREAGE	0	0.08	0	0.08	0.17 ACRES

* 0.18 ACRES FROM WETLAND "III" IN SEGMENT 1A (VANDOLAH TO P.I. 37).
IMPACT ACREAGE WAS 0.07 ACRES @ 2.5:1 RATIO = 0.18 ACRES.

** 1.51 ACRES DERIVED FROM 3 IMPACT AREAS:
i) 0.47 ACRES IN SEGMENT 1 (IMPACT WAS 0.31 ACRES @ 1.5:1 = 0.47 ACRES)
ii) WETLAND "2D-19/20" IN SEGMENT 2 (IMPACT WAS 0.31 ACRES @ 1.5:1 = 0.47 ACRES)
iii) WETLAND "2D-22" IN SEGMENT 2 (IMPACT WAS 0.38 ACRES @ 1.5:1 = 0.57 ACRES)



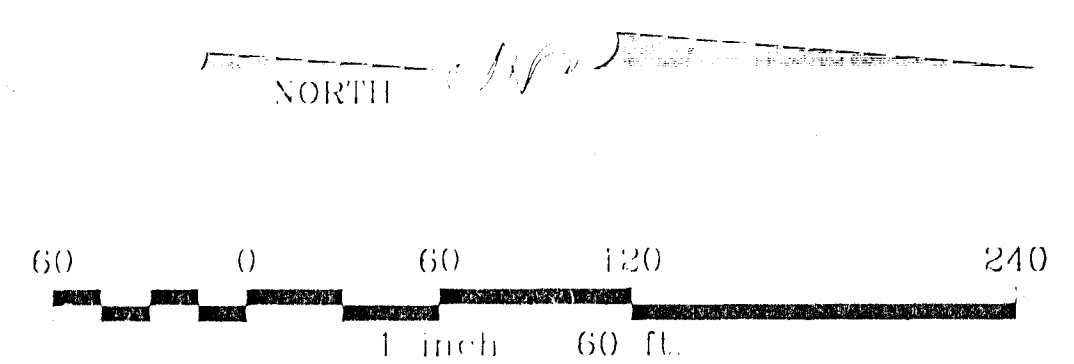
NOTE: GRADE THE INTERFACE OF SLOUGH #2 AND THE WETLAND CREATION AREA TO PROVIDE FOR HYDRAULIC CONNECTION AT THE SHW ELEVATION OF 25.4'

LEGEND:

	HIGH SWAMP MITIGATION - ELEVATIONS AT S.H.W. TO 0.2' BELOW S.H.W.
	MID SWAMP MITIGATION - ELEVATIONS RANGE FROM 0.2' TO 1.0' BELOW S.H.W.
	LOW SWAMP MITIGATION - ELEVATIONS RANGE FROM 1.0' TO 2.0' BELOW S.H.W.
	HIGH MARSH MITIGATION - ELEVATIONS AT S.H.W. TO 0.7' BELOW S.H.W.
	MID MARSH MITIGATION - ELEVATIONS RANGE FROM 0.7' TO 1.0' BELOW S.H.W.
	LOW MARSH MITIGATION - ELEVATIONS RANGE FROM 1.0' TO 2.0' BELOW S.H.W.
	SILT BARRIER

AREA 11
LOW SWAMP
TYPE FOR TYPE
SEGMENT 1A (0.18 ACRES)

70/TA	200/SC
10/FC	80/PC
15/CO	80/PHE
5/HF	80/RT
7/MC	80/PP
195/BS	180/OR



AREA 4
MID MARSH (0.36 ACRES)

194/PC	194/RT
194/SL	194/SL
194/SG	194/SS
194/PHE	194/ED
194/PP	400/HF

AREA 1
MID MARSH (0.82 ACRES)

860/PC	200/RT
860/SL	200/SL
389/SG	400/SS
860/PHE	429/ED
206/PP	135/HF

AREA 2
LOW MARSH (0.66 ACRES)

400/PC	110/SG
400/PHE	444/TG
400/PP	110/NL
444/RT	36/HF
400/SL	36/CO
444/SS	

AREA 3
LOW MARSH (0.32 ACRES)

246/PC	123/TG
246/PHE	73/NL
246/PP	18/HF
123/RT	18/CO
246/SL	
123/SS	
123/SG	

AREA 5
LOW SWAMP (0.24 ACRES)

193/PC
162/PHE
162/PP
81/RT
81/SL
81/SS
81/SG
81/TG
81/NL
24/HF
50/TA
50/FC
24:1 SLOPE

AREA 6
LOW MARSH (0.14 ACRES)

189/PC
113/PHE
113/PP
27/RT
5' WIDE 113/SL
BUFFER 57/SS
27/SG
4' WIDE 57/TG
TOP OF 57/NL
BERM 9/HF
9/CO
INSTALL SEDIMENT
BARRIER 5.0'
LANDWARD OF
WETLAND LINE

WETLAND
AREA #2

INSTALL SEDIMENT
CONTROL BARRIERS
AT JURISDICTIONAL
WETLAND LINE

AREA 13
HIGH, MID, AND
LOW MARSH TYPE
FOR TYPE
SEGMENT 1 AND 2
(1.04 ACRES)

ZONE 1 TRANSITIONAL	ZONE 2 EMERGENT
830/SB	746/PC
150/XS	1491/SL
150/BC	746/PHE
60/ED	746/RT
30/MC	85/HF

AREA 12
HIGH AND MID MARSH
TYPE FOR TYPE
SEGMENT 1 (0.47 ACRES)

296/LC	296/SL
296/XS	500/PHE
296/AC	296/RS
	310/JP

AREA 10
HIGH SWAMP (3.55 ACRES)

168/IC	406/FS
437/QL	812/LC
168/PEP	500/FL
168/PEB	406/ES
437/LS	406/XS
168/QN	406/ED
3395/SB	406/HU
3395/JE	812/JP
406/BC	406/IH
3395/RS	406/DI
406/CFL	73/IV
406/LR	73/VO
812/COD	73/HR
	73/LYL
	73/VA

AREA 9
MID SWAMP (10.59 ACRES)

2146/TA	8445/PP
2146/FC	4171/RT
179/QL	1074/CFL
140/LS	4166/SC
9216/PC	4166/DI
9216/SL	629/ED
656/SS	1153/HF
636/SG	
8880/PHE	

AREA 8
MID MARSH (0.93 ACRES)

600/PC	300/SC
600/SL	300/DI
300/SS	300/ED
300/SG	101/HF
600/PHE	
600/PP	
300/RT	
300/CFL	

AREA 7
LOW SWAMP (2.19 ACRES)

476/TA	924/TG BERM CREST
476/FC	924/NL AT e.L. 27.0'
1965/PC	119/HF
1846/PHE	119/CO
1846/PP	
624/RT	
1846/SL	
624/SS	

SLOPE AT 4:1
TO EXISTING
GRADE
(TYPICAL)

WETLAND
AREA #3

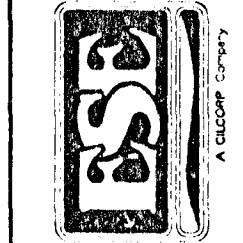
NOTE: ORIGINAL SOURCE OF DESIGN AND SURVEY
DATA DAMES AND MOORE - APRIL 1992

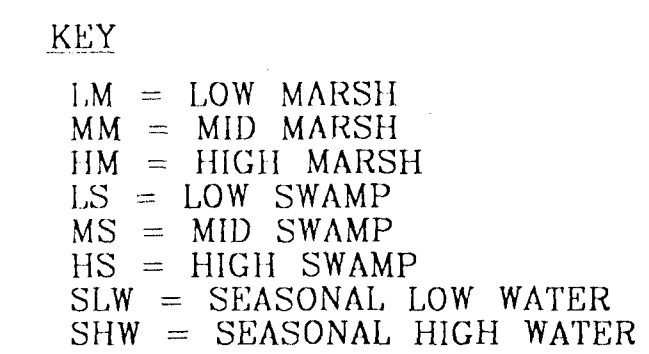
KEY PLAN AND NOTES

WETLAND RESTORATION AND CREATION
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16313 NORTH DALE WATKINS HIGHWAY
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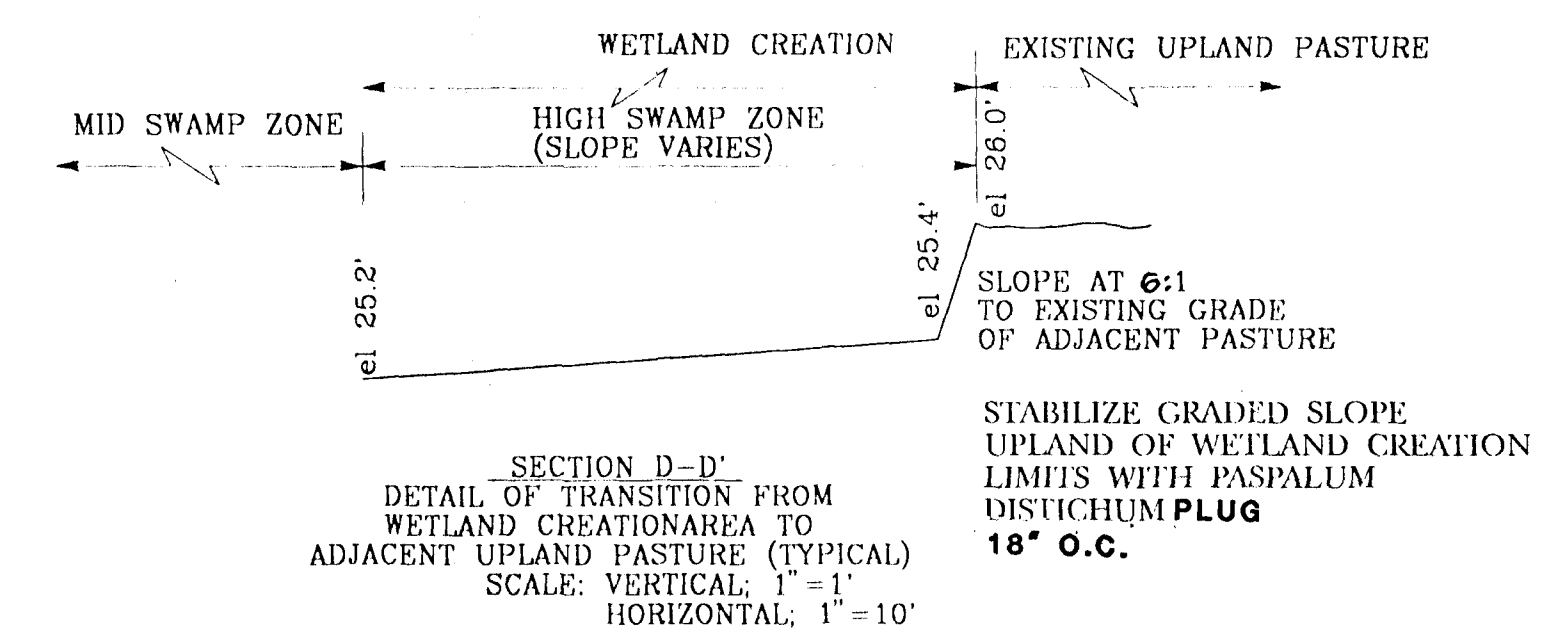
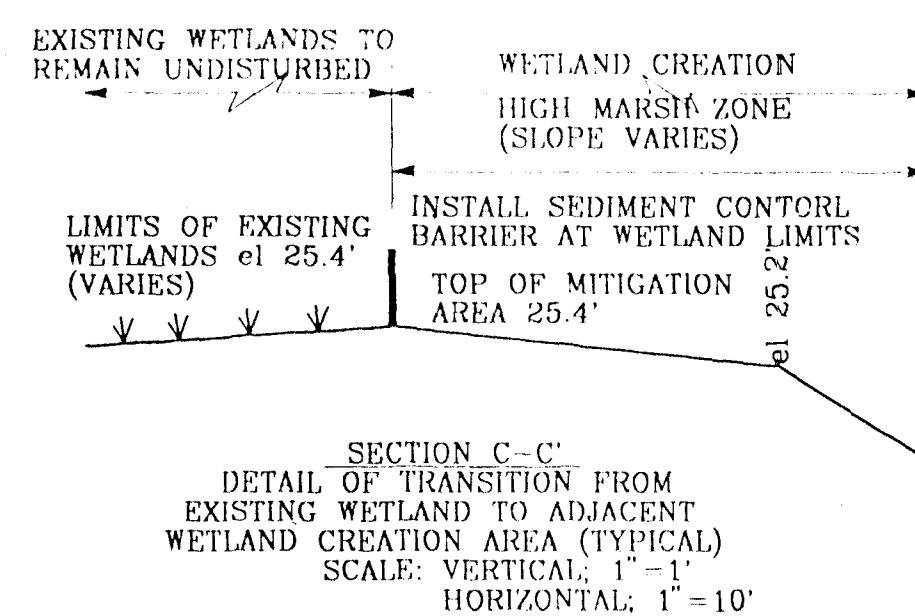
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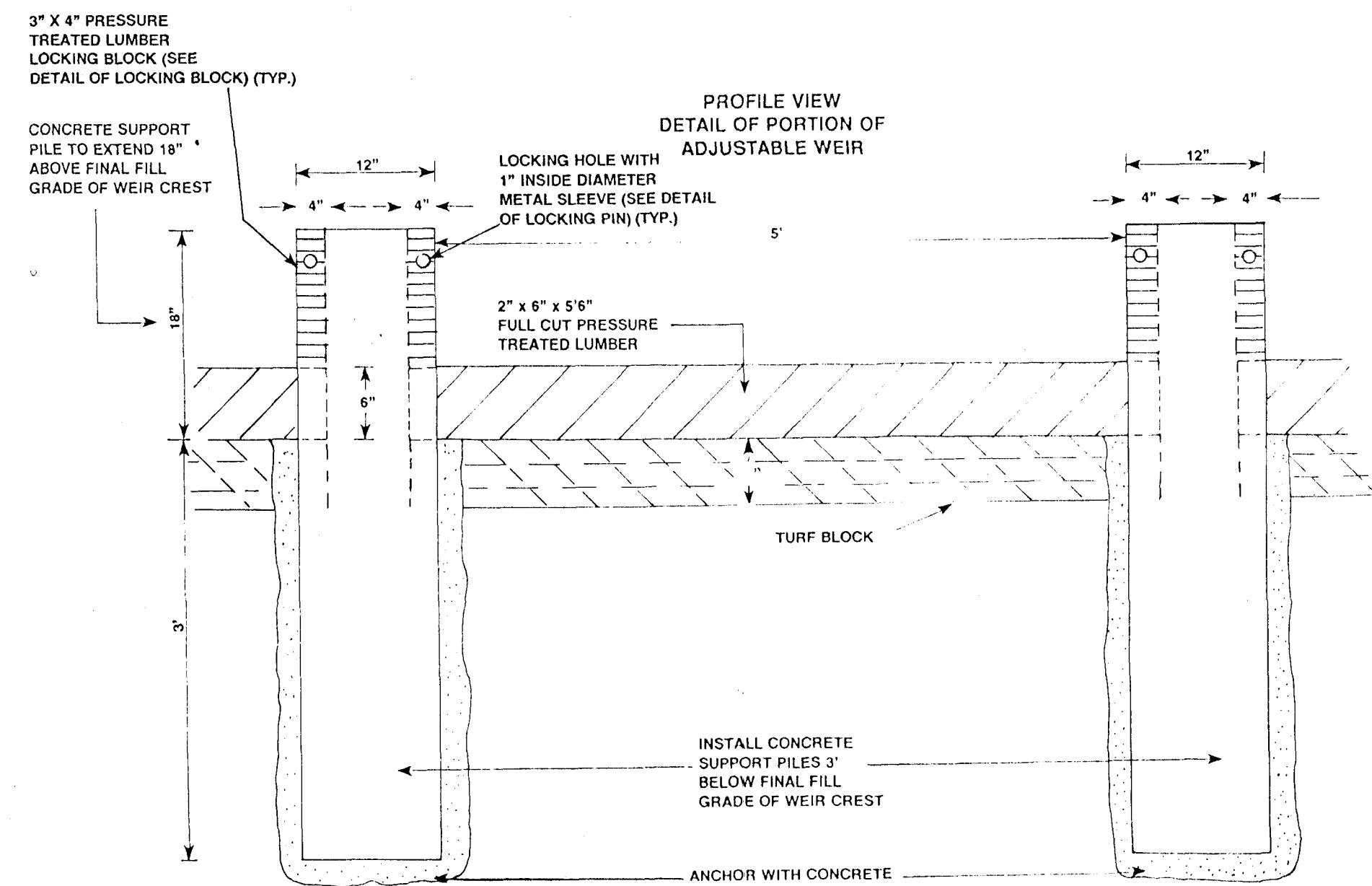
SCALE: HORIZONTAL - 1" = 60'
VERTICAL - N. T. S.



BERM/DITCH BLOCK/TURF BLOCK PLANTINGS			
QUANTITY	SPECIES NAME	COMMON NAME	SPECIFICATIONS
98,000	Panicum hemiltoni	Malden cane	2" Pot, plugs, 18" o.c.
11,510	Paspalum distichum	Knotgrass	2" Pot plugs, 18" o.c.

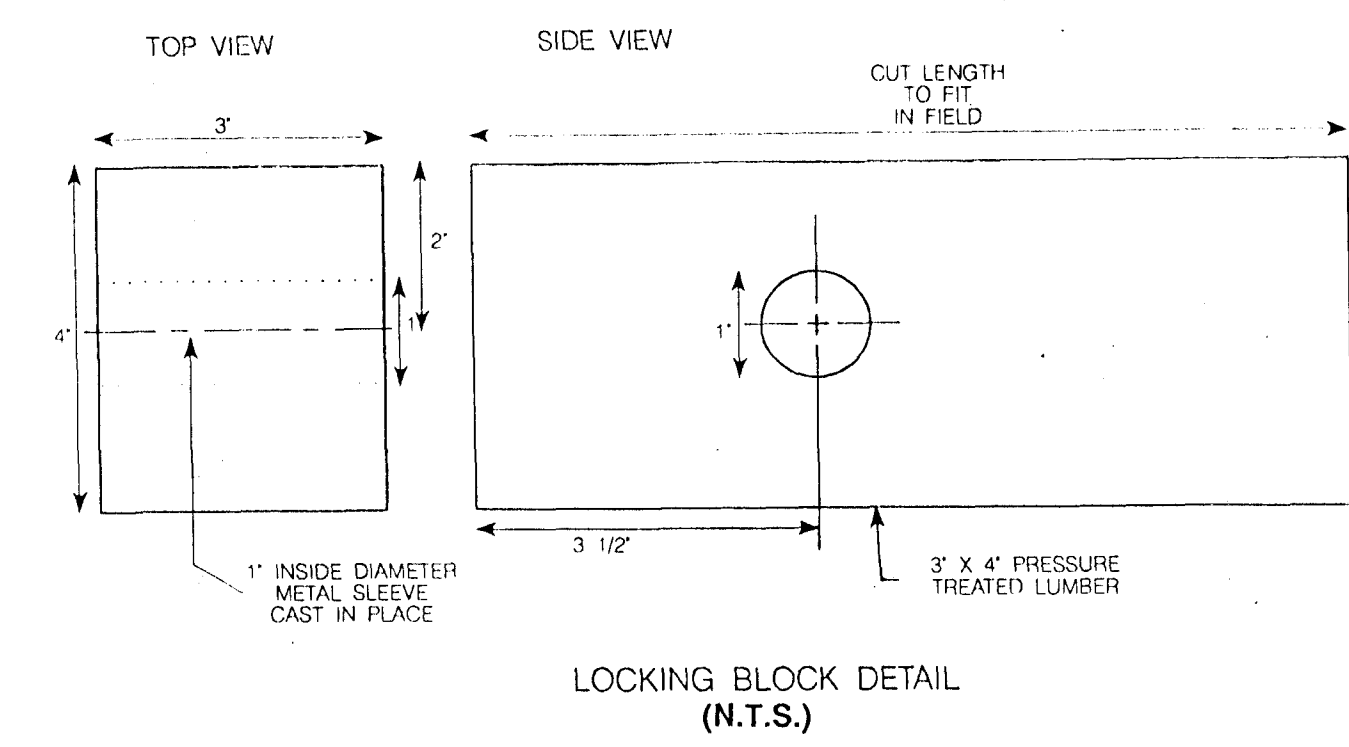
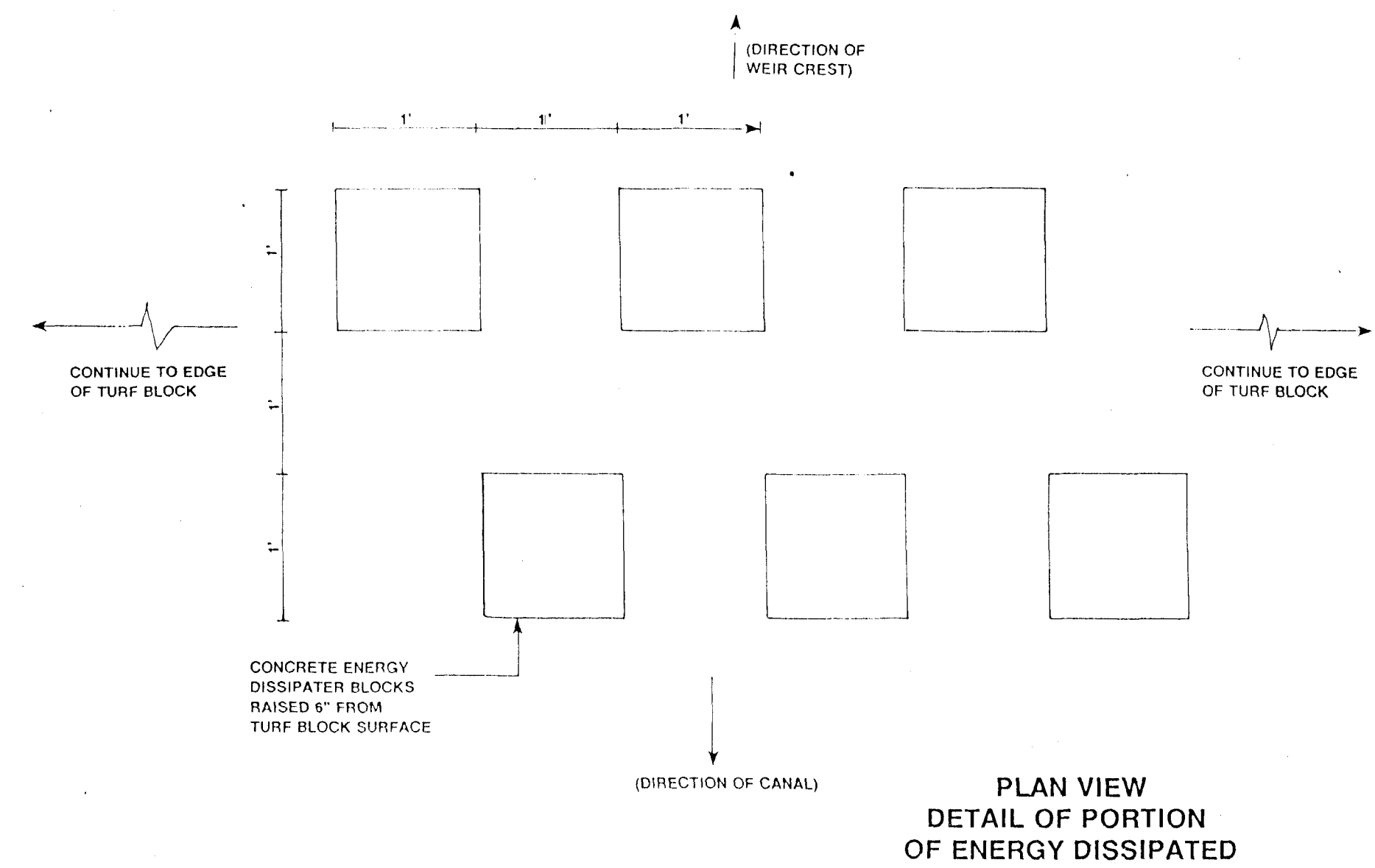
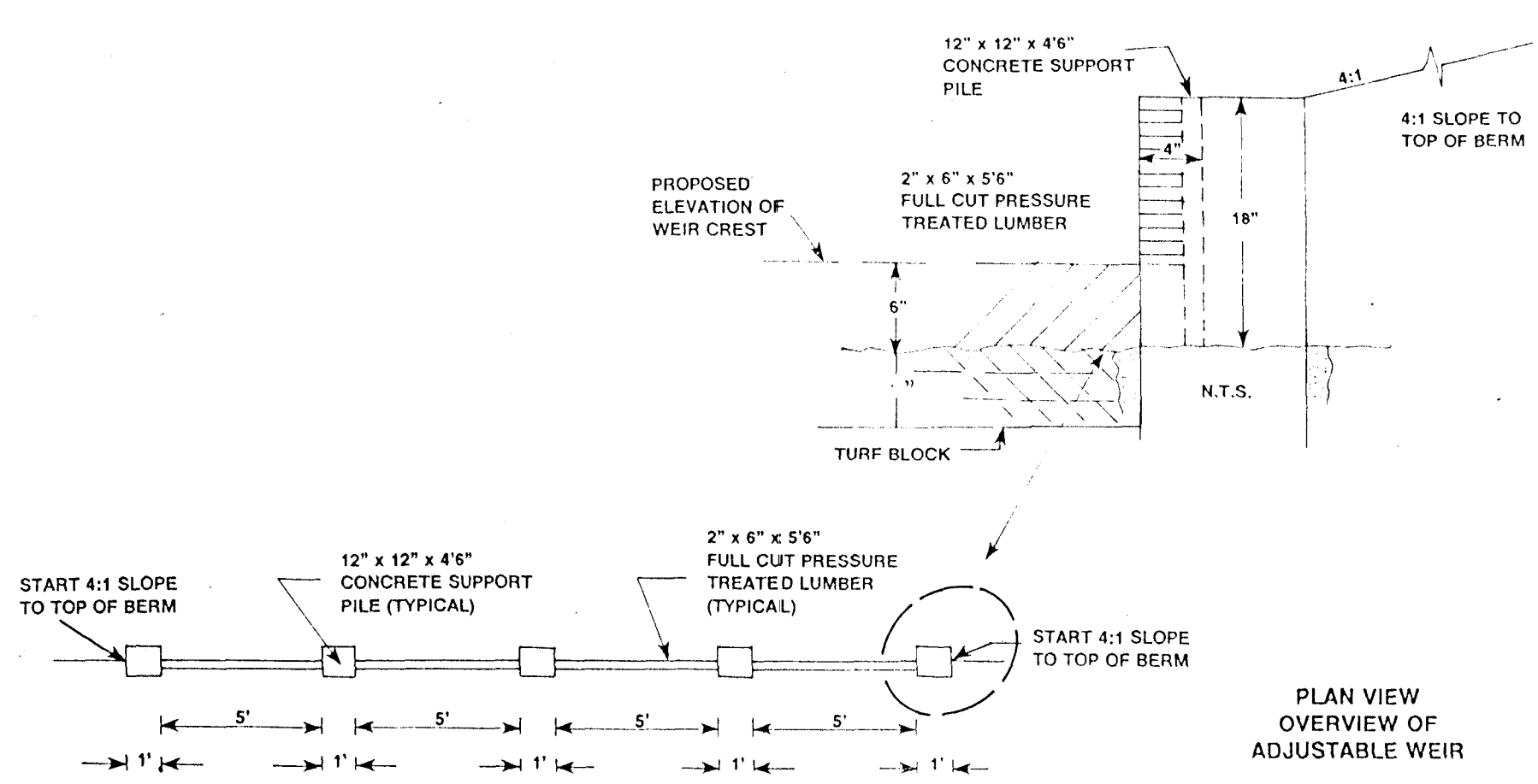
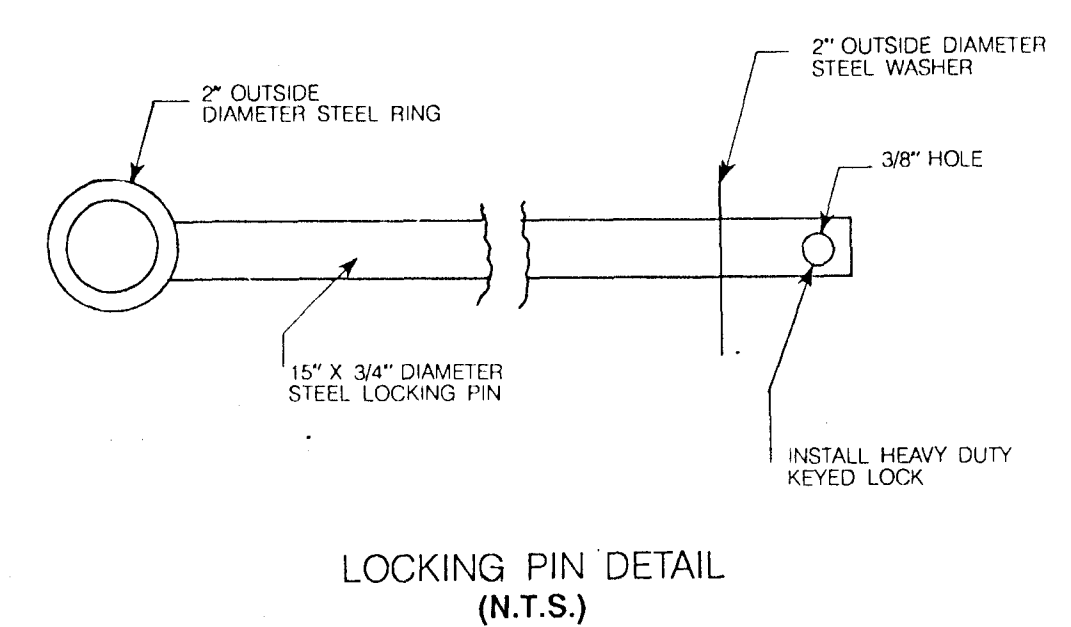
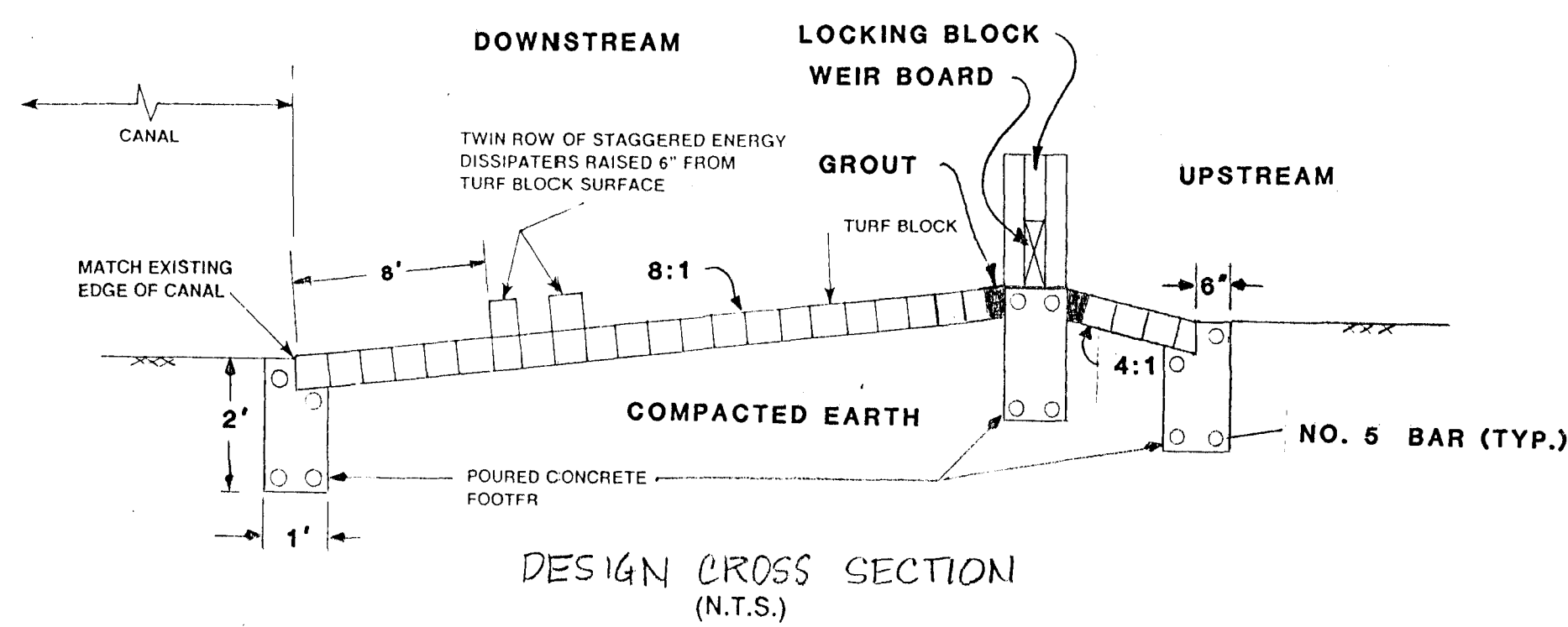
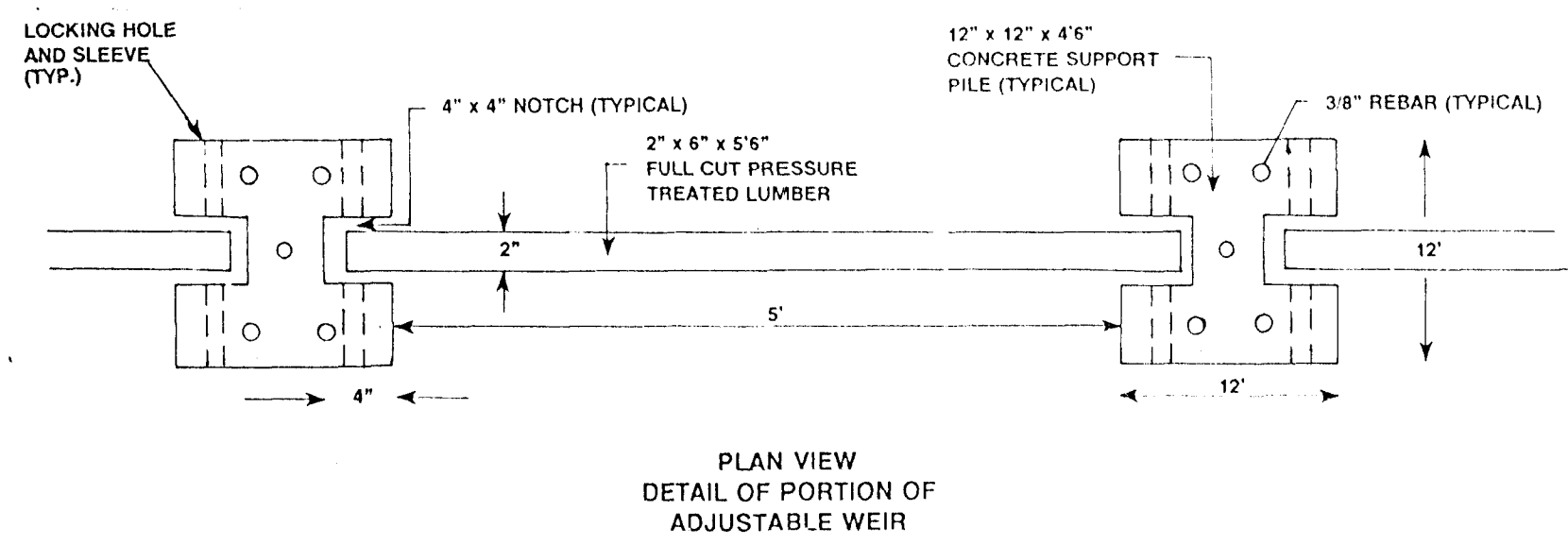
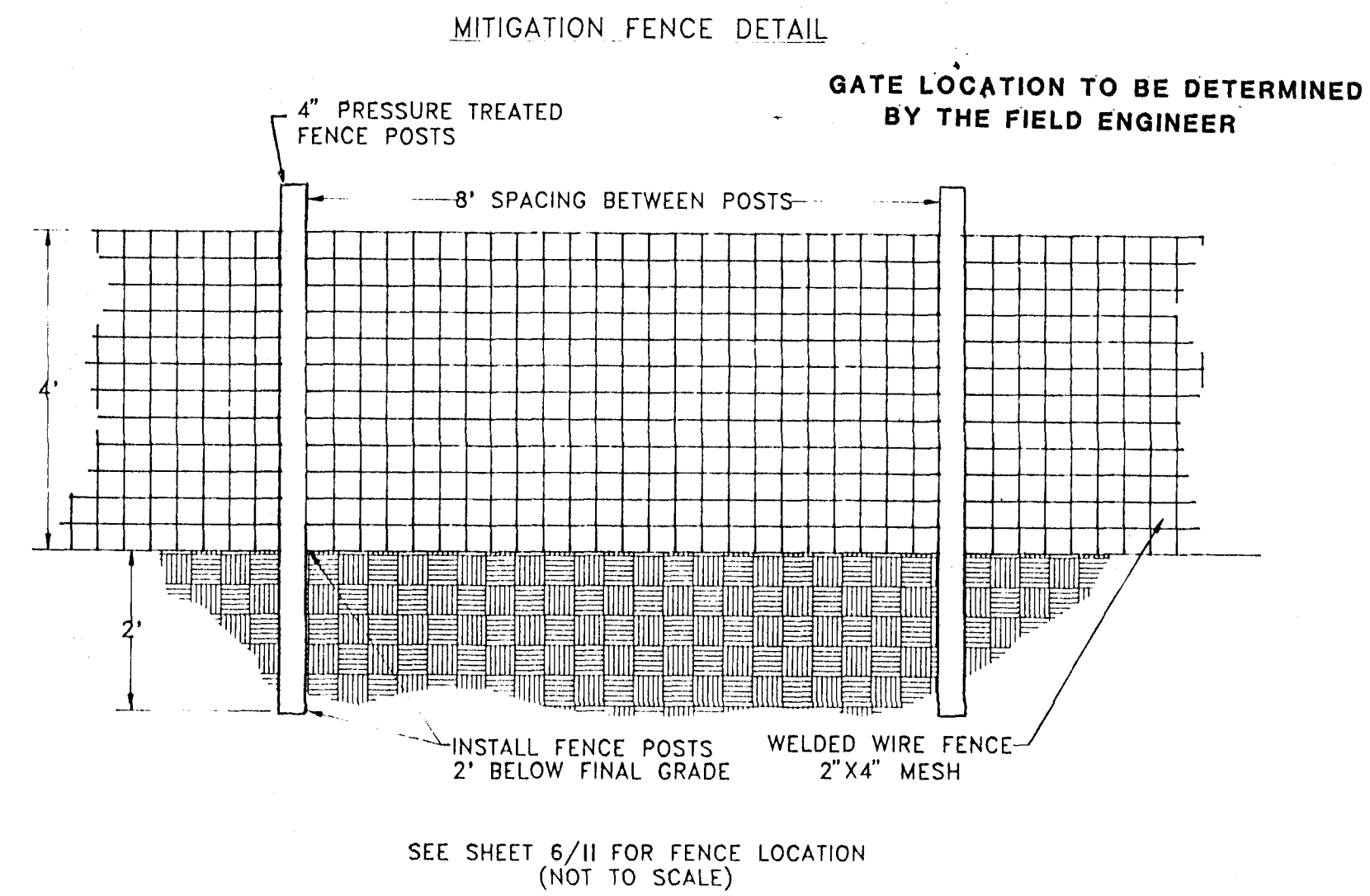
SYMBOL	QUANTITY	SPECIES NAME	COMMON NAME	SPECIFICATIONS
NL	1245	<i>Naphar luteum</i>	Spatterdock	Base Flag, 6" HT. min, 3'o.c.
OR	180	<i>Osmunda regalis</i>	Royal fern	4" Pot, 6" HT. min, 3'o.c.
PC	14689	<i>Pontederia cordata</i>	Pickersleweed	2" Pot, 6" HT. min, 3'o.c.
PHE	14,027	<i>Panicum hemitonum</i>	Maidencane	2" Pot, 6" HT. min, 3'o.c.
PP	12286	<i>Polygonum punctatum</i>	Smartweed	2" Pot, 6" HT. min, 3'o.c.
RS	3691	<i>Rhynchospora spp.</i>	Rush	2" Pot, 6" HT. min, 3'o.c.
RT	6990	<i>Rhynchospora tracyi</i>	Rush	2" Pot, 6" HT. min, 3'o.c.
SB	4225	<i>Spartina bakeri</i>	Cordgrass	2" Pot, 6" HT. min, 3'o.c.
SC	4666	<i>Saururus cernuus</i>	Lizard's tail	2" Pot, 6" HT. min, 3'o.c.
SG	1860	<i>Sagittaria graminea</i>	Arrowhead	2" Pot, 6" HT. min, 3'o.c.
SL	15737	<i>Sagittaria lancifolia</i>	Arrowhead	2" Pot, 6" HT. min, 3'o.c.
SS	2879	<i>Sagittaria subulata</i>	Arrowhead	2" Pot, 6" HT. min, 3'o.c.
TG	1629	<i>Thalia geniculata</i>	Flag	2" Pot, 6" HT. min, 3'o.c.
XS	852	<i>Xyris spp.</i>	Yellow-eyed grass	2" Pot, 6" HT. min, 3'o.c.

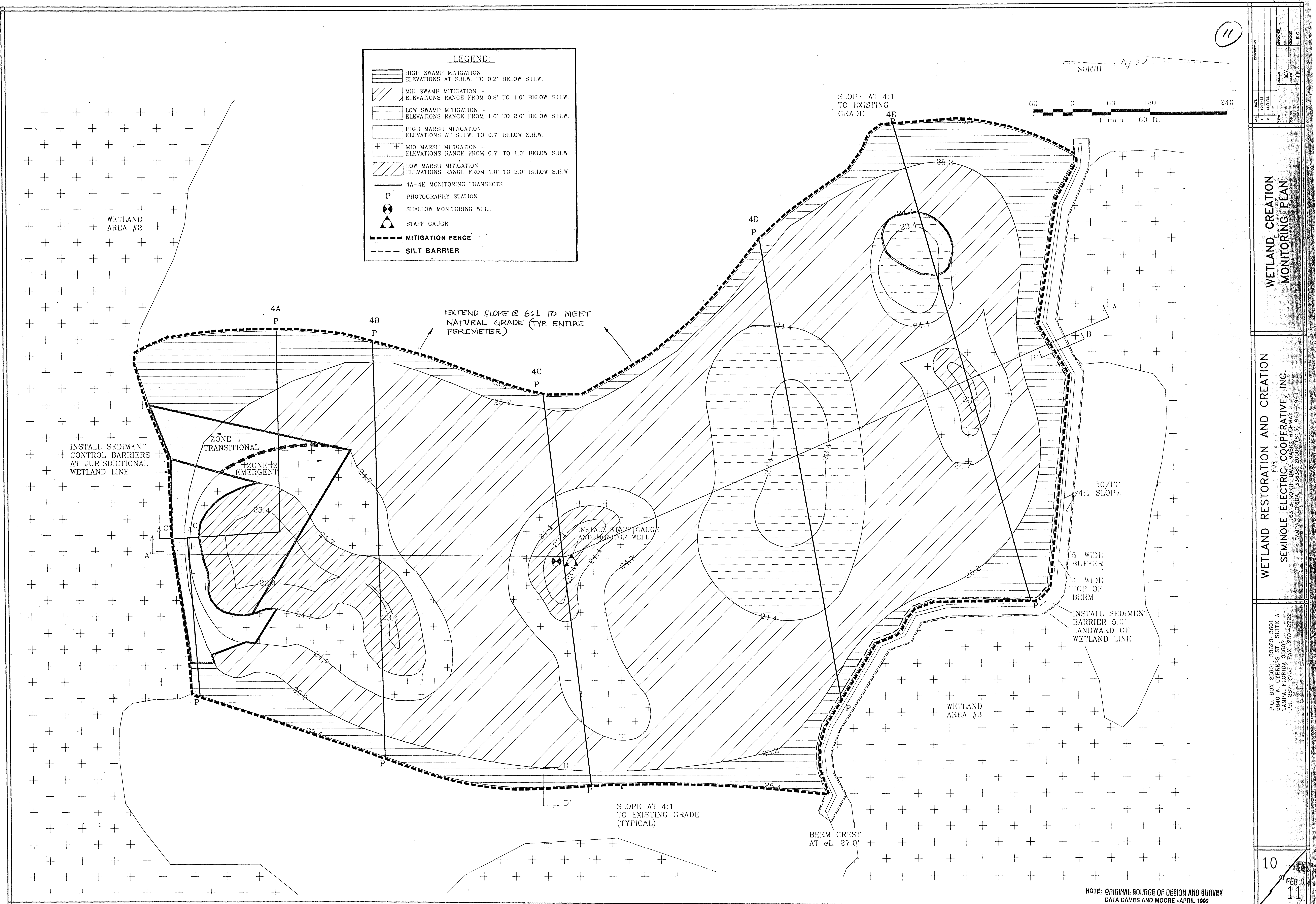
NOTE: ORIGINAL SOURCE OF DESIGN AND SURVEY DATA DAMES AND MOORE- APRIL 1992



1. The adjustable flash board riser weirs have been integrated into the design at the specific request of the FDER.
2. The intent of the adjustable weirs, is to if warranted, be able to fine tune the hydropereiod and water depths of the wetland mitigation and enhancement areas.
3. The proposed elevation of the weir crest will be the top edge of a single row of 2\"/>
4. The flash board risers will be bolted or otherwise secured in place, to prevent unauthorized adjustments.
5. Any adjustments to the weir elevations will be documented and forwarded to the FDER and SWFWMD within 10 working days.
6. After a period of 5 years, the adjustable weir will be converted to a fixed crest weir at an elevation supported by hydrologic monitoring data.
7. Weir height specifications for each slough are as follows:

	Slough No.			No. of 6\"/>
	1	2	3	
Minimum Elevation	25.6	24.9	24.0	0
Proposed Elevation	26.1	25.4	24.5	1
Mid Elevation	26.6	25.9	25.0	2
Maximum Elevation	27.1	26.4	25.5	3





WETLAND CREATION
MONITORING, MAINTENANCE AND SUCCESS CRITERIA

MONITORING
Vegetation monitoring of the wetland creation area will be conducted along five transects as shown on sheet 10.

-Monitoring of the herbaceous species will be conducted along the 5 transects, within permanently monumented 1 meter by 1 meter square quadrats, spaced at a regular (10 m) interval. The quadrats will be monumented using 3/8" rebar installed at 2 diagonals. Data to be collected at each quadrat will include: species composition, percent cover by species, total percent cover by nuisance and exotic species, and percent cover of upland species.

-Monitoring of the woody tree species will be conducted along the five belt transects employing the Point Quarter Center technique described by LABORATORY MANUAL OF GENERAL ECOLOGY (Cox, 1967). Monitoring by this method will be conducted at permanently monumented stations established on approximately 6 meter increments (20 feet). This methodology will sample at least 7.5% of the planted wetland creation trees.

-Data to be collected for each Point Quarter Center station will include: tree species, health, canopy coverage and height.

In addition, water level data will be collected from a staff gauge or shallow well (when the staff gauge is dry) installed at the center of the wetland creation area. A rainfall gauge or recorder will be installed at the created wetland to record monthly rainfall. Fixed point photographic documentation will be conducted from the photographic stations shown on sheet 10 of the site plan.

Monitoring of wetland creation marsh zones and swamp zones will occur for a period of 3 and 5 years respectively, or until the specified success criteria have been achieved. The frequency of monitoring will occur as follows:

- year 1 quarterly monitoring
- years 2 & 3 semi-annual monitoring
- years 4 & 5 annual monitoring

MAINTENANCE
Maintenance of the wetland creation area will be conducted routinely, with the intent of reducing noxious and exotic species to approximately 0% following each maintenance event. At no time will the percent cover of noxious or exotic species be allowed to exceed 10%. Any maintenance associated with monitoring events will be conducted after monitoring sampling has occurred.

SUCCESS CRITERIA
The success of the wetland creation area will be based on the following criteria:

- Herbaceous Species**
 - 85% coverage of desirable wetland species
- Tree Species**
 - 85% survival of planted tree species
 - 85% of trees to be a minimum of 10 feet in height

- Nuisance Species**
 - less than 10% coverage by nuisance, exotic or upland species

The wetland creation areas will be deemed successful when the above success criteria are satisfied for a continuous year without the intervention of irrigation, or the removal or addition of plants.

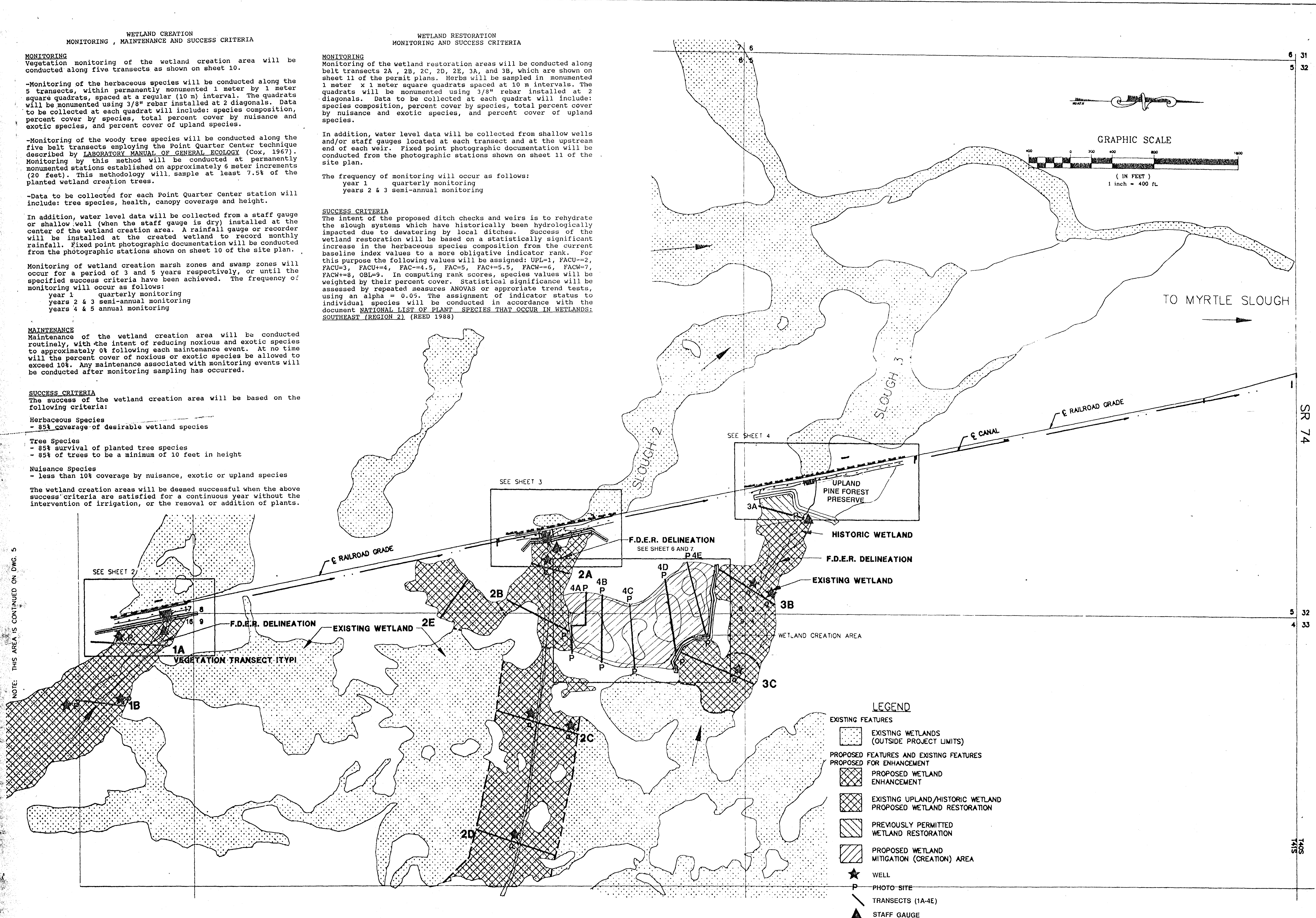
WETLAND RESTORATION
MONITORING AND SUCCESS CRITERIA

MONITORING
Monitoring of the wetland restoration areas will be conducted along belt transects 2A, 2B, 2C, 2D, 2E, 3A, and 3B, which are shown on sheet 11 of the permit plans. Herbs will be sampled in monumented 1 meter x 1 meter square quadrats spaced at 10 m intervals. The quadrats will be monumented using 3/8" rebar installed at 2 diagonals. Data to be collected at each quadrat will include: species composition, percent cover by species, total percent cover by nuisance and exotic species, and percent cover of upland species.

In addition, water level data will be collected from shallow wells and/or staff gauges located at each transect and at the upstream end of each weir. Fixed point photographic documentation will be conducted from the photographic stations shown on sheet 11 of the site plan.

The frequency of monitoring will occur as follows:
year 1 quarterly monitoring
years 2 & 3 semi-annual monitoring

SUCCESS CRITERIA
The intent of the proposed ditch checks and weirs is to rehydrate the slough systems which have historically been hydrologically impacted due to dewatering by local ditches. Success of the wetland restoration will be based on a statistically significant increase in the herbaceous species composition from the current baseline index values to a more obligative indicator rank. For this purpose the following values will be assigned: UPL=1, PACU=2, FACU=3, FACU+=4, PAC=4.5, PAC=5, PAC+=5.5, FACW=6, PACW=7, FACW+=8, OBL=9. In computing rank scores, species values will be weighted by their percent cover. Statistical significance will be assessed by repeated measures ANOVAS or appropriate trend tests, using an alpha = 0.05. The assignment of indicator status to individual species will be conducted in accordance with the document NATIONAL LIST OF PLANT SPECIES THAT OCCUR IN WETLANDS: SOUTHEAST (REGION 2) (REED 1988).



REVISION DATE: NOVEMBER 9, 1992

WETLAND MONITORING
OVERVIEW PLAN

WETLAND RESTORATION AND CREATION
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