

Appendix A

Cross Sectional Profiles

for

SRBPP Actions

at

RM 26.9, 34.5, 49.6, 49.9, 50.2, 50.4, 50.8, 51.5, 52.4, 53.1, 72.2, 99.3, and 123.5

and

CDWR Actions

at

Cache Slough, RM 16.5 and 21.8

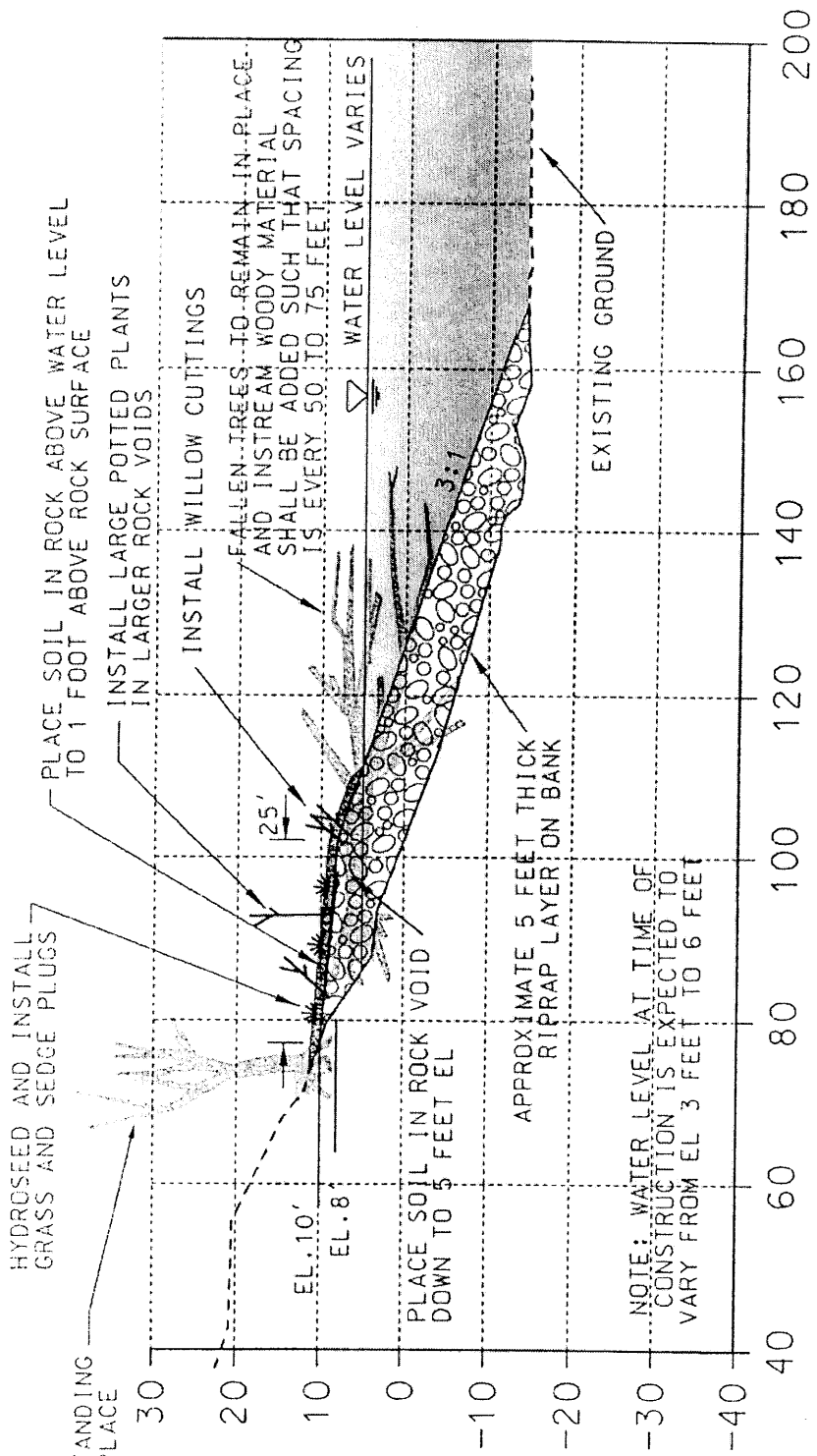
Steamboat Slough, RM 20.8

Sacramento River, RM 20.8, 26.5, 32.5, 56.8, 69.9, 85.6, 130.8, 141.4, 145.9, 154.5, 164

and

Bear River, RM 2.4 and 10.1

09615 (03 029)



SITE 49.6L, TYPICAL CROSS SECTION 1
 SCALE 1"=10'
 C-102[C-112]

Source: USACE

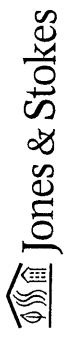
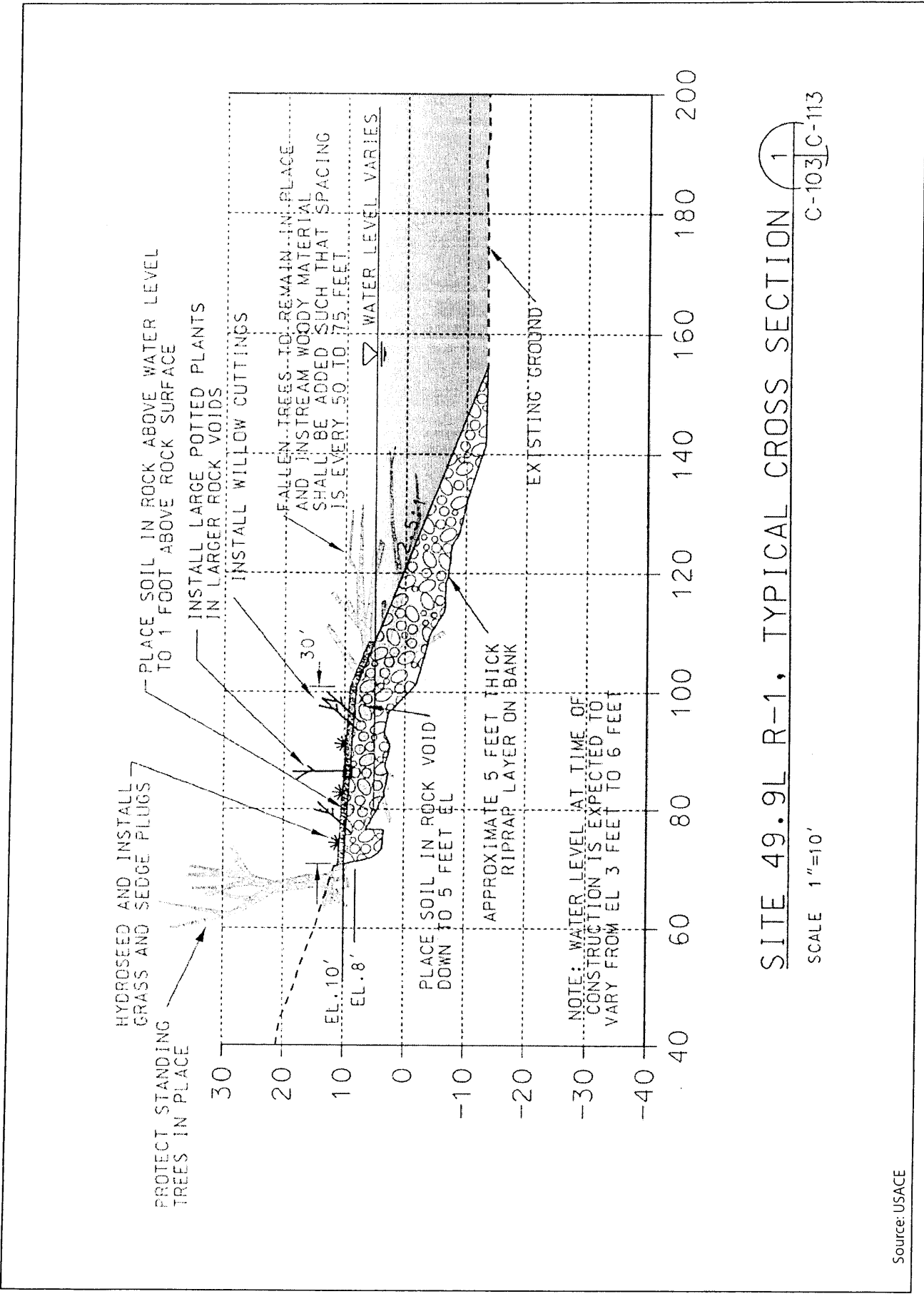


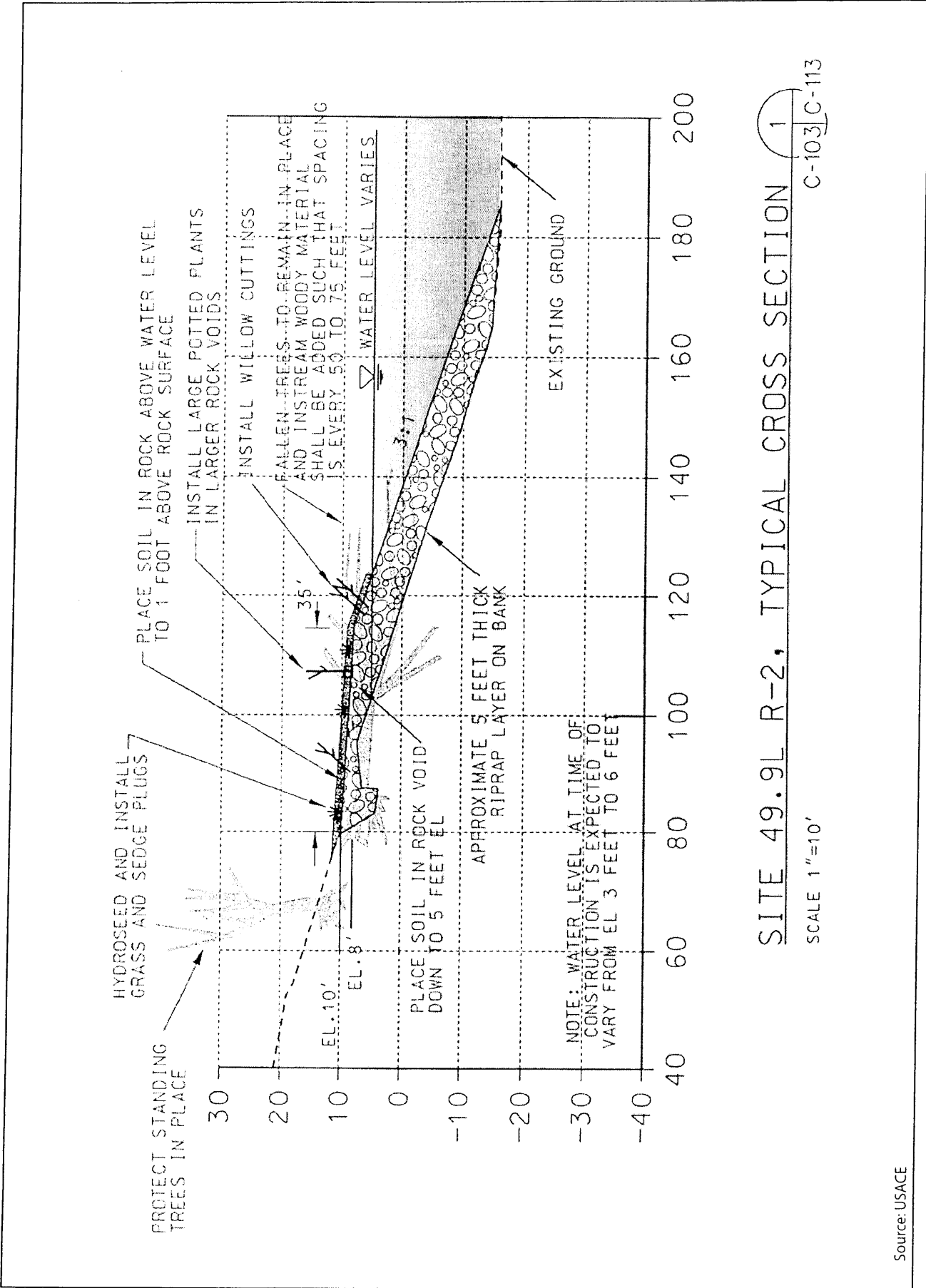
Figure 1
 Typical Cross-Section at Site 49.6 (90% Design)
 Pocket Bank Protection Project



Source: USACE

Figure 2
 Typical Cross-Section at Site 49.9, Reach 1 (90% Design)
 Pocket Bank Protection Project

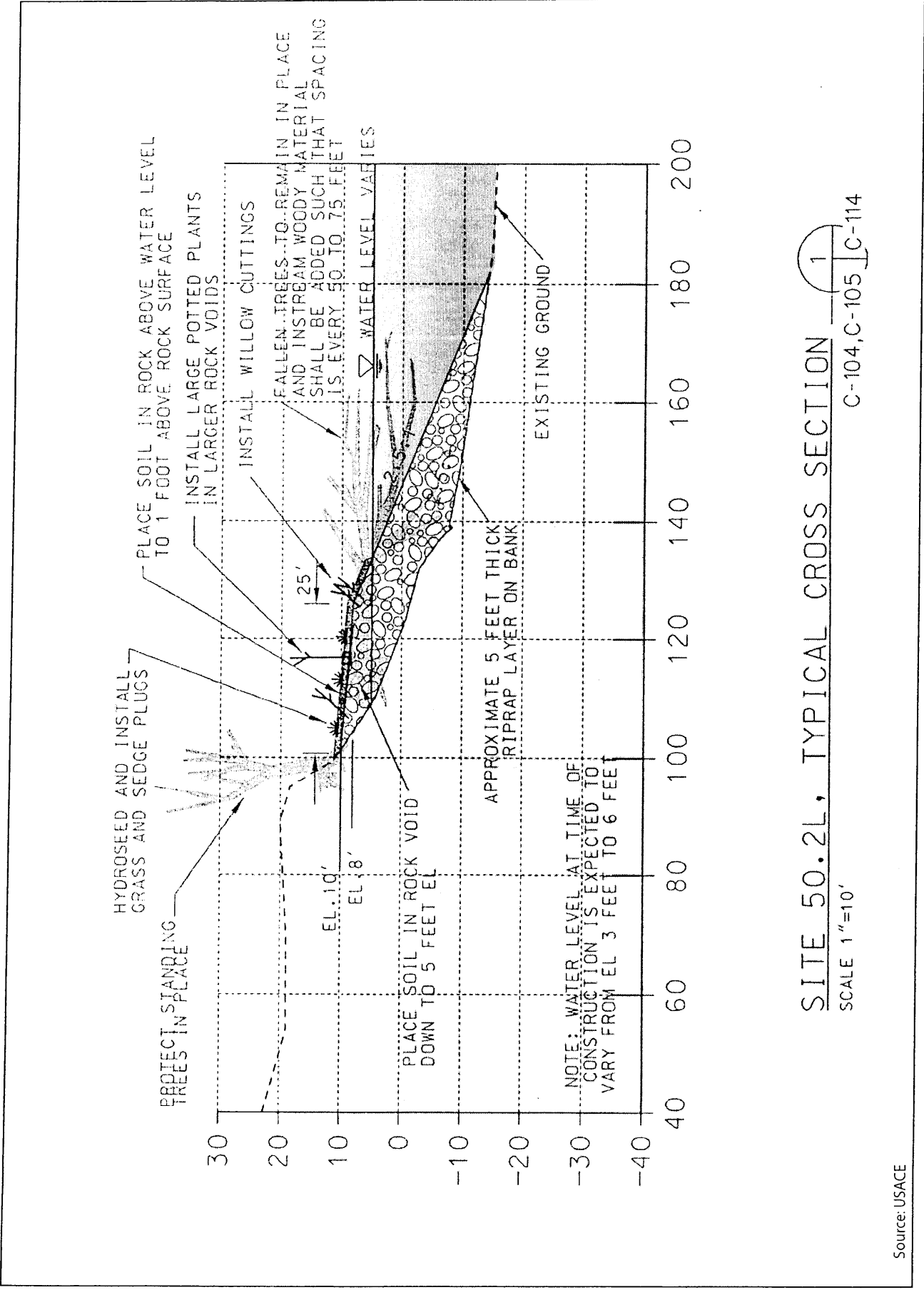
03615.03.020



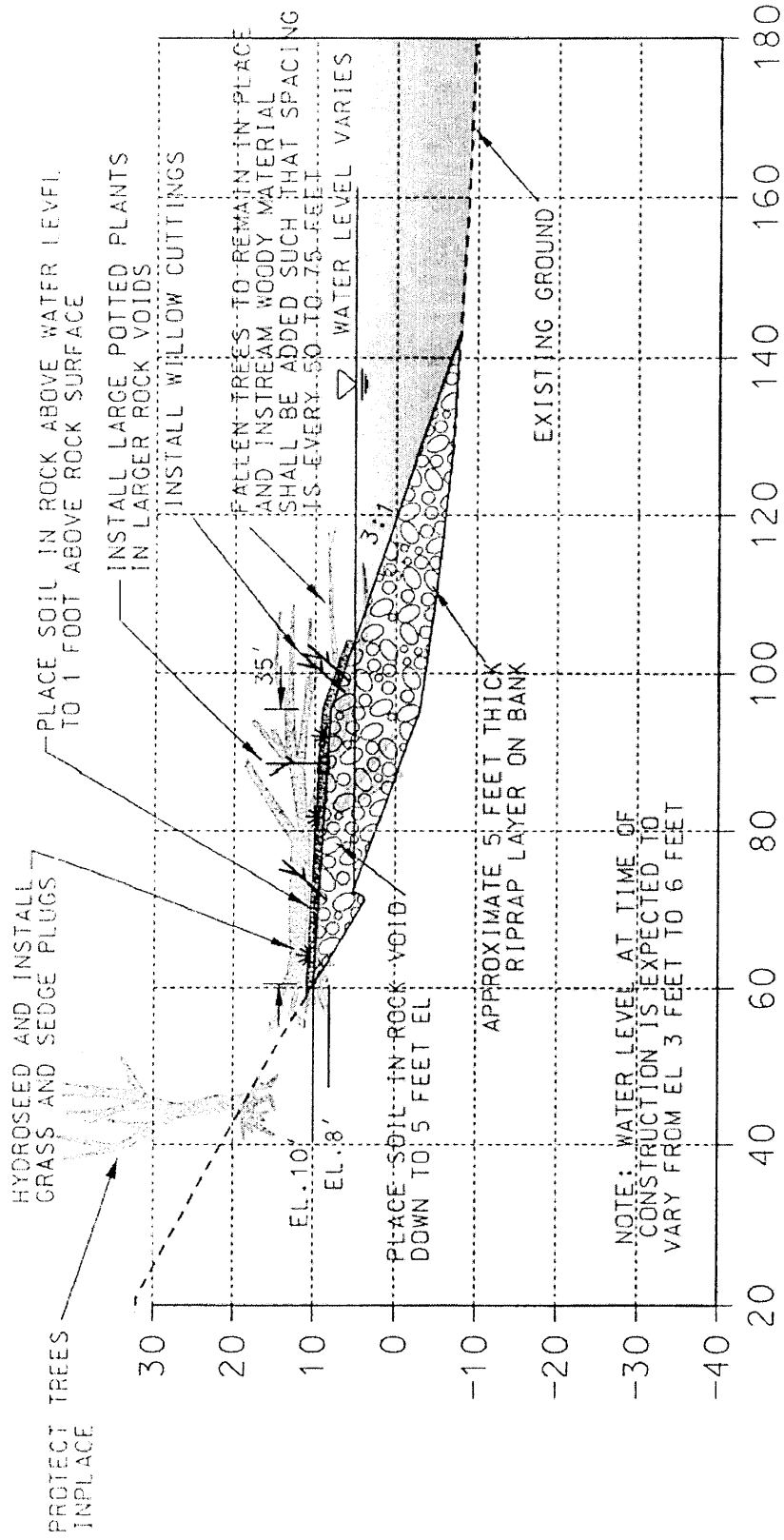
Source: USACE

Figure 3
 Typical Cross-Section at Site 49.9, Reach 2 (90% Design)
 Pocket Bank Protection Project

03615 (3 020)

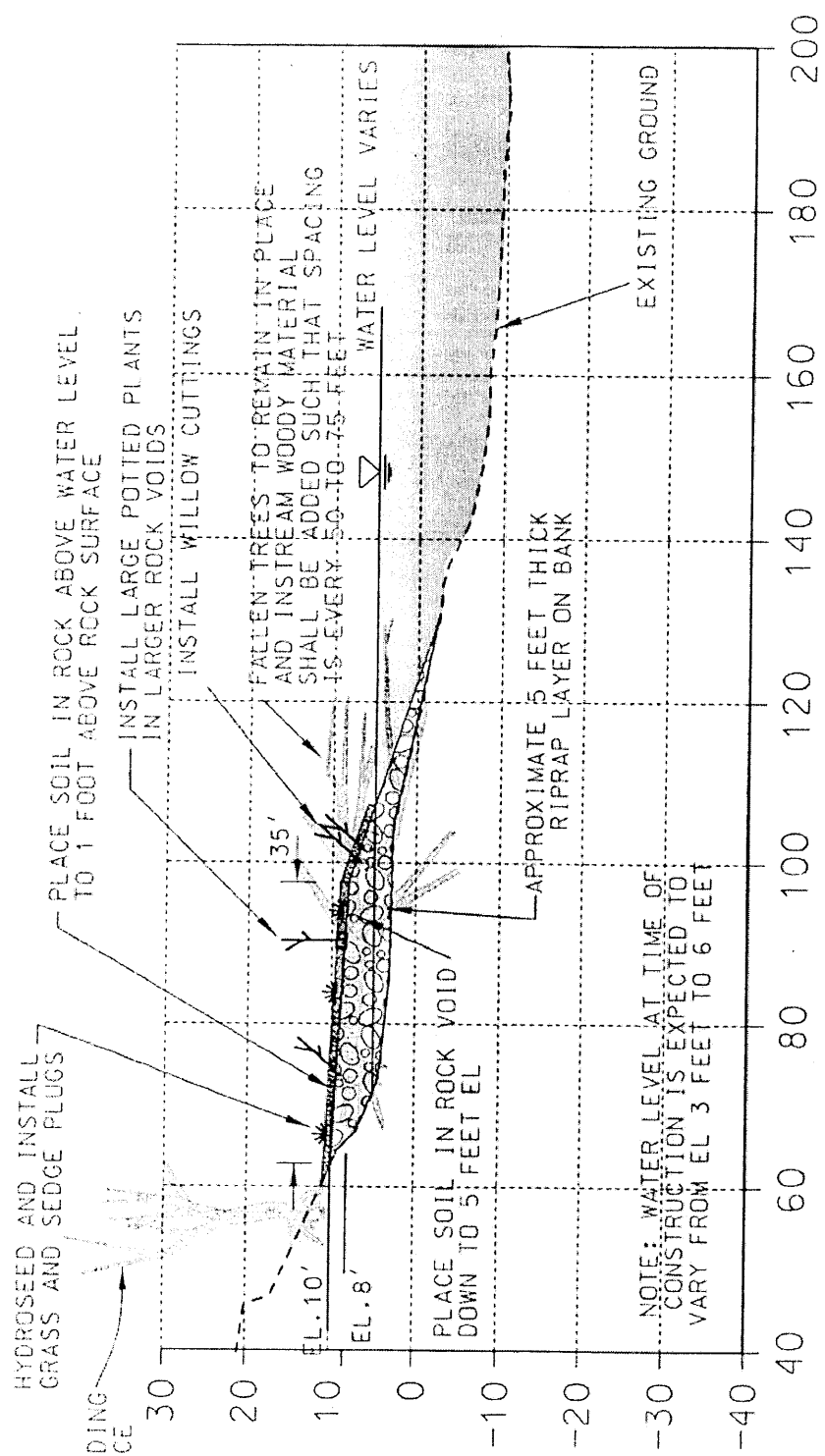


Source: USACE



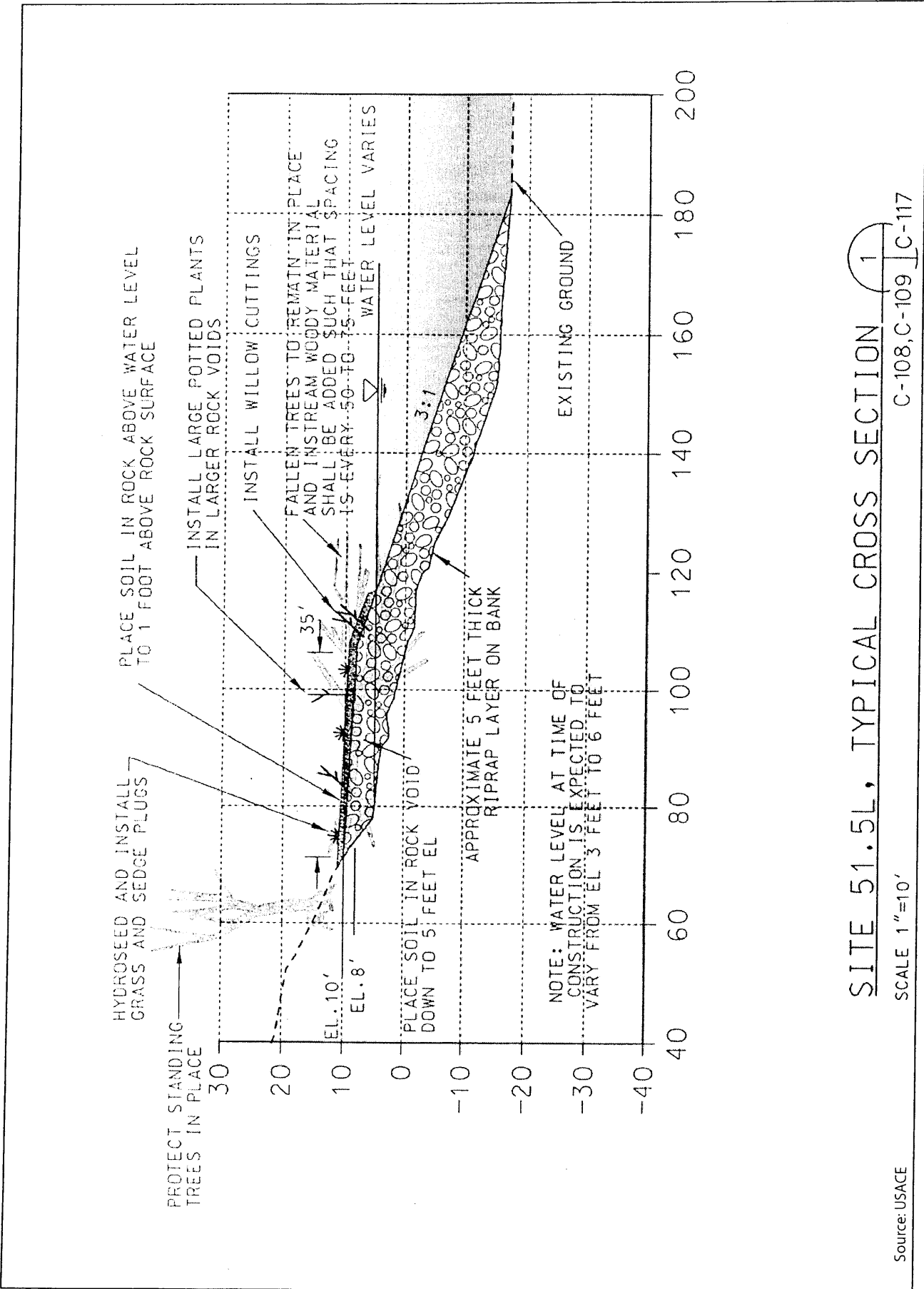
SITE 50.4L, TYPICAL CROSS SECTION 1
 SCALE 1"=10' C-106 C-115

Source: USACE



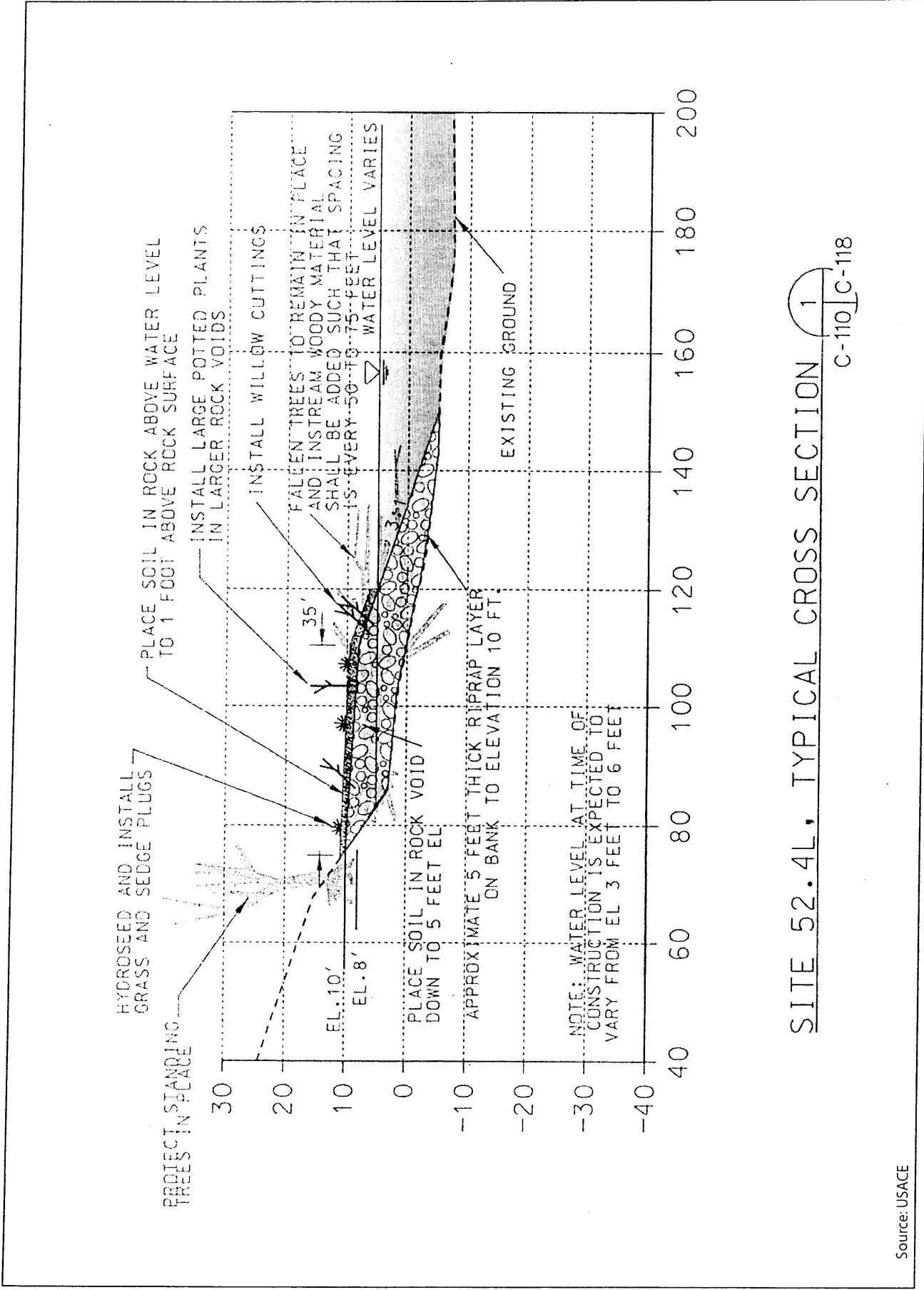
SITE 50.8L, TYPICAL CROSS SECTION 1
 SCALE 1"=10'
 C-107[C-116]

Source: USACE



02915.03 029

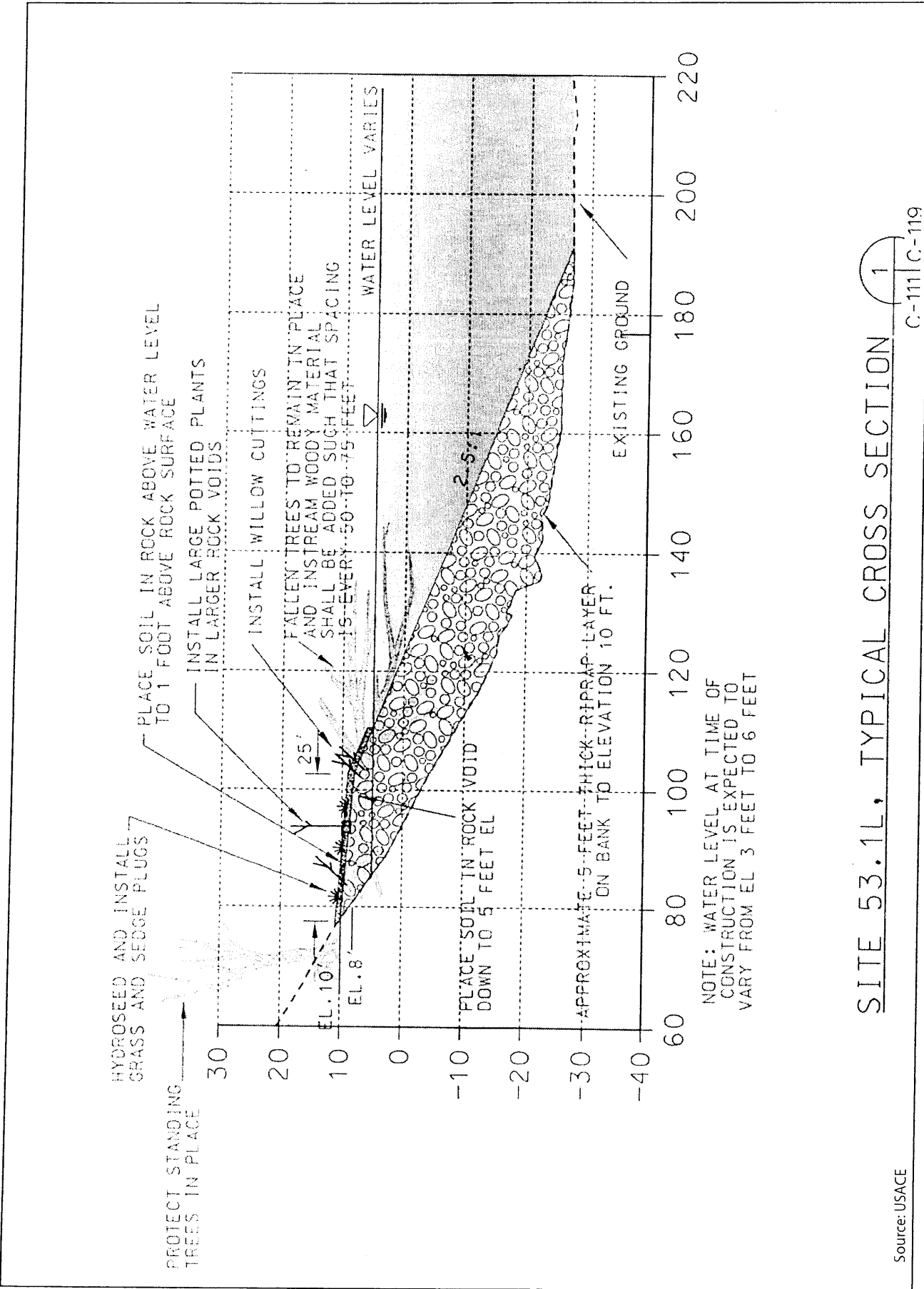
Source: USACE



Source: USACE

Figure 8
 Typical Cross-Section at Site 52.4 (90% Design)
 Pocket Bank Protection Project

03615.03 020



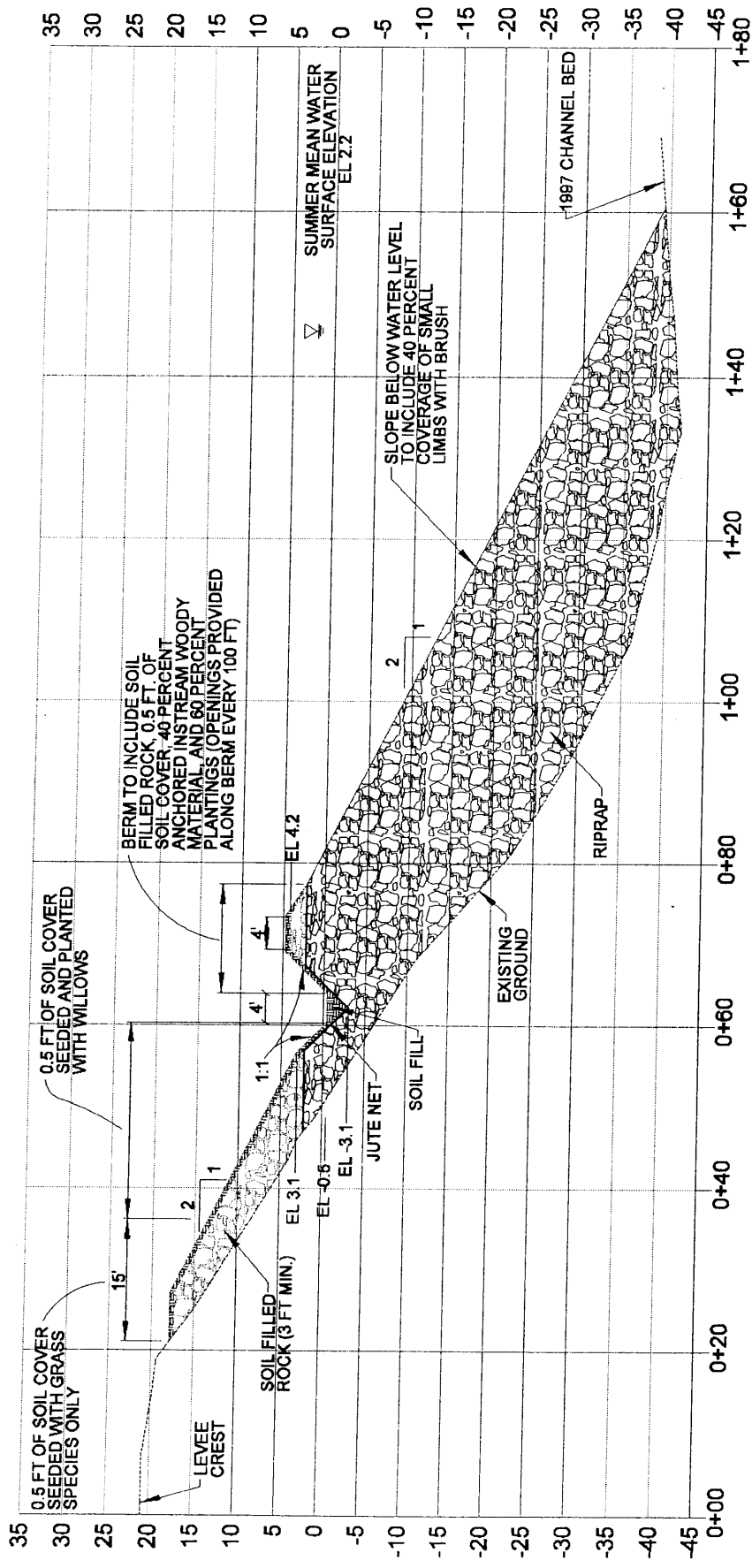
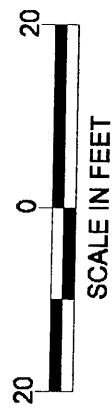


Figure 10
Typical Cross Section
RM 26.9



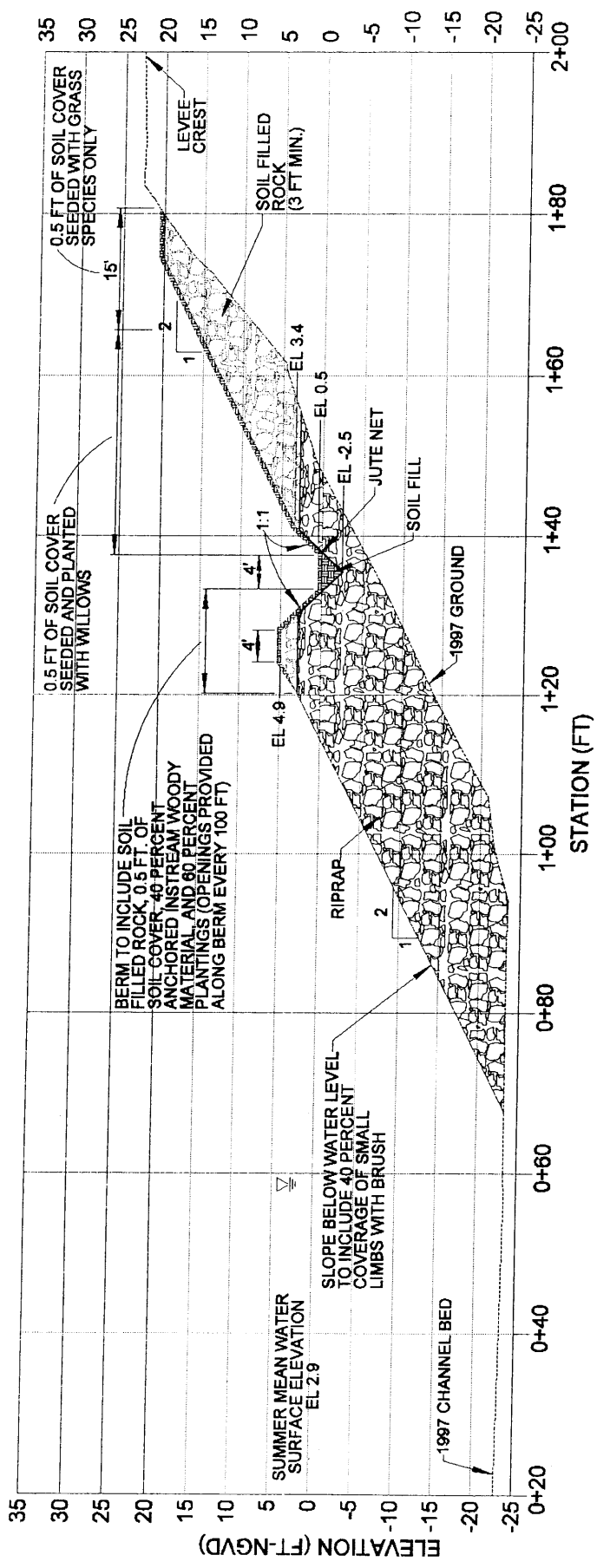
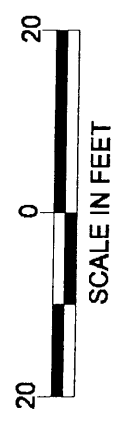


Figure 11
Typical Cross Section
RM 34.5



MAY 4, 2008

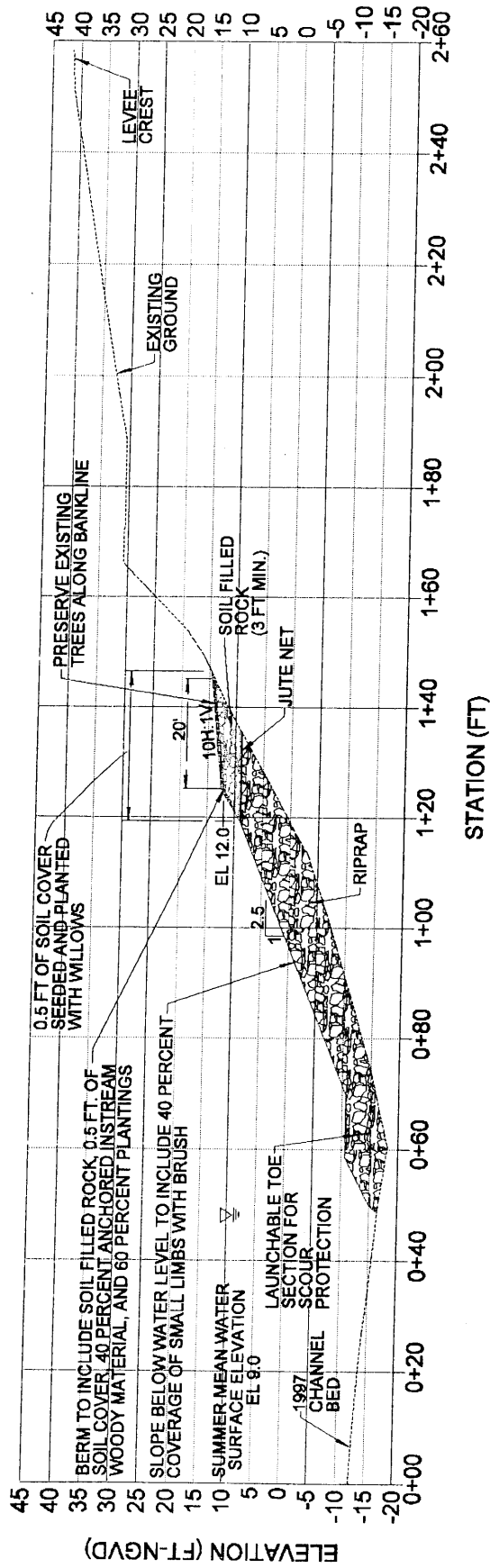
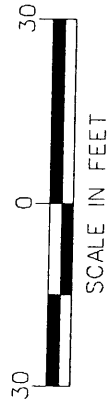


Figure 12
Typical Cross Section
RM 72.2



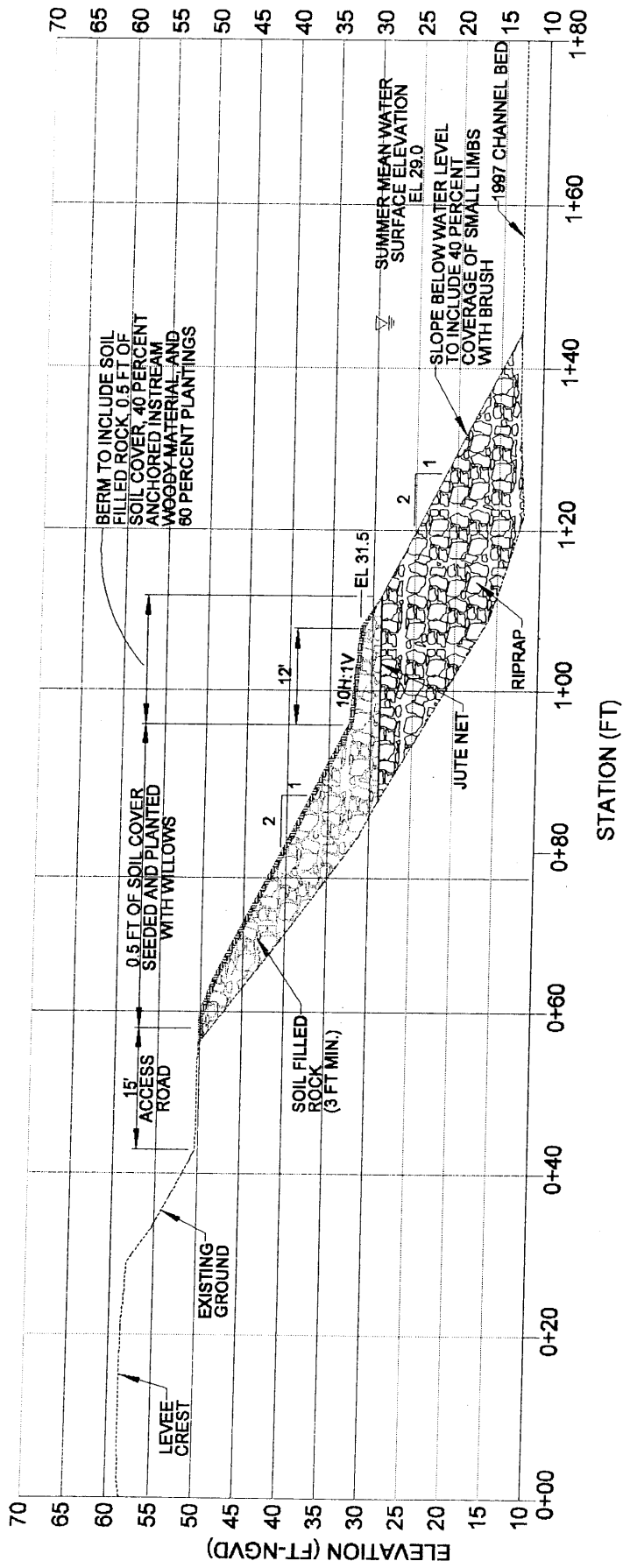
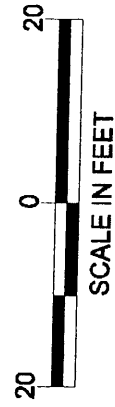


Figure 14
Typical Cross Section
RM 123.5



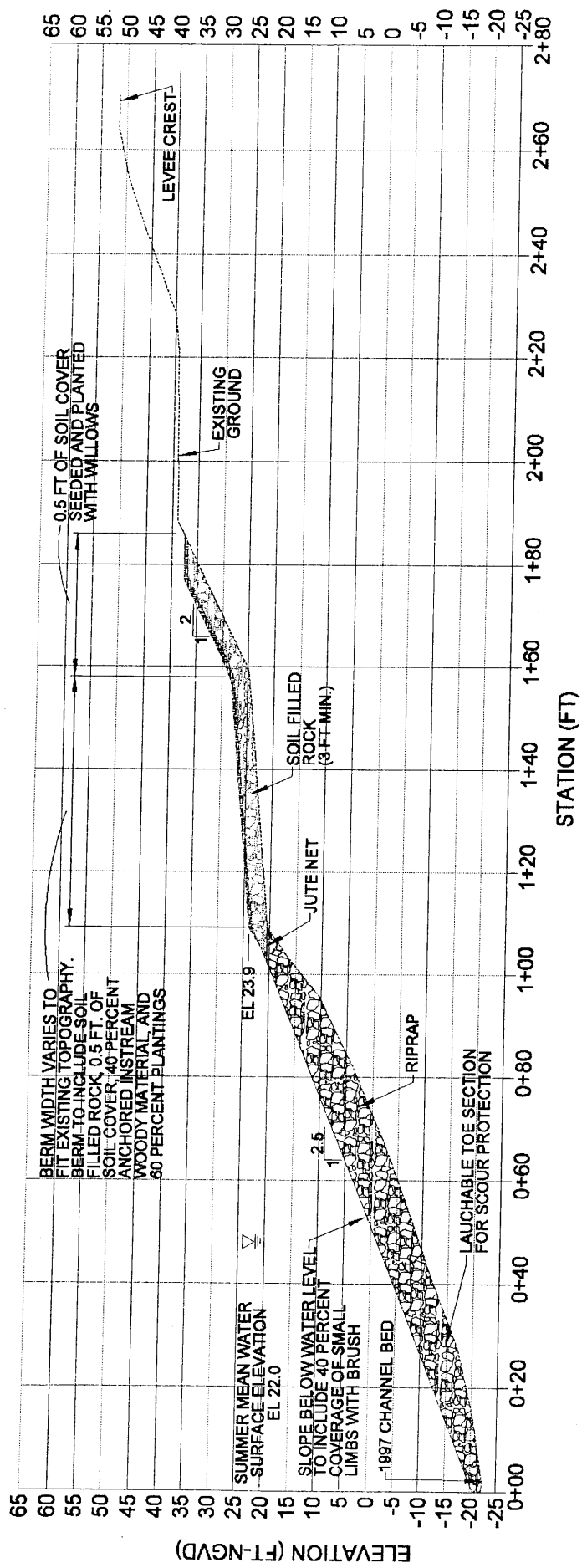
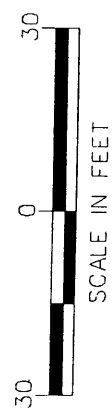
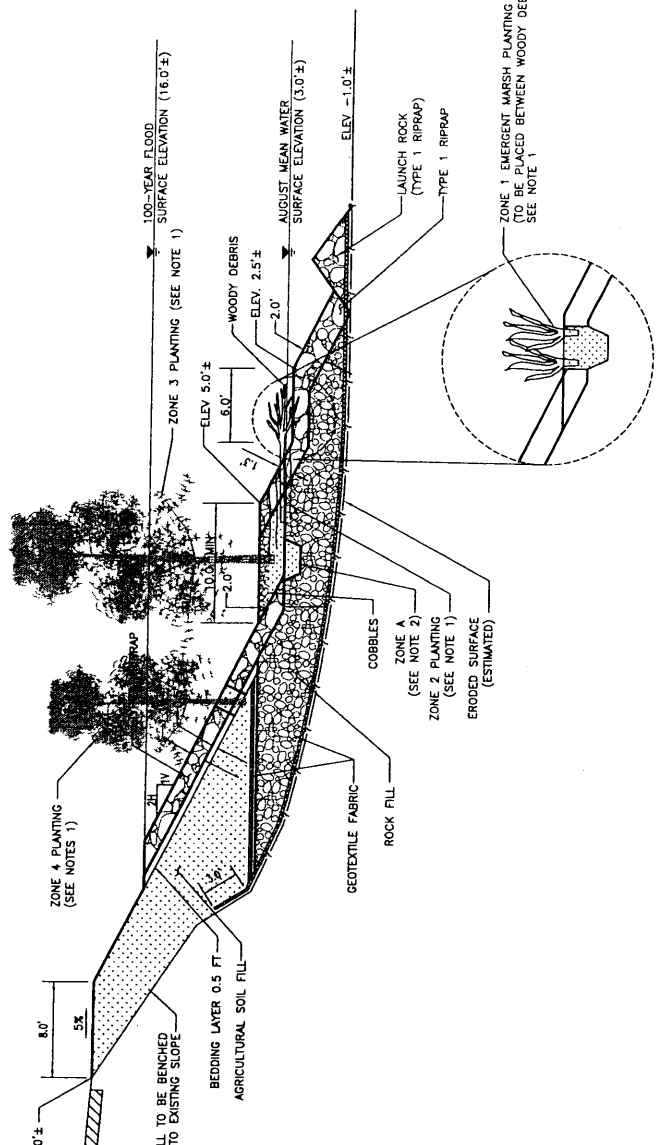


Figure 13
 Typical Cross Section
 RM 99.3



- NOTES:**
- Four different zones of plantings are used at this site. The typical cross section, and the species to be planted and their spacing are shown in the table at the left. See also Specification Section 2850.
 - After placement of rock fill in Zone 2 and riprap in Zone 4, fill zone 4 with planting soil to the maximum depth possible prior to planting on top.



TYPICAL CROSS SECTION
N.T.S.

Typical Planting Schedule - DWR Levee Repair

Zone	Basical Name (INCUS 23)	Common Name	Preparation Method	Size	Group	Spacing/Planting Method
1 (emergent marsh)	<i>Scirpus arvensis</i>	California bulrush	Container	Free Band 10' larger	1	1 Plant from Group 1 at 5 ft O.C.
	<i>Scirpus californicus</i>	California bulrush	Container	Free Band 10' larger	1	1 Plant from Group 1 at 5 ft O.C.
	<i>Scirpus kyssii</i> (includes <i>S. arvensis</i> and <i>S. californicus</i>)	bulrush-like species	transplant	3 foot diameter clumps	NA	Clumps transplanted from approved locations 10 ft O.C.
	<i>Saxifraga sp.</i> (includes <i>S. lasiocarpa</i> and <i>S. lucida</i>)	yellow species	plug cuttings	3.75 x 3 inch cuttings	NA	Planting Bundles 4 to 6 inch diameter, 1 bundle per 3 linear feet
	<i>Lepidosiphon sp.</i>	yellow species	plug cuttings	0.75 x 2.5 inch cuttings	NA	injected into riprap openings at multiple elevations
2 (Ingression (100%)	<i>Lepidosiphon sp.</i>	creeping widgee	Division	Free Band 10' larger	NA	1.5 ft O.C.
	<i>Conoclinium californicum</i>	Blue plant	Container	1 gallon	2	1 Plant from Group 2 at 5 ft O.C.
	<i>Deschampsia cespitosa</i>	tufted hair-grass	Container	1 gallon	2	1 Plant from Group 2 at 5 ft O.C.
	<i>Phragmites australis</i>	Common reed	Container	5 gallon	3	1 Plant from Group 3 at 10 ft O.C.
	<i>Saxifraga sp.</i> (includes <i>S. lasiocarpa</i> and <i>S. lucida</i>)	yellow species	plug cuttings	3.75 x 3 inch cuttings	NA	10 ft O.C. (see Summary Table)
3 (Ingression (100%)	<i>Actinella maritima</i>	Common yellow	Seed	0.75 x 2.5 inch seed	NA	1.5 ft O.C.
	<i>Trochium s. rhytidanthum</i>	meadow lark	Seed	NA	NA	1.5 ft O.C.
	<i>Artemisia douglasiana</i>	rugwort	Seed	NA	NA	1.5 ft O.C.
	<i>Rhynchospora californica</i>	California cordgrass	Container	1 gallon	4	1 Plant from Group 4 at 5 ft O.C.
	<i>Sida acuta</i>	California rose	Container	1 gallon	4	1 Plant from Group 4 at 5 ft O.C.
4 (leaves slopes)	<i>Phragmites australis</i>	Common reed	Container	5 gallon	5	1 Plant from Group 5 at 10 ft O.C. Plant at lower portion of planting zone
	<i>Quercus laevis</i>	White oak	Container	5 gallon	5	1 Plant from Group 5 at 10 ft O.C. Plant at lower portion of planting zone
	<i>Panicum asperum</i>	Stymatoc	Container	5 gallon	6	1 Plant from Group 6 at higher portion of planting zone
	<i>Stipa capensis</i>	California brome	Seed	NA	NA	10 ft O.C.
	<i>Elymus glaucus</i>	Blue wild rye	Seed	NA	NA	10 ft O.C.
	<i>Hordeum jubatum</i>	purple beak grass	Seed	NA	NA	5 ft O.C.
	<i>Deschampsia cespitosa</i>	tufted hair-grass	Seed	NA	NA	5 ft O.C.
	<i>Allyea californica</i>	Common blue	Seed	NA	NA	4 ft O.C.
	<i>Elymus capensis</i>	California brome	Seed	NA	NA	3 ft O.C.
	<i>Stipa capensis</i>	California brome	Seed	NA	NA	4 ft O.C.

NA = Not Applicable



REVIEWED: _____ DATE: _____
 APPROVAL: RECOMMENDED
 APPROVED PROJECT NUMBER: _____

URS

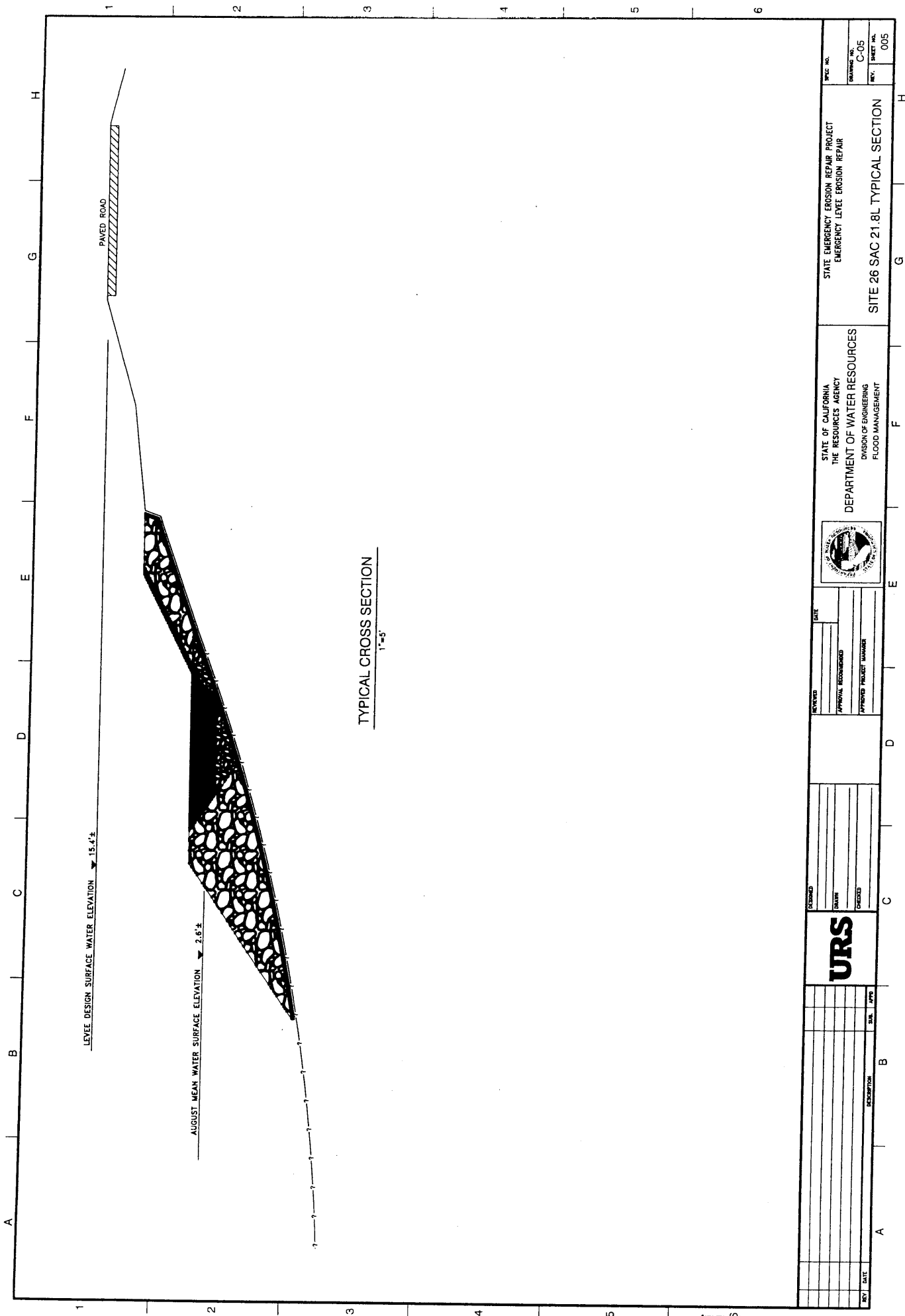
REV	DATE	DESCRIPTION	BY	APP'D

STATE OF CALIFORNIA
 THE RESOURCES AGENCY
 DEPARTMENT OF WATER RESOURCES
 DIVISION OF ENGINEERING
 FLOOD-MANAGEMENT

STATE EMERGENCY EROSION REPAIR PROJECT
 EMERGENCY LEVEE EROSION REPAIR
 SITE 380CAS 16.5L TYPICAL SECTION

DATE: _____
 SHEET NO.: C-05
 REV. SHEET NO.: 005

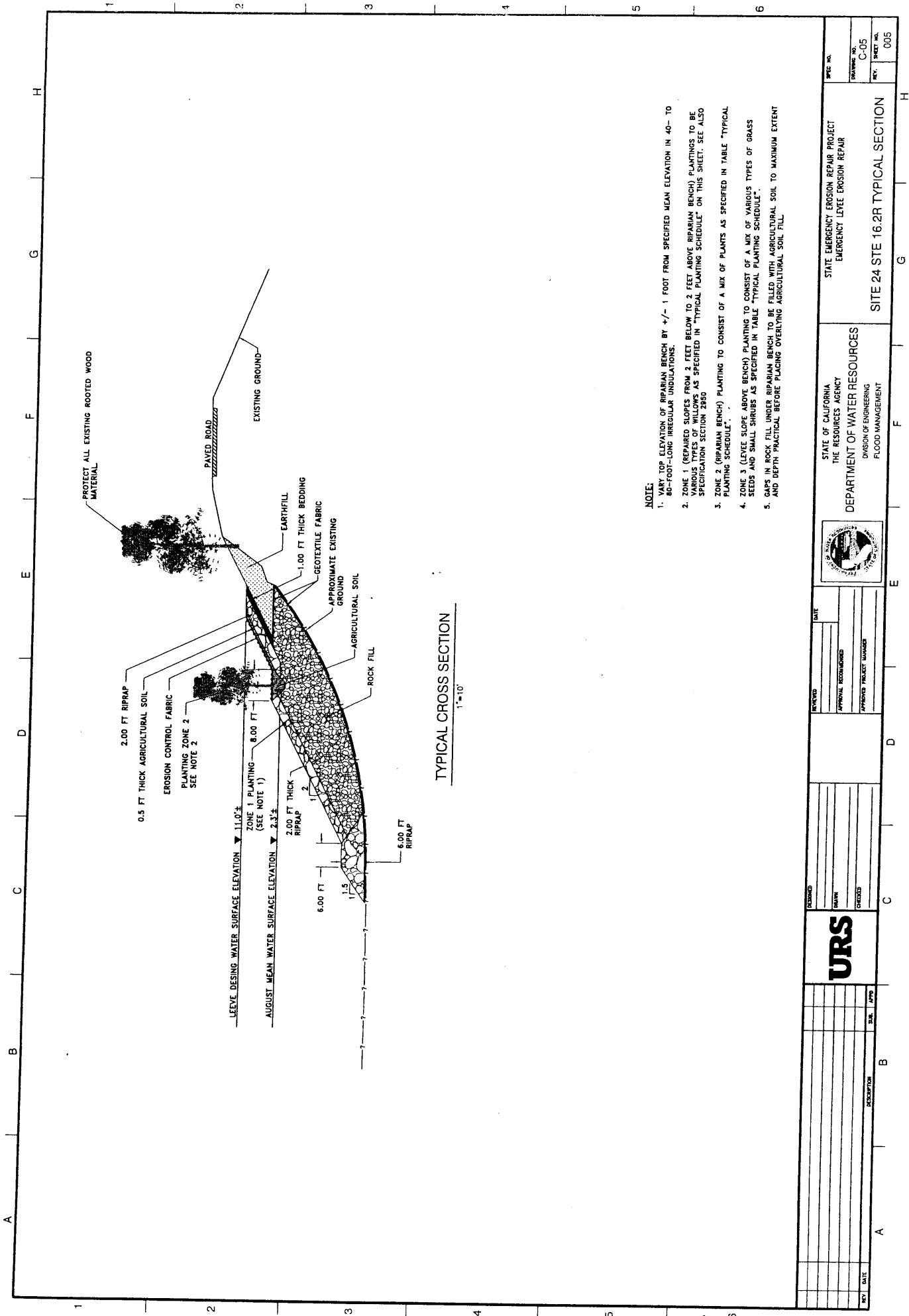
Figure 14
Typical Cross Section at Cache Slough, RM 16.5



TYPICAL CROSS SECTION
1"=5'

PROJECT NO. 15-10-000 DRAWING NO. C-05 REV. SHEET NO. 005		STATE EMERGENCY EROSION REPAIR PROJECT EMERGENCY LEVEL EROSION REPAIR		SPEC. NO.	
STATE OF CALIFORNIA THE RESOURCES AGENCY DEPARTMENT OF WATER RESOURCES DIVISION OF ENGINEERING FLOOD MANAGEMENT		SITE 26 SAC 21.8L TYPICAL SECTION		H	
				E	
DESIGNED CHECKED		REVIEWED APPROVAL RECOMMENDED APPROVED PROJECT MANAGER		DATE	
A		B		C	
DESCRIPTION		SIZE		QUANTITY	
REV. DATE		DESCRIPTION		SIZE	
A		B		C	
D		E		F	
G		H		I	

Figure 15
Typical Cross Section at Cache Slough, RM 21.8



TYPICAL CROSS SECTION
1"=10'

NOTE:

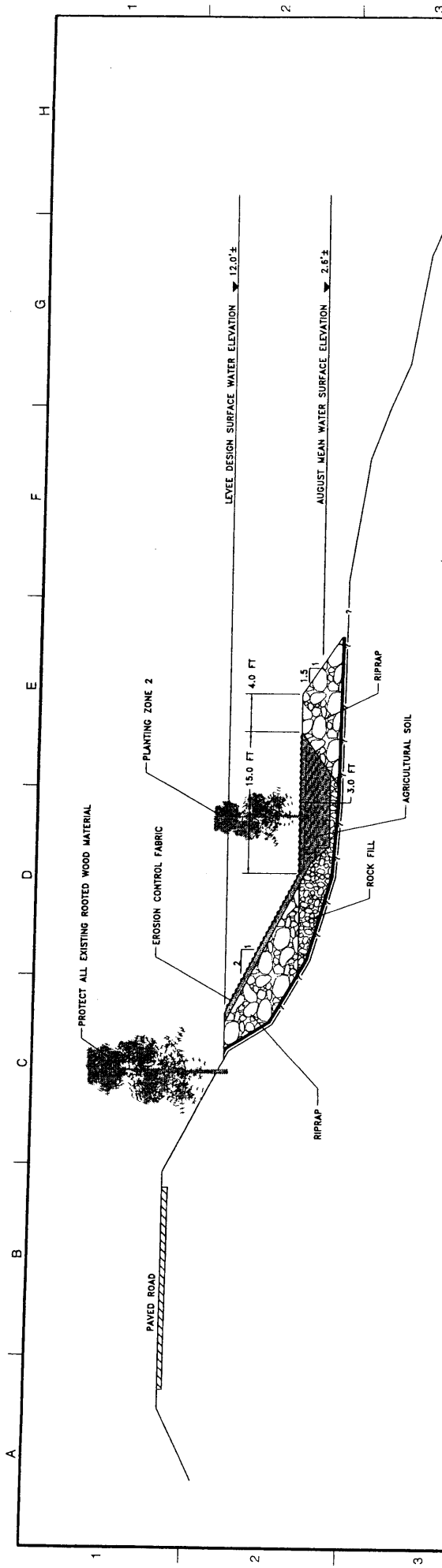
1. VARY TOP ELEVATION OF RIPARIAN BENCH BY +/- 1 FOOT FROM SPECIFIED MEAN ELEVATION IN 40- TO 80-FOOT-LONG IRREGULAR UNDULATIONS.
2. ZONE 1 (REPAIRED SLOPES FROM 3 FEET BELOW TO 2 FEET ABOVE RIPARIAN BENCH) PLANTINGS TO BE VARIOUS TYPES OF WILLOWS AS SPECIFIED IN "TYPICAL PLANTING SCHEDULE" ON THIS SHEET. SEE ALSO SPECIFICATION SECTION 2850.
3. ZONE 2 (RIPARIAN BENCH) PLANTING TO CONSIST OF A MIX OF PLANTS AS SPECIFIED IN TABLE "TYPICAL PLANTING SCHEDULE".
4. ZONE 3 (LEEVE SLOPE ABOVE BENCH) PLANTING TO CONSIST OF A MIX OF VARIOUS TYPES OF GRASS SEEDS AND SMALL SHRUBS AS SPECIFIED IN TABLE "TYPICAL PLANTING SCHEDULE".
5. GAPS IN ROCK FILL UNDER RIPARIAN BENCH TO BE FILLED WITH AGRICULTURAL SOIL TO MAXIMUM EXTENT AND DEPTH PRACTICAL BEFORE PLACING OVERLYING AGRICULTURAL SOIL FILL.

NO.	DATE	DESCRIPTION	BY	APP'D

DESIGNED	CHECKED	DATE	
APPROVAL AUTHORIZED	APPROVED PROJECT MANAGER		

STATE OF CALIFORNIA THE RESOURCES AGENCY DEPARTMENT OF WATER RESOURCES DIVISION OF ENGINEERING FLOOD-MANAGEMENT			STATE EMERGENCY EROSION REPAIR PROJECT EMERGENCY LEVEL EROSION REPAIR SITE 24 STE 16.2R TYPICAL SECTION
			SPEC NO. DRAWING NO. C-05 REV. SHEET NO. 005

Figure 16
Typical Cross Section at Sacramento River, RM 16.2



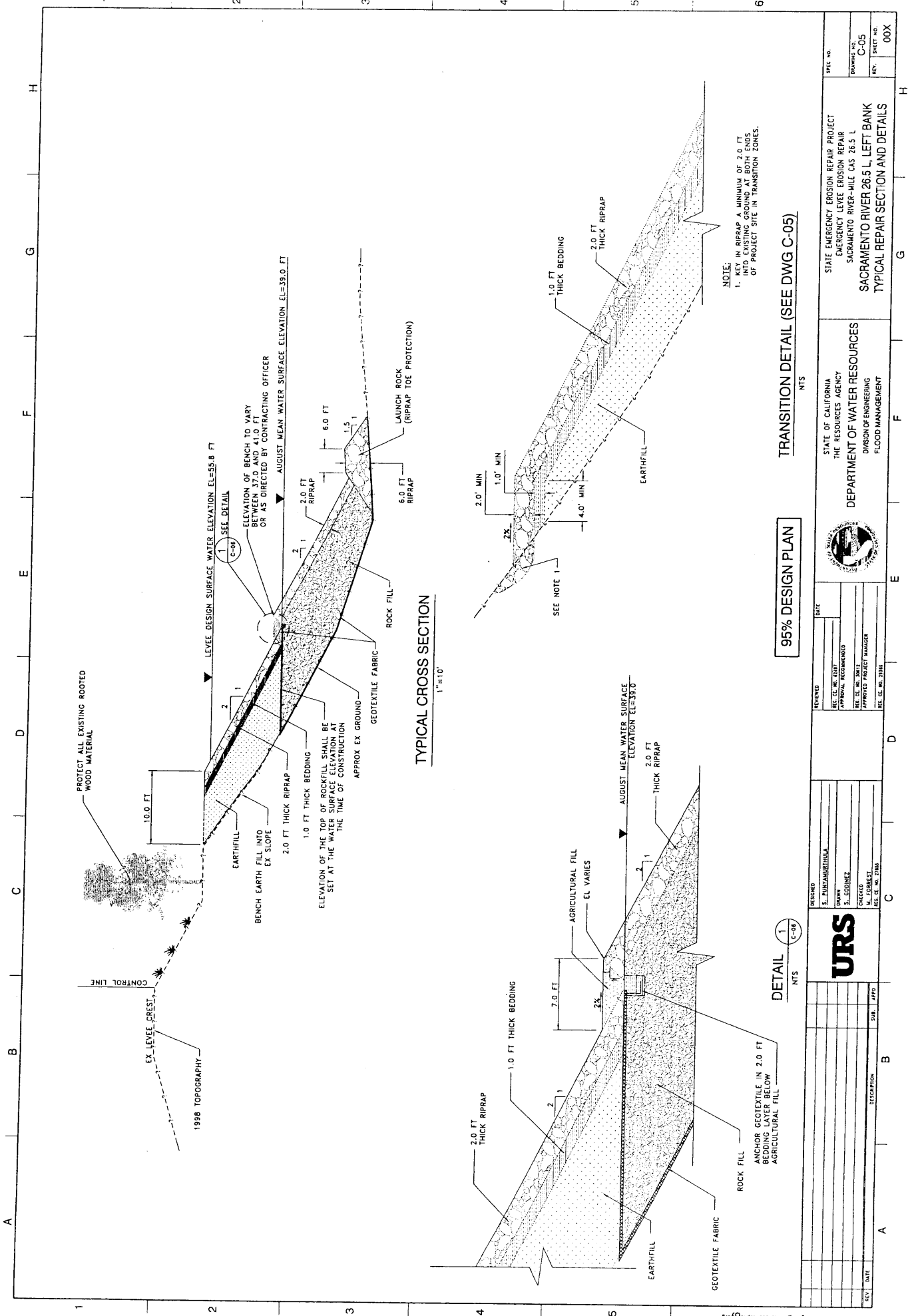
TYPICAL CROSS SECTION
1"=5'

NOTE:

1. THE EXISTING ROCK FILL BETWEEN ABOUT STA 3+40 AND 2+50 SHALL BE REMOVED DOWN TO THE SPECIFIED TOP OF ROCK FILL ELEVATION.
2. THE FINISHED ELEVATION OF THE TOP OF THE RIPRAP BENCH SHALL BE VARIED BY ±1.0 FOOT IN LONG (100 TO 200 FEET) IRREGULAR UNDULATIONS ALONG THE BENCH.
3. THE TOP PART OF THE EXISTING LEVEE SLOPE ABOVE THE TOP OF THE RIPRAP AT ELEVATION 14.6 FEET SHALL BE PROTECTED FROM ANY CONSTRUCTION DISTURBANCE.
4. EXISTING TREES AND LARGER SHRUBS BELOW ELEVATION 14.6 FEET SHALL BE LEFT IN PLACE AND PROTECTED FROM ANY CONSTRUCTION DAMAGE. TREES SHALL BE PROTECTED FROM DIRECT CONTACT WITH LARGE ROCKS, AND FILL MATERIAL SHALL BE PLACED CAREFULLY (BY HAND IF REQUIRED) AROUND THE TREE TRUNKS.
5. GAPS IN ROCK FILL UNDER RIPRAP BENCH AND IN RIPRAP UNDER UPPER LEVEE SLOPE SHALL BE FILLED WITH SOIL IN MAXIMUM EXTENT AND DEPTH PRACTICAL BEFORE PLACING OVERLYING SOIL FILL.
6. ZONE 2 (ABOUT 2 FEET ABOVE AND BELOW RIPRAP BENCH) PLANTING TO CONSIST OF WILLOW BRANCHES PLACED INTO RIPRAP AS SPECIFIED IN TABLE AT LEFT.
7. ZONE 3 (RIPRAP BENCH) PLANTING TO CONSIST OF A MIX OF TREES AND SHRUBS AS SPECIFIED IN THE TABLE AT LEFT.
8. ZONE 4 (LEVEE SLOPE ABOVE BENCH) PLANTING TO CONSIST OF A MIX OF VARIOUS TYPES OF GRASS SEEDS AND SMALL SHRUBS AS SPECIFIED IN THE TABLE AT LEFT.

		STATE OF CALIFORNIA THE RESOURCES AGENCY DEPARTMENT OF WATER RESOURCES DIVISION OF ENGINEERING FLOOD MANAGEMENT		STATE EMERGENCY EROSION REPAIR PROJECT EMERGENCY LEVEE EROSION REPAIR SITE 26 SAC 20.8L TYPICAL SECTION		SPEC. NO. DRAWING NO. C-05 REV. SHEET NO. 005
REVISION DATE	APPROVAL AUTHORITY RECOMMENDED DATE	CHECKED DATE	APPROVED PROJECT MANAGER DATE	REVISION DATE	APPROVAL AUTHORITY RECOMMENDED DATE	CHECKED DATE
REVISION DATE	APPROVAL AUTHORITY RECOMMENDED DATE	CHECKED DATE	APPROVED PROJECT MANAGER DATE	REVISION DATE	APPROVAL AUTHORITY RECOMMENDED DATE	CHECKED DATE

Figure 17
Typical Cross Section at Sacramento River, RM 20.8



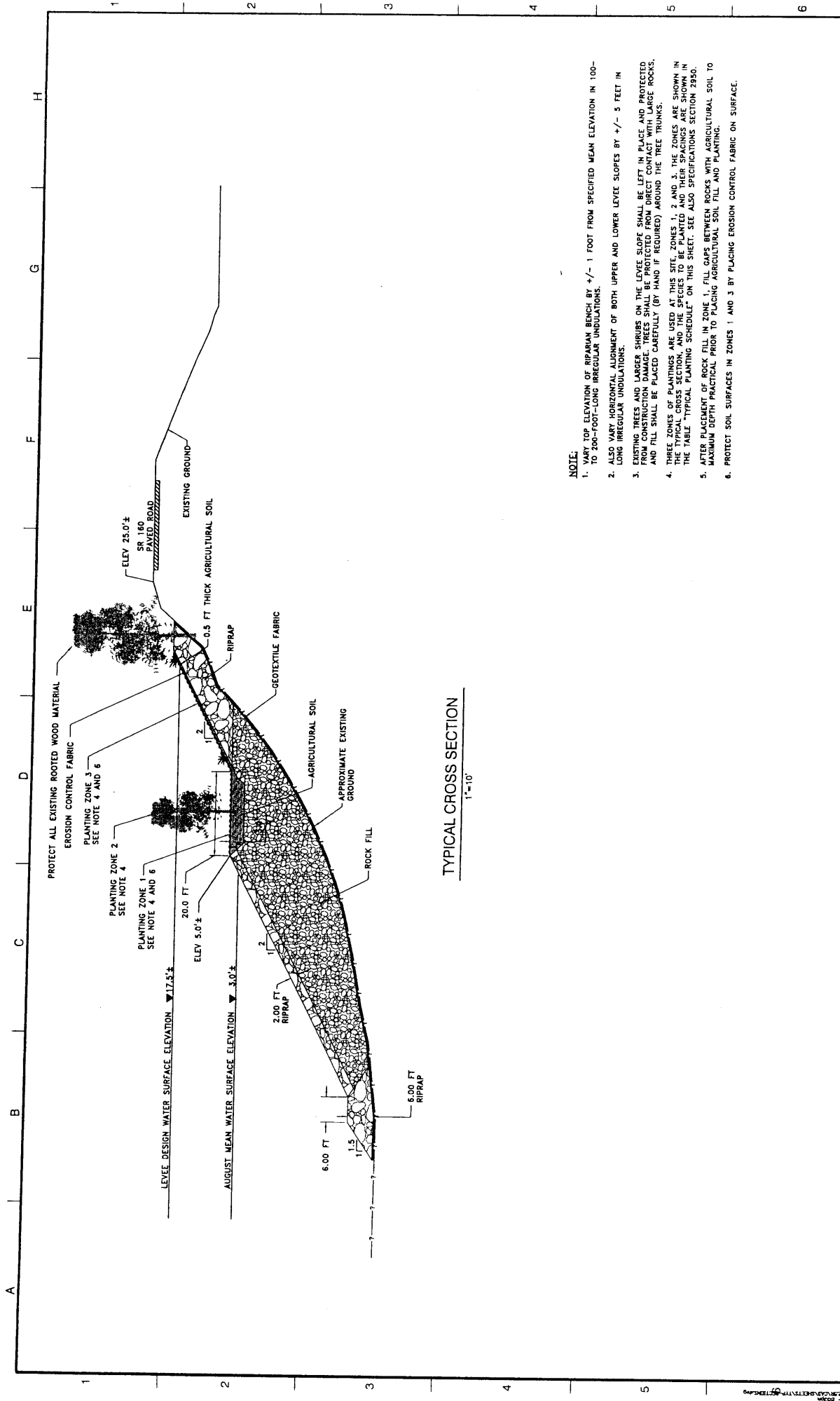
REV	DATE	DESCRIPTION	SUB	APPD

DESIGNED	S. PANFILIANTINA	DATE	
DRAWN	S. LESCHKE	APPROVAL	
CHECKED		APPROVED PROJECT MANAGER	
SCALE	AS SHOWN		

STATE OF CALIFORNIA THE RESOURCES AGENCY DEPARTMENT OF WATER RESOURCES DIVISION OF ENGINEERING FLOOD MANAGEMENT	STATE EMERGENCY EROSION REPAIR PROJECT EMERGENCY LEVEE EROSION REPAIR SACRAMENTO RIVER-MILE CAS 26.5 L SACRAMENTO RIVER 26.5 L LEFT BANK TYPICAL REPAIR SECTION AND DETAILS
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SPEC NO.	
DRAWING NO.	C-05
REV.	
SHEET NO.	00X

Figure 18
Typical Cross Section at Sacramento River, RM 26.5



TYPICAL CROSS SECTION
1"=10'

NOTE:

1. VARY TOP ELEVATION OF RIPARIAN BENCH BY +/- 1 FOOT FROM SPECIFIED MEAN ELEVATION IN 100- TO 200-FOOT-LONG IRREGULAR UNDULATIONS.
2. ALSO VARY HORIZONTAL ALIGNMENT OF BOTH UPPER AND LOWER LEVEL SLOPES BY +/- 5 FEET IN LONG IRREGULAR UNDULATIONS.
3. EXISTING TREES AND LARGER SHRUBS ON THE LEVEE SLOPE SHALL BE LEFT IN PLACE AND PROTECTED FROM CONSTRUCTION DAMAGE. TREES SHALL BE PROTECTED FROM DIRECT CONTACT WITH ROCKS, AND FILL SHALL BE PLACED CAREFULLY (BY HAND IF REQUIRED) AROUND THE TREE TRUNKS.
4. THREE ZONES OF PLANTINGS ARE USED AT THIS SITE. ZONES 1, 2, AND 3. THE ZONES ARE SHOWN IN THE TYPICAL CROSS SECTION, AND THE SPECIES TO BE PLANTED AND THEIR SPACING ARE SHOWN IN THE TABLE "TYPICAL PLANTING SCHEDULE" ON THIS SHEET. SEE ALSO SPECIFICATIONS SECTION 2850.
5. AFTER PLACEMENT OF ROCK FILL IN ZONE 1, FILL GAPS BETWEEN ROCKS WITH AGRICULTURAL SOIL TO MAXIMUM DEPTH PRACTICAL PRIOR TO PLACING AGRICULTURAL SOIL FILL AND PLANTING.
6. PROTECT SOIL SURFACES IN ZONES 1 AND 3 BY PLACING EROSION CONTROL FABRIC ON SURFACE.

URS	DESIGNED DRAWN CHECKED	APPROVED APPROVAL RECOMMENDED APPROVED PROJECT MANAGER	DATE	DATE	DATE	DATE	DATE
STATE OF CALIFORNIA THE RESOURCES AGENCY DEPARTMENT OF WATER RESOURCES				STATE EMERGENCY EROSION REPAIR PROJECT EMERGENCY LEVEE EROSION REPAIR			
DIVISION OF ENGINEERING FLOOD MANAGEMENT				SITE 2 SAC 32.5R TYPICAL SECTION			
				SPEC. NO. DRAWING NO. C-05 REV. SHEET NO. 005			

Figure 19
Typical Cross Section at Sacramento River, RM 32.5

NOTES:

1. Four different zones of plantings are used at this site. The zones are shown in the typical cross section, and the species to be planted are listed in the planting schedule. The species listed in the planting schedule are shown in the table at the left. See also Specification Section 2950.
2. After placement of rock fill in Zone 2 and riprap in Zone 4, fill gaps between the riprap with planting soil to the maximum depth possible prior to planting on top.
3. Emergent bench shall be sloped approx 10% to river and shall vary in elevation \pm foot along entire length to provide an uneven surface.

APPROX. LEVEE DESIGN
MSEL (3.0' 1)

2-1/2" WSEL (21.96')

APPROX. MEAN MSEL (3.0')

APPROX. LEVEE DESIGN
MSEL (3.0' 1)

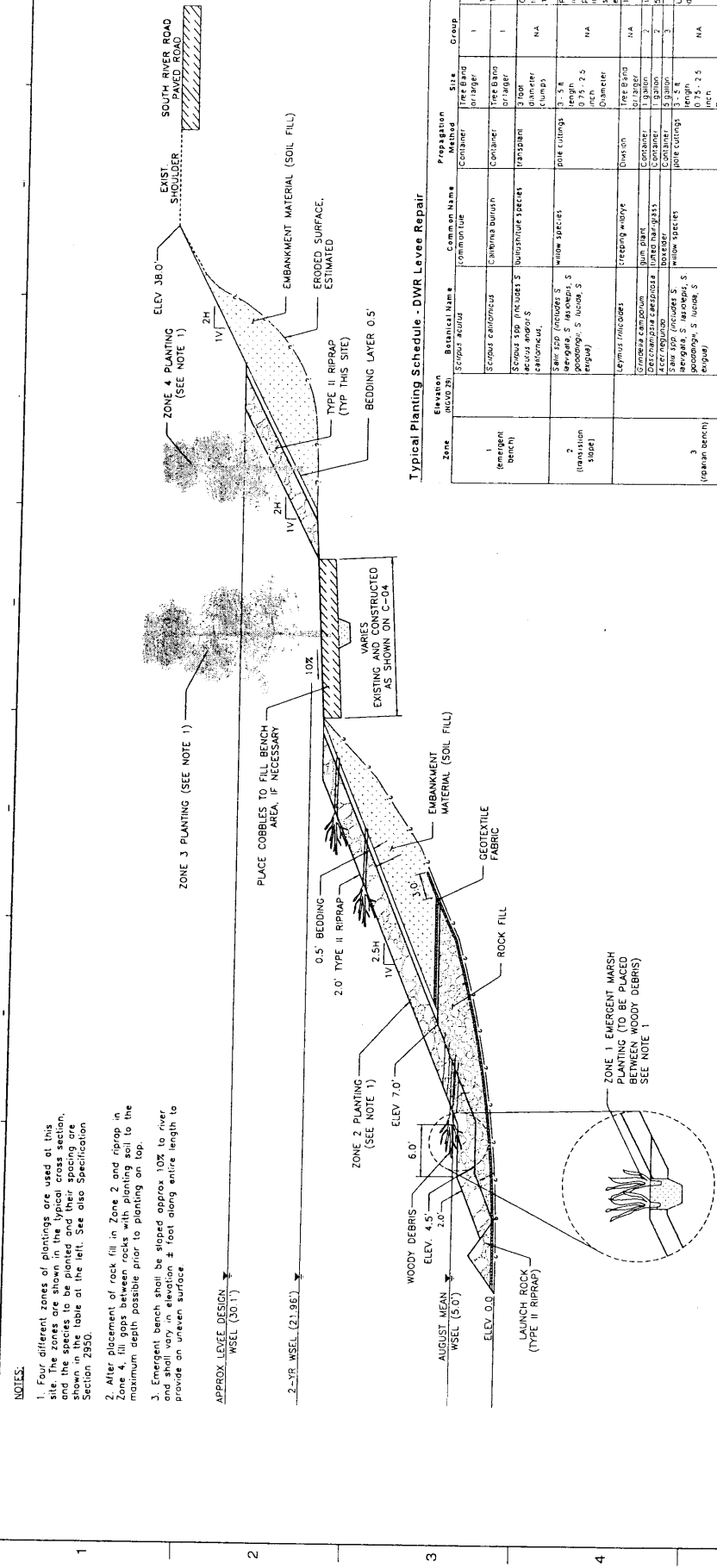
2-1/2" WSEL (21.96')

APPROX. MEAN MSEL (3.0')

APPROX. LEVEE DESIGN
MSEL (3.0' 1)

2-1/2" WSEL (21.96')

APPROX. MEAN MSEL (3.0')



Typical Planting Schedule - DWR Levee Repair

Zone	Elevation (ft. on 29)	Botanical Name	Common Name	Preparation Method	Site	Group	Spacing (ft. x ft.)
1 (emergent bench)		<i>Scirpus americanus</i>	Common Tule	Container	Tree Bag or larger	1	Plant from Group 1 at 15 ft. O.C.
		<i>Scirpus californicus</i>	California Bulrush	Container	Tree Bag or larger	1	Plant from Group 1 at 15 ft. O.C.
		<i>Scirpus spp (includes S. americanus and S. californicus)</i>	bulrush-like species	TRANSPLANT	Clumps	NA	Clumps from existing from approved locations. 18" O.C.
		<i>Salix spp (includes S. lasiolepis, S. spaldingii, S. lucida, S. elongata)</i>	willow species	poie cuttings	3 - 5 ft length 0.75 - 2.5 inch diameter	NA	3 - 5 ft length cuttings into 30" x 30" or 40" x 40" grids. Multiple plantations.
		<i>Lepidosaphale</i>	stream willow	stream willow	Division	Tree Bags	NA
2 (fluvial slope)		<i>Gomphocarpus</i>	Gum plant	Container	3 gallon	2	Plant from Group 2 at 15 ft. O.C.
		<i>Deschampsia cespitosa</i>	Wheatgrass	Container	1 gallon	2	Plant from Group 2 at 15 ft. O.C.
		<i>Sida spp (includes S. lasiolepis, S. spaldingii, S. lucida, S. elongata)</i>	willow species	poie cuttings	3 gallon	3	Plant from Group 3 at 15 ft. O.C.
		<i>Achillea millefolium</i>	Common Yarrow	Seed	0.75 - 2.5 inch	NA	Live bush mat (see drawing detail)
		<i>Hordeum distichum</i>	Meadow Barley	Seed	NA	NA	Plant from Group 3 at 15 ft. O.C. Plant at 15 ft. O.C. Plant at 15 ft. O.C. Plant at 15 ft. O.C.
3 (fluvial bench)		<i>Achillea millefolium</i>	Common Yarrow	Seed	0.75 - 2.5 inch	NA	Live bush mat (see drawing detail)
		<i>Hordeum distichum</i>	Meadow Barley	Seed	NA	NA	Plant from Group 3 at 15 ft. O.C. Plant at 15 ft. O.C. Plant at 15 ft. O.C.
		<i>Achillea millefolium</i>	Common Yarrow	Seed	0.75 - 2.5 inch	NA	Live bush mat (see drawing detail)
		<i>Hordeum distichum</i>	Meadow Barley	Seed	NA	NA	Plant from Group 3 at 15 ft. O.C. Plant at 15 ft. O.C. Plant at 15 ft. O.C.
		<i>Trifolium pratense</i>	Red Clover	Seed	NA	NA	Plant from Group 3 at 15 ft. O.C. Plant at 15 ft. O.C. Plant at 15 ft. O.C.
		<i>Chenopodium album</i>	Common Lambsquarters	Seed	NA	NA	Plant from Group 3 at 15 ft. O.C. Plant at 15 ft. O.C. Plant at 15 ft. O.C.
		<i>Chenopodium album</i>	Common Lambsquarters	Seed	NA	NA	Plant from Group 3 at 15 ft. O.C. Plant at 15 ft. O.C. Plant at 15 ft. O.C.
		<i>Chenopodium album</i>	Common Lambsquarters	Seed	NA	NA	Plant from Group 3 at 15 ft. O.C. Plant at 15 ft. O.C. Plant at 15 ft. O.C.
		<i>Chenopodium album</i>	Common Lambsquarters	Seed	NA	NA	Plant from Group 3 at 15 ft. O.C. Plant at 15 ft. O.C. Plant at 15 ft. O.C.
		<i>Chenopodium album</i>	Common Lambsquarters	Seed	NA	NA	Plant from Group 3 at 15 ft. O.C. Plant at 15 ft. O.C. Plant at 15 ft. O.C.
		<i>Chenopodium album</i>	Common Lambsquarters	Seed	NA	NA	Plant from Group 3 at 15 ft. O.C. Plant at 15 ft. O.C. Plant at 15 ft. O.C.
		<i>Chenopodium album</i>	Common Lambsquarters	Seed	NA	NA	Plant from Group 3 at 15 ft. O.C. Plant at 15 ft. O.C. Plant at 15 ft. O.C.

TYPICAL CROSS SECTION
N/S

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
DIVISION OF ENGINEERING
FLOOD MANAGEMENT

SACRAMENTO RIVER FLOOD CONTROL PROJECT
EMERGENCY LEVEE EROSION REPAIR
SITE SAC 56.8R TYPICAL SECTION

DATE: MAY 01, 2006

REVISIONS: W. ZINAKIS; C. O. BERNALDEZ

APPROVED PROJECT MANAGER

DRAWN BY: W. ZINAKIS; C. O. BERNALDEZ

CHECKED BY: W. ZINAKIS; C. O. BERNALDEZ

DATE: _____

NO. DATE _____

DESCRIPTION _____

SCALE: 1" = 10' (VERTICAL); 1" = 10' (HORIZONTAL)

SPICE NO. _____

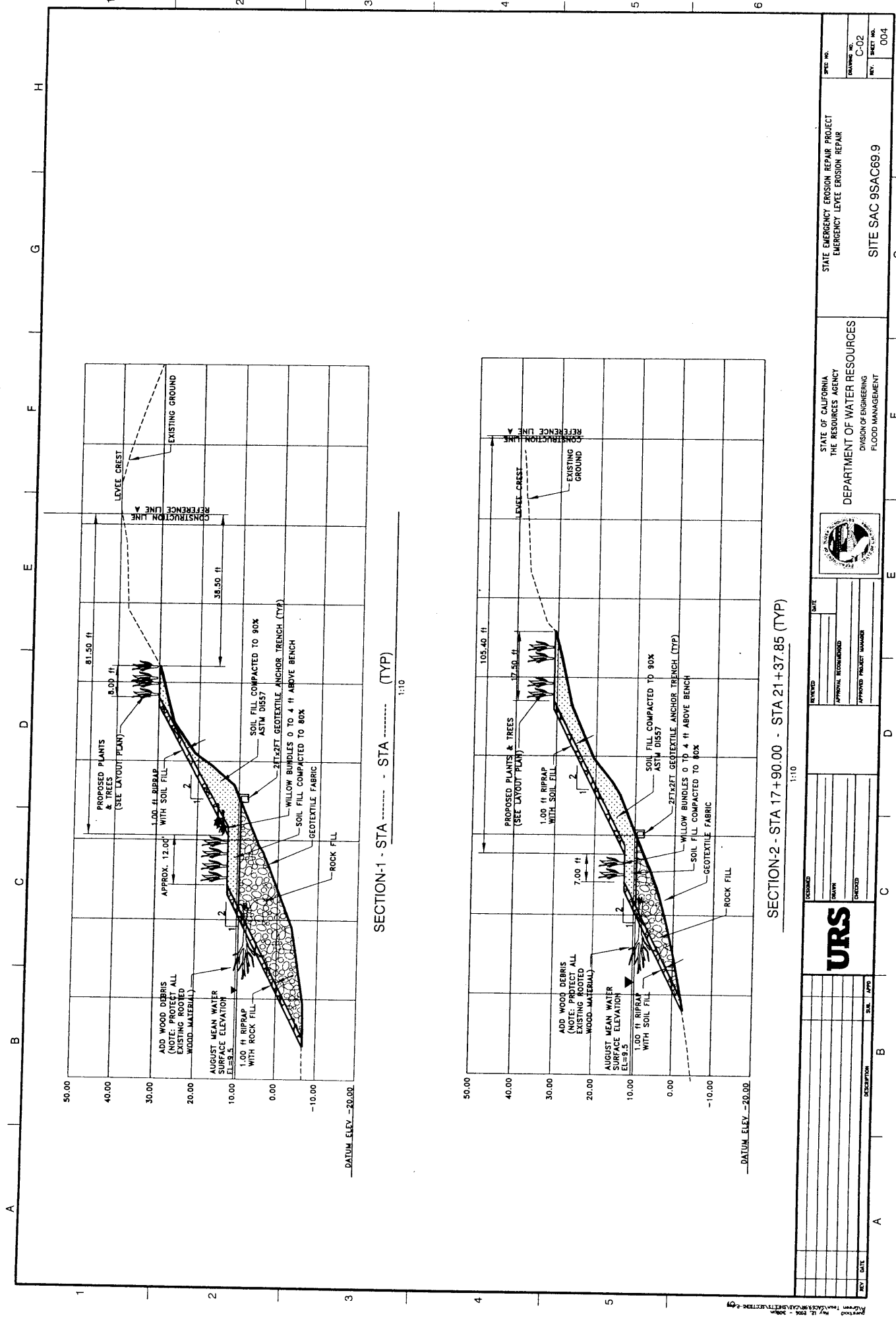
DRAWING NO. C-05

REV. SHEET NO. _____

TOTAL SHEETS: 005

Figure 20
Typical Cross Section at Sacramento River, RM 56.8

May 06, 2006 - 4:47pm
H:\CADD\Current\ENR\INFRADWR Levee Repair\Levee Repair\Sac56.8\56.8R.C-05.dwg

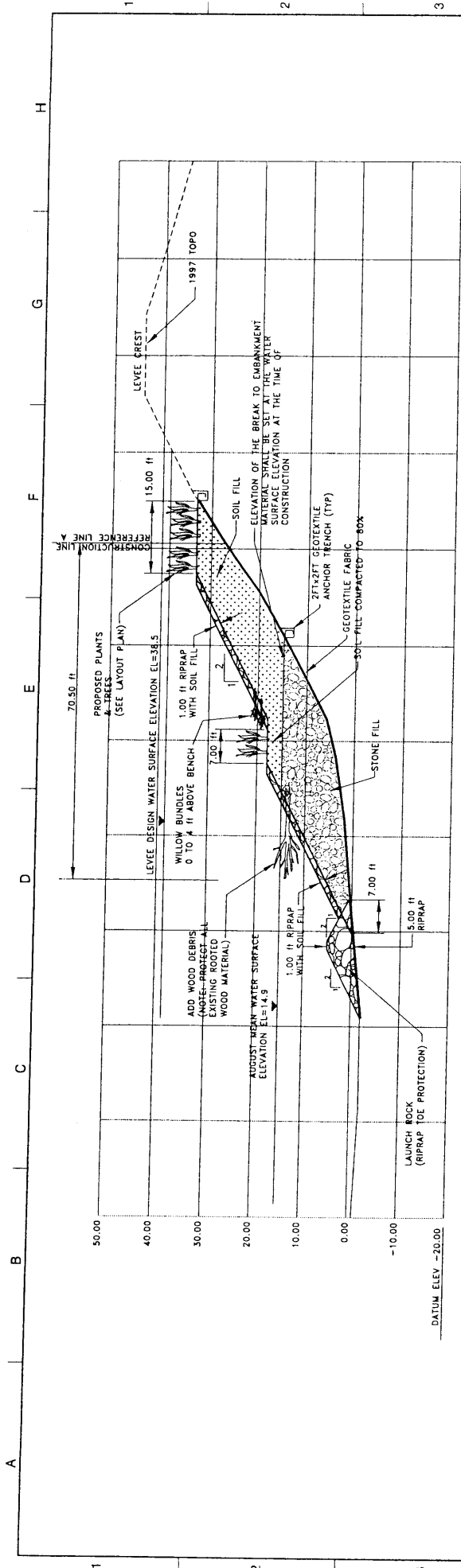


SECTION-1 - STA 17+90.00 - STA 21+37.85 (TYP) 1:10

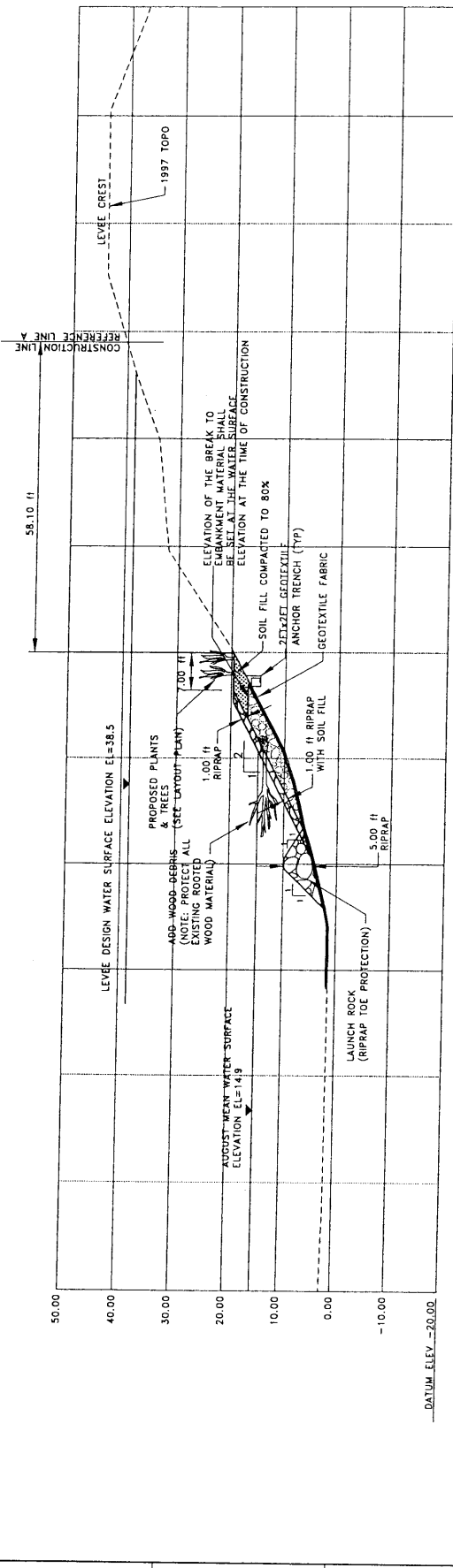
SECTION-2 - STA 17+90.00 - STA 21+37.85 (TYP) 1:10

REV	DATE	DESCRIPTION	SCALE	DATE	APPROVED PROJECT NUMBER	DATE	APPROVAL	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE
STATE OF CALIFORNIA THE RESOURCES AGENCY DEPARTMENT OF WATER RESOURCES DIVISION OF ENGINEERING FLOOD MANAGEMENT											STATE EMERGENCY EROSION REPAIR PROJECT EMERGENCY LEVEE EROSION REPAIR C-02 REV. SHEET NO. 004				
SITE SAC 9SAC69.9											STATE EMERGENCY EROSION REPAIR PROJECT EMERGENCY LEVEE EROSION REPAIR C-02 REV. SHEET NO. 004				

Figure 21
Typical Cross Section at Sacramento River, RM 69.9



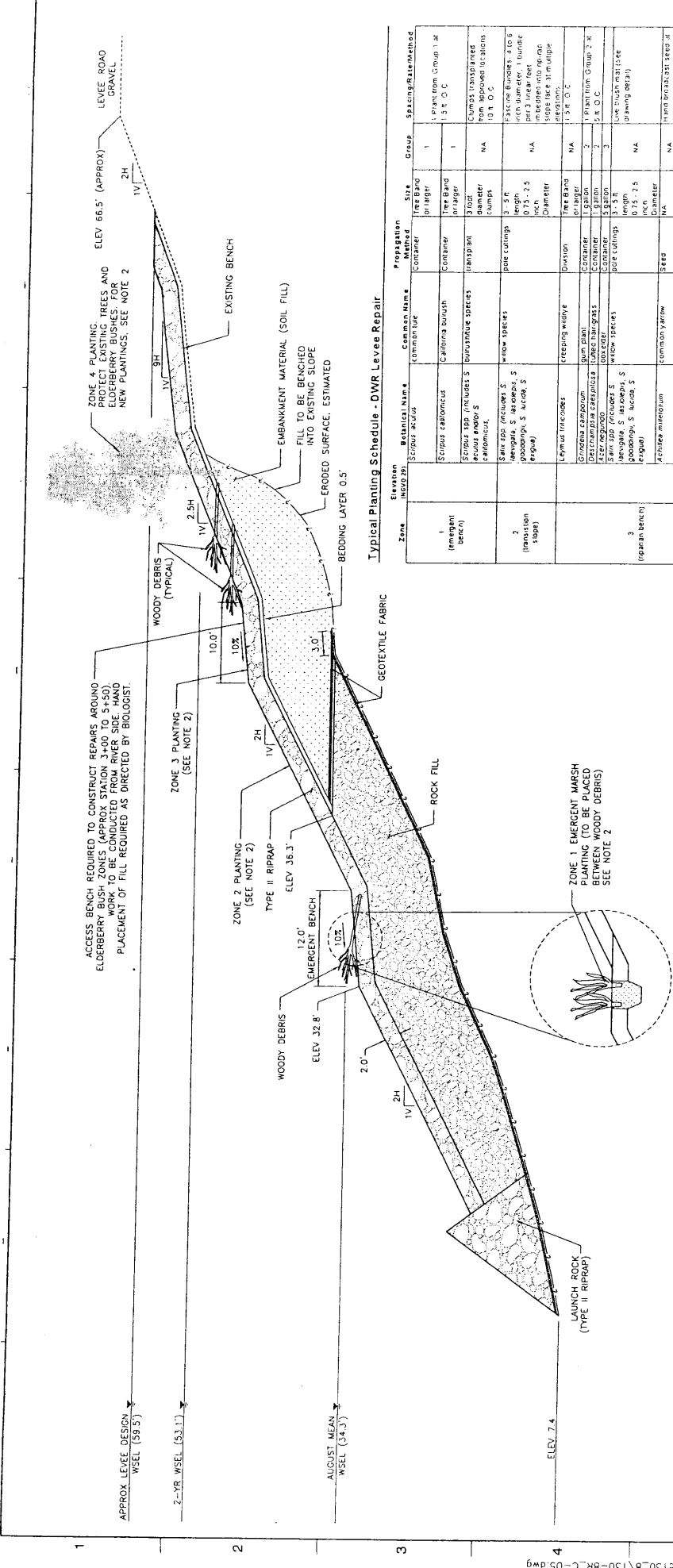
SECTION-1 - STA 17+90.00 (TYP)
1:10



SECTION-2 - STA 17+90.00 - STA 21+37.85 (TYP)
1:10

		STATE OF CALIFORNIA THE RESOURCES AGENCY DEPARTMENT OF WATER RESOURCES DIVISION OF ENGINEERING FLOOD MANAGEMENT		STATE EMERGENCY EROSION REPAIR PROJECT EMERGENCY LEVEE EROSION REPAIR SITE SAC 11SAC85.6		SPEC. NO. DRAWING NO. REV. SHEET NO.	
DESIGNED DRAWN CHECKED		REVIEWED APPROVAL RECOMMENDED APPROVED PROJECT MANAGER		DATE		SHEET NO. 004	
DESCRIPTION		SUR. APPD.		A		H	

Figure 22
Typical Cross Section at Sacramento River, RM 85.6



Typical Planting Schedule - DWR Levee Repair

Zone	Elevation (MOVD 90)	Botanical Name	Common Name	Propagation Method	Size	Group	Spacing/Rate/Method
1 (emergent bench)		<i>Scirpus aculeatus</i>	California bulrush	Container	Tree Band or larger	1	1 plant from Group 1 at 5' x 5' O.C.
		<i>Scirpus spp.</i> (includes <i>S. aculeatus</i>)	bulrush species	(various)	Tree Band or larger	1	1 plant from Group 1 at 5' x 5' O.C.
2 (transient slope)		<i>Salix lasiolepis</i>	willow species	pole cuttings	3" x 3" length, 0.75" - 1.5" diameter	NA	1-2 cuttings per 10' x 10' O.C. spacing
		<i>Salix lasiolepis</i>	willow species	pole cuttings	3" x 3" length, 0.75" - 1.5" diameter	NA	1-2 cuttings per 10' x 10' O.C. spacing
3 (open bank)		<i>Lemna trilocoides</i>	creeping water	Division	Tree Band or larger	NA	1 plant from Group 2 at 5' x 5' O.C.
		<i>Lythrum salicaria</i>	rose hip	Container	Tree Band or larger	2	1 plant from Group 2 at 5' x 5' O.C.
4 (steep slope and bench)		<i>Lythrum salicaria</i>	rose hip	Container	Tree Band or larger	2	1 plant from Group 2 at 5' x 5' O.C.
		<i>Lythrum salicaria</i>	rose hip	Container	Tree Band or larger	2	1 plant from Group 2 at 5' x 5' O.C.

- NOTES:**
- Emergent bench shall be sloped approx 10% to river and shall vary in elevation ± 1 foot along entire length to provide an uneven surface.
 - Four different zones of plantings are used at this site. The zones are shown in the typical cross section, and the species and spacing are shown in the table to the left. See also Specification Section 2950.
 - After placement of rock fill in Zone 2 and riprap in Zone 4, fill gaps between riprap and planting soil to the maximum depth possible prior to planting on top.

ACCESS BENCH REQUIRED TO CONSTRUCT REPAIRS AROUND ELDERBERRY BUSH. WORK SHALL BE CONDUCTED FROM 5:00 TO 5:50. WORK TO BE CONDUCTED FROM 5:00 TO 5:50. WORK TO BE CONDUCTED FROM 5:00 TO 5:50. WORK TO BE CONDUCTED FROM 5:00 TO 5:50. WORK TO BE CONDUCTED FROM 5:00 TO 5:50. WORK TO BE CONDUCTED FROM 5:00 TO 5:50. WORK TO BE CONDUCTED FROM 5:00 TO 5:50.

TYPICAL CROSS SECTION NIS

**STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
DIVISION OF ENGINEERING
FLOOD MANAGEMENT**

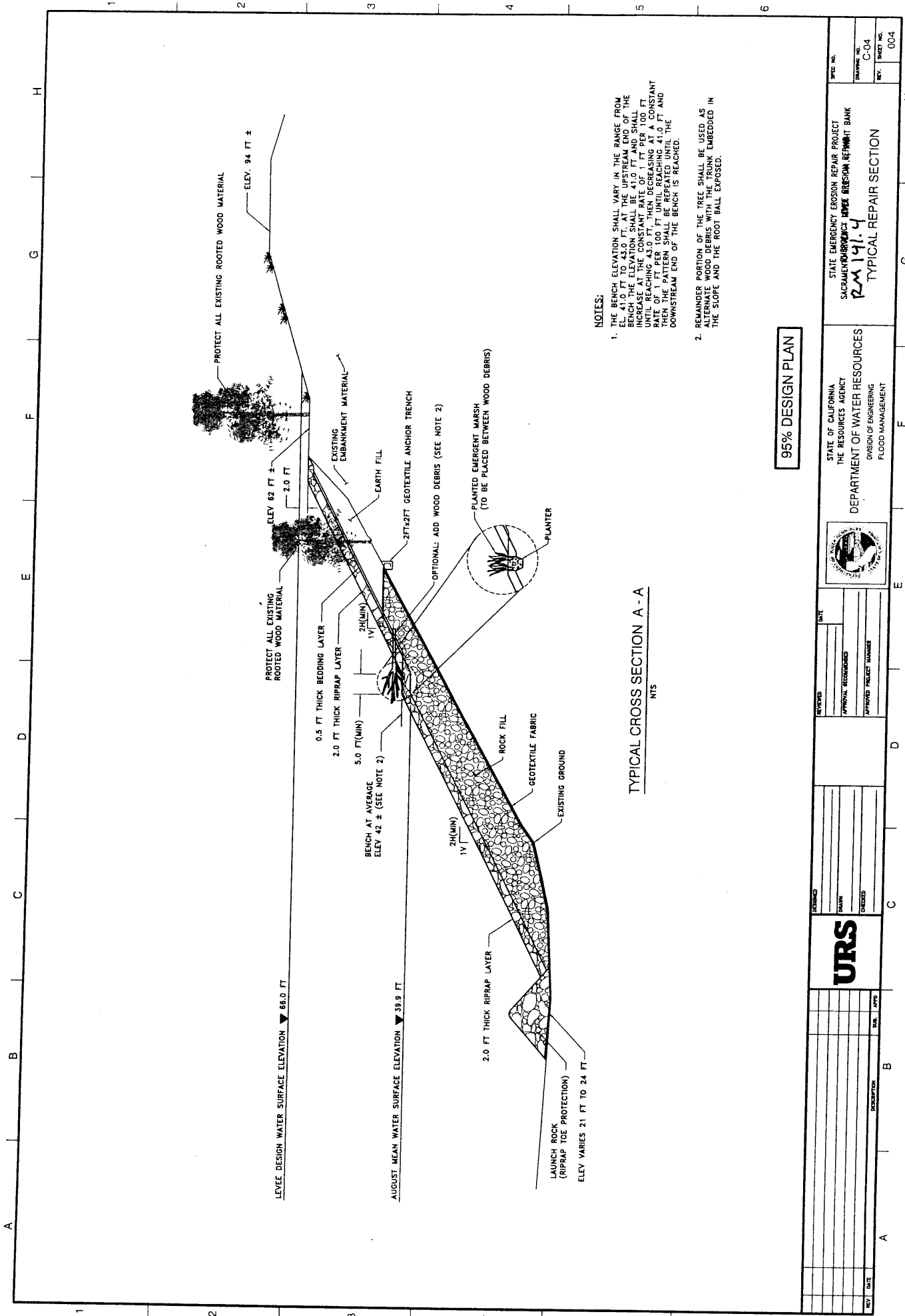
**SACRAMENTO RIVER FLOOD CONTROL PROJECT
EMERGENCY LEVEE EROSION REPAIR
SITE SAC 130.8R TYPICAL SECTION**

DATE	MAY 01, 2006
REVISION	
DESIGNED	M.S. BURNETT
DRAWN	L.O. BERNALDEZ
CHECKED	
APPROVED PROJECT MANAGER	
DATE	
REV	

SYFC NO. 005
DRAWING NO. C-05
SHEET NO. 005

Figure 23
Typical Cross Section at Sacramento River, RM 130.8

May 06, 2006 - 5:38pm
 H:\CADD\Current\ENV-INFRA\DWR Levee Repair\Sect 130.8\30-RR-C-05.dwg



NOTES:

1. THE BENCH ELEVATION SHALL VARY IN THE RANGE FROM EL. 41.0 FT TO 43.0 FT. AT THE UPSTREAM END OF THE BENCH THE ELEVATION SHALL BE 41.0 FT AND SHALL INCREASE AT A CONSTANT RATE OF 1 FT PER 100 FT UNTIL REACHING A BENCH ELEVATION OF 43.0 FT. THE BENCH SHALL BE REPEATED UNTIL THE DOWNSTREAM END OF THE BENCH IS REACHED.
2. REMAINDER PORTION OF THE TREE SHALL BE USED AS ALTERNATE WOOD DEBRIS WITH THE TRUNK EMBEDDED IN THE SLOPE AND THE ROOT BALL EXPOSED.

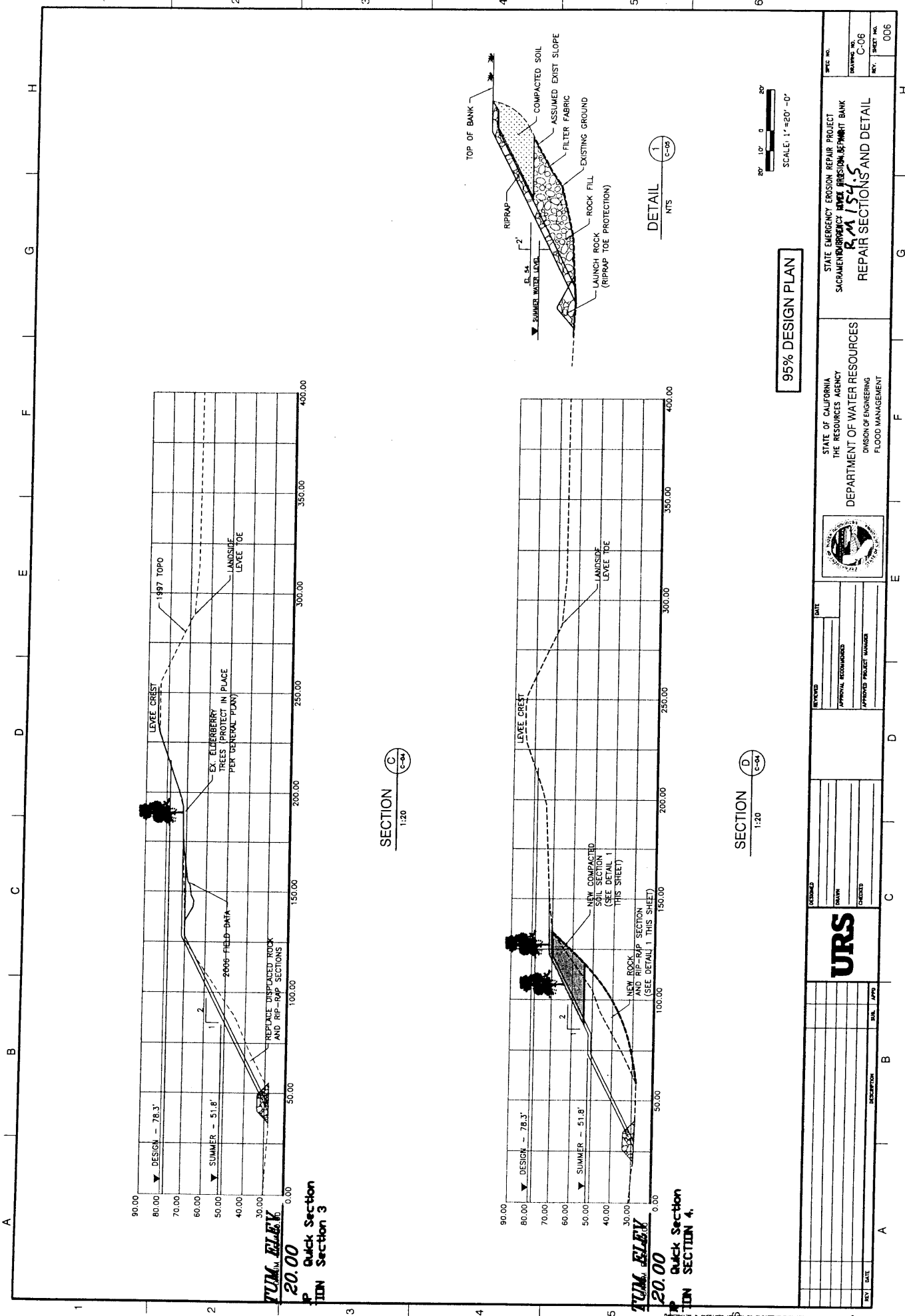
TYPICAL CROSS SECTION A-A
NTS

95% DESIGN PLAN

REVISIONS NO. DATE DESCRIPTION _____ _____ _____			STATE OF CALIFORNIA THE RESOURCES AGENCY DEPARTMENT OF WATER RESOURCES DIVISION OF ENGINEERING FLOOD MANAGEMENT	STATE EMERGENCY EROSION REPAIR PROJECT SACRAMENTO RIVER EROSION REPAIR BANK RM 141.4 TYPICAL REPAIR SECTION	SHEET NO. C-04
					DRAWING NO. C-04

Figure 24
Typical Cross Section at Sacramento River, RM 141.4

Approved May 12, 2004 - Design
 Project: SACRAMENTO RIVER EROSION REPAIR BANK
 Drawing: TYPICAL CROSS SECTION A-A



95% DESIGN PLAN



DESIGNED	DATE
DRAWN	APPROVAL
CHECKED	APPROVED PROJECT MANAGER

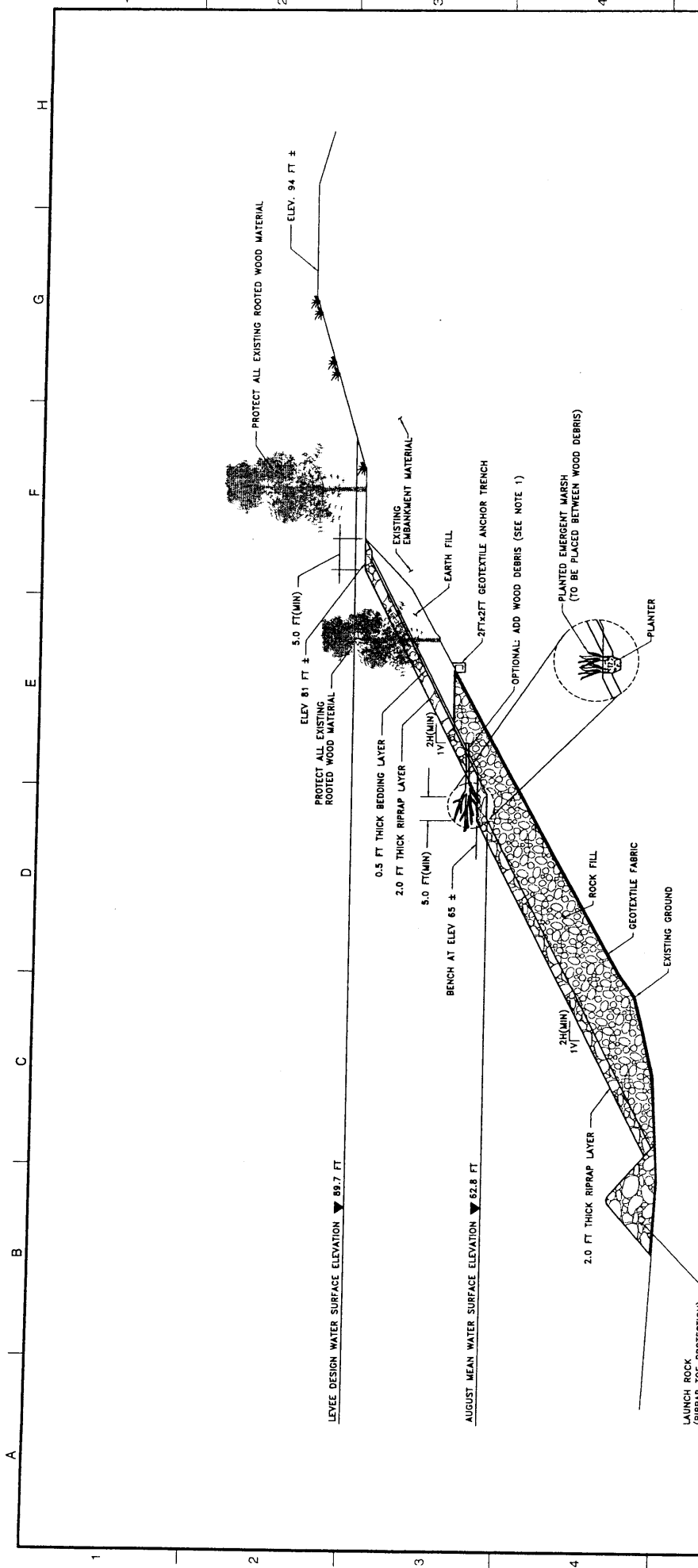
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
DIVISION OF ENGINEERING
FLOOD MANAGEMENT

STATE EMERGENCY EROSION REPAIR PROJECT
SACRAMENTO COUNTY LEVEE REVISION-BENTON BANK
RM 154.5
REPAIR SECTIONS AND DETAIL

REV.	DATE	DESCRIPTION

SPEC. NO.	006
DRAWING NO.	C-06
REV.	SHEET NO.

Figure 25
Typical Cross Section at Sacramento River, RM 154.5



- NOTES:**
1. THE BENCH ELEVATION SHALL VARY IN THE RANGE FROM EL. 41.0 FT TO 43.0 FT. AT THE UPSTREAM END OF THE BENCH THE ELEVATION SHALL BE 41.0 FT AND SHALL INCREASE TO 43.0 FT AT THE DOWNSTREAM END. THE BENCH SHALL BE 100 FT LONG PER 100 FT OF BENCH. THE BENCH SHALL BE PLACED AT A RATE OF 1 FT PER 100 FT UNTIL REACHING 41.0 FT AND THEN THE PATTERN SHALL BE REPEATED UNTIL THE DOWNSTREAM END OF THE BENCH IS REACHED.
 2. REMAINDER PORTION OF THE TREE SHALL BE USED AS ALTERNATE WOOD DEBRIS WITH THE TRUNK EMBEDDED IN THE SLOPE AND THE ROOT BALL EXPOSED.

TYPICAL CROSS SECTION A - A
NTS

95% DESIGN PLAN

		STATE OF CALIFORNIA THE RESOURCES AGENCY DEPARTMENT OF WATER RESOURCES DIVISION OF ENGINEERING FLOOD MANAGEMENT		STATE EMERGENCY EROSION REPAIR PROJECT SACRAMENTO EMERGENCY EROSION REPAIR BANK RM 164.0 TYPICAL REPAIR SECTION		SHEET NO. DRAWING NO. REV. SHEET NO.
CHECKED DATE	REVIEWED DATE	APPROVAL AUTHORITY APPROVED PROJECT MANAGER	PROJECT NO. 004			
NO. / DATE	DESCRIPTION	NO. / DATE				

Figure 26
Typical Cross Section at Sacramento River, RM 164

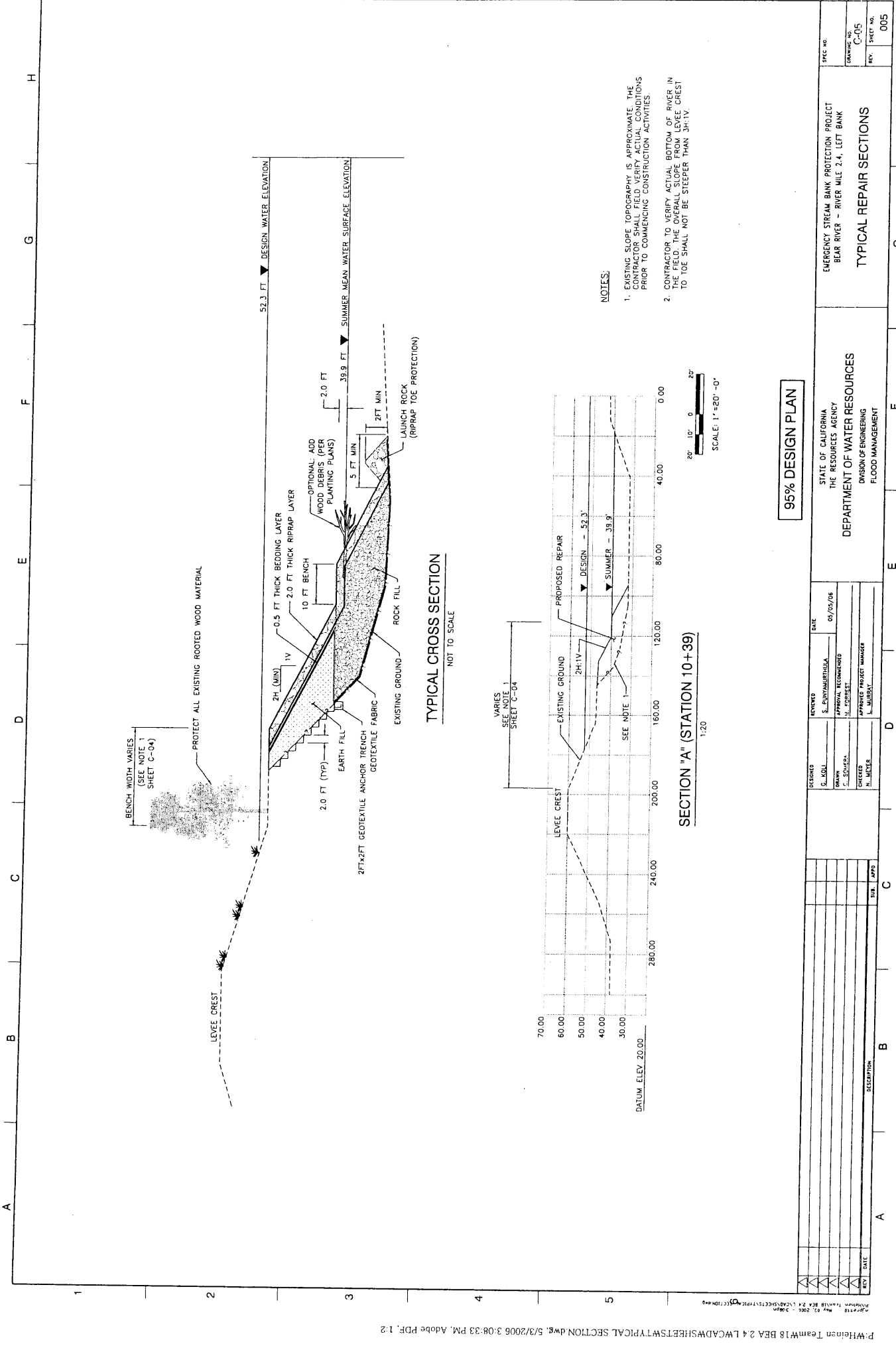
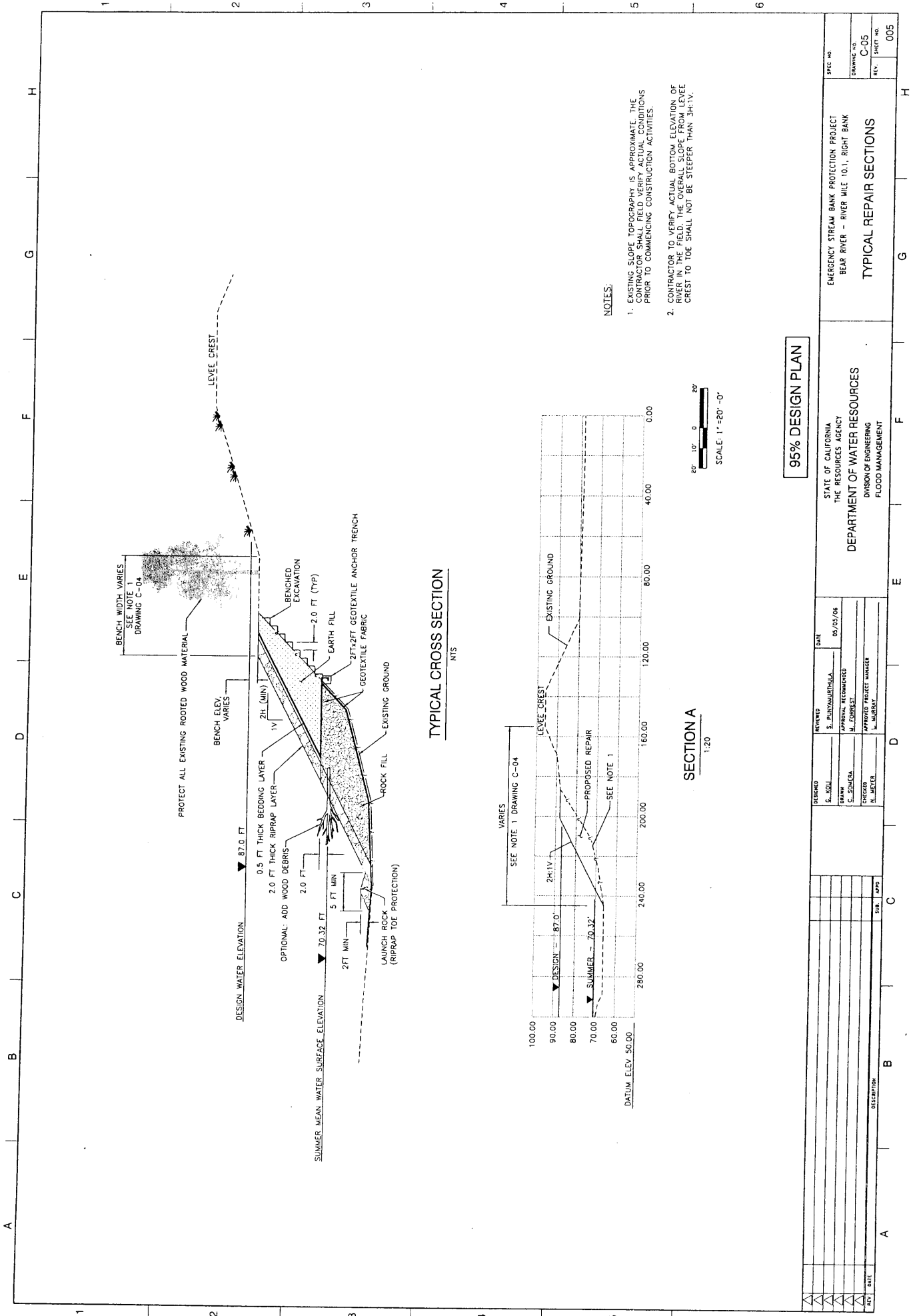
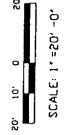


Figure 27
Typical Cross Section at Bear River, RM 2.4



TYPICAL CROSS SECTION
N.T.S.

SECTION A
1:20



NOTES:

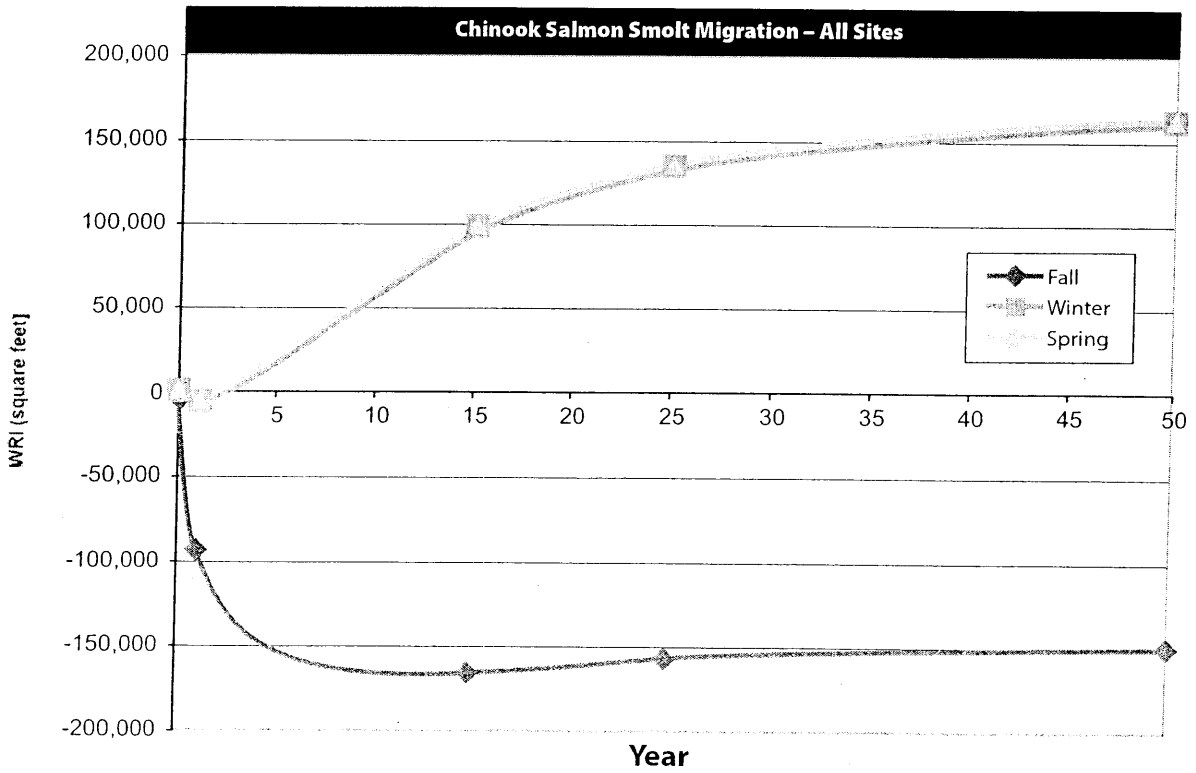
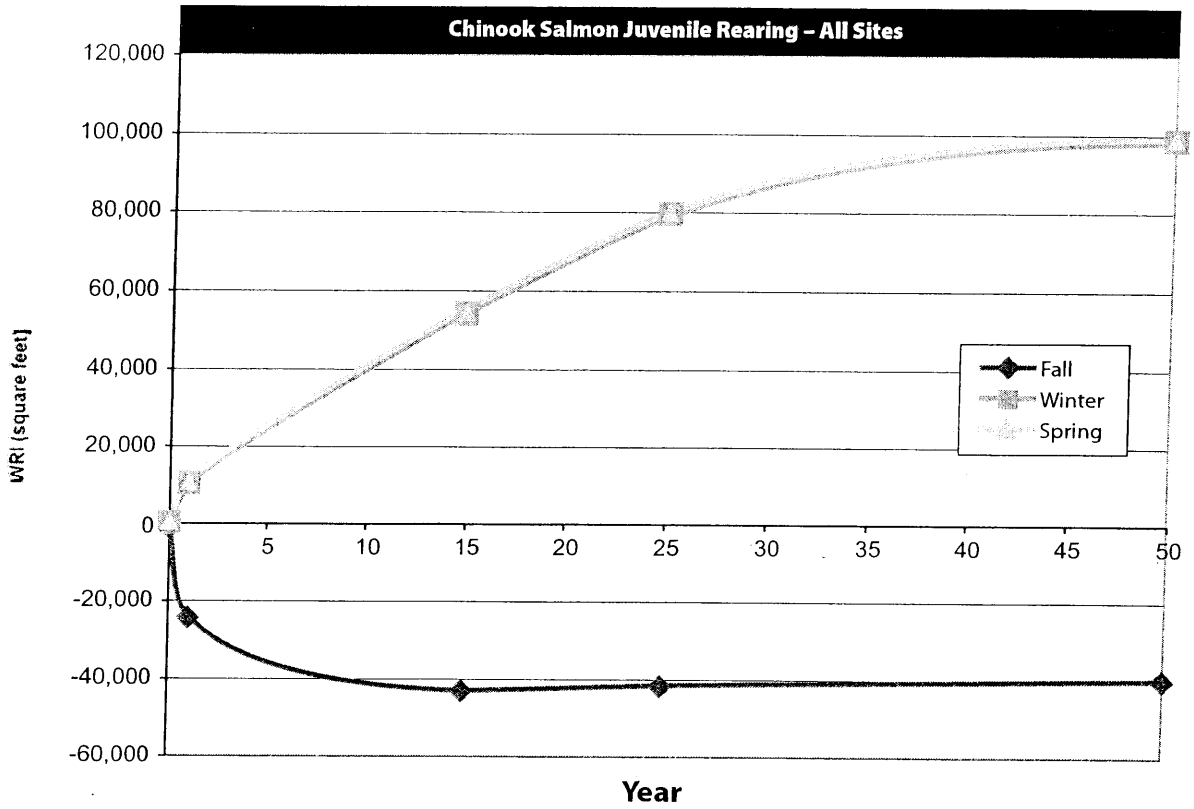
- EXISTING SLOPE TOPOGRAPHY IS APPROXIMATE. THE CONTRACTOR SHALL FIELD VERIFY ACTUAL CONDITIONS PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.
- CONTRACTOR TO VERIFY ACTUAL BOTTOM ELEVATION OF CHANNEL BED. THE OVERALL SLOPE FROM LEVEE CREST TO TOE SHALL NOT BE STEEPER THAN 3H:1V.

95% DESIGN PLAN

Figure 28
Typical Cross Section at Bear River, RM 10.1

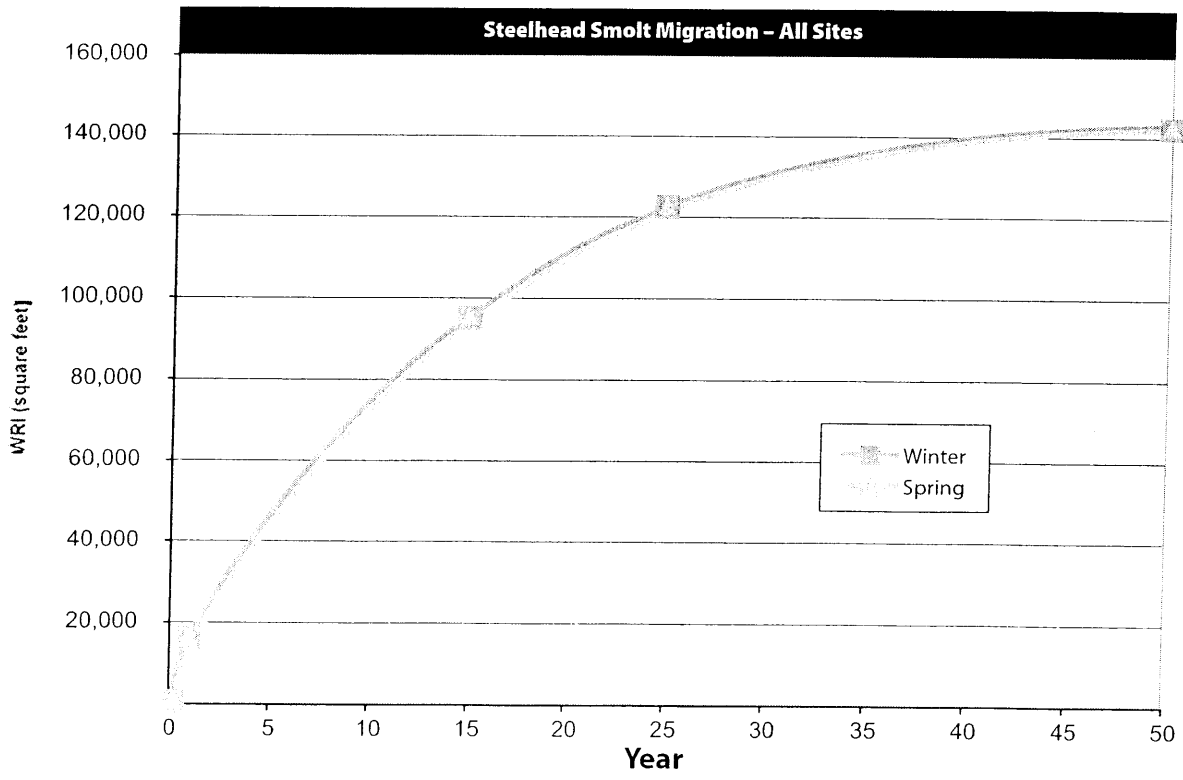
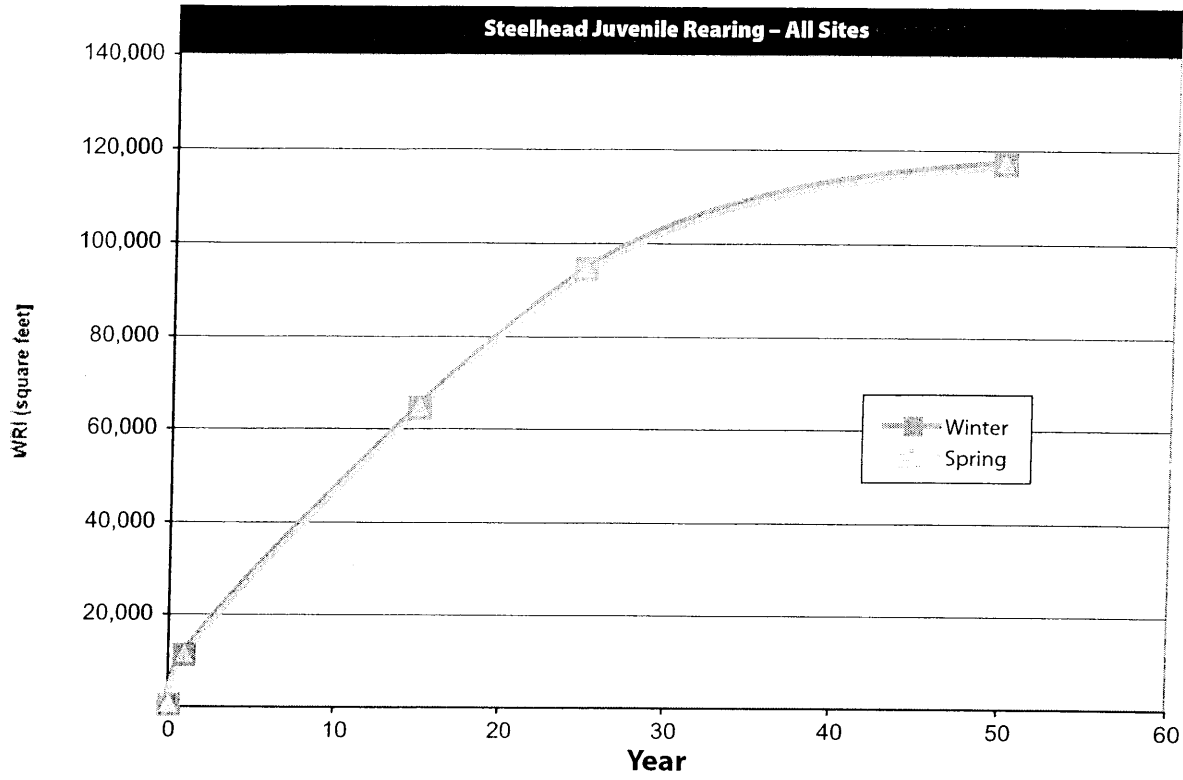
Appendix B

**Standard Assessment Methodology (SAM) Model Results
for
SRBPP Actions
at
Sacramento RMs 49.6, 49.9, 50.2, 50.4, 50.8, 51.5, 52.4, and 53.1**



03/15/03 (120)

Figure 1
Chinook Salmon SAM Response
Indices for Pocket Bank Protection Sites



03/01/15 03:02:00

Figure 2
Steelhead SAM Response Indices
for Pocket Bank Protection Sites

CHINOOK

		WRI (SQUARE FEET)								
Year		RM 49.6	RM 49.9	RM 50.2	RM 50.4	RM 50.8	RM 51.5	RM 52.4	RM 53.1	Total
Fall	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Juvenile Rearing	1	-1936.05	-1786.03	-10089.01	-797.77	-4126.52	-4637.82	-387.38	-116.70	-23877.29
	15	-3513.67	-3261.01	-18327.77	-1355.99	-7547.07	-8421.18	-668.97	-191.52	-43287.18
	25	-3381.81	-3155.04	-17654.69	-1228.17	-7312.41	-8108.64	-615.33	-167.36	-41623.44
	50	-3282.91	-3075.56	-17149.88	-1132.31	-7136.41	-7874.23	-575.10	-149.24	-40375.63
Winter	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Juvenile Rearing	1	-1174.38	197.97	3814.34	3512.32	2839.46	-913.39	1221.36	364.54	9862.21
	15	55.91	1928.30	17822.20	8837.84	13611.49	6767.48	3636.04	1483.06	54142.32
	25	1685.75	2893.98	24944.54	10307.26	19663.49	13053.64	4578.84	2078.37	79205.86
	50	2908.12	3618.24	30286.29	11409.33	24202.48	17768.26	5285.94	2524.86	98003.52
Spring	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Juvenile Rearing	1	-1174.38	197.97	3814.34	3512.32	2839.46	-913.39	1221.36	364.54	9862.21
	15	55.91	1928.30	17822.20	8837.84	13611.49	6767.48	3636.04	1483.06	54142.32
	25	1685.75	2893.98	24944.54	10307.26	19663.49	13053.64	4578.84	2078.37	79205.86
	50	2908.12	3618.24	30286.29	11409.33	24202.48	17768.26	5285.94	2524.86	98003.52
Fall	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Smolt Migration	1	-7088.79	-6815.05	-37055.96	-3624.19	-17126.42	-18352.63	-2211.31	-777.20	-93051.56
	15	-12675.96	-12236.72	-66245.20	-6050.07	-30674.16	-32814.80	-3779.37	-1280.16	-165756.44
	25	-12041.77	-11667.22	-62916.31	-5381.35	-29181.32	-31170.64	-3441.67	-1122.94	-156923.22
	50	-11566.12	-11240.10	-60419.64	-4879.82	-28061.69	-29937.52	-3188.40	-1005.03	-150298.31
Winter	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Smolt Migration	1	-2257.41	-2069.83	-1873.91	9056.67	-882.38	-8818.66	2045.01	907.16	-3893.34
	15	2728.03	2096.13	31650.84	24338.94	20551.25	5812.34	8047.63	4025.69	99250.85
	25	5121.96	3438.44	41320.85	26462.34	29497.21	15058.67	9518.77	5093.12	135511.37
	50	6917.41	4445.17	48573.36	28054.89	36206.68	21993.42	10622.13	5893.70	162706.76
Spring	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Smolt Migration	1	-2257.41	-2069.83	-1873.91	9056.67	-882.38	-8818.66	2045.01	907.16	-3893.34
	15	2728.03	2096.13	31650.84	24338.94	20551.25	5812.34	8047.63	4025.69	99250.85
	25	5121.96	3438.44	41320.85	26462.34	29497.21	15058.67	9518.77	5093.12	135511.37
	50	6917.41	4445.17	48573.36	28054.89	36206.68	21993.42	10622.13	5893.70	162706.76
Fall	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Adult Migration	1	-1635.10	-2119.67	-8237.19	-2183.43	-3699.69	-4757.00	-628.44	-204.85	-23465.38
	15	-2740.87	-3697.07	-13695.80	-3803.23	-6039.26	-8058.12	-978.92	-287.76	-39301.04
	25	-2448.20	-3432.83	-12131.92	-3527.00	-5247.14	-7273.97	-806.83	-206.60	-35074.49
	50	-2228.71	-3234.65	-10959.01	-3319.83	-4653.05	-6685.86	-677.76	-145.72	-31904.58
Winter	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Adult Migration	1	-2081.86	-1391.59	-4577.38	-130.34	-505.07	-3097.00	1349.22	714.95	-9719.07
	15	-2997.76	-2111.53	-4678.22	548.28	2451.22	-2453.38	3219.32	1783.09	-4238.97
	25	-2231.54	-1685.54	-1463.18	1185.03	5179.91	291.35	3743.97	2122.84	7142.83
	50	-1656.87	-1366.05	948.10	1662.59	7226.43	2349.89	4137.45	2377.65	15679.19
Spring	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Adult Migration	1	-2081.86	-1391.59	-4577.38	-130.34	-505.07	-3097.00	1349.22	714.95	-9719.07
	15	-2997.76	-2111.53	-4678.22	548.28	2451.22	-2453.38	3219.32	1783.09	-4238.97
	25	-2231.54	-1685.54	-1463.18	1185.03	5179.91	291.35	3743.97	2122.84	7142.83
	50	-1656.87	-1366.05	948.10	1662.59	7226.43	2349.89	4137.45	2377.65	15679.19

02/15/02-020

Table 1
Chinook Salmon SAM Results
for the Pocket Bank Protection Sites

STEELHEAD

WRI (SQUARE FEET)

Year	RM 49.6	RM 49.9	RM 50.2	RM 50.4	RM 50.8	RM 51.5	RM 52.4	RM 53.1	Total	
Fall	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Juvenile	1	-3047.22	-2863.77	-15973.35	-1588.59	-6946.88	-7514.53	-693.01	-212.84	-38840.19
Rearing	15	-5434.94	-5141.38	-28519.25	-2680.17	-12490.98	-13405.59	-1159.02	-332.86	-69164.19
(ns)	25	-5151.13	-4901.56	-27055.16	-2409.64	-11924.50	-12707.96	-1032.86	-275.63	-65458.44
	50	-4938.26	-4721.69	-25957.10	-2206.75	-11499.64	-12184.75	-938.24	-232.71	-62679.13
Winter	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Juvenile	1	-1677.36	-6.52	3870.74	4440.27	3760.76	-1460.57	1762.36	565.03	11254.70
Rearing	15	-378.18	1835.82	20055.21	11037.54	17222.09	7612.84	5008.89	2097.25	64491.45
	25	1585.93	2956.46	28425.74	12769.07	24530.73	15175.47	6179.02	2858.28	94480.70
	50	3059.01	3796.94	34703.64	14067.71	30012.21	20847.44	7056.62	3429.05	116972.63
Spring	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Juvenile	1	-1677.36	-6.52	3870.74	4440.27	3760.76	-1460.57	1762.36	565.03	11254.70
Rearing	15	-378.18	1835.82	20055.21	11037.54	17222.09	7612.84	5008.89	2097.25	64491.45
	25	1585.93	2956.46	28425.74	12769.07	24530.73	15175.47	6179.02	2858.28	94480.70
	50	3059.01	3796.94	34703.64	14067.71	30012.21	20847.44	7056.62	3429.05	116972.63
Winter	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Smolt	1	-894.69	139.33	5479.11	7605.17	2874.24	-2984.83	2668.31	1117.40	16004.04
Migration	15	2665.27	3604.30	30945.18	18616.56	19544.74	8558.58	7742.02	3700.69	95377.34
	25	4493.68	4552.12	38109.19	20168.74	26267.24	15437.88	8901.90	4538.32	122469.07
	50	5864.99	5262.98	43482.20	21332.87	31309.12	20597.36	9771.81	5166.54	142787.87
Spring	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Smolt	1	-894.69	139.33	5479.11	7605.17	2874.24	-2984.83	2668.31	1117.40	16004.04
Migration	15	2665.27	3604.30	30945.18	18616.56	19544.74	8558.58	7742.02	3700.69	95377.34
	25	4493.68	4552.12	38109.19	20168.74	26267.24	15437.88	8901.90	4538.32	122469.07
	50	5864.99	5262.98	43482.20	21332.87	31309.12	20597.36	9771.81	5166.54	142787.87
Fall	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Adult	1	-3416.05	-4525.92	-17516.95	-4665.24	-7723.56	-10347.02	-1178.94	-386.90	-49760.57
Migration	15	-5718.25	-7922.74	-29189.73	-8167.75	-12722.29	-17654.44	-1821.91	-540.79	-83737.91
	25	-5100.46	-7381.53	-25915.75	-7610.77	-11160.32	-16050.53	-1487.46	-385.34	-75092.16
	50	-4637.12	-6975.63	-23460.26	-7193.04	-9988.84	-14847.59	-1236.62	-268.75	-68607.86
Winter	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Adult	1	-3758.45	-2185.15	-8155.53	-234.51	-1084.43	-6100.97	2896.32	1435.58	-17187.14
Migration	15	-5524.74	-3323.43	-8996.61	848.46	3984.28	-5462.64	6623.23	3497.24	-8354.21
	25	-4231.68	-2660.75	-3797.49	1883.68	8820.03	-559.27	7519.41	4112.95	11086.87
	50	-3261.89	-2163.74	101.85	2660.10	12446.85	3118.25	8191.54	4574.73	25667.69
Spring	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Adult	1	-3758.45	-2185.15	-8155.53	-234.51	-1084.43	-6100.97	2896.32	1435.58	-17187.14
Migration	15	-5524.74	-3323.43	-8996.61	848.46	3984.28	-5462.64	6623.23	3497.24	-8354.21
	25	-4231.68	-2660.75	-3797.49	1883.68	8820.03	-559.27	7519.41	4112.95	11086.87
	50	-3261.89	-2163.74	101.85	2660.10	12446.85	3118.25	8191.54	4574.73	25667.69

ns = not present in significant numbers

02/15/02/12/0

Appendix C

**Standard Assessment Methodology (SAM) Model Results
for
SRBPP Actions
at
Sacramento River, RMs 26.9, 34.5, 72.2, 99.3, and 123.5**

Table 1
SAM results at RM 26.9 showing wetted-area relative response in square feet

Focus Fish Species and Scenario	Fall (September-November)					Winter (December-February)					Spring (March-May)					Summer (June-August)				
	Adult Upstream Migration	Spawning and Incubation	Juvenile Rearing	Smolt Outmigration	Adult Habitat	Adult Upstream Migration	Spawning and Incubation	Juvenile Rearing	Smolt Outmigration	Adult Habitat	Adult Upstream Migration	Spawning and Incubation	Juvenile Rearing	Smolt Outmigration	Adult Habitat	Adult Upstream Migration	Spawning and Incubation	Juvenile Rearing	Smolt Outmigration	Adult Habitat
Central Valley spring-run chinook salmon																				
Year 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Year 1	2350	973	7723		3034	1396	6564		2493		1171	6334		2350		973				
Year 5	2350	973	7723		3058	1432	6669		2493		1171	6334		2350		973				
Year 15	2578	1196	8279		3242	1705	7448		2660		1443	6960		2578		1197				
Year 25	2981	1561	8928		3464	2060	8261		3047		2056	7892		2981		1561				
Year 50	3697	2122	9688		3800	2610	9431		3749		3103	9162		3697		2123				
Central Valley fall-run chinook salmon																				
Year 0	0	0				0	0		0		0			0						
Year 1	2350	973				1396	6564		2493		6334			2350						
Year 5	2350	973				1432	6669		2493		6334			2350						
Year 15	2578	1196				1705	7448		2660		6960			2578						
Year 25	2981	1561				2060	8261		3047		7892			2981						
Year 50	3697	2122				2610	9431		3749		9162			3697						
Central Valley late fall-run chinook salmon																				
Year 0	0		0		0		0		0		0		0							
Year 1	2350		7723		3034		6564		2493		1171									
Year 5	2350		7723		3058		6669		2493		1171									
Year 15	2578		8279		3242		7448		2660		1443									
Year 25	2981		8928		3464		8261		3047		2056									
Year 50	3697		9688		3800		9431		3749		3103									
Sacramento River winter-run chinook salmon																				
Year 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Year 1	2350	973	7723		3034	1396	6564		2493	1171	6334		2350	973						
Year 5	2350	973	7723		3058	1432	6669		2493	1171	6334		2350	973						
Year 15	2578	1196	8279		3242	1705	7448		2660	1443	6960		2578	1197						
Year 25	2981	1561	8928		3464	2060	8261		3047	2056	7892		2981	1561						
Year 50	3697	2122	9688		3800	2610	9431		3749	3103	9162		3697	2123						
Central Valley steelhead																				
Year 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Year 1	5610	1739	5610	6419		2268	4950	5690	5690	1831	4348	5690	5609		1741				5609	
Year 5	5610	1739	5610	6472		2320	5026	5690	5690	1831	4348	5690	5609		1741				5609	
Year 15	6052	2087	6052	6868		2719	5592	6028	6028	2208	4809	6028	6052		2089				6052	
Year 25	6753	2540	6753	7318		3214	6201	6726	6726	3021	5593	6726	6752		2641				6752	
Year 50	7860	3455	7860	7991		3970	7096	7904	7904	4392	6756	7904	7860		3486				7860	
Delta Smelt																				
Year 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Year 1	0		0	0	-21164	-21164		0	0	-21320	-21320		0	0	16072	16072			0	
Year 5	0		0	0	-21164	-21164		0	0	-21320	-21320		0	0	16072	16072			0	
Year 15	0		0	0	-21164	-21164		0	0	-21320	-21320		0	0	16072	16072			0	
Year 25	0		0	0	-21164	-21164		0	0	-21320	-21320		0	0	16072	16072			0	
Year 50	0		0	0	-21164	-21164		0	0	-21320	-21320		0	0	16072	16072			0	

Notes: 1 Dark shading represents seasons in which various life stages are not found in the modeled reach of the Sacramento River.
2 Results calculated from time-averaged relative responses (with minus without project) to changes in each of six habitat variables used in the SAM (Stillwater Sciences 2006).

Table 2
SAM results at RM 34.5 showing wetted-area relative response in square feet

Focus Fish Species and Scenario	Fall (September-November)					Winter (December-February)					Spring (March-May)					Summer (June-August)				
	Adult Upstream Migration	Spawning and Incubation	Juvenile Rearing	Smolt Outmigration	Adult Habitat	Adult Upstream Migration	Spawning and Incubation	Juvenile Rearing	Smolt Outmigration	Adult Habitat	Adult Upstream Migration	Spawning and Incubation	Juvenile Rearing	Smolt Outmigration	Adult Habitat	Adult Upstream Migration	Spawning and Incubation	Juvenile Rearing	Smolt Outmigration	Adult Habitat
Central Valley spring-run chinook salmon																				
Year 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Year 1	1601	798	5736		1921	1215	6069				2259	1217	5940			1601	798			
Year 5	1601	798	5736		1921	1215	6091				2259	1217	5963			1601	798			
Year 15	1770	956	6236		2017	1349	6521				2381	1400	6483			1770	956			
Year 25	2071	1231	6849		2196	1622	7188				2665	1838	7271			2071	1231			
Year 50	2619	1678	7594		2458	2033	8117				3197	2620	8391			2619	1678			
Central Valley fall-run chinook salmon																				
Year 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Year 1	1601	798				1215	6069				2259		5940			1601				
Year 5	1601	798				1215	6091				2259		5963			1601				
Year 15	1770	956				1349	6521				2381		6483			1770				
Year 25	2071	1231				1622	7188				2665		7271			2071				
Year 50	2619	1678				2033	8117				3197		8391			2619				
Central Valley late fall-run chinook salmon																				
Year 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Year 1	1601		5736		1921		6069				2259	1217								
Year 5	1601		5736		1921		6091				2259	1217								
Year 15	1770		6236		2017		6521				2381	1400								
Year 25	2071		6849		2196		7188				2665	1838								
Year 50	2619		7594		2458		8117				3197	2620								
Sacramento River winter-run chinook salmon																				
Year 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Year 1	1601	798	5736		1921	1215	6069				2259	1217	5940			1601	798			
Year 5	1601	798	5736		1921	1215	6091				2259	1217	5963			1601	798			
Year 15	1770	956	6236		2017	1349	6521				2381	1400	6483			1770	956			
Year 25	2071	1231	6849		2196	1622	7188				2665	1838	7271			2071	1231			
Year 50	2619	1678	7594		2458	2033	8117				3197	2620	8391			2619	1678			
Central Valley steelhead																				
Year 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Year 1	3521	1604	3521	4085		2175	4728	4219	4219		2150	4630	4219	3521		1604	3521			
Year 5	3521	1604	3521	4085		2175	4731	4219	4219		2150	4632	4219	3521		1604	3521			
Year 15	3870	1860	3870	4292		2375	5029	4476	4476		2413	4997	4476	3870		1860	3870			
Year 25	4425	2287	4425	4862		2762	5532	5013	5013		3008	5639	5013	4425		2287	4425			
Year 50	5319	2957	5319	5193		3335	6243	5940	5940		4019	6619	5940	5319		2957	5319			
Delta Smelt																				
Year 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Year 1	0	0	0	0	-14421	-14421	0	0	-14329	-14329	0	0	10284	10284	0	0	0	10284	10284	0
Year 5	0	0	0	0	-14421	-14421	0	0	-14329	-14329	0	0	10284	10284	0	0	0	10284	10284	0
Year 15	0	0	0	0	-14421	-14421	0	0	-14329	-14329	0	0	10284	10284	0	0	0	10284	10284	0
Year 25	0	0	0	0	-14421	-14421	0	0	-14329	-14329	0	0	10284	10284	0	0	0	10284	10284	0
Year 50	0	0	0	0	-14421	-14421	0	0	-14329	-14329	0	0	10284	10284	0	0	0	10284	10284	0

Notes: 1 Dark shading represents seasons in which various life stages are not found in the modeled reach of the Sacramento River.
2 Results calculated from time-averaged relative responses (with minus without project) to changes in each of six habitat variables used in the SAM (Stillwater Sciences 2006).

Table 3
SAM results at RM 72.2 showing wetted-area relative response in square feet

Focus Fish Species and Scenario	Fall (September-November)					Winter (December-February)					Spring (March-May)					Summer (June-August)				
	Adult Upstream Migration	Spawning and Incubation	Juvenile Rearing	Smolt Outmigration	Adult Habitat	Adult Upstream Migration	Spawning and Incubation	Juvenile Rearing	Smolt Outmigration	Adult Habitat	Adult Upstream Migration	Spawning and Incubation	Juvenile Rearing	Smolt Outmigration	Adult Habitat	Adult Upstream Migration	Spawning and Incubation	Juvenile Rearing	Smolt Outmigration	Adult Habitat
Central Valley spring-run chinook salmon																				
Year 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Year 1	40	-2191	-5173		1361	2832	8556		301		-4102	-8440		40		-2179				
Year 5	40	-2191	-5173		1361	2832	8961		301		-4102	-8132		40		-2179				
Year 15	460	-1964	-4461		1621	3442	10471		608		-3747	-7009		460		-1952				
Year 25	1204	-1596	-3631		2080	4582	12444		1277		-2999	-5662		1204		-1583				
Year 50	2522	-1029	-2659		2739	6254	15112		2538		-1676	-3785		2522		-1017				
Central Valley fall-run chinook salmon																				
Year 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Year 1	40	-2191				2832	8556		301			-8440		40						
Year 5	40	-2191				2832	8961		301			-8132		40						
Year 15	460	-1964				3442	10471		608			-7009		460						
Year 25	1204	-1596				4582	12444		1277			-5662		1204						
Year 50	2522	-1029				6254	15112		2538			-3785		2522						
Central Valley late fall-run chinook salmon																				
Year 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Year 1	40	-2191	-5173		1361		8556		301			-4102								
Year 5	40	-2191	-5173		1361		8961		301			-4102								
Year 15	460	-1964	-4461		1621		10471		608			-3747								
Year 25	1204	-1596	-3631		2080		12444		1277			-2999								
Year 50	2522	-1029	-2659		2739		15112		2538			-1676								
Sacramento River winter-run chinook salmon																				
Year 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Year 1	40	-2191	-5173		1361	2832	8556		301		-4102	-8440		40		-2179				
Year 5	40	-2191	-5173		1361	2832	8961		301		-4102	-8132		40		-2179				
Year 15	460	-1964	-4461		1621	3442	10471		608		-3747	-7009		460		-1952				
Year 25	1204	-1596	-3631		2080	4582	12444		1277		-2999	-5662		1204		-1583				
Year 50	2522	-1029	-2659		2739	6254	15112		2538		-1676	-3785		2522		-1017				
Central Valley steelhead																				
Year 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Year 1	854	-3309	854	2625		-4274	7799	1014	1014		-5088	-5978	1014	854		-3290		854		
Year 5	854	-3309	854	2625		-4275	7872	1014	1014		-5087	-5917	1014	854		-3290		854		
Year 15	1668	-2898	1668	3181		-5060	8793	1635	1635		-4546	-5124	1635	1668		-2879		1668		
Year 25	2956	-2247	2956	4121		-6475	10222	2844	2844		-3453	-3890	2844	2956		-2228		2956		
Year 50	4991	-1252	4991	5445		-8521	12193	4955	4955		-1546	-2012	4955	4991		-1233		4991		
Delta Smelt																				
Year 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Year 1	0	0	0	0	57510	57510			0	0	48969	48969		0	0	33065	33065		0	0
Year 5	0	0	0	0	57514	57514			0	0	48974	48974		0	0	33065	33065		0	0
Year 15	0	0	0	0	57516	57516			0	0	48975	48975		0	0	33065	33065		0	0
Year 25	0	0	0	0	57517	57517			0	0	48976	48976		0	0	33065	33065		0	0
Year 50	0	0	0	0	57517	57517			0	0	48976	48976		0	0	33065	33065		0	0

Notes: 1 Dark shading represents seasons in which various life stages are not found in the modeled reach of the Sacramento River.
2 Results calculated from time-averaged relative responses (with minus without project) to changes in each of six habitat variables used in the SAM (Stillwater Sciences 2006).

Table 4
SAM results at RM 99.3 showing wetted-area relative response in square feet

Focus Fish Species and Scenario	Fall (September-November)					Winter (December-February)					Spring (March-May)					Summer (June-August)				
	Adult Upstream Migration	Spawning and Incubation	Juvenile Rearing	Smolt Outmigration	Adult Habitat	Adult Upstream Migration	Spawning and Incubation	Juvenile Rearing	Smolt Outmigration	Adult Habitat	Adult Upstream Migration	Spawning and Incubation	Juvenile Rearing	Smolt Outmigration	Adult Habitat	Adult Upstream Migration	Spawning and Incubation	Juvenile Rearing	Smolt Outmigration	Adult Habitat
Central Valley spring-run chinook salmon																				
Year 0	0		0			0		0	0		0		0	0		0		0		0
Year 1	2209		223			2209		1759	6571		2209		1767	6347		2209		214		
Year 5	2209		223			2221		1787	6728		2209		1768	6443		2209		214		
Year 15	2342		287			2314		2004	7228		2301		1998	6940		2342		278		
Year 25	2580		406			2438		2328	7768		2518		2578	7715		2580		397		
Year 50	3020		605			2632		2846	8578		2931		3647	8845		3020		596		
Central Valley fall-run chinook salmon																				
Year 0	0		0					0	0		0		0		0					
Year 1	2209		223					1759	6571		2209			6347		2209				
Year 5	2209		223					1787	6728		2209			6443		2209				
Year 15	2342		287					2004	7228		2301			6940		2342				
Year 25	2580		406					2328	7768		2518			7715		2580				
Year 50	3020		605					2846	8578		2931			8845		3020				
Central Valley late fall-run chinook salmon																				
Year 0	0		0		0			0			0		0							
Year 1	2209			1676		2209			6571		2209		1767							
Year 5	2209			1676		2221			6728		2209		1768							
Year 15	2342			1976		2314			7228		2301		1998							
Year 25	2580			2360		2438			7768		2518		2578							
Year 50	3020			2846		2632			8578		2931		3647							
Sacramento River winter-run chinook salmon																				
Year 0	0		0	0		0		0	0		0		0	0		0		0	0	0
Year 1	2209		223	1676		2209		1759	6571		2209		1767	6347		2209		214	1607	
Year 5	2209		223	1676		2221		1787	6728		2209		1768	6443		2209		214	1607	
Year 15	2342		287	1976		2314		2004	7228		2301		1998	6940		2342		278	1907	
Year 25	2580		406	2360		2438		2328	7768		2518		2578	7715		2580		397	2292	
Year 50	3020		605	2846		2632		2846	8578		2931		3647	8845		3020		596	2777	
Central Valley steelhead																				
Year 0	0		0	0	0			0	0	0			0	0	0			0	0	0
Year 1	4422		542	1779	4422	4422		2808	5543	4422	4422		2793	5285	4422	4422		522	1693	4422
Year 5	4422		542	1779	4422	4449		2845	5605	4422	4422		2794	5304	4422	4422		522	1693	4422
Year 15	4707		667	2065	4707	4653		3129	5941	4623	4707		3089	5636	4623	4707		647	1979	4707
Year 25	5163		885	2463	5163	4908		3528	6335	5043	5163		3782	6232	5043	5163		865	2377	5163
Year 50	5907		1244	3009	5907	5302		4159	6932	5780	5907		5026	7158	5780	5907		1224	2923	5907
Delta Smelt																				
Year 0																				
Year 1																				
Year 5																				
Year 15																				
Year 25																				
Year 50																				

Notes: 1 Dark shading represents seasons in which various life stages are not found in the modeled reach of the Sacramento River.
2 Results calculated from time-averaged relative responses (with minus without project) to changes in each of six habitat variables used in the SAM (Stillwater Sciences 2006).

Table 5
SAM results at RM 123.5 showing wetted-area relative response in square feet

Focus Fish Species and Scenario	Fall (September-November)					Winter (December-February)					Spring (March-May)					Summer (June-August)				
	Adult Upstream Migration	Spawning and Incubation	Juvenile Rearing	Smolt Outmigration	Adult Habitat	Adult Upstream Migration	Spawning and Incubation	Juvenile Rearing	Smolt Outmigration	Adult Habitat	Adult Upstream Migration	Spawning and Incubation	Juvenile Rearing	Smolt Outmigration	Adult Habitat	Adult Upstream Migration	Spawning and Incubation	Juvenile Rearing	Smolt Outmigration	Adult Habitat
Central Valley spring-run chinook salmon																				
Year 0	0		0		0		0	0		0		0	0		0		0		0	
Year 1	1511		169		1529		1407	5190		1517		439	2170		1502		165			
Year 5	1511		169		1537		1427	5306		1517		439	2221		1502		165			
Year 15	1603		210		1602		1587	5678		1581		507	2477		1597		207			
Year 25	1767		284		1687		1824	6059		1730		678	2855		1763		283			
Year 50	2070		409		1822		1944	6042		2016		990	3402		2068		408			
Central Valley fall-run chinook salmon																				
Year 0	0		0				0	0		0		0		0		0				
Year 1	1511		169				1407	5190		1517			2170		1502					
Year 5	1511		169				1427	5306		1517			2221		1502					
Year 15	1603		210				1587	5678		1581			2477		1597					
Year 25	1767		284				1824	6059		1730			2855		1763					
Year 50	2070		409				1944	6042		2016			3402		2068					
Central Valley late fall-run chinook salmon																				
Year 0	0		0		0					0		0								
Year 1	1511				1529			5190		1517			439							
Year 5	1511				1537			5306		1517			439							
Year 15	1603				1602			5678		1581			507							
Year 25	1767				1687			6059		1730			678							
Year 50	2070				1822			6042		2016			990							
Sacramento River winter-run chinook salmon																				
Year 0	0		0	0			0	0		0		0	0		0		0	0		0
Year 1	1511		169	1402		1529		1407	5190		1517		439	2170		1502		165	1381	
Year 5	1511		169	1402		1537		1427	5306		1517		439	2221		1502		165	1381	
Year 15	1603		210	1602		1602		1587	5678		1581		507	2477		1597		207	1589	
Year 25	1767		284	1858		1687		1824	6059		1730		678	2855		1763		283	1850	
Year 50	2070		409	2179		1822		1944	6042		2016		990	3402		2068		408	2175	
Central Valley steelhead																				
Year 0	0		0	0	0		0	0	0		0	0	0	0		0	0	0		0
Year 1	3028		422	1494	3028	3062		2257	4467	3039	3007		880	2041	3039	3007		414	1474	3007
Year 5	3028		422	1494	3028	3081		2284	4511	3039	3007		880	2051	3039	3007		414	1474	3007
Year 15	3224		503	1687	3224	3222		2491	4748	3178	3210		990	2236	3178	3210		498	1674	3210
Year 25	3537		644	1955	3537	3398		2779	5023	3467	3529		1248	2564	3467	3529		641	1947	3529
Year 50	4048		875	2320	4048	3670		2931	5059	3975	4044		1710	3072	3975	4044		874	2316	4044
Delta Smelt																				
Year 0																				
Year 1																				
Year 5																				
Year 15																				
Year 25																				
Year 50																				

Notes: 1 Dark shading represents seasons in which various life stages are not found in the modeled reach of the Sacramento River.
2 Results calculated from time-averaged relative responses (with minus without project) to changes in each of six habitat variables used in the SAM (Stillwater Sciences 2006).

Appendix D

**Standard Assessment Methodology (SAM) Model Results
for
CDWR Actions
at
Sacramento River, RMs 20.8, 25.5, 32.5, 56.8, 69.9, 85.6, 130.8, 141.4, 145.9, 154.5,
and 164
Cache Slough RMs 16.5, and 21.8
Steamboat Slough RM 16.2
and
Bear River RMs 2.4, and 10.1**

Table 1. Area-weighted SAM WRI values at RM 20.8

Chinook Salmon

Year	Juvenile Rearing		Smolt Migration	
	Fall	Winter-Spring	Fall	Winter-Spring
0	0.00	0.00	0.00	0.00
1	-6433.80	-11504.22	-16720.78	-23044.37
5	-8149.48	-12951.10	-21179.66	-24890.49
15	-12438.68	-16568.30	-32326.85	-29505.79
25	-12652.37	-15113.28	-33205.83	-25421.43
50	-12865.29	-13922.12	-34406.45	-22327.49

Steelhead

Year	Juvenile Rearing	Smolt Migration
	Winter-Spring	Winter-Spring
0	0.00	0.00
1	-17209.76	-7566.06
5	-18395.07	-8244.50
15	-21358.33	-9940.59
25	-18010.06	-8986.39
50	-15063.35	-8376.02

Table 2. Area-weighted SAM WRI values at RM 26.5

Chinook Salmon

Year	Juvenile Rearing		Smolt Migration	
	Fall	Winter-Spring	Fall	Winter-Spring
0	0.00	0.00	0.00	0.00
1	-1154.65	-1710.34	-6595.28	-9385.98
5	-1462.56	-1042.85	-8354.02	-8334.90
15	-2232.33	625.86	-12750.88	-5707.19
25	-2293.04	2058.50	-13219.71	-1730.29
50	-2375.96	2898.97	-13937.52	1057.28

Steelhead

Year	Juvenile Rearing	Smolt Migration
	Winter-Spring	Winter-Spring
0	0.00	0.00
1	-2878.42	-7152.78
5	-1921.65	-5758.98
15	470.28	-2274.47
25	2562.57	1189.71
50	3813.42	3356.92

Table 3. Area-weighted SAM WRI values at RM 32.5

Chinook Salmon

Year	Juvenile Rearing		Smolt Migration	
	Fall	Winter-Spring	Fall	Winter-Spring
0	0.00	0.00	0.00	0.00
1	-6510.77	-9742.83	-15832.70	-33665.96
5	-8246.98	-3611.00	-20054.75	-22835.87
15	-12587.49	11718.57	-30609.89	4239.36
25	-13260.74	16716.85	-34023.17	13388.59
50	-14390.22	17764.85	-40321.97	14021.69

Steelhead

Year	Juvenile Rearing	Smolt Migration
	Winter-Spring	Winter-Spring
0	0.00	0.00
1	-14337.88	-18832.28
5	-7087.43	-9400.88
15	11038.72	14177.63
25	16977.05	21216.76
50	18097.87	23441.43

Table 4. Area-weighted SAM WRI values at RM 56.8

RM 56.8 WRI Values (area weighted - square feet)

Chinook Salmon

Year	Juvenile Rearing			Smolt Migration		
	Fall	Winter	Spring	Fall	Winter	Spring
0	0.00	0.00	0.00	0.00	0.00	0.00
1	-2610.34	-7279.01	-9150.66	-4632.31	-19150.59	-21177.01
5	-2812.99	-6718.83	-8804.78	-1320.14	-17716.61	-20323.11
15	-3319.63	-5318.38	-7940.09	6960.27	-14131.65	-18188.39
25	-3687.97	-3221.42	-6101.43	6779.75	-9508.21	-14342.06
50	-4553.51	-1598.93	-5253.56	4478.09	-6836.55	-13113.29

Steelhead

Year	Juvenile Rearing		Smolt Migration	
	Winter	Spring	Winter	Spring
0	0.00	0.00	0.00	0.00
1	-9783.01	-11672.31	-12994.07	-13740.48
5	-8995.16	-11186.40	-11670.59	-12620.52
15	-7025.55	-9971.64	-8361.89	-9820.62
25	-4404.56	-7764.37	-4827.60	-6853.21
50	-2491.43	-6832.91	-2111.96	-5241.98

Table 5. Area-weighted SAM WRI values at RM 69.9

Chinook Salmon

Year	Juvenile Rearing			Smolt Migration		
	Fall	Winter	Spring	Fall	Winter	Spring
0	0.00	0.00	0.00	0.00	0.00	0.00
1	1296.30	7664.77	6434.90	8649.09	27992.91	17737.44
5	2440.82	14689.51	13869.81	13461.21	50354.21	35396.20
15	5302.14	32251.37	32457.11	25491.50	106257.45	79543.10
25	7091.11	36260.59	39007.45	30387.67	117249.93	92938.81
50	7829.89	38419.80	41297.32	31121.80	121873.06	99207.14

Steelhead

Year	Juvenile Rearing		Smolt Migration	
	Winter	Spring	Winter	Spring
0	0.00	0.00	0.00	0.00
1	14119.93	11552.26	26163.54	17584.70
5	24960.40	22303.25	44369.67	33188.13
15	52061.60	49180.71	89884.97	72196.72
25	57488.53	57648.41	98554.93	83983.15
50	60258.57	60721.94	103799.43	90440.72

Table 6. Area-weighted SAM WRI values at RM 85.6

Chinook Salmon

Year	Juvenile Rearing			Smolt Migration		
	Fall	Winter	Spring	Fall	Winter	Spring
0	0.00	0.00	0.00	0.00	0.00	0.00
1	-14.53	2215.90	2088.84	-1207.64	3642.37	1493.89
5	298.89	4903.20	5134.51	-489.96	10630.34	7334.41
15	1082.43	11621.43	12748.70	1304.23	28100.26	21935.72
25	1729.51	13247.65	15609.52	3188.95	32279.75	27481.28
50	1913.66	14067.66	16650.45	3359.65	33881.79	30132.60

Steelhead

Year	Juvenile Rearing		Smolt Migration	
	Winter	Spring	Winter	Spring
0	0.00	0.00	0.00	0.00
1	3684.11	3340.97	4357.84	2967.90
5	7613.29	7546.06	10054.89	8353.92
15	17436.25	18058.79	24297.49	21818.98
25	19596.87	21712.66	27573.90	26690.56
50	20624.46	23086.08	29448.88	29376.46

Table 7. Area-weighted SAM WRI values at RM 130.8

Chinook Salmon

Year	Juvenile Rearing			Smolt Migration		
	Fall	Winter	Spring	Fall	Winter	Spring
0	0.00	0.00	0.00	0.00	0.00	0.00
1	1753.08	3174.34	2217.44	10038.00	9439.04	5111.11
5	2220.57	6245.35	4866.28	12714.80	18396.67	12442.83
15	3389.29	13922.86	11488.37	19406.80	40790.76	30772.11
25	3237.71	16350.86	13287.80	18589.39	46838.94	35314.66
50	2876.11	18598.33	14497.92	16619.98	51517.64	37646.69

Steelhead

Year	Juvenile Rearing		Smolt Migration	
	Winter	Spring	Winter	Spring
0	0.00	0.00	0.00	0.00
1	5580.53	3880.73	9067.76	5451.03
5	10203.87	7815.72	16217.29	11351.02
15	21762.23	17653.20	34091.13	26101.01
25	24994.21	20034.43	38469.18	29662.64
50	27898.55	21546.87	42194.02	32160.15

Table 8. Area-weighted SAM WRI values at RM 141.4

Chinook Salmon

Year	Juvenile Rearing			Smolt Migration		
	Fall	Winter	Spring	Fall	Winter	Spring
0	0.00	0.00	0.00	0.00	0.00	0.00
1	319.60	11203.26	5221.14	2287.89	27981.92	5221.14
5	404.83	21149.17	11397.19	2897.99	49338.73	11397.19
15	617.90	46013.95	26837.33	4423.25	102730.75	26837.33
25	447.85	53022.39	29790.27	3079.37	114898.21	29790.27
50	97.09	58837.22	30440.59	315.34	122976.23	30440.59

Steelhead

Year	Juvenile Rearing		Smolt Migration	
	Winter	Spring	Winter	Spring
0	0.00	0.00	0.00	0.00
1	17897.05	9272.81	24298.10	13484.01
5	31234.41	18271.58	40657.99	26406.75
15	64577.80	40768.50	81557.71	58713.60
25	72711.13	44663.74	90457.28	63803.16
50	79165.14	45524.88	97571.28	65478.38

Table 9. Area-weighted SAM WRI values at RM 145.9

Chinook Salmon

Year	Juvenile Rearing			Smolt Migration		
	Fall	Winter	Spring	Fall	Winter	Spring
0	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	2344.78	2227.54	0.00	1375.86	1307.07
5	0.00	2970.05	2821.55	0.00	1742.75	1655.62
15	0.00	4533.23	4306.57	0.00	2659.99	2526.99
25	0.00	4595.76	4365.97	0.00	2696.68	2561.85
50	0.00	4642.66	4410.52	0.00	2724.20	2587.99

Steelhead

Year	Juvenile Rearing		Smolt Migration	
	Winter	Spring	Winter	Spring
0	0.00	0.00	0.00	0.00
1	2512.78	2387.14	1365.14	1296.89
5	3182.85	3023.71	1729.18	1642.72
15	4858.04	4615.13	2639.28	2507.31
25	4925.04	4678.79	2675.68	2541.90
50	4975.30	4726.53	2702.98	2567.84

Table 10. Area-weighted SAM WRI values at RM 154.5

Chinook Salmon

Year	Juvenile Rearing			Smolt Migration		
	Fall	Winter	Spring	Fall	Winter	Spring
0	0.00	0.00	0.00	0.00	0.00	0.00
1	271.96	3886.64	3502.59	2467.62	11856.89	8077.39
5	344.49	7644.10	7499.19	3125.65	21564.51	15834.93
15	525.80	17037.74	17490.68	4770.73	45833.56	35228.77
25	431.12	19909.77	20880.79	4046.13	51814.53	40899.22
50	232.69	22462.98	21869.80	2514.67	56162.16	43332.06

Steelhead

Year	Juvenile Rearing		Smolt Migration	
	Winter	Spring	Winter	Spring
0	0.00	0.00	0.00	0.00
1	6455.89	5551.78	10202.01	8362.31
5	11830.91	10913.31	17683.91	15285.94
15	25268.46	24317.14	36388.69	32595.02
25	28894.09	28463.42	40752.46	37507.13
50	31998.90	29751.94	44381.04	39944.19

Table 11. Area-weighted SAM WRI values at RM 164

Chinook Salmon

Year	Juvenile Rearing			Smolt Migration		
	Fall	Winter	Spring	Fall	Winter	Spring
0	0.00	0.00	0.00	0.00	0.00	0.00
1	-490.75	1358.89	900.86	-3768.57	1274.67	-2162.87
5	-621.62	3758.33	3287.93	-4773.53	7194.81	2004.47
15	-948.79	9756.93	9255.59	-7285.91	21995.16	12422.81
25	-1049.14	11661.56	11527.94	-8091.71	26419.98	16944.59
50	-1233.48	13133.70	12064.87	-9577.69	29072.95	18746.43

Steelhead

Year	Juvenile Rearing		Smolt Migration	
	Winter	Spring	Winter	Spring
0	0.00	0.00	0.00	0.00
1	2330.20	1413.91	1611.48	54.18
5	5782.22	4671.74	6157.13	4164.66
15	14412.27	12816.32	17521.25	14440.85
25	16880.28	15761.76	20901.29	18322.57
50	18692.76	16543.99	23493.88	19880.92

Table 12. Area-weighted SAM WRI values at Cache Slough RM 32.5

Chinook Salmon

Year	Juvenile Rearing		Smolt Migration	
	Fall	Winter-Spring	Fall	Winter-Spring
0	0.00	0.00	0.00	0.00
1	-10.58	-24.56	-40.13	-87.89
5	-13.41	-30.01	-50.83	-108.19
15	-20.46	-43.63	-77.59	-158.92
25	-18.70	-41.38	-73.18	-153.54
50	-14.82	-39.92	-63.03	-150.84

Steelhead

Year	Juvenile Rearing	Smolt Migration
	Winter-Spring	Winter-Spring
0	0.00	0.00
1	-35.55	-66.16
5	-42.96	-80.55
15	-61.49	-116.51
25	-57.04	-109.42
50	-54.19	-104.43

Table 13. Area-weighted SAM WRI values at Cache Slough RM 21.8

Chinook Salmon

Year	Juvenile Rearing		Smolt Migration	
	Fall	Winter-Spring	Fall	Winter-Spring
0	0.00	0.00	0.00	0.00
1	-14.00	-39.10	-99.12	-261.85
5	-17.73	-47.51	-125.55	-321.54
15	-27.07	-68.53	-191.64	-470.77
25	-27.98	-64.93	-199.09	-455.19
50	-29.35	-63.51	-210.68	-450.76

Steelhead

Year	Juvenile Rearing	Smolt Migration
	Winter-Spring	Winter-Spring
0	0.00	0.00
1	-69.19	-221.62
5	-83.29	-269.59
15	-118.53	-389.51
25	-110.31	-371.13
50	-106.81	-365.92

Table 14. Area-weighted SAM WRI values at Steamboat Slough RM 16.2

Chinook Salmon

Year	Juvenile Rearing		Smolt Migration	
	Fall	Winter-Spring	Fall	Winter-Spring
0	0.00	0.00	0.00	0.00
1	23.03	-30.25	76.71	-1319.23
5	29.17	-6.50	97.17	-1356.85
15	44.52	52.89	148.31	-1450.90
25	36.32	254.96	64.03	-516.31
50	19.15	627.66	-107.10	905.90

Steelhead

Year	Juvenile Rearing	Smolt Migration
	Winter-Spring	Winter-Spring
0	0.00	0.00
1	14.95	-1001.05
5	84.89	-939.44
15	259.72	-785.44
25	638.79	113.92
50	1328.39	1491.19

Table 15. Area-weighted SAM WRI values at Bear River RM 2.4

Chinook Salmon

Year	Juvenile Rearing		Smolt Migration	
	Fall	Winter-Spring	Fall	Winter-Spring
0	0.00	0.00	0.00	0.00
1	-14.39	8.48	-65.85	-27.36
5	-16.98	17.96	-78.06	-17.51
15	-23.48	41.67	-108.59	7.11
25	-21.65	46.69	-101.75	22.46
50	-21.86	44.63	-104.60	25.35

Steelhead

Year	Juvenile Rearing	Smolt Migration
	Winter-Spring	Winter-Spring
0	0.00	0.00
1	14.38	-13.20
5	27.36	-2.67
15	59.82	23.67
25	66.02	37.40
50	62.98	43.18

Table 16. Area-weighted SAM WRI values at Bear River RM 10.1

Chinook Salmon

Year	Juvenile Rearing		Smolt Migration	
	Fall	Winter-Spring	Fall	Winter-Spring
0	0.00	0.00	0.00	0.00
1	2.79	28.21	21.01	42.02
5	8.56	39.32	40.53	66.99
15	22.99	67.11	89.30	129.43
25	26.67	72.15	93.23	142.81
50	28.23	73.37	88.92	144.80

Steelhead

Year	Juvenile Rearing	Smolt Migration
	Winter-Spring	Winter-Spring
0	0.00	0.00
1	41.30	42.19
5	56.91	62.60
15	95.94	113.61
25	102.16	123.68
50	103.23	127.95

Table 17. Summary of SAM WRI values for each site with total values for fall and winter flow elevations

Chinook Salmon	Year	Total WRI (square feet)	Total WRI Fall+Winter/Spring
Fall	0	0	
Juvenile	1	-13587.04639	
Rearing	5	-15594.42327	
	15	-20612.86547	
	25	-20011.30691	
	50	-22487.68296	
Winter-Spring	0	0	0
Juvenile	1	1554.960206	-12032.08619
Rearing	5	37009.1907	21414.76743
	15	125644.7669	105031.9015
	25	155756.7024	135745.3955
	50	175947.3396	153459.6567
Fall	0	0	
Smolt	1	-25422.06769	
Migration	5	-24089.17676	
	15	-20756.94943	
	25	-22685.92133	
	50	-40230.59578	
Winter-Spring	0	0	0
Smolt	1	-3337.547396	-28759.61509
Migration	5	83707.0737	59617.89694
	15	301318.6264	280561.677
	25	367966.9267	345281.0054
	50	404597.416	364366.8202
Steelhead	Year	Total WRI (square feet)	
Winter-Spring	0	0	
Juvenile	1	8337.298505	
Rearing	5	58451.56209	
	15	183737.2211	
	25	223254.7752	
	50	249303.7908	
Winter-Spring	0	0	
Smolt	1	29260.85497	
Migration	5	100565.4708	
	15	278827.0102	
	25	327771.64	
	50	361093.8435	