Meeting of the Central Valley Flood Protection Board
January 28, 2011

Staff Report – USACE Project Transfer

American River Common Features (Remaining Sites) WRDA 1996 Contract 1 (Site R4), Sacramento County

1.0 – ITEM

Consider approval of Resolution No. 10-45 to accept completed American River Common Features Project from the U.S. Army Corps of Engineers (USACE) and transfer operation and maintenance responsibility to the Sacramento Area Flood Control Agency (SAFCA).

2.0 – LOCATION

The project is located approximately 250 feet south of the Strong Ranch Pump Station and 1,330 feet northwest of the Northrop Avenue west terminus as measured along the American River Bike Trail in Sacramento County.

3.0 – DESCRIPTION

American River Common Features Project, as authorized by the Water Resources Development Act of 1996 (WRDA 1996), consists of strengthening of 8.9 miles of the right (north) bank and 10.6 miles of the left (south) bank of the American River levee, and 12.1 miles of the Sacramento River east levee and some berm raising. Eighteen "windows" were left during the initial construction of the slurry walls along the American River. These windows exist near bridge abutments, deep underground utility lines and under low overhead utility lines along both the right and left bank levees. These windows are designated with either an "L" for left bank and "R" for right bank. The subsequent number designates its ordered position relative to the other similar project locations. This turnover letter is for site R4 only.

The work associated with Site R4 includes the installation of a reinforced concrete drainage channel outlet wall keyed into the existing slurry wall.

4.0 – PROJECT ANALYSIS

4.1 – Project Background

1. The USACE, with DWR and SAFCA as local sponsors, completed construction at Site R4 on September 1, 2009. The project work was performed under a California Environmental Quality Act Categorical Exemption, filed April 14, 2008 (State Clearinghouse Number 2008048211).

2. The USACE sent a letter, dated July 1, 2010 (Attachment A), alerting the Board that it is transferring the recently completed portion of work (Site R4) performed under the authority of WRDA 1996 and providing a turnover package which included the amendments to the Operation and Maintenance Manual (Attachment B) and the As-Built Drawings (Attachment C).

3. SAFCA, in a letter dated January 19, 2011(Attachment D), notified the Board of the assurance of their acceptance of the completion of construction of Site R4, and its desire to accept operation and maintenance responsibility for said completed construction.

4.2 – Project Design Review

The project design and construction work was monitored by DWR staff throughout the project. The As-Built Drawings and the revisions to the Operation and Maintenance Manual were also reviewed by DWR staff.

The construction was completed in accordance with American River Common Features WRDA 1996 Remaining Sites Contract I (Site R4), Specification Number 1593, Design File Number 104-0514, Contract Number W91238-09-D-0020. As-Built Drawings and revisions to the Operation and Maintenance Manual are attached. Also, a copy of the "Written Notice of Acceptance of Completed Work" (Attachment E) is included as required by the Project Cooperation Agreement (PCA).

5.0 – STAFF RECOMMENDATION

Staff recommends that the Board adopt Resolution No. 10-45, which constitutes the Board's written findings and decision. The Resolution contains the following recommended actions:

1. Approves the acceptance of the completed American River Common Features (Remaining Sites) WRDA 1996 Contract 1 (Site R4) from the USACE and authorizes Board Staff to issue a letter to the USACE (Attachment F) informing them of the same.

2. Approves the transfer of the operation and maintenance responsibility of the completed American River Common Features (Remaining Sites) WRDA 1996 Contract 1 (Site R4) to SAFCA and authorizes Board Staff to issue a letter to SAFCA (Attachment G) informing them of the same.

3. Delegates to the Board Executive Officer the authority to sign the letters to the USACE and SAFCA.

5.0 – LIST OF ATTACHMENTS

A. Resolution 10-45
B. Transfer Letter from USACE (Dated July 1, 2010)
C. Amendment to Operation and Maintenance Manual – American River Flood Control Project
D. American River Common Features (Remaining Sites) WRDA 1996 Contract 1 (Site R4) – As-Built Drawings
E. Letter from SAFCA accepting O&M responsibility for Site R4 (January 19, 2011)
F. Written Notice of Acceptance of Completed Work
G. Letter to be sent to USACE acknowledging transfer of Site R4 (Dated January 28, 2011)
H. Letter to be sent to SAFCA transferring Operation and Maintenance responsibility to SAFCA (Dated January 28, 2011)

Design Review:	Jason Sidley
Environmental Review:	Environmental Staff Assigned
Document Review:	Kent Zenobia, Dan Fua

STATE OF CALIFORNIA
CALIFORNIA NATURAL RESOURCES AGENCY
THE CENTRAL VALLEY FLOOD PROTECTION BOARD

RESOLUTION NUMBER: 10-45

ACCEPTANCE OF AMERICAN RIVER COMMON FEATURES REMAINING SITES CONTRACT 1 (SITE R4) FROM THE U.S. ARMY CORPS OF ENGINEERS AND TRANSFER OPERATION AND MAINTENANCE RESPONSIBILITY TO THE SACRAMENTO AREA FLOOD CONTROL AGENCY (SAFCA)

WHEREAS, the Central Valley Flood Protection Board (Board) has entered into a Project Cooperation Agreement with the United States Army Corps of Engineers (USACE), Contract Number B81560, dated 9/9/1998, to cost share funding for the American River Common Features Project; and

WHEREAS, the Board has entered into a Local Project Cooperation Agreement (LPCA) with SAFCA, Contract Number B81559/165946, dated 9/9/1998, to cost share funding for the local share of the American River Common Features Project; and

WHEREAS, the LPCA identified SAFCA as the Local Maintaining Agency (LMA) for the American River Common Features Project; and

WHEREAS, construction of Site R4 was completed by the USACE in accordance with American River Common Features Water Resources Development Act 1996 – Remaining Sites Contract 1, Specification Number 1593, Design File Number 1-04-0514, Contract Number W91238-09-D-0020; and

WHEREAS, the USACE, in a letter to the Board, dated July 1, 2010, has notified the Board of the completion of construction of Site R4, and its desire to turn over to the Board such work, as completed, for operation and maintenance; and

WHEREAS, the LPCA states that the Board shall turn completed projects from USACE over to SAFCA for operation and maintenance; and

WHEREAS, SAFCA, in a letter dated January 19, 2011, has notified the Board of the assurance of their acceptance of the completion of construction of Section R4, and their desire to accept operation and maintenance responsibility for said completed construction.

NOW, THEREFORE, LET IT BE RESOLVED that the Board:

1. Approves the acceptance of the completed American River Common Features (Remaining Sites) WRDA 1996 Contract 1 (Site R4) from the

USACE and authorizes Board Staff to issue a letter to the USACE informing them of the same.

2. Approves the transfer of the operation and maintenance responsibility of the completed American River Common Features (Remaining Sites) WRDA 1996 Contract 1 (Site R4) to SAFCA and authorizes Board Staff to issue a letter to SAFCA informing them of the same.

3. Delegates to the Board Executive Officer the authority to sign the letters to the USACE and SAFCA.

BY: _____ Date: _____
Benjamin F. Carter
President

BY: _____ Date: _____
Francis Hodgkins
Secretary

Approved as to Legal Form and Sufficiency

_____
Jeremy Goldberg
Staff Counsel

DEPARTMENT OF THE ARMY
U.S. Army Engineer District, Sacramento
Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

REPLY TO
ATTENTION OF

Flood Protection and Navigation Section

JUL 0 1 2010

Mr. Jay Punia, Executive Officer
Central Valley Flood Protection Board
3310 El Camino Avenue, Room 151
Sacramento, California 95821

Dear Mr. Punia:

This letter is to transfer the U.S. Army Corps of Engineers (Corps) recently completed portion of work (R4) performed under the authority of the Water Resources Development Act of 1996 (WRDA 96). American River (Common Features) as authorized by WRDA 96 consists of lower American River levee strengthening of 8.9 miles of the right (north) bank and 10.6 miles of the left (south) bank levees, and 12.1 miles of Sacramento River east levee and berm raising. Eighteen American River "windows" exist where construction of separate cutoff walls and appurtenant structures around bridge abutments, deep underground utility lines and under low overhead utility lines for both right and left bank levees are required to ensure complete closure of the slurry wall. These "windows" are designated with either an "L" for left bank and "R" for right bank. The subsequent number designates its ordered position relative to the other similar project locations. This turnover letter is for site R4 only.

Site R4 is located approximately 250-feet south the Strong Ranch Pump Station and 1,330-feet northwest of the Northrop Avenue west end terminus as measured along the American River Bike Trail. The R4 project includes a new reinforced concrete drainage channel outlet wall keyed into the slurry wall built under a previous contract.

The construction was completed in accordance with American River Common Features WRDA 1996 – Remaining Sites Contract 1, Specification Number 1593, Design File Number 1-04-0514, Contract Number W91238-09-D-0020. As constructed drawings and revisions to the Operation and Maintenance Manual are enclosed. Also, a copy of the "Written Notice of Acceptance of Completed Work" is included as required by the Project Cooperation Agreement (PCA). Both hard-copy and electronic versions (CD) are provided.

This work meets the requirements of the existing Operation and Maintenance Manual American River - Part No. 1, Levee Construction from Carmichael Bluffs Downstream 8.3 miles; therefore, said flood control work is transferred as of the date of this letter to the State of California for operation, maintenance, repair, replacement, and rehabilitation (OMRR&R). This letter of acceptance into the Federal flood control system should not be construed as an endorsement for inclusion into the National Flood Insurance Program as outlined in Title 44 of the Code of Federal Regulations Section 65.10 of the National Flood Insurance Regulations (44 CFR Section 65.10).

If you have any questions regarding this project, please contact the Project Manager, Mr. John Hoge, at (916) 557-53042. If you have any questions regarding this transfer, please contact Mr. Ryan Larson at (916) 557-7568, Flood Protection and Navigation Section. A copy of this letter is being furnished to Mr. Stein Buer, Sacramento Area Flood Control Agency, 1007 7th Street, Sacramento, CA 95814.

Sincerely,

Thomas C. Chapman, P.E.
Colonel, Corps of Engineers
District Engineer

Enclosures

OPERATION AND MAINTENANCE MANUAL AMERICAN RIVER FLOOD CONTROL PROJECT

AMERICAN RIVER – PART NO. 1 LEVEE CONSTRUCTION FROM CARMICHAEL BLUFFS DOWNSTREAM 8.3 MILES

REVISIONS OR ADDITIONS

	ADDITIONS	DATE
Exhibit F	Add copy of letter of transfer dated 17 Nov 1958	23 Mar 2010
Paragraph 4-05. a.(4)	**Slurry Wall Facilities added**	**01 Jul 2010**
Paragraph 4-05. a.(4)(a)	**Site R4 added**	**01 Jul 2010**
Paragraph 4-05. b.(5)	**Site R4 added**	**01 Jul 2010**
Exhibit F	**Copy of R4 Transfer letter added**	**01 Jul 2010**

	REVISIONS	DATE
Paragraph 4-04. a.	**Revised to include R4 structure**	**01 Jul 2010**
Exhibit B	**Revised to include R4 structure**	**01 Jul 2010**

which become lodged against the bank shall be removed. The improved channel or floodway shall be thoroughly inspected immediately following each major high water period. As soon as practicable thereafter all snags and other debris shall be removed and all damage to .... walls, drainage outlets or other flood control structures repaired."

4-04. Drainage and Irrigation Structures.

a. Description. Drainage and irrigation structures which extend through the levees are listed as follows. **See drawing set 01-04-0415 for centerline stationing:**

Centerline Station	Bank	Size of Pipe	Other Structure Description	Elevation Invert of Pipe
33+55	Right	1-1/2"		60.6
37+58	"	1-1/2"		63.0
40+10	"	2-1/2"		-
42+25	"	1-1/2"		62.0
44+46	"	1-1/2"		63.0
48+75	"	1-1/2"		63.0
49+50	"	1-1/2"		63.7
51+50	"	1-1/2"		63.0
201+75	"	8"	Gate valve R.S. crown	55.0
203+45	"	3-24" C.	Pumping plant #2	40.0
203+45	"	24" C.	Pumping plant #2	30.0
224+30	"	10"		44.7
227+70	"	6"		43.4
288+65	"	8"	Gate valve R.S. crown	52.0
296+85	"	12"	Riser unit R.S. C.E.S.	40.0
346+09	"	12"	Riser unit R.S. C.E.S.	36.0
365+14	"	36"CM.	Riser unit R.S.	31.8
425+30	"	7-48"C.	Pumping plant No. 1	31.0
425+30	"	36"C.	Pumping plant No. 1	18.0
38°35.0514'N 121°25.2672'W (NAD 83)	"	**23'± Total Width**	**1-Double Box Culvert and 1-Single Box Culvert Endwall and Apron [R4]**	**4.45± DBC 4.73± SBC NGVD 1929**

Notes on abbreviations:

R.S.	=	Riverside
C.M.	=	Corrugated Metal
C.	=	Concrete
C.E.S.	=	Concrete Encased Steel Pipe
DBC	**=**	**Double Box Culvert**
SBC	**=**	**Single Box Culvert**

b. Inspection.

(1) Pertinent Requirements of the Code of Federal Regulations. Flood Control Regulations, paragraph 208.10 (d)(1), are quoted in part as follows:

whether seepage is taking place along the lines of their contact with the embankment. Immediate steps shall be taken to correct any adverse conditions."

(2) The outlets of side drainage structures inundate at relatively low river stages. They should, therefore, be inspected at the first sign of a rise in the river to make certain that the gates are not jammed in an open position and thus allow flood waters to enter behind the levee.

4-05. Miscellaneous Facilities.

a. Description. Miscellaneous structures or facilities which were constructed as a part of, or existed in conjunction with, the protective works, and which might affect their functioning, include the following:

(1) Bridges.

(a) A low water bridge crossing the American River at approximate centerline station 229+00. This bridge to be maintained by the owners at the adjacent rock plant.

(b) The H Street bridge crossing the American River at approximate centerline station 364+00. This bridge to be maintained by the County of Sacramento.

(2) Utility Relocations. Because of the nature of the construction of the levee by local interests, no records of any utility relocations are available.

(3) Hydrographic Facilities. A continuous water stage recorder and staff gage located on the H Street Bridge. This station to be maintained by the U.S. Geological Society and the State Department of Water Resources.

(4) Slurry Wall Facilities.

(a) Site R4: A reinforced concrete drainage channel outlet wall keyed into the slurry wall built under a previous contract, at approximate centerline station 422+70. The integrity of the structure/SCB (soil cement bentonite) cutoff wall interface is to be maintained by the Superintendent.

b. Inspection and Maintenance.

(1) Pertinent Requirements of the Code of Federal Regulations. Flood Control Regulations, paragraph 208.10 (h)(1) are quoted in part as follows:

"(h) Miscellaneous Facilities. (1) Maintenance. Miscellaneous structures and facilities constructed as a part of

the protective works and other structures and facilities which function as a part of, or affect the efficient functioning of the protective works, shall be periodically inspected by the Superintendant and appropriate maintenance measures taken. Damaged or unserviceable parts shall be replaced without delay...."

(2) Inspection of the miscellaneous facilities shall be made at the same time that the inspection of the other features of the project are made, and shall be reported on check list No. 3, sheet No. 4 of Exhibit E.

(3) The interest of the Corps of Engineers and the responsibility of the local interests in the existing highway and railroad bridges is confined to their effect on the safety and functioning of the flood control channel, but any conditions noted in the inspections that may affect them in any way should, as a matter of courtesy, be brought to the attention of the agencies maintaining and operating them. If the inspection of any miscellaneous structure, either existent or constructed in the future under permit, discloses any condition that indicates the probability of failure during periods of high water, the Superintendent shall address a letter to the owner of the structure, quoting this manual as authority and inviting attention to the conditions observed and requesting that immediate steps be taken to correct them. A copy of such letter shall be forwarded to the District Engineer for his information. A report of the action taken by the owner shall be submitted to the District Engineer to accompany the next semi-annual report. A suggested report form is included as EXHIBIT D of this manual.

(4) The purpose of maintenance work is to insure continuous satisfactory operation of equipment. It is, therefore, important in such work that all possible causes of future trouble be found and corrected. Particular attention should be given to minor weaknesses which may be given to minor weaknesses which may be an indication of future trouble.

(5) Site R4: Modification or repair work in the vicinity of the concrete liner where the SCB cutoff wall is located should include provisions to avoid damaging the SCB cutoff. Work that requires penetrating the cutoff wall would require special consideration to assure that the cutoff wall forms a continuous seepage barrier as originally designed.

Acceptable seepage barrier earth fill would have at least 30 percent fines (percent passing the No. 200 sieve) with liquid limit less than or equal to 45 and plasticity index of greater than 7 and less than 25. The controlled low strength material replacing the cutoff wall material should have a permeability similar to the

cutoff wall with at least 1x10-6 cm/sec permeability at 28 days and a strength of at least 40 psi at 28 days. Any potential impact to the cutoff shall be coordinated with the Corps of Engineers, Sacramento District to develop mitigation measures or repair methods for the cutoff wall.

Any channel modifications or repairs impacting the impervious blanket that starts at the SCB cutoff and extends to the levee slope shall be restored to the original layer thickness, using the same soil material type. Any repair to the concrete lined channel that affects the geomembrane and that connects the concrete liner edge to the impervious blanket shall be restored.

c. Operation.

(1) Requirements of the Code of Federal Regulations. Flood Control Regulations, paragraph 208.10(h)(2) is quoted as follows:

"(2) Operation. Miscellaneous facilities shall be operated to prevent or reduce flooding during periods of high water. Those facilities constructed as a part of the protective works shall not be used for purposes other than flood protection without approval of the District Engineer unless designed therefore."

Exhibit B

"AS CONSTRUCTED"
DRAWINGS

(See Separate Folder for the Following Drawings)

FILE NO.	TITLE
1-4-375	Emergency Levee Repairs and Bank Protection North Levee American River 1.3 Miles above H Street Bridge, Sheets 1 to 3, inclusive.
1-4-415	Levee Construction and Bank Protection, Fair Grounds to Carmichael Bluffs, Sheets 1 to 20 inclusive.
1-04-0514	**American River Common Features (Remaining Sites) WRDA 1996 Contract 1, Sheets 1 to 21 inclusive. [Site R4]**

EXHIBIT B
Unattached

US Army Corps
of Engineers
Sacramento District

AMERICAN RIVER COMMON FEATURES (REMAINING SITES) WRDA 1996 CONTRACT 1

SACRAMENTO COUNTY CALIFORNIA

FY 2009

AS BUILT

CONTR. NO: W91238-09-D-0020

This project was designed by the Sacramento District of the U. S. Army Corps of Engineers. The initials or signatures and registration designations of individuals appear on these project documents within the scope of their employment as required by ER 1110-1-8152

Approved
/S/KEVIN KNUUTI XX/XX/XX
Chief, Engineering Division Date:
Prepared under the Direction of
/S/COL. THOMAS C. CHAPMAN
Col, Corps of Engineers District Engineer

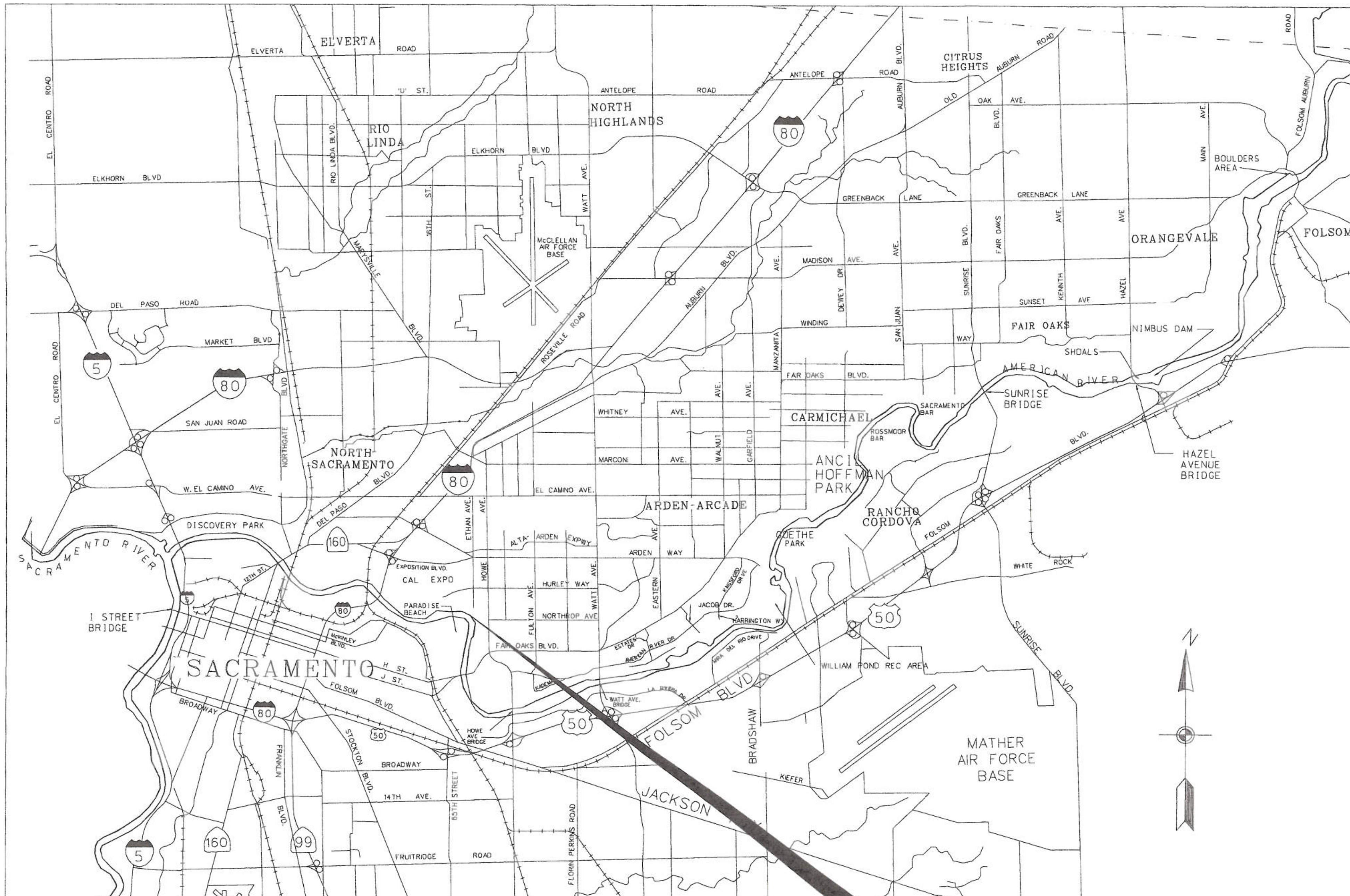
Drawn by D. MAYO
Designed by P. HSIA
Design File No: 1-04-514
Spec No. 1593
Drawing Code:

Approved Functional Adequacy
/S/RICK POEPPLEMAN XX/XX/XX
Chief, Design Branch Date:
Prepared by
SACRAMENTO DISTRICT
DESIGN BRANCH
/S/RICHARD A. TORBIK XX/XX/XX
Chief, Civil Design Sec B Date:

SACRAMENTO COUNTY
AMERICAN RIVER COMMON FEATURES
(REMAINIG SITES) WRDA 1996
CONTRACT 1
SITE R4
TITLE COVER SHEET
CALIFORNIA

Sheet reference number:
G-001
Sheet 1 of 21

8.1.1 PLOT DATE: $$$$date$$$$ PLOT TIME: $$$$time$$$$ DGNSPEC



PROJECT AREA

LOCATION MAP

N.T.S.

WESTERN STATES MAP

AS BUILT

US Army Corps of Engineers
Sacramento District

Symbol	Description	Date	Approved
1	AS BUILT	9/23/09	TS

DEPARTMENT OF THE ARMY CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA	Designed by: J. SCIANDRONE	Date: DATE_APPROVED / Rev.
	Dwn by: D.MAYO / Spec No.: 1593	Design file no: 1-04-514
SACRAMENTO DISTRICT IN-HOUSE DESIGN 1325 'J' STREET SACRAMENTO, CA 95814-2922	Reviewed by: P. HSIA	Drawing Code: 100% REVIEW SUBMITTAL
	Submitted by: /S/RICHARD A. TORBIK CHIEF, CIV ENGR DES SEC B	File name: Plot date: $$$$date$$$$ Plot scale:

SACRAMENTO COUNTY CALIFORNIA
AMERICAN RIVER COMMON FEATURES
(REMAINING SITES) WRDA 1996
CONTRACT 1

LOCATION MAP

Sheet reference number: G-102
Sheet 2 of 21

PLOT DATE: $$$$date$$$$ PLOT TIME: $$$$time$$$$ DGNSPEC

SCHEDULE OF DRAWINGS

SCHEDULE OF DRAWINGS		
GENERAL , CIVIL PLANS, BORING LOGS AND STRUCTURAL PLANS		
SHEET NO.	SHEET REFER NO.	SHEET TITLE
1	G-001	TITLE COVER SHEET
2	G-102	LOCATION MAP
3	G-603	SCHEDULE OF DRAWINGS
4	G-004	GENERAL NOTES, CONSTRUCTION NOTES, LEGENDS AND ABBREVIATIONS
5	G-105	ACCESS ROUTE, HAULING AND BIKE DETOUR PLAN
6	B-701	LOG OF EXPLORATION, 2F-03-15
7	B-702	LOG OF EXPLORATION, 2F-03-16
8	B-703	LOG OF EXPLORATION, 2F-97-13
9	B-704	LOG OF EXPLORATION, 2F-03-20
10	C-100	SITE PLAN
11	C-101	TOPOGRAHICAL SURVEY AND BIKE TRAIL DETAILS
12	C-102	GRADING PLAN AND PROFILE
13	C-103	STAFF GAUGE
14	C-104	TEMPORARY SHORING AND EXCAVATION PLAN
15	S-100	PLAN AND PROFILE
16	S-101	DEMOLITION PLAN
17	S-102	PLAN AND SECTION
18	S-103	SECTION AND DETAILS
19	S-104	SECTION AND DETAILS
20	S-105	IMPERVIOUS BLANKET AND CONNECTION DETAILS
21	S-106	GENERAL STRUCTURAL NOTES AND DETAILS

AS BUILT

US Army Corps of Engineers
Sacramento District

AS BUILT 9/23/09 TS
Symbol | Description | Date | Approval

Designed by: J. SCIANDRONE
Dwn by: D.MAYO
Spec No.: 1593
Reviewed by: P. HSIA
Submitted by: /S/RICHARD A. TORBIK CHIEF, CIV ENGR DES SEC B
Date: DATE_APPROVED
Rev.
Design file no: 1-04-514
Drawing Code: 100% REVIEW SUBMITTAL
File name:
Plot date: $$$$date$$$$
Plot scale:

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SACRAMENTO DISTRICT
IN-HOUSE DESIGN
1325 'J' STREET
SACRAMENTO, CA 95814-2922

SACRAMENTO COUNTY CALIFORNIA
AMERICAN RIVER COMMON FEATURES
(REMAINING SITES) WRDA 1996
CONTRACT 1

SCHEDULE OF DRAWINGS

Sheet reference number:
G-603
Sheet 3 of 21

PLOT DATE: $$$$date$$$$ PLOT TIME: $$$$time$$$$ DGNSPEC

GENERAL NOTES

1. 

2. GENERAL NOTES ARE APPLICABLE TO ALL WORK, UNLESS NOTED OTHERWISE ON OTHER SHEETS.
3. BENCH MARK USED: SEE SHEET C-101

LEGENDS

ELECTRICAL TOWER	OVERHEAD POWER/TELEPHONE LINES
POWER POLE	GAS LINES
ELECTRICAL VAULT	OVERHEAD POWER LINE
TRANSFORMER UNDERGROUND	TELEPHONE LINE
OVERHEAD SWITCH	SEWER LINE
CATCH BASIN	STORM DRAIN
SANITARY SEWER MANHOLE	WATER LINE
RISER	CHAIN LINK OR OTHER TYPE FENCE
STORM DRAIN MANHOLE	RIGHT-OF-WAY
SOIL LOG LOCATION	LIMIT OF WORK
SPOT ELEVATION (11.8)	
FINISH ELEVATION (11.0)	

ABBREVIATIONS

AC	ASPHALT CONCRETE
AB	AGGREGATE BASE
AGP	ABOVE GROUND POWER
B.W.	BARBED WIRE
C.L.	CHAIN LINK
CL	CHAIN LINK
CJ	CONSTRUCTION JOINT
CLSM	CONTROLLED LOW STRENGTH MATERIAL
CM	CENTIMETER
CONC.	CONCRETE
DBL.	DOUBLE
DEMO.	DEMOLISH
EL.	ELEVATION
EVT	EVENT POINT
EXIST.	EXISTING
FL	FLOW LINE
FT	FEET
IN	INCHES
L	LENGTH
M	METER
MIN	MINIMUM
N.T.S.	NOT TO SCALE
POB	POINT OF BEGINNING
PCC	POINT OF COMPOUND CURVE
PC	POINT OF CURVE
POE	POINT OF ENDING
PI	POINT OF INTERSECTION
PT	POINT OF TANGENT
PVI	POINT OF VERTICAL INTERSECTION
R/W	RIGHT-OF-WAY
RFT	STEEL REINFORCEMENT
SD	STORM DRAIN
SLP	SLOPE
STA.	STATION
TYP	TYPICAL
TOC	TOP OF CONCRETE
TOGC	TOP OF GROUTED COBBLE
3H:1V	SLOPE OF 3 HORIZONTAL TO 1 VERTICAL

CONSTRUCTION NOTES

1. THE LOCATION OF EXISTING UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL UTILITIES WITHIN THE CONSTRUCTION ZONE. ALONG THE CONSTRUCTION ACCESS ROUTE AND IN THE STAGING AREAS BEFORE COMMENCING WORK. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE CAUSED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UTILITIES.
2. CONTRACTOR SHALL NOTIFY THE CORPS OF ENGINEERS CONTRACTING OFFICER OF HIS CONSTRUCTION SCHEDULE IN ADVANCE OF CONSTRUCTION.
3. THE CONTRACTOR WILL BE RESPONSIBLE FOR:
   a) DISPOSAL OF EXCESS CONSTRUCTION AND EXCAVATION MATERIAL AND COMPLIANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS: SUCH AS THE CLEAN WATER ACT AND THE NATIONAL HISTORIC PRESERVATION ACT.
   b) PREVENT ANY MATERIALS FROM ENTERING THE RIVER AT WATERSIDE DURING CONSTRUCTION.
   c) NO REFUELING OF MOBILE EQUIPMENT IS PERMITTED ON THE WATERSIDE OF THE LEVEE.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED BY THE CONTRACTOR TO THE RECREATION BIKE TRAIL, STAGING AREAS, PAVEMENT, ROADS, FENCES, FLOOD CONTROL STRUCTURES, INCLUDING LEVEES, LEVEE RAMP, AND EXISTING BANK PROTECTION IMPROVEMENTS, VEGETATION, AND ALL OTHER UTILITIES AND IMPROVEMENT NOT DESIGNATED FOR REMOVAL.
5. EXISTING ROADWAYS SHALL BE KEPT CLEAR OF MUD AND DEBRIS AT ALL TIMES.
6. CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES TO REMAIN WITHIN PROJECT LIMITS, AND WILL BE RESPONSIBLE FOR ANY DAMAGE TO THESE UTILITIES BY CONTRACT WORK. UTILITY SERVICES AND THEIR LOCATIONS MAY NOT BE COMPLETE AS SHOWN ON DRAWING PLANS. THE CONTRACTOR SHALL TAKE NECESSARY MEASURES TO LOCATE AND PROTECT SERVICES DURING CONSTRUCTION. CONTRACTOR SHALL NOT INTERRUPT ANY UTILITY SERVICES.
7. ACCESS TO THE LEVEE CROWN AND ACCESS RAMPS ARE INDICATED ON THE DRAWINGS UNLESS OTHERWISE APPROVED BY THE CONTRACTING OFFICER.
8. ELEVATIONS REFER TO NATIONAL GEODITIC VERTICAL DATUM (NGVD)1929.
9. GRID COORDINATES REFER TO CALIFORNIA COORDINATE SYSTEM ZONE II NAD 83/91 AND ARE BASE ON THE CALFORNIA H.A.R.N. PUBLISHED BY CAL-TRANS.

POINTS OF CONTACT

CONTACT INFORMATION IS PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR WHERE DIRECT CONTACT IS OR MAY BE REQUIRED. THE PRIMARY POINT OF CONTACT IS THE CONTRACTING OFFICER OR HIS/HER DESIGNATED REPRESENTATIVE. ONLY THE CONTRACTING OFFICER HAS THE AUTHORITY TO ALTER OR INTERPRET THIS CONTRACT SHOULD ANY INTERPRETATION BE NECESSARY. IN THE EVENT ANY CONTACT, WHETHER LISTED HERE OR NOT REQUESTS ADDITIONAL WORK OR AN ALTERATION OF THIS CONTRACT, THE CONTRACTOR SHALL INFORM THE CONTRACTING OFFICER AS SOON AS POSSIBLE, WITH WRITTEN FOLLOW-UP, AND BEFORE PLANNING ANY SUCH WORK.

USA (UNDERGROUND SERVICE ALERT)
1 800 227 2600

SMUD
Al Sanders Inspector
916 869 0510

SACRAMENTO COUNTY TRAFFIC CONTROL
(permit needed for hauling material and routing)
PRIMARY:
JACKIE GROOVER
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ROOM 105 WINDOW 11
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916 874 5606
SECONDARY:
SCOTT URBANIK
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AMERICAN RIVER FLOOD CONTROL DISTRICT
(entity which will operate and maintain levee when complete)
TIM KERR, GENERAL MANAGER, 165 COMMERCE CIRCLE, SUITE D, SACRAMENTO, CA 95815
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MIKE CROOKS (ALTERNATE)
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ELK GROVE, CA 957583
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crooksm@saccounty.net

SRCSD (SACRAMENTO REGIONAL COUNTY SANITATION DISTRICT)
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MATHER, CA 95655
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SECONDARY: MELENIE DAVIS
COUNTY SANITATION DISTRICT 1

SACRAMENTO METRO FIRE DISTRICT
EMERGENCY ALWAYS CALL 911
PRIMARY
Michael Keehn, Fire Prevention Bureau
Supervising Inspector
office: 942-3326 cell: 616-4679
keehn.michael@smfd.ca.gov
SECONDARY
Deputy Chief of Operations Geoff Miller:
566-4303
miller.geoffrey@smfd.ca.gov
TERTIARYAssistant Chief of Operations Mike Johnson:
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AS BUILT

US Army Corps of Engineers
Sacramento District

Rev.	Description	Date	Approved
1	AS BUILT	4/23/08	TS

Date: DATE_APPROVED
No.: Design file no: 1-04-514
Drawing Code: 100% REVIEW SUBMITTAL
File name: PRBLK
Plot date: $$$$date$$$$
Plot scale: SIZE B

Designed by: J. SCIANDRONE
Drawn by: D.MATO | Spec No.: 1593
Reviewed by: P. HSIA
Submitted by: /S/RICHARD A. TORBIK
DATE: CITY DES SEC B

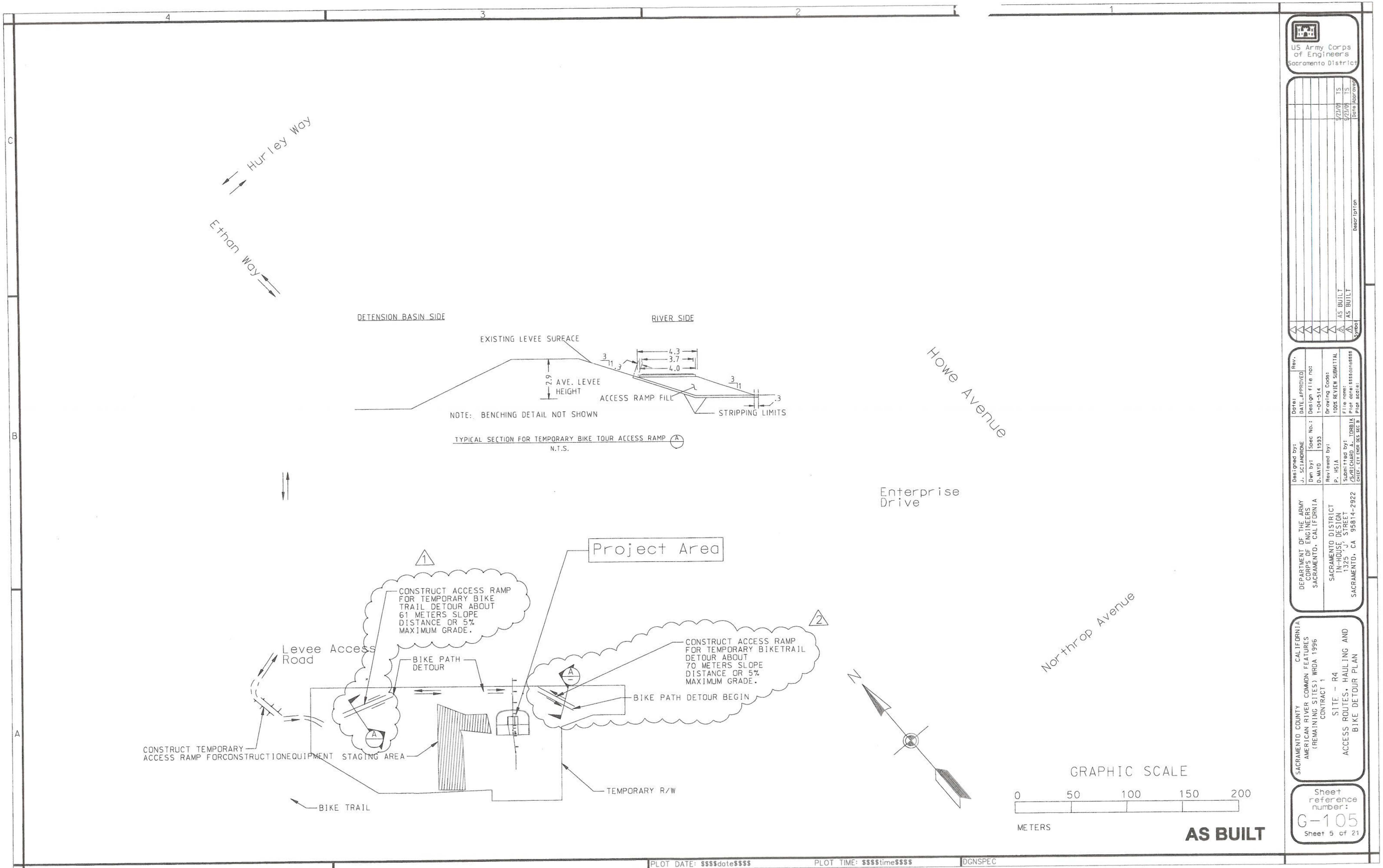
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SACRAMENTO DISTRICT
IN-HOUSE DESIGN
1325 'J' STREET
SACRAMENTO, CA 95814-2922

SACRAMENTO COUNTY
AMERICAN RIVER COMMON FEATURES
(REMAINING SITES) WRDA 1996
CONTRACT 1

GENERAL NOTES, CONSTRUCTION NOTES
LEGENDS, ABBREVIATIONS
AND POINTS OF CONTACT

Sheet reference number:
G-004
Sheet 4 of 21



Hurley Way
Ethan Way
DETENSION BASIN SIDE
RIVER SIDE
EXISTING LEVEE SURFACE
4.3
3.7
4.0
2.9
AVE. LEVEE HEIGHT
ACCESS RAMP FILL
STRIPPING LIMITS
NOTE: BENCHING DETAIL NOT SHOWN
TYPICAL SECTION FOR TEMPORARY BIKE TOUR ACCESS RAMP A
N.T.S.
Howe Avenue
Enterprise Drive
Project Area
1
CONSTRUCT ACCESS RAMP FOR TEMPORARY BIKE TRAIL DETOUR ABOUT 61 METERS SLOPE DISTANCE OR 5% MAXIMUM GRADE.
2
CONSTRUCT ACCESS RAMP FOR TEMPORARY BIKETRAIL DETOUR ABOUT 70 METERS SLOPE DISTANCE OR 5% MAXIMUM GRADE.
Levee Access Road
BIKE PATH DETOUR
BIKE PATH DETOUR BEGIN
CONSTRUCT TEMPORARY ACCESS RAMP FORCONSTRUCTIONEQUIPMENT
STAGING AREA
TEMPORARY R/W
BIKE TRAIL
Northrop Avenue
N
GRAPHIC SCALE
0 50 100 150 200
METERS
AS BUILT
US Army Corps of Engineers Sacramento District
AS BUILT
AS BUILT
Symbol
Description
Date
Approved
DEPARTMENT OF THE ARMY CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA
SACRAMENTO DISTRICT IN-HOUSE DESIGN 1325 'J' STREET SACRAMENTO, CA 95814-2922
Designed by: J. SCIANDRONE
Dwn by: D.MAYO
Spec No.: 1593
Reviewed by: P. HSIA
Submitted by: /S/RICHARD A. TORBIK CHIEF, CIV ENGR DES SEC B
Date: DATE_APPROVED
Rev.
Design file no: 1-04-514
Drawing Code: 100% REVIEW SUBMITTAL
File name:
Plot date: $$$$date$$$$
Plot scale:
SACRAMENTO COUNTY CALIFORNIA
AMERICAN RIVER COMMON FEATURES (REMAINING SITES) WRDA 1996 CONTRACT 1
SITE - R4
ACCESS ROUTES, HAULING AND BIKE DETOUR PLAN
Sheet reference number: G-105
Sheet 5 of 21
PLOT DATE: $$$$date$$$$
PLOT TIME: $$$$time$$$$
DGNSPEC

2F-03-15
SITE R4

DEPTH		N	GR	SA	FI	LL	PI	MC	Description
EL. 13.7m (44.9') 0									Hole is located at top of levee, centerline of crown. About 2.5cm (1") of bituminous course and AB material present. No samples taken between 0 to 2.4m (8 feet) depths; easy drilling
(8.0') 2.4m	ML	31	-	-	-	-	-	-	SANDY SILT, ML: Dense; moist; reddish-brown; 65% low plasticity fines; 35% fine sand; no reaction to HCl; no odor; easy drilling
(11.0') 3.4m	ML	23	-	-	-	-	-	-	SANDY SILT, ML: Very firm; moist; very dark grayish-brown; 70% low plasticity fines; 30% fine sand; no reaction to HCl; no odor; easy drilling
(14.0') 4.3m	ML	22	-	-	-	-	-	-	SANDY SILT, ML: as above at 3.4m (11.0') depth
(17.0') 5.2m	ML	22	-	-	-	-	-	-	SANDY SILT, ML: as above at 3.4m (11.0') depth
(20.0') 6.1m	ML	21	-	-	-	-	-	-	SANDY SILT, ML: Very firm; moist; dark brown; 70% low plasticity fines; 30% fine sand; no reaction to HCl; no odor; carbon rootlets present; easy drilling
(23.0') 7.0m	ML	8	-	-	-	-	-	-	SANDY SILT, ML: as above at 6.1m (20.0') except loose; dark grayish-brown
(26.0') 7.9m	ML	13	-	-	-	-	-	-	SANDY SILT, ML: as above at 6.1m (20.0') except firm
(29.0') 8.8m	ML								SANDY SILT, ML: Firm; moist; very dark grayish-brown; 65% low plasticity fines; 35% fine sand; no reaction to HCl; no odor; carbon rootlets present; easy drilling
(29.6') 9.0m	SM	18	-	-	-	-	-	-	SILTY SAND, SM: Firm; moist; dark brown; 75% fine to medium, subangular sand; 25% nonplastic fines; no reaction to HCl; no odor
(32.0') 9.8m	SM	16	-	-	-	-	-	-	SILTY SAND, SM: as above at 9.0m (29.6') except trace of carbon rootlets
(35.0') 10.7m	SM	11	-	-	-	-	-	-	SILTY SAND, SM: Firm; moist; very dark grayish-brown; 85% fine to medium, subangular sand; 15% nonplastic fines; no reaction to HCl; no odor
(38.0') 11.6m									

(CONTINUED IN THE NEXT COLUMN)

2F-03-15
(CONTINUED FROM PREVIOUS COLUMN)

DEPTH		N	GR	SA	FI	LL	PI	MC	Description
(38.0') 11.6m	SP-SM	12	-	-	-	-	-	-	POORLY GRADED SAND WITH SILT, SP-SM: Firm; moist; dusky red; 90% fine to medium, subangular sand; 10% nonplastic fines; no reaction to HCl; no odor
▽ (41.0') 12.5m	GP		-	-	-	-	-	-	POORLY GRADED GRAVEL WITH SAND, GP: Dense; wet; dark brown; 60% fine to medium, subangular to subrounded gravel; 40% fine to coarse, subangular sand; trace of nonplastic fines; no reaction to HCl; no odor; rough drilling
(42.0') 12.8m	GRAVEL AND COBBLES	38	-	-	-	-	-	-	At 12.8m (42.0'), driller state top of cobbles; begin air rotary/Odex System on 21Jan2003; pushed 6" dia. casing to 11.6m (38') depth; rough drilling
(44.0') 13.4m	GRAVEL AND COBBLES								At 13.4m (44.0'), very rough drilling
(49.0') 14.9m	GRAVEL AND COBBLES								At 14.9m (49.0'), wet, sand and gravel fragments in returns; rough drilling
(53.0') 16.2m	GRAVEL AND COBBLES								At 16.2m (53.0'), wet, gravel fragments in returns; moderate to rough drilling
(56.0') 17.1m	GRAVEL AND COBBLES								At 17.1m (56.0'), wet returns; moderate drilling At 17.4m (57.0'), driller states bottom of cobbles; wet, fine to medium sand; casing advances steadily
(57.0') 17.4m	SM	16	-	-	-	-	-	-	Begin mud rotary on 24Jan03; SILTY SAND, SM: Firm; wet; brown; 80% fine to medium sand; 20% nonplastic fines; no reaction to HCl; no odor; loss of drilling mud circulation
(60.0') 18.3m	SP-SM		-	-	-	-	-	-	POORLY GRADED SAND WITH SILT, SP-SM: Very dense; wet; brown; 90% fine to medium sand; 10% nonplastic fines; no reaction to HCl; no odor; loss of drilling mud circulation
(60.8') 18.5m	ML	52	-	-	-	-	-	-	SILT, ML: Very dense; moist; light olive-brown; 95% low plasticity fines; 5% fine sand; no reaction to HCl; no odor; trace of iron oxide staining; loss of drilling mud circulation
(63.0') 19.2m	SM	44	-	-	-	-	-	-	SILTY SAND, SM: Dense; moist; dark yellowish-brown; 60% fine sand; 40% low plasticity fines; no reaction to HCl; no odor; loss of drilling mud circulation SILTY SAND, SM: Very firm; moist; brown; 75% fine to coarse, subangular to subrounded sand; 15% nonplastic fines; 10% fine to coarse, subangular to subrounded gravel; no reaction to HCl; no odor; moderate drilling
(66.0') 20.1m (66.5') 20.3m	SW	26	-	-	-	-	-	-	WELL-GRADED SAND, SW: Very firm; moist; dark brown; 95% fine to medium, subangular to subrounded sand; 5% nonplastic fines; no reaction to HCl; no odor
(69.0') 21.0m	SW	24	-	-	-	-	-	-	WELL-GRADED SAND, SW: as above except excessive loss of drilling mud circulation; moderate drilling
(72.0') 21.9m (72.2') 22.0m	SM	26	-	-	-	-	-	-	SILTY SAND, SM: Very firm; moist; dark yellowish-brown; 65% fine sand; 35% low plasticity fines; hard nodules of sand and silt present; no reaction to HCl; no odor; loss of drilling mud circulation; easy drilling SILTY SAND, SM: Very firm; moist; dark yellowish-brown; 55% fine sand; 45% low plasticity fines; no reaction to HCl; no odor; loss of drilling mud circulation; easy drilling
(75.0') 22.9m									

(CONTINUED IN THE NEXT COLUMN)

2F-03-15
(CONTINUED FROM PREVIOUS COLUMN)

DEPTH		N	GR	SA	FI	LL	PI	MC	Description
(75.0') 22.9m	ML	19	-	-	-	-	-	-	SILT WITH SAND, ML: Firm; wet; dark yellowish-brown; 75% low plasticity fines; 25% fine sand; trace of gravel maximum particle size 2.5cm (1"); no reaction to HCl; no odor; loss of drilling mud circulation; easy drilling
(78.0') 23.8m	CL	40	-	-	-	-	-	-	LEAN CLAY WITH SAND, CL: Hard; wet; yellowish-brown; 75% medium plasticity fines; 25% fine sand; no reaction to HCl; drilling mud circulation returns; no odor; easy drilling
(81.0') 24.7m	ML	31	-	-	-	-	-	-	SANDY SILT, ML: Dense; wet; yellowish-brown; 60% low plasticity fines; 40% fine sand; no reaction to HCl; no odor; slight loss of drilling mud circulation; easy drilling
(84.0') 25.6m	ML	24	-	-	-	-	-	-	SANDY SILT, ML: Very firm; wet; brown; 60% low plasticity fines; 40% fine sand; no reaction to HCl; no odor; easy drilling
(85.5') 26.1m	B.O.H.								Boring completed 28 Jan 03

LEGEND:

GR	GRAVEL, PERCENT BY WEIGHT PASSING THE 76mm (3-INCH) SIEVE AND RETAINED ON THE NO. 4 SIEVE.
SA	SAND, PERCENT BY WEIGHT PASSING THE NO. 4 SIEVE AND RETAINED ON THE NO. 200 SIEVE.
FI	FINES, PERCENT BY WEIGHT PASSING THE NO. 200 SIEVE.
LL	LIQUID LIMIT.
PI	PLASTICITY INDEX (LIQUID LIMIT MINUS PLASTIC LIMIT).
MC	LABORATORY DETERMINED MOISTURE CONTENT IN PERCENT OF DRY WEIGHT.
SM	COMBINED FIELD VISUAL IDENTIFICATION AND/OR LABORATORY CLASSIFICATION.
NP	NONPLASTIC.
N	NUMBER OF BLOWS WITH THE STANDARD PENETROMETER.
R	REFUSAL WITH THE STANDARD PENETROMETER (SEE NOTE 10).
A	ATTEMPT WITH THE STANDARD PENETROMETER (SEE NOTE 11).
▽	WATER LEVEL.
B.O.H.	BOTTOM OF HOLE.

NOTES:

1. THIS DRAWING IS TO BE USED ONLY FOR APPROXIMATE DESCRIPTIONS OF SUBSURFACE CONDITIONS.
2. SOIL CLASSIFICATIONS AND DESCRIPTIONS ARE BASED ON FIELD LOG DESCRIPTIONS IN ACCORDANCE WITH ASTM D 2488 (DESCRIPTION AND IDENTIFICATION OF SOILS, VISUAL-MANUAL PROCEDURE) AND/OR LABORATORY TEST RESULTS IN ACCORDANCE WITH ASTM D 2487 (CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES).
3. ALL COLORS SHOWN ARE IN ACCORDANCE WITH THE MUNSELL SOIL COLOR CHART.
4. ALL SIEVE SIZES SHOWN ARE METRIC WITH U.S. STANDARD IN PARENTHESES.
5. BORING 2F-03-15 WAS DRILLED WITH A MOBILE B-61 DRILL RIG USING A 152mm (6") ABOVE THE COBBLE LAYER. BORING 2F-03-15 WAS DRILLED WITH AN IRA DRILL RIG USING A ORDEX SYSTEM WITH A 152mm (6") CASING AT DEPTHS WITHIN THE COBBLE LAYER. BORING 2F-03-15 WAS DRILLED WITH A MUD ROTARY SYSTEM AT DEPTHS BELOW THE COBBLES LAYER. BORING 2F-03-15 WAS DRILLED BETWEEN 27 AND 28 JANUARY 2003.
6. WHERE COBBLES WERE ENCOUNTERED, LABORATORY GRADATION DATA REPRESENT MATERIAL PASSING THE 76mm (3") SIEVE. PARTICLES LARGER THAN THE INSIDE DIAMETER OF THE SAMPLER WERE NOT RECOVERED; HENCE, ALL GRAVEL AND COBBLE LAYERS REFERENCED IN SOIL BORINGS CONTAINED LARGER PARTICLES OF GRAVEL AND COBBLES THAT ARE NOT REFLECTED IN THE LABORATORY GRADATION TEST RESULTS SHOWN IN THE LOGS OF EXPLORATIONS.
7. STANDARD PENETROMETER DATA WERE OBTAINED IN ACCORDANCE WITH ASTM D 1586 UTILIZING A 610mm LONG STANDARD 51mm O.D. BY 35mm I.D. SPLIT BARREL SAMPLER. THE SPLIT-BARREL PENETROMETER WAS DRIVEN USING AN AUTOMATIC-TRIP, 63.5 KG SAFETY HAMMER. ALL SPT "N" VALUES ARE "FIELD", I.E. UNCORRECTED FOR DEPTH.
8. GROUNDWATER WAS ENCOUNTERED AT THE TIME OF EXPLORATIONS; GROUNDWATER LEVELS CAN BE EXPECTED TO FLUCTUATE IN RESPONSE TO RAINFALL VARIATIONS, PARTICULARLY IN THE VICINITY OF SITE DRAINAGE FEATURES.
9. DEPENDING ON THE SOIL MOISTURE AT THE TIME OF CONSTRUCTION, THE SOIL ENCOUNTERED MAY BE UNSTABLE OR POTENTIALLY UNSTABLE. THE PROBABILITY OF UNSTABLE CONDITIONS IS HIGHEST WHEN THE SOIL MOISTURE IS GREATEST.
10. REFUSAL WITH THE STANDARD PENETROMETER IS DEFINED AS ONE OF THE FOLLOWING:
    A. 10 BLOWS FOR NO APPARENT ADVANCEMENT OF THE SAMPLER; OR
    B. 50 BLOWS FOR LESS THAN 152mm (6") ADVANCEMENT OF THE SAMPLER; OR
    C. 100 BLOWS FOR 152mm (6") TO 457mm (18") ADVANCEMENT OF THE SAMPLER.
11. ATTEMPT WITH THE STANDARD PENETROMETER IS DEFINED AS REFUSAL WITHIN THE FIRST 152mm (6") OF SEATING PENETRATION.
12. SEE SHEET C-100 FOR LOCATION OF EXPLORATIONS.
13. SEE SHEET B-703 FOR STANDARD PENETROMETER DESCRIPTIVE DATA.

GRAPHIC SCALE

SCALE 1 : 25 — 0, 0.5, 1, 1.5, 2, 2.5 METERS

AS BUILT

US Army Corps of Engineers
Sacramento District

AS BUILT

Designed by: J. SCHAPPROE
Dwn by: K. PHAM
Ckd by: R. HIASA
Submitted by: /S/ ED. KETCHUM
Design file no: X-XX-XXX
SPEC. No.: XXXX
Plot date: 1 MAY 2007
Plot scale: 1:1

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SACRAMENTO DISTRICT
IN-HOUSE DESIGN
1325 'J' STREET
SACRAMENTO, CA 95814-2922

SACRAMENTO COUNTY CALIFORNIA
AMERICAN RIVER COMMON FEATURES
(REMAINING SITES) WRDA 1996
CONTRACT 1
SITE - R4
LOG OF EXPLORATION
2F-03-15

2F-03-16
SITE R4

DEPTH		N	GR	SA	FI	LL	PI	MC	Description
EL. 13.65m (44.8') 0									Hole is located at top of levee, centerline of crown. About 2.5cm (1") of bituminous course and AB material present. No samples taken between 0 to 2.4m (8 feet) depths; easy drilling
(8.0') 2.4m	SC	20	-	-	-	-	-	-	CLAYEY SAND, SC: Firm; moist; very dark gray; 60% fine, subangular sand; 40% medium plasticity fines; no reaction to HCl; no odor
(11.0') 3.4m	ML	19	-	-	-	-	-	-	SANDY SILT, ML: Firm; dry; dark brown; 70% low plasticity fines; 30% fine, subangular sand; no odor present; no reaction with HCl
(14.0') 4.3m	ML	19	-	-	-	-	-	-	SANDY SILT, ML: Firm; dry; dark brown; 70% low plasticity fines; 30% fine, subangular sand; no odor present; no reaction with HCl
(17.0') 5.2m	ML	5	-	-	-	-	-	-	SILT WITH SAND, ML: Loose; moist; dark brown; 85% low plasticity fines; 15% very fine sand; no reaction with HCl
(20.0') 6.1m	ML	6	-	-	-	-	-	-	SILT WITH SAND, ML: Loose; moist; dark brown; 85% low plasticity fines; 15% very fine sand; no reaction with HCl
(23.0') 7.0m	ML	9	-	-	-	-	-	-	SILT WITH SAND, ML: Loose; moist; dark brown; 85% low plasticity fines; 15% very fine sand; no reaction with HCl
(26.0') 7.9m	ML	11	-	-	-	-	-	-	SANDY SILT, ML: Firm; moist; dark brown; 65% low plasticity fines; 35% very fine sand; no reaction with HCl
(29.0') 8.8m	SM	12	-	-	-	-	-	-	SILTY SAND, SM: Firm; dry; brown; 85% fine to medium, subangular sand; 15% nonplastic fines; no reaction with HCl
(32.0') 9.8m	SM	12	-	-	-	-	-	-	SILTY SAND, SM: Firm; dry; dusky red; 80% fine, subangular sand; 20% nonplastic fines; no reaction with HCl
(35.0') 10.7m	SM		-	-	-	-	-	-	SILTY SAND, SM: Loose; moist; very dark grayish-brown; 70% fine, subangular sand; 30% nonplastic fines; particles of charcoal present; no reaction with HCl
(35.5') 10.8m	SM	7	-	-	-	-	-	-	SILTY SAND, SM: Loose; dry; dusky red; 80% fine, subangular sand; 20% nonplastic fines; no reaction with HCl
(38.0') 11.6m									

(CONTINUED IN THE NEXT COLUMN)

2F-03-16
(CONTINUED FROM PREVIOUS COLUMN)

DEPTH		N	GR	SA	FI	LL	PI	MC	Description
(38.0') 11.6m	SP-SM	7	-	-	-	-	-	-	POORLY GRADED SAND WITH SILT, SP-SM: Loose; moist; very dark grayish-brown; 90% fine to medium, subangular sand; 10% nonplastic fines; no reaction with HCl
▽ (41.0') 12.5m	SM	17	-	-	-	-	-	-	SILTY SAND, SM: Firm; wet; very dark grayish-brown; 85% medium, subangular sand; 15% nonplastic fines; 1 piece of fractured gravel maximum particle size 2.5cm (1"); no odors present; no reaction with HCl. At 12.5m (41.1'), lense of black orgaincs 3cm (1.2") thick
(44.0') 13.4m	GP	21	-	-	-	-	-	-	POORLY GRADED GRAVEL WITH SAND, GP: Very firm; wet; dark brown; 50% coarse, angular to subangular gravel maximum particle size 5.1cm (2"); 45% fine to coarse, angular to subangular sand; 5% nonplastic fines; no odor; no reaction with HCl
(47.0') 14.3m	SP-SM		-	-	-	-	-	-	POORLY GRADED SAND WITH SILT, SP-SM: Firm; wet; very dark grayish-brown; 90% fine to coarse, subangular sand; 10% nonplastic fines; no odor present; no reaction with HCl; rock in shoe
(47.9') 14.6m	GP	14	-	-	-	-	-	-	POORLY GRADED GRAVEL WITH SAND, GP: Firm; wet; light brown to dark yellowish-brown; 50% coarse, subangular to surbrounded gravel; 45% fine to coarse, subangular to subrounded sand; 5% low plasticity fines; no odor; no reaction with HCl; traces of charcoal present; rough drilling
(50.0') 15.2m	SP-SM	A	-	-	-	-	-	-	POORLY GRADED SAND WITH SILT, SP-SM: Very dense; wet; very dark grayish-brown; 90% fine to coarse, subangular sand; 10% nonplastic fines; no odor present; no reaction with HCl; rough drilling
(53.0') 16.2m	SM		-	-	-	-	-	-	SILTY SAND, SM: Dense; wet; dark gray; 80% fine to coarse, subangular sand; 20% nonplastic fines; no odor; no reaction with HCl
(53.6') 16.3m	GP	50	-	-	-	-	-	-	POORLY GRADED GRAVEL WITH SAND, GP: Dense; wet; very dark grayish-brown; 60% fine to coarse, subangular to subrounded gravel maximum particle size 41cm (1-5/8"); 35% fine to coarse, subangular sand; 5% nonplastic fines; no odor; no reaction with HCl; rough drilling
(55.0') 16.8m	GRAVEL & COBBLES		-	-	-	-	-	-	At 16.8m (55.0'), driller state top of cobbles; begin air rotary/Odex System on 27Jan2003; placed 6" dia. casing to 15.2m (50') depth; very little amounts of returns; moist, fine sand to gravel fragments; rocky drilling. At 16.8m (55.0'), lots of water in returns. At 17.1m (56.0'), dry gravel fragments. At 17.4m (57.0'), wet, fine sand returns; driller states bottom of cobbles/gravels at 17.4m (57.0')
(57.0') 17.4m	ML	46	-	-	-	-	-	-	Begin mud rotary on 28Jan03; SANDY SILT, ML: Dense; moist; dark yellowish-brown; 70% low plasticity fines; 30% fine sand; no reaction to HCl; no odor; trace of iron oxide staining laminations; easy drilling
(60.0') 18.3m	SW-SM		-	-	-	-	-	-	WELL-GRADED SAND WITH SILT, SW-SM: Very firm; wet; dark brown; 90% fine to medium, subangular to subrounded sand; 10% nonplastic fines; no reaction to HCl; no odor; easy drilling
(60.5') 18.4m	SM	29	-	-	-	-	-	-	SILTY SAND, SM: Very firm; wet; dark brown; 70% fine sand; 30% nonplastic fines; no reaction to HCl; no odor
(63.0') 19.2m	SW-SM		-	-	-	-	-	-	WELL-GRADED SAND WITH SILT, SW-SM: same as above at 18.3m (60.0') depth
(63.4') 19.3m	SM	25	-	-	-	-	-	-	SILTY SAND, SM: same as above at 18.4m (60.5') depth
(66.0') 20.1m	SM	43	-	-	-	-	-	-	SILTY SAND, SM: Dense; wet; dark brown; 75% fine sand; 25% nonplastic fines; no reaction to HCl; no odor; loss of drilling mud circulation; easy drilling
(69.0') 21.0m	SM	34	-	-	-	-	-	-	SILTY SAND, SM: Dense; wet; dark brown; 80% fine sand; 20% nonplastic fines; no reaction to HCl; no odor; easy drilling
(72.0') 21.9m	SM	47	-	-	-	-	-	-	SILTY SAND, SM: Dense; moist; brown; 70% fine sand; 30% nonplastic fines; no reaction to HCl; no odor; easy drilling
(75.0') 22.9m									

(CONTINUED IN THE NEXT COLUMN)

2F-03-16
(CONTINUED FROM PREVIOUS COLUMN)

DEPTH		N	GR	SA	FI	LL	PI	MC	Description
(75.0') 22.9m	ML	16	-	-	-	-	-	-	SILT WITH SAND, ML: Firm; moist; brown; 80% low plasticity fines; 20% fine sand; no reaction to HCl; no odor; trace of iron oxide staining; easy drilling
(78.0') 23.8m	MH	64	-	-	-	-	-	-	ELASTIC SILT WITH SAND, MH: Very dense; moist; brown; 85% low plasticity fines; 15% fine sand; no reaction to HCl; no odor; trace of iron oxide staining; easy drilling
(81.0') 24.7m	ML	45	-	-	-	-	-	-	SILT WITH SAND, ML: Dense; moist; yellowish-brown; 75% low plasticity fines; 25% fine sand; no reaction to HCl; no odor; easy drilling
(84.0') 25.6m	ML	24	-	-	-	-	-	-	SANDY SILT, ML: Very firm; moist; dark grayish-brown; 55% low plasticity fines; 45% fine sand; no reaction to HCl; no odor; easy drilling
(87.0') 26.5m	ML	43	-	-	-	-	-	-	SILT WITH SAND, ML: Dense; moist; brown; 75% low plasticity fines; 25% fine sand; no reaction to HCl; no odor; trace of iron oxide staining; easy drilling
(88.5') 27.0m	B.O.H.								Boring completed 28 Jan 03

LEGEND:

GR	GRAVEL, PERCENT BY WEIGHT PASSING THE 76mm (3-INCH) SIEVE AND RETAINED ON THE NO. 4 SIEVE.
SA	SAND, PERCENT BY WEIGHT PASSING THE NO. 4 SIEVE AND RETAINED ON THE NO. 200 SIEVE.
FI	FINES, PERCENT BY WEIGHT PASSING THE NO. 200 SIEVE.
LL	LIQUID LIMIT.
PI	PLASTICITY INDEX (LIQUID LIMIT MINUS PLASTIC LIMIT).
MC	LABORATORY DETERMINED MOISTURE CONTENT IN PERCENT OF DRY WEIGHT.
SM	COMBINED FIELD VISUAL IDENTIFICATION AND/OR LABORATORY CLASSIFICATION.
NP	NONPLASTIC.
N	NUMBER OF BLOWS WITH THE STANDARD PENETROMETER.
R	REFUSAL WITH THE STANDARD PENETROMETER (SEE NOTE 10).
A	ATTEMPT WITH THE STANDARD PENETROMETER (SEE NOTE 11).
▽	WATER LEVEL.
B.O.H.	BOTTOM OF HOLE.

NOTES:

1. THIS DRAWING IS TO BE USED ONLY FOR APPROXIMATE DESCRIPTIONS OF SUBSURFACE CONDITIONS.
2. SOIL CLASSIFICATIONS AND DESCRIPTIONS ARE BASED ON FIELD LOG DESCRIPTIONS IN ACCORDANCE WITH ASTM D 2488 (DESCRIPTION AND IDENTIFICATION OF SOILS, VISUAL-MANUAL PROCEDURE) AND/OR LABORATORY TEST RESULTS IN ACCORDANCE WITH ASTM D 2487 (CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES).
3. ALL COLORS SHOWN ARE IN ACCORDANCE WITH THE MUNSELL SOIL COLOR CHART.
4. ALL SIEVE SIZES SHOWN ARE METRIC WITH U.S. STANDARD IN PARENTHESES.
5. BORING 2F-03-16 WAS DRILLED WITH A MOBILE B-61 DRILL RIG USING A 152mm (6") ABOVE THE COBBLE LAYER. BORING 2F-03-16 WAS DRILLED WITH AN IRA DRILL RIG USING A ORDEX SYSTEM WITH A 152mm (6") CASING AT DEPTHS WITHIN THE COBBLE LAYER. BORING 2F-03-16 WAS DRILLED WITH A MUD ROTARY SYSTEM AT DEPTHS BELOW THE COBBLES LAYER. BORING 2F-03-16 WAS DRILLED ON 28 JANUARY 2003.
6. WHERE COBBLES WERE ENCOUNTERED, LABORATORY GRADATION DATA REPRESENT MATERIAL PASSING THE 76mm (3") SIEVE. PARTICLES LARGER THAN THE INSIDE DIAMETER OF THE SAMPLER WERE NOT RECOVERED; HENCE, ALL GRAVEL AND COBBLE LAYERS REFERENCED IN SOIL BORINGS CONTAINED LARGER PARTICLES OF GRAVEL AND COBBLES THAT ARE NOT REFLECTED IN THE LABORATORY GRADATION TEST RESULTS SHOWN IN THE LOGS OF EXPLORATIONS.
7. STANDARD PENETROMETER DATA WERE OBTAINED IN ACCORDANCE WITH ASTM D 1586 UTILIZING A 610mm LONG STANDARD 51mm O.D. BY 35mm I.D. SPLIT BARREL SAMPLER. THE SPLIT-BARREL PENETROMETER WAS DRIVEN USING AN AUTOMATIC-TRIP, 63.5 KG SAFETY HAMMER. ALL SPT "N" VALUES ARE "FIELD", I.E. UNCORRECTED FOR DEPTH.
8. GROUNDWATER WAS ENCOUNTERED AT THE TIME OF EXPLORATIONS; GROUNDWATER LEVELS CAN BE EXPECTED TO FLUCTUATE IN RESPONSE TO RAINFALL VARIATIONS, PARTICULARLY IN THE VICINITY OF SITE DRAINAGE FEATURES.
9. DEPENDING ON THE SOIL MOISTURE AT THE TIME OF CONSTRUCTION, THE SOIL ENCOUNTERED MAY BE UNSTABLE OR POTENTIALLY UNSTABLE. THE PROBABILITY OF UNSTABLE CONDITIONS IS HIGHEST WHEN THE SOIL MOISTURE IS GREATEST.
10. REFUSAL WITH THE STANDARD PENETROMETER IS DEFINED AS ONE OF THE FOLLOWING:
    A. 10 BLOWS FOR NO APPARENT ADVANCEMENT OF THE SAMPLER; OR
    B. 50 BLOWS FOR LESS THAN 152mm (6") ADVANCEMENT OF THE SAMPLER; OR
    C. 100 BLOWS FOR 152mm (6") TO 457mm (18") ADVANCEMENT OF THE SAMPLER.
11. ATTEMPT WITH THE STANDARD PENETROMETER IS DEFINED AS REFUSAL WITHIN THE FIRST 152mm (6") OF SEATING PENETRATION.
12. SEE SHEET C-100 FOR LOCATION OF EXPLORATIONS.
13. SEE SHEET B-703 FOR STANDARD PENETROMETER DESCRIPTIVE DATA.

GRAPHIC SCALE
SCALE 1 : 25 — 0, 0.5, 1, 1.5, 2, 2.5 METERS

AS BUILT

US Army Corps of Engineers
Sacramento District

Symbol	Description	Date	Approved
△	AS BUILT	5/7/07	TS

Designed by: J. SCIANDRONE	Date:	Rev.
Dwn by: K. PHAN	Ckd by: R. IWASA	Design file no: X-XX-XXX
Reviewed by:		SPEC. No.: XXXX
Submitted by: /S/ ED. KETCHUM CHIEF, SOIL DES. SEC.		File name: Plot date: 1 MAY 2007 Plot scale: 1:1

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SACRAMENTO DISTRICT
IN-HOUSE DESIGN
1325 'J' STREET
SACRAMENTO, CA 95814-2922

SACRAMENTO COUNTY CALIFORNIA
AMERICAN RIVER COMMON FEATURES
(REMAINING SITES) WRDA 1996
CONTRACT 1
SITE - R4
LOG OF EXPLORATION
2F-03-16

Sheet reference number:
B-702
Sheet 7 of 21

Reference: Exploration Log File No.: XXX-01-XXX
Soil Design Section Sheet No.: X OF X

MASTER DESIGN FILE:
PLOT DATE: 1 MAY 2007
PLOT TIME:

2F-97-13

SITE R4

DEPTH	Soil	N	GR	SA	FI	LL	PI	MC	Description
EL. 13.65m (44.8')= 0	CL								At surface, asphaltic concrete about 51mm (2") thick; aggregate base about 51mm (2") thick
		22	-	-	-	-	-	-	SANDY LEAN CLAY, CL: Very stiff; moist; brown; medium plasticity fines; fine to medium, mostly fine sand; gravel maximum particle size 19mm (3/4")
		15							At 1.1m (3.5'), as above except stiff
(5.0') 1.5m		10	5	37	58	-	NP	-	
(6.5') 2.0m			-	-	-	-	-	-	
(7.0') 2.1m	ML	13	-	-	-	-	-	-	SANDY SILT, ML: Firm; moist; dark grayish-brown; about 65% low plasticity fines; about 35% fine to medium sand
(9.0') 2.7m	SM		-	-	-	-	-	-	At 2.7m (9.0'), no penetration with sampler; no recovery; speculate pipe present
(11.0') 3.4m		21	-	-	-	-	-	-	SILTY SAND, SM: Very firm; moist; very dark grayish-brown; about 55% fine to medium sand; about 45% low plasticity fines
(13.0') 4.0m	ML	27	-	-	-	-	-	-	SANDY SILT, ML: Very firm; moist; dark grayish-brown; about 70% low plasticity fines; about 30% fine to medium sand
(15.0') 4.6m		27	0	38	62	-	NP	-	SANDY SILT, ML: Very firm; moist; brown; nonplastic fines; fine to medium, mostly fine sand; easy drilling
(16.5') 5.0m			-	-	-	-	-	-	
(17.0') 5.2m		23	-	-	-	-	-	-	SILT WITH SAND, ML: Very firm; moist; dark brown; about 80% low plasticity fines; about 20% fine sand
(20.5') 6.2m		23	-	-	-	-	-	-	SANDY SILT, ML: Very firm; moist; brown; about 70% low plasticity fines; about 30% fine sand
		10							At 7.3m (24.0'), as above except dark brown At 7.5m (24.5'), as above except loose
(27.5') 8.4m	SM	13	0	85	15	-	NP	-	SILTY SAND, SM: Firm; moist; brown; fine to medium, mostly fine sand; nonplastic fines; no reaction with HCl
(29.0') 8.8m			-	-	-	-	-	-	
(31.0') 9.4m	SP-SM	11							POORLY GRADED SAND WITH SILT, SP-SM: Firm; moist; olive-brown; about 90% fine to medium sand; about 10% nonplastic fines
		27	-	-	-	-	-	-	From 10.4m (34.0') to 10.5m (34.5'), no recovery; catcher was not installed At 10.5m (34.5'), as above except firm
(40.0') 12.2m									

(Continued in Next Column)

2F-97-13

(Continued from Previous Column)

DEPTH	Soil	N	GR	SA	FI	LL	PI	MC	Description
(40.0') 12.2m	SM	8	-	-	-	-	-	-	SILTY SAND, SM: Loose; moist; brown; about 75% fine to medium sand; about 25% low plasticity fines
(41.5') 12.6m		9	-	-	-	-	-	-	SILTY SAND, SM: Loose; moist; brown; about 85% fine to medium sand; about 15% low plasticity fines
(45.0') 13.7m	SP-SM	2	5	85	10	-	NP	-	POORLY GRADED SAND WITH SILT, SP-SM: Very loose; moist; dark grayish-brown; fine to medium, mostly fine sand; nonplastic fines; subrounded gravel maximum particle size 38mm (1-1/2"); rough drilling
(46.5') 14.2m			-	-	-	-	-	-	
(48.5') 14.8m	GC	38	-	-	-	-	-	-	CLAYEY GRAVEL WITH SAND, GC: Dense; moist; dark brown; about 40% fine to coarse, subangular to subrounded gravel maximum particle size 32mm (1-1/4"); about 35% fine to coarse, subangular to subrounded sand; about 25% low to medium plasticity fines; moderate drilling At 15.8m (52.0'), water level
(52.0') 15.8m (water level)		30*	31	30	39	26	8	8	From 15.8m (52.0') to bottom of hole, samples were obtained with a 64mm (2-1/2") I.D. sampler
(53.5') 16.3m			-	-	-	-	-	-	CLAYEY GRAVEL WITH SAND, GC: Very firm; moist; fine to coarse, subangular to subrounded gravel maximum particle size 38mm (1-1/2"); fine to coarse, mostly fine, subangular to subrounded sand; low plasticity fines
(55.5') 16.9m		100*	-	-	-	-	-	-	CLAYEY GRAVEL WITH SAND, GC: Very dense; wet; dark brown; about 40% subrounded gravel maximum particle size 51mm (2"); about 30% fine sand; about 30% low plasticity fines; slow drilling
(59.0') 18.0m	GRAVEL AND COBBLES	60*	28	32	40	-	NP	-	GRAVEL AND COBBLES with a matrix of SILTY SAND WITH GRAVEL, SM: Dense; wet; dark brown; nonplastic fines; fine to coarse sand; coarse, subrounded gravel maximum particle size 38mm (1-1/2"); slow drilling
(60.5') 18.4m			-	-	-	-	-	-	At 18.6m (61.0'), as above except easier drilling; gravel and cobbles present
(62.5') 19.1m		110*	38	49	13	-	NP	-	GRAVEL AND COBBLES with a matrix of SILTY SAND, SM: Very dense; wet; dark brown; fine to coarse, mostly fine to medium sand; gravel maximum particle size 76mm (3"); nonplastic fines; refusal on rock particle; gravels are fragments from larger rock material
(64.0') 19.5m			-	-	-	-	-	-	At 64.5', as above except easy drilling
(66.0') 20.1m		50*	-	-	-	-	-	-	At 20.1m (66.0'), refusal on rock particle; no recovery At 20.6m (67.5'), as above except hard drilling; difficulty with extracting sample rod
(68.5') 20.9m	SP-SM	78*	1	88	11	-	NP	-	POORLY GRADED SAND WITH SILT, SP-SM: Dense; dark brown to black; fine to coarse, mostly fine to medium sand; nonplastic fines; gravel maximum particle size 19mm (3/4")
(70.0') 21.3m	B.O.H.								

STANDARD PENETROMETER DESCRIPTIVE DATA

COHESIONLESS		COHESIVE	
BLOWS*	RELATIVE DENSITY	BLOWS*	CONSISTENCY
0-4	VERY LOOSE	0-1	VERY SOFT
5-10	LOOSE	2-4	SOFT
11-20	FIRM	5-8	FIRM
21-30	VERY FIRM	9-15	STIFF
31-50	DENSE	16-30	VERY STIFF
51+	VERY DENSE	31+	HARD

*BLOWS PER 0.3m OF PENETRATION OF A 51mm O.D. AND 35mm I.D. SAMPLER DRIVEN BY A 63.5kg HAMMER, WITH A 0.76m FREEFALL.

LEGEND:

GR	GRAVEL, PERCENT BY WEIGHT PASSING THE 76mm (3-INCH) SIEVE AND RETAINED ON THE NO. 4 SIEVE.
SA	SAND, PERCENT BY WEIGHT PASSING THE NO. 4 SIEVE AND RETAINED ON THE NO. 200 SIEVE.
FI	FINES, PERCENT BY WEIGHT PASSING THE NO. 200 SIEVE.
LL	LIQUID LIMIT.
PI	PLASTICITY INDEX (LIQUID LIMIT MINUS PLASTIC LIMIT).
MC	LABORATORY DETERMINED MOISTURE CONTENT IN PERCENT OF DRY WEIGHT.
SM	COMBINED FIELD VISUAL IDENTIFICATION AND/OR LABORATORY CLASSIFICATION.
NP	NONPLASTIC.
N	NUMBER OF BLOWS WITH THE STANDARD PENETROMETER.
N*	NUMBER OF BLOWS WITH SAMPLERS LARGER THAN THE STANDARD PENETROMETER.
R	REFUSAL WITH THE STANDARD PENETROMETER (SEE NOTE 10).
A	ATTEMPT WITH THE STANDARD PENETROMETER (SEE NOTE 11).
(water level symbol)	WATER LEVEL.
B.O.H.	BOTTOM OF HOLE.
COBBLES AND GRAVEL	COBBLES WITH MATRIX MATERIAL (GRAVEL, SAND AND FINES); MATRIX MATERIAL IS CLASSIFIED IN ACCORDANCE WITH ASTM STANDARDS.

NOTES:

1. THIS DRAWING IS TO BE USED ONLY FOR APPROXIMATE DESCRIPTIONS OF SUBSURFACE CONDITIONS.
2. SOIL CLASSIFICATIONS AND DESCRIPTIONS ARE BASED ON FIELD LOG DESCRIPTIONS IN ACCORDANCE WITH ASTM D 2488 (DESCRIPTION AND IDENTIFICATION OF SOILS, VISUAL-MANUAL PROCEDURE) AND/OR LABORATORY TEST RESULTS IN ACCORDANCE WITH ASTM D 2487 (CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES).
3. ALL COLORS SHOWN ARE IN ACCORDANCE WITH THE MUNSELL SOIL COLOR CHART.
4. ALL SIEVE SIZES SHOWN ARE METRIC WITH U.S. STANDARD IN PARENTHESES.
5. BORING 2F-97-13 WAS DRILLED WITH A CME 75 DRILL RIG USING A 203mm (8") HOLLOW STEM AUGER BETWEEN 8 AND 11 AUGUST 1997.
6. WHERE COBBLES WERE ENCOUNTERED, LABORATORY GRADATION DATA REPRESENT MATERIAL PASSING THE 76mm (3") SIEVE. RECOVERY OF PARTICLES LARGER THAN THE INSIDE DIAMETER OF THE SAMPLER WERE NOT RECOVERED; HENCE, ALL GRAVEL AND COBBLE LAYERS REFERENCED IN SOIL BORINGS CONTAINED LARGER PARTICLES OF GRAVEL AND COBBLES THAT ARE NOT REFLECTED IN THE LABORATORY GRADATION TEST RESULTS SHOWN IN THE LOGS OF EXPLORATIONS.
7. UNLESS OTHERWISE NOTED, STANDARD PENETROMETER DATA WERE OBTAINED IN ACCORDANCE WITH ASTM D 1586 USING A STANDARD 457mm (18") LONG BY 51mm (2") O.D. BY 38mm (1-1/2") I.D. SAMPLER. A 64mm (2-1/2") O.D. BY 51mm (2") I.D. SAMPLER OR A 76mm (3") O.D. BY 64mm (2-1/2") I.D. SAMPLER WAS USED IN SOME CASES WHERE COARSE GRAINED MATERIAL WAS ENCOUNTERED. CHANGES IN SAMPLERS ARE DESIGNATED WITH AN ASTERISK (*) AND ARE STATED WITHIN THE DESCRIPTION. THE SPLIT-BARREL PENETROMETER WAS DRIVEN USING AN AUTOMATIC-TRIP, 63.5KG (140-LB.) SAFETY HAMMER. THE FIELD SPT "N" VALUES HAVE NOT BEEN CORRECTED FOR SPOON SIZE OR DEPTH.
8. GROUNDWATER WAS ENCOUNTERED AT THE TIME OF EXPLORATIONS; GROUNDWATER LEVELS CAN BE EXPECTED TO FLUCTUATE IN RESPONSE TO RAINFALL VARIATIONS, PARTICULARLY IN THE VICINITY OF SITE DRAINAGE FEATURES.
9. DEPENDING ON THE SOIL MOISTURE AT THE TIME OF CONSTRUCTION, THE SOIL ENCOUNTERED MAY BE UNSTABLE OR POTENTIALLY UNSTABLE. THE PROBABILITY OF UNSTABLE CONDITIONS IS HIGHEST WHEN THE SOIL MOISTURE IS GREATEST.
10. REFUSAL WITH THE STANDARD PENETROMETER IS DEFINED AS ONE OF THE FOLLOWING:
    A. 10 BLOWS FOR NO APPARENT ADVANCEMENT OF THE SAMPLER; OR
    B. 50 BLOWS FOR LESS THAN 152mm (6") ADVANCEMENT OF THE SAMPLER; OR
    C. 100 BLOWS FOR 152mm (6") TO 457mm (18") ADVANCEMENT OF THE SAMPLER.
11. ATTEMPT WITH THE STANDARD PENETROMETER IS DEFINED AS REFUSAL WITHIN THE FIRST 152mm (6") OF SEATING PENETRATION.
12. SEE SHEET C-100 FOR LOCATION OF EXPLORATIONS.

GRAPHIC SCALE

SCALE 1 : 25 — 0, 0.5, 1, 1.5, 2, 2.5 METERS

AS BUILT

US Army Corps of Engineers
Sacramento District

Symbol	Description	Date	Approved
AS BUILT			

Designed by: J. SCIANDRONE
Dwn by: K. PHAN
Ckd by: R. IWASA
Reviewed by:
Submitted by: /S/ ED. KETCHUM, CHIEF, SOIL DES. SEC.
Date:
Rev.
Design file no: X-XX-XXX
SPEC. No.: XXXX
File name:
Plot date: 1 MAY 2007
Plot scale: 1:1

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SACRAMENTO DISTRICT
IN-HOUSE DESIGN
1325 'J' STREET
SACRAMENTO, CA 95814-2922

SACRAMENTO COUNTY CALIFORNIA
AMERICAN RIVER COMMON FEATURES
(REMAINING SITES) WRDA 1996
CONTRACT 1
SITE - R4
LOG OF EXPLORATION
2F-97-13

Sheet reference number:
B-703

MASTER DESIGN FILE:
PLOT DATE: 1 MAY 2007
PLOT TIME:

2F-03-20

SITE R4

Boring drilled on waterside of levee

EL. 10.92m (35.8')± 0

DEPTH	Class	N	GR	SA	FI	LL	PI	MC	Description
0	ML		-	-	-	-	-	-	
		7	0	35	65	-	-	-	SANDY SILT, ML: Firm; moist; brown; fine sand
		14							At 1.8m (6.0') becomes firm
		16							At 2.6m (8.5') grades to dark brown
			-	-	-	-	-	-	
		16							At 4.0m (13.0') grades to light reddish-brown
		9							At 4.7m (15.5') grades to brown; fine to medium grained
(18.0') 5.5m	SM	11	0	85	15	-	-	-	SILTY SAND, SM: Firm; moist; gray-brown to red-brown; fine to (predominantly) medium grained sand
		7							At (21.5') 6.5m grades to loose; brown
		4	-	-	-	-	-	-	From 7.5m (24.5') grades moist to wet
		6							
(30.0') 9.1m	SP-SM	9	7	85	8	-	-	-	POORLY GRADED SAND WITH SILT, SP-SM: Loose; moist; brown; fine to medium grained sand
▽ (31.0') 9.4m									At 9.1m (30.0') Wet; trace of coarse sand
(33.0') 10.1m	GRAVEL AND COBBLES	R							
		R							At 11.3m (37.0') changed drill rigs to ODEX
(39') 11.9m									

(CONTINUED IN THE NEXT COLUMN)

2F-03-20

(CONTINUED FROM PREVIOUS COLUMN)

DEPTH	Class	N	GR	SA	FI	LL	PI	MC	Description
(39') 11.9m	GRAVEL AND COBBLES		-	-	-	-	-	-	
(47.0') 14.3m	ML		-	-	-	-	-	-	CLAYEY SILT, ML: Very stiff; moist; tan At 14.6m (48.0') changed drill rigs to Mobile
(50.0') 15.2m	SM	34							SILTY SAND, SM: Dense; wet; brown; fine to medium grained sand; abundant mica
			-	-	-	-	-	-	
		27							At 16.1m (53.0') grades to very firm
(56.0') 17.1m	SP-SM	37	0	92	8	-	-	-	POORLY GRADED SAND WITH SILT, SP-SM: Dense; wet; gray; fine to medium grained sand; abundant mica; decreased silt content
(59.5') 18.1m	ML	51	-	-	-	-	-	-	SANDY SILT, ML: Very dense; moist; brown; fine grained sand
(62.0') 18.9m	SM	14							SILTY SAND, SM: Firm; wet; gray-brown; fine to medium grained sand
(63.5') 19.3m	ML								SANDY SILT, ML: Firm; moist; red-brown; fine grained sand
		20	0	16	84	42	8	-	At 20.3m (66.5') grades to mottled light gray with orange
		56							At 20.7m (68.0') very dense; grades to brown
		21							At 21.8m (71.5') firm
		45							At 23.0m (75.5') Dense; grades to mottled gray; weak cementation
(77.0') 23.5m									

(CONTINUED IN THE NEXT COLUMN)

2F-03-20

(CONTINUED FROM PREVIOUS COLUMN)

DEPTH	Class	N	GR	SA	FI	LL	PI	MC	Description
(77.0') 23.5m	SM	63							SILTY SAND, SM: Very dense; wet; gray-brown; fine grained sand
			-	-	-	-	-	-	
		76							At 24.5m (80.5') grades from fine to medium grained sand; weak cementation; trace of clay
(83.2') 25.4m	ML	57							SILT WITH SAND, ML: Very dense; moist; gray with mottled orange; fine grained sand
		R	-	-	-	-	-	-	
		68							
(90.4') 27.5m	SM		-	-	-	-	-	-	SILTY SAND, SM: Very dense; wet; gray; fine to medium grained sand
(91.0') 27.7m	B.O.H.								Boring drilled 25-26 Feb. 03

LEGEND:

GR	GRAVEL, PERCENT BY WEIGHT PASSING THE 76mm (3-INCH) SIEVE AND RETAINED ON THE NO. 4 SIEVE.
SA	SAND, PERCENT BY WEIGHT PASSING THE NO. 4 SIEVE AND RETAINED ON THE NO. 200 SIEVE.
FI	FINES, PERCENT BY WEIGHT PASSING THE NO. 200 SIEVE.
LL	LIQUID LIMIT.
PI	PLASTICITY INDEX (LIQUID LIMIT MINUS PLASTIC LIMIT).
MC	LABORATORY DETERMINED MOISTURE CONTENT IN PERCENT OF DRY WEIGHT.
SM	COMBINED FIELD VISUAL IDENTIFICATION AND/OR LABORATORY CLASSIFICATION.
NP	NONPLASTIC.
N	NUMBER OF BLOWS WITH THE STANDARD PENETROMETER.
R	REFUSAL WITH THE STANDARD PENETROMETER (SEE NOTE 9).
A	ATTEMPT WITH THE STANDARD PENETROMETER (SEE NOTE 10).
▽	WATER LEVEL.
B.O.H.	BOTTOM OF HOLE.

NOTES:

1. THIS DRAWING IS TO BE USED ONLY FOR APPROXIMATE DESCRIPTIONS OF SUBSURFACE CONDITIONS.
2. SOIL CLASSIFICATIONS AND DESCRIPTIONS ARE BASED ON FIELD LOG DESCRIPTIONS IN ACCORDANCE WITH ASTM D 2488 (DESCRIPTION AND IDENTIFICATION OF SOILS, VISUAL-MANUAL PROCEDURE) AND/OR LABORATORY TEST RESULTS IN ACCORDANCE WITH ASTM D 2487 (CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES).
3. ALL COLORS SHOWN ARE IN ACCORDANCE WITH THE MUNSELL SOIL COLOR CHART.
4. ALL SIEVE SIZES SHOWN ARE METRIC WITH U.S. STANDARD IN PARENTHESES.
5. BORING 2F-03-20 WAS DRILLED WITH A MOBILE B-61 DRILL RIG USING A 203mm (8") HOLLOW STEM AUGER BETWEEN 25 AND 26 FEBRUARY 2003.
6. STANDARD PENETROMETER DATA WERE OBTAINED IN ACCORDANCE WITH ASTM D 1586 UTILIZING A 610mm LONG STANDARD 51mm O.D. BY 35mm I.D. SPLIT BARREL SAMPLER. THE SPLIT-BARREL PENETROMETER WAS DRIVEN USING AN AUTOMATIC-TRIP, 63.5 KG SAFETY HAMMER. ALL SPT "N" VALUES ARE "FIELD", I.E. UNCORRECTED FOR DEPTH.
7. GROUNDWATER WAS ENCOUNTERED AT THE TIME OF EXPLORATIONS; GROUNDWATER LEVELS CAN BE EXPECTED TO FLUCTUATE IN RESPONSE TO RAINFALL VARIATIONS, PARTICULARLY IN THE VICINITY OF SITE DRAINAGE FEATURES.
8. DEPENDING ON THE SOIL MOISTURE AT THE TIME OF CONSTRUCTION, THE SOIL ENCOUNTERED MAY BE UNSTABLE OR POTENTIALLY UNSTABLE. THE PROBABILITY OF UNSTABLE CONDITIONS IS HIGHEST WHEN THE SOIL MOISTURE IS GREATEST.
9. REFUSAL WITH THE STANDARD PENETROMETER IS DEFINED AS ONE OF THE FOLLOWING:
   A. 10 BLOWS FOR NO APPARENT ADVANCEMENT OF THE SAMPLER; OR
   B. 50 BLOWS FOR LESS THAN 152mm (6") ADVANCEMENT OF THE SAMPLER; OR
   C. 100 BLOWS FOR 152mm (6") TO 457mm (18") ADVANCEMENT OF THE SAMPLER.
10. ATTEMPT WITH THE STANDARD PENETROMETER IS DEFINED AS REFUSAL WITHIN THE FIRST 152mm (6") OF SEATING PENETRATION.
11. SEE SHEET C-100 FOR LOCATION OF EXPLORATIONS.
12. SEE SHEET B-703 FOR STANDARD PENETROMETER DESCRIPTIVE DATA.

GRAPHIC SCALE

SCALE 1 : 25 — 0, 0.5, 1, 1.5, 2, 2.5 METERS

AS BUILT

US Army Corps of Engineers Sacramento District

Symbol	Description	Date	Approved
△	AS BUILT		

Designed by: J. SCIANDRONE		Date:	Rev.
Dwn by: K. PHAN	Ckd by: R. IWASA	Design file no: X-XX-XXX	
Reviewed by:		SPEC. No.: XXXX	
Submitted by: /S/ ED. KETCHUM CHIEF, SOIL DES. SEC.		File name: Plot date: 1 MAY 2007 Plot scale: 1:1	

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SACRAMENTO DISTRICT
IN-HOUSE DESIGN
1325 'J' STREET
SACRAMENTO, CA 95814-2922

SACRAMENTO COUNTY CALIFORNIA
AMERICAN RIVER COMMON FEATURES
(REMAINING SITES) WRDA 1996
CONTRACT 1
SITE - R4

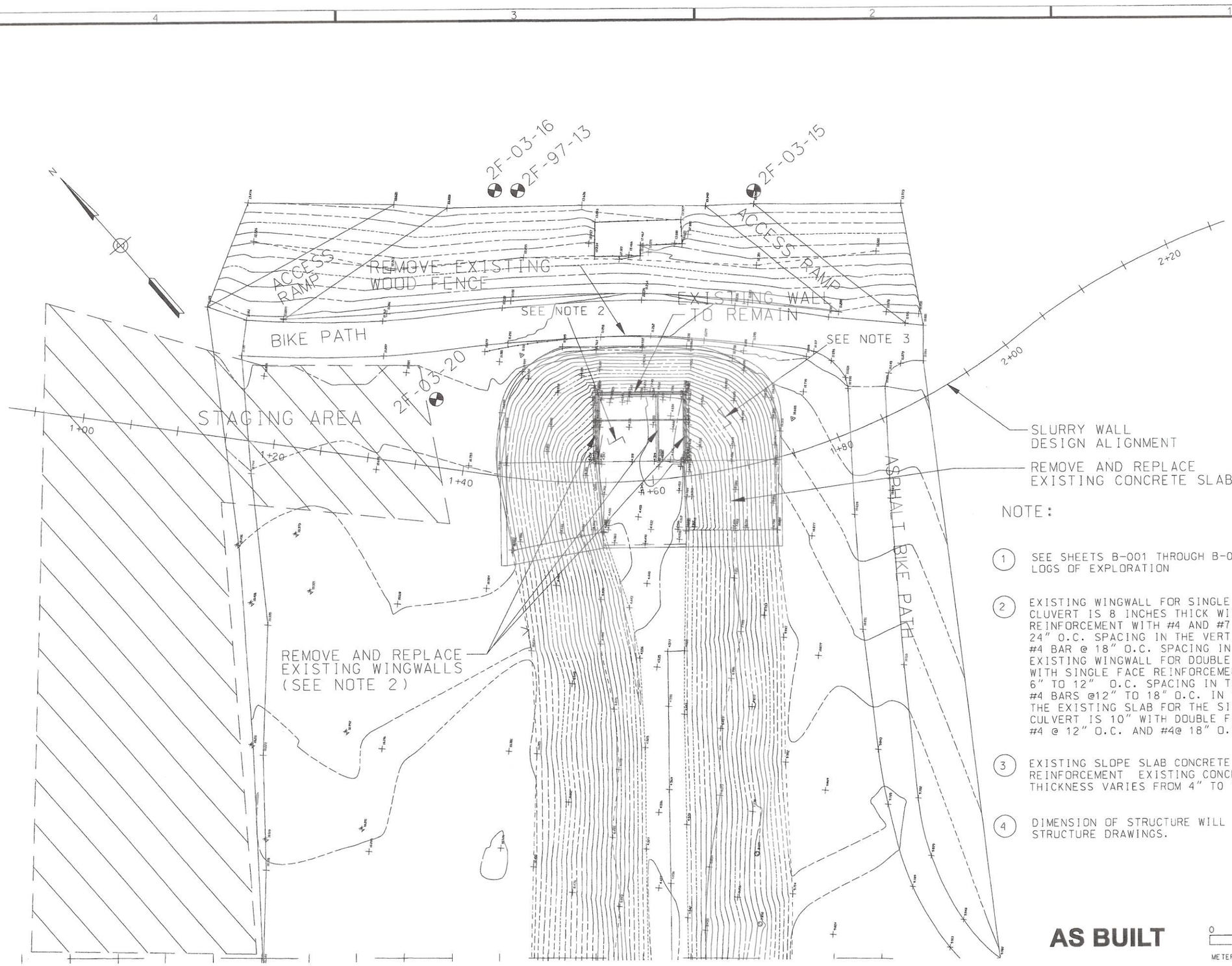
LOG OF EXPLORATION 2F-03-20

Sheet reference number: B-704

Sheet 9 of 21

MASTER DESIGN FILE: PLOT DATE: 1 MAY 2007 PLOT TIME:

Exploration Log File No.: XXX-01-XXX Soil Design Section Sheet No.: X OF X



NOTE:

1. SEE SHEETS B-001 THROUGH B-004 FOR LOGS OF EXPLORATION
2. EXISTING WINGWALL FOR SINGLE CELL CLUVERT IS 8 INCHES THICK WITH DOUBLE FACE REINFORCEMENT WITH #4 AND #7 BARS @ 12" AND 24" O.C. SPACING IN THE VERTICAL DIRECTION AND #4 BAR @ 18" O.C. SPACING IN THE HORIZONTAL DIRECTION. EXISTING WINGWALL FOR DOUBLE CELL CLUVERT IS 10" THICK WITH SINGLE FACE REINFORCEMENT #4 AND #6 BARS @ 6" TO 12" O.C. SPACING IN THE VERTICAL DIRECTION AND #4 BARS @12" TO 18" O.C. IN THE HORIZONTAL DIRECTION. THE EXISTING SLAB FOR THE SINGLE CELL AND DOUBLE CELL CULVERT IS 10" WITH DOUBLE FACE REINFORCEMENT WITH #4 @ 12" O.C. AND #4@ 18" O.C.
3. EXISTING SLOPE SLAB CONCRETE IS WITHOUT REINFORCEMENT EXISTING CONCRETE SLOPE THICKNESS VARIES FROM 4" TO 12"
4. DIMENSION OF STRUCTURE WILL BE SHOWN IN STRUCTURE DRAWINGS.

AS BUILT

GRAPHIC SCALE
0 5 10 15 20
METERS

US Army Corps of Engineers
Sacramento District

Symbol	Description	Date	Approved
	AS BUILT	9/21/05	T.S.

Designed by: J. SCIANDRONE
Drawn by: D.MAYO
Spec No.: 1593
Reviewed by: P. HSIA
Submitted by: /S/RICHARD A. TORBIK CHIEF, CIV ENGR DES SEC B
Date: DATE_APPROVED
Design file no: 1-04-514
Drawing Code: 100% REVIEW SUBMITTAL
File name: Plot date: $$$$date$$$$ Plot scale:
Rev:

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

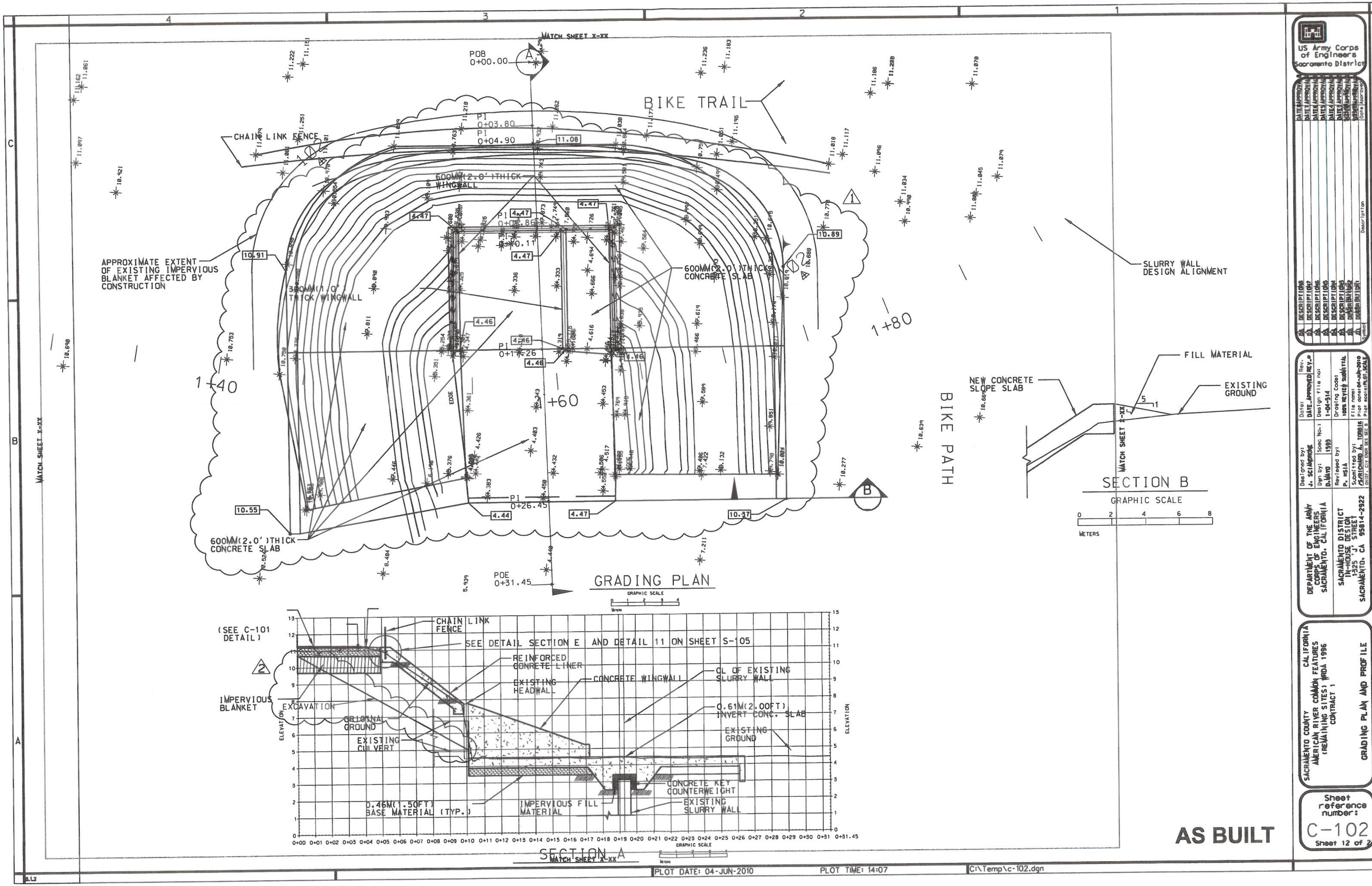
SACRAMENTO DISTRICT
IN-HOUSE DESIGN
1325 J STREET
SACRAMENTO, CA 95814-2922

SACRAMENTO COUNTY CALIFORNIA
AMERICAN RIVER COMMON FEATURES
(REMAINING SITES) WRDA 1996
CONTRACT 1

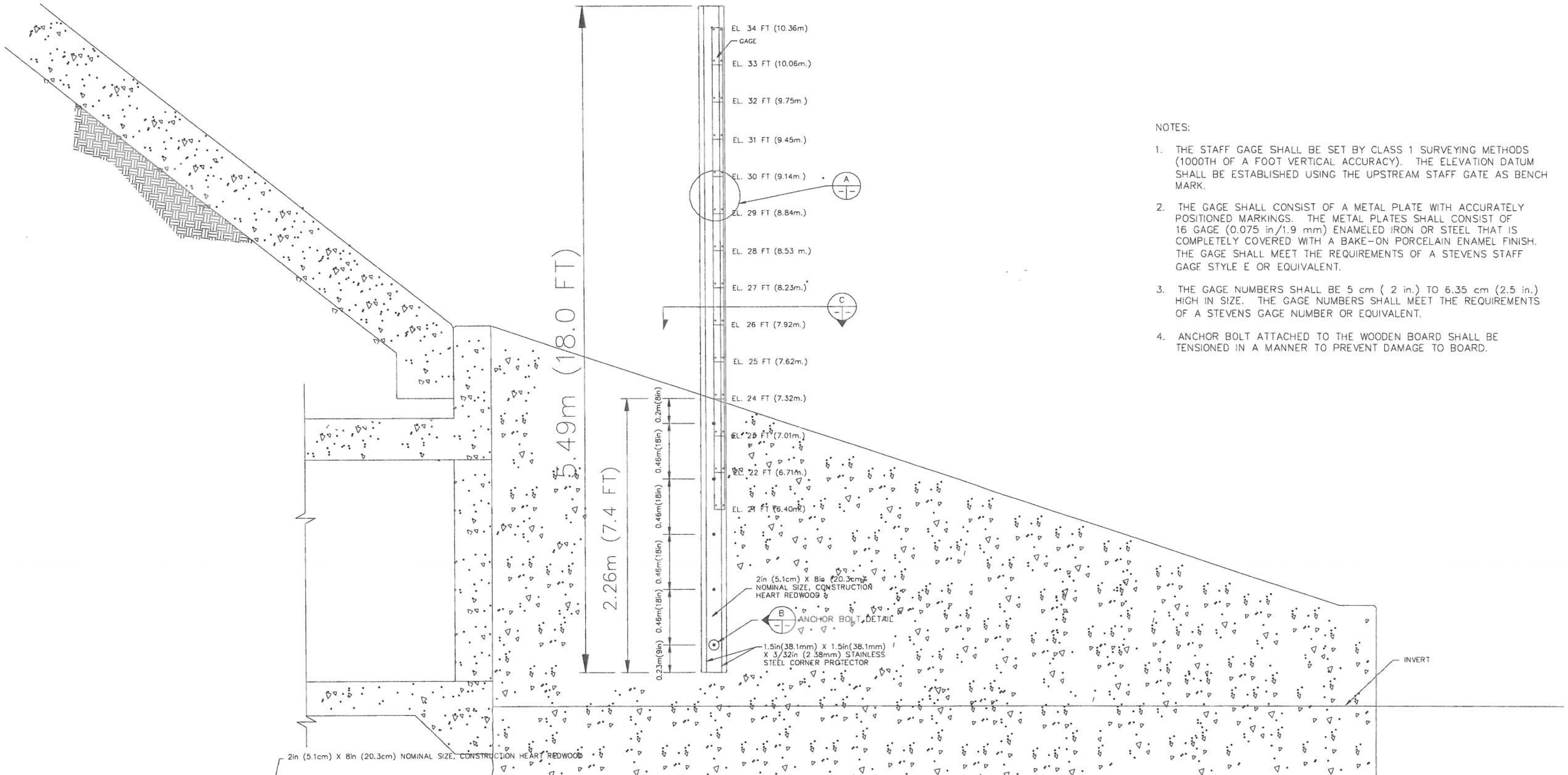
SITE PLAN

Sheet reference number:
C-100
Sheet 10 of 21

B.1.2 | PLOT DATE: $$$$date$$$$ | PLOT TIME: $$$$time$$$$ | DGNSPEC



MATCH SHEET X-XX
POB 0+00.00
BIKE TRAIL
CHAIN LINK FENCE
PI 0+03.80
PI 0+04.90
600MM(2.0')THICK WINGWALL
APPROXIMATE EXTENT OF EXISTING IMPERVIOUS BLANKET AFFECTED BY CONSTRUCTION
300MM(1.0') THICK WINGWALL
600MM(2.0')THICK CONCRETE SLAB
SLURRY WALL DESIGN ALIGNMENT
1+40
1+60
1+80
PI 0+17.26
PI 0+26.45
EDGE
BIKE PATH
600MM(2.0')THICK CONCRETE SLAB
POE 0+31.45
GRADING PLAN
GRAPHIC SCALE
FILL MATERIAL
NEW CONCRETE SLOPE SLAB
EXISTING GROUND
SECTION B
GRAPHIC SCALE
METERS
(SEE C-101 DETAIL)
CHAIN LINK FENCE
SEE DETAIL SECTION E AND DETAIL 11 ON SHEET S-105
REINFORCED CONCRETE LINER
EXISTING HEADWALL
CONCRETE WINGWALL
CL OF EXISTING SLURRY WALL
IMPERVIOUS BLANKET
EXCAVATION
ORIGINAL GROUND
0.61M(2.00FT) INVERT CONC. SLAB
EXISTING GROUND
EXISTING CULVERT
CONCRETE KEY COUNTERWEIGHT
0.46M(1.50FT) BASE MATERIAL (TYP.)
IMPERVIOUS FILL MATERIAL
EXISTING SLURRY WALL
ELEVATION
SECTION A
US Army Corps of Engineers Sacramento District
DEPARTMENT OF THE ARMY CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA
SACRAMENTO DISTRICT IN-HOUSE DESIGN 1325 'J' STREET SACRAMENTO, CA 95814-2922
SACRAMENTO COUNTY CALIFORNIA AMERICAN RIVER COMMON FEATURES (REMAINING SITES) WRDA 1996 CONTRACT 1
GRADING PLAN AND PROFILE
Sheet reference number: C-102
AS BUILT
PLOT DATE: 04-JUN-2010
PLOT TIME: 14:07
C:\Temp\c-102.dgn

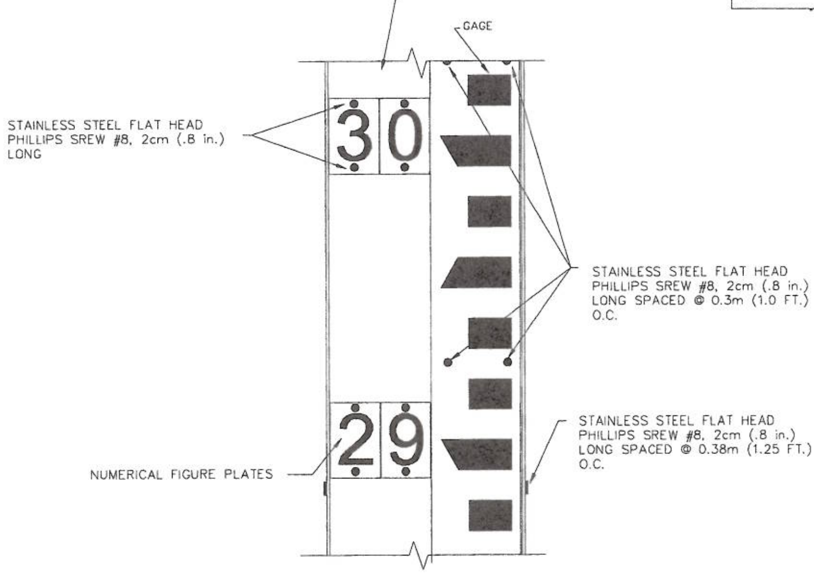


NOTES:

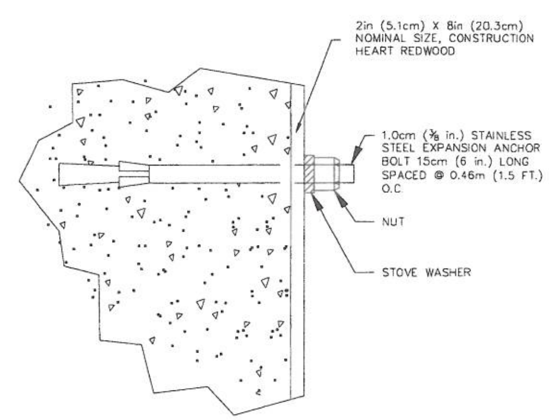
1. THE STAFF GAGE SHALL BE SET BY CLASS 1 SURVEYING METHODS (1000TH OF A FOOT VERTICAL ACCURACY). THE ELEVATION DATUM SHALL BE ESTABLISHED USING THE UPSTREAM STAFF GATE AS BENCH MARK.
2. THE GAGE SHALL CONSIST OF A METAL PLATE WITH ACCURATELY POSITIONED MARKINGS. THE METAL PLATES SHALL CONSIST OF 16 GAGE (0.075 in/1.9 mm) ENAMELED IRON OR STEEL THAT IS COMPLETELY COVERED WITH A BAKE-ON PORCELAIN ENAMEL FINISH. THE GAGE SHALL MEET THE REQUIREMENTS OF A STEVENS STAFF GAGE STYLE E OR EQUIVALENT.
3. THE GAGE NUMBERS SHALL BE 5 cm (2 in.) TO 6.35 cm (2.5 in.) HIGH IN SIZE. THE GAGE NUMBERS SHALL MEET THE REQUIREMENTS OF A STEVENS GAGE NUMBER OR EQUIVALENT.
4. ANCHOR BOLT ATTACHED TO THE WOODEN BOARD SHALL BE TENSIONED IN A MANNER TO PREVENT DAMAGE TO BOARD.

GRAPHIC SCALES

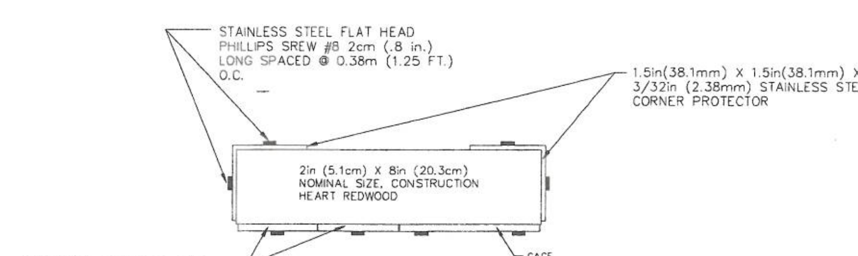
SCALE 1 : 50 — 0, .5, 1, 2 METERS



DETAIL (A) N.T.S



ANCHOR BOLT DETAIL (B) N.T.S



SECTION (C) N.T.S

AS BUILT

US Army Corps of Engineers Sacramento District

Symbol	Description	Date	Approved
	AS BUILT	9/21/09	TS

Designed by: J. SCIANDRONE | Date: DATE_APPROVED | Rev.
Dwn by: B. MIMBN | Spec No.: 1593 | Design file no: 1-04-514
Reviewed by: P. HSIA | Drawing Code: 100% REVIEW SUBMITTAL
Submitted by: /S/RICHARD A. TORBIK CHIEF, CIV ENGR DES SEC B | File name: | Plot date: $$$$date$$$$ | Plot scale:

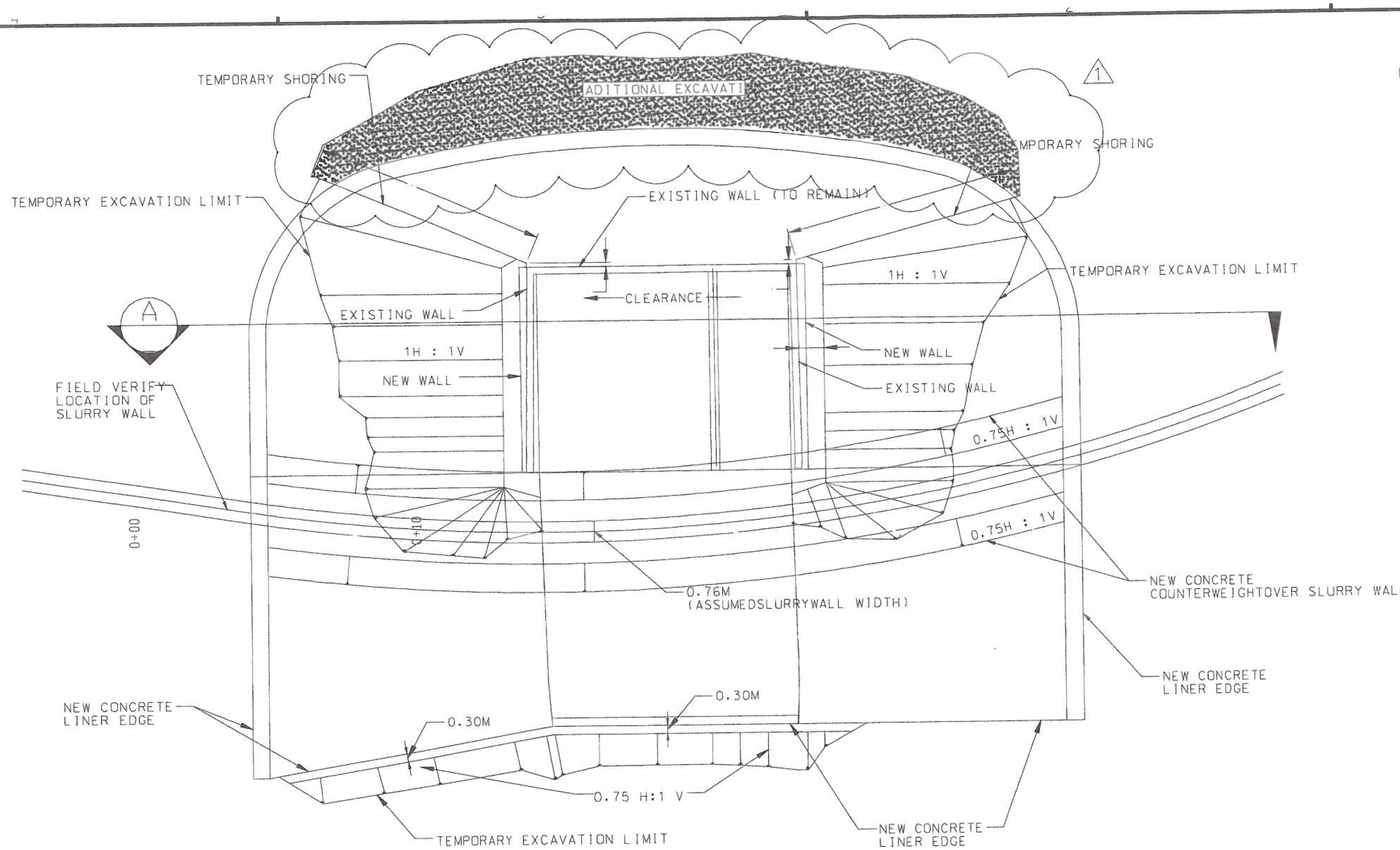
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SACRAMENTO DISTRICT
IN-HOUSE DESIGN
1325 'J' STREET
SACRAMENTO, CA 95814-2922

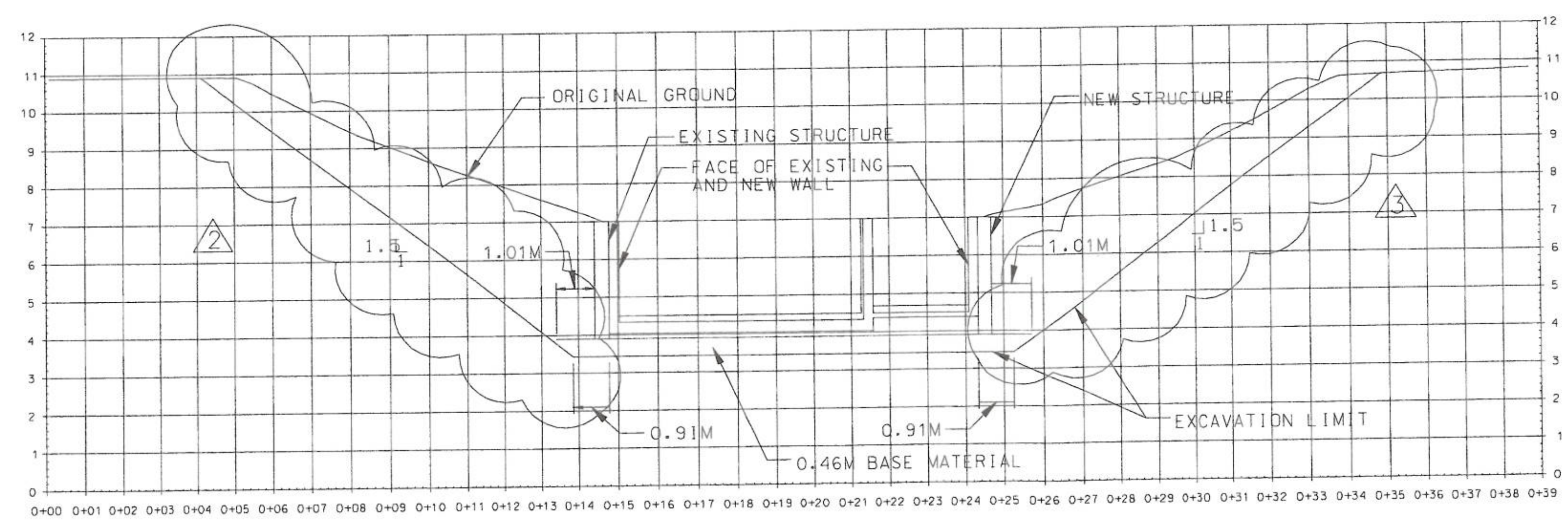
SACRAMENTO COUNTY CALIFORNIA
AMERICAN RIVER COMMON FEATURES
(REMAINING SITES) WRDA 1996
CONTRACT 1

STAFF GAGE

Sheet reference number:
C-103
Sheet 13 of 2



PLAN
SCALE: 1:100



SECTION (A)
SCALE: 1:100

NOTES:

1. PRIOR TO THE START OF THE TEMPORARY EXCAVATION AND TEMPORARY SHORING INSTALLATION THE LOCATION OF EXISTING SLURRY SHALL BE DETERMINED BY POT-HOLING.
2. POTHOLING SHALL BE PERFORMED IN THE PRESENCE OF THE CONTRACTING OFFICER'S REPRESENTATIVE AND CORPS GEOTHECHNICAL ENGINEER FROM THE SOIL DESIGN SECTION.
3. ADJUSTMENTS SHALL BE MADE TO TEMPORARY SHORING AND EXCAVATION LIMITS BASED ON ACTUAL LOCATION OF SLURRY.
4. PRIOR TO EXCAVATION AND SHORING INSTALLATION LOCATION OF UTILITIES SHALL BE IDENTIFIED.
5. REFER TO SPECIFICATION SECTION 35 42 13.00 41 FOR TEMPORARY SHORING REQUIREMENTS.

GRAPHIC SCALE
0 2 4 6 8
METERS

AS BUILT

US Army Corps of Engineers
Sacramento District

Symbol	Description	Date	Approved
△	AS BUILT	9/23/08	TS
△	AS BUILT	9/23/08	TS
△	AS BUILT	9/23/08	TS

Designed by: J. SCIANDRONE
Dwn by: D.MAYO | Spec No.: 1593
Reviewed by: P. HSIA
Submitted by: /S/RICHARD A. TORBIK CHIEF, CIV ENGR DES SEC B
Date: DATE_APPROVED | Rev.
Design file no: 1-04-514
Drawing Code: 100% REVIEW SUBMITTAL
File name: Plot date: $$$$date$$$$ Plot scale:

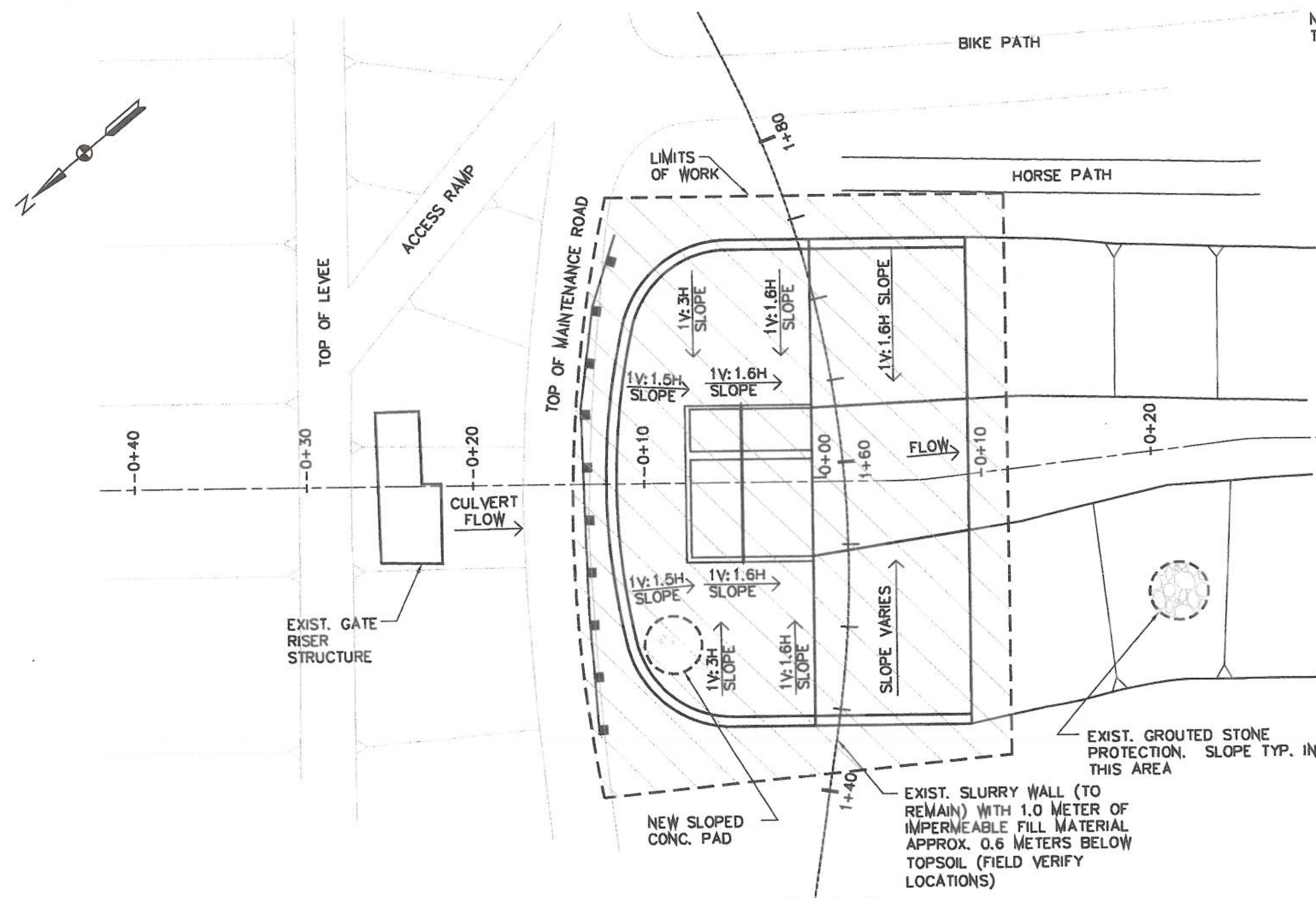
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SACRAMENTO DISTRICT
IN-HOUSE DESIGN
1325 'J' STREET
SACRAMENTO, CA 95814-2922

SACRAMENTO COUNTY CALIFORNIA
AMERICAN RIVER COMMON FEATURES
(REMAINING SITES) WRDA 1996
CONTRACT 1

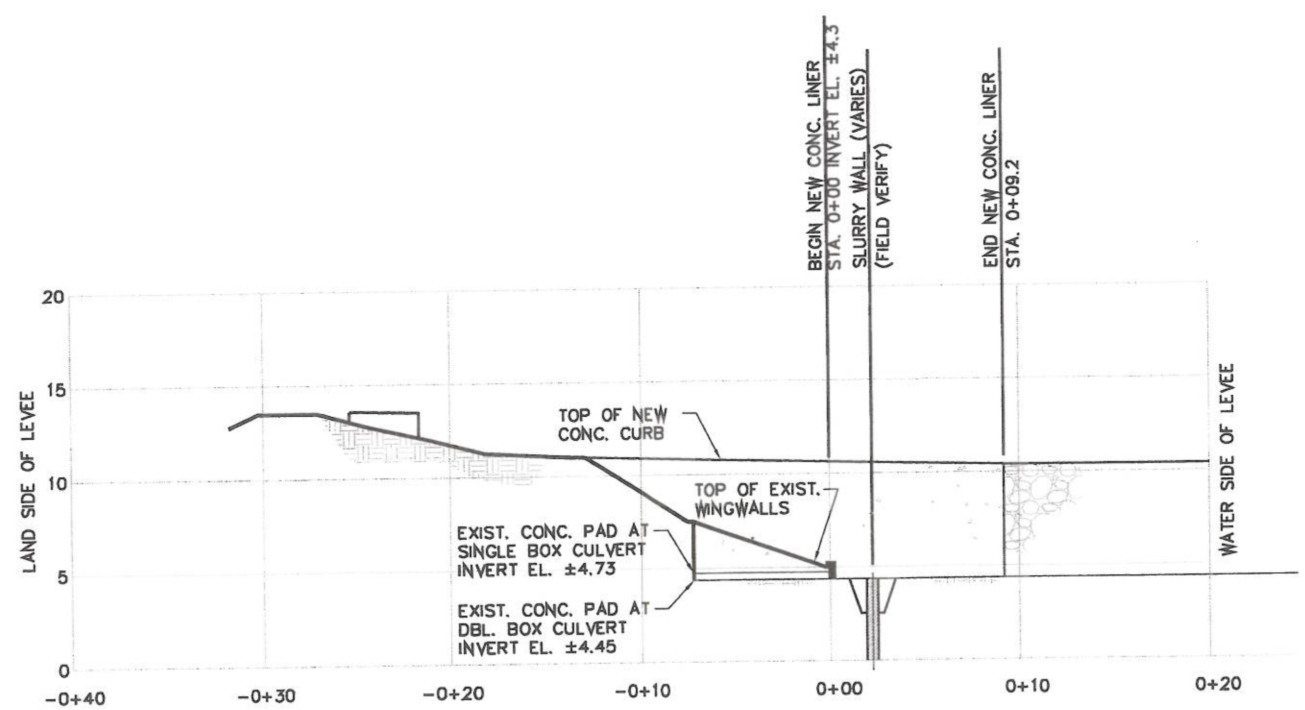
TEMPORARY SHORING AND
EXCAVATION PLAN

Sheet reference number:
C-104
Sheet 14 of 21



NOTE: HATCHED AREA IS THE LIMITS OF WORK

SITE PLAN
SCALE: 1:200



PROFILE
SCALE: 1:200

GRAPHIC SCALE
1:200 0 1 2 4 8 12 16 20 m

AS BUILT

US Army Corps of Engineers Sacramento District

Symbol	Description	Date	Approved
	AS BUILT		

REVISIONS

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

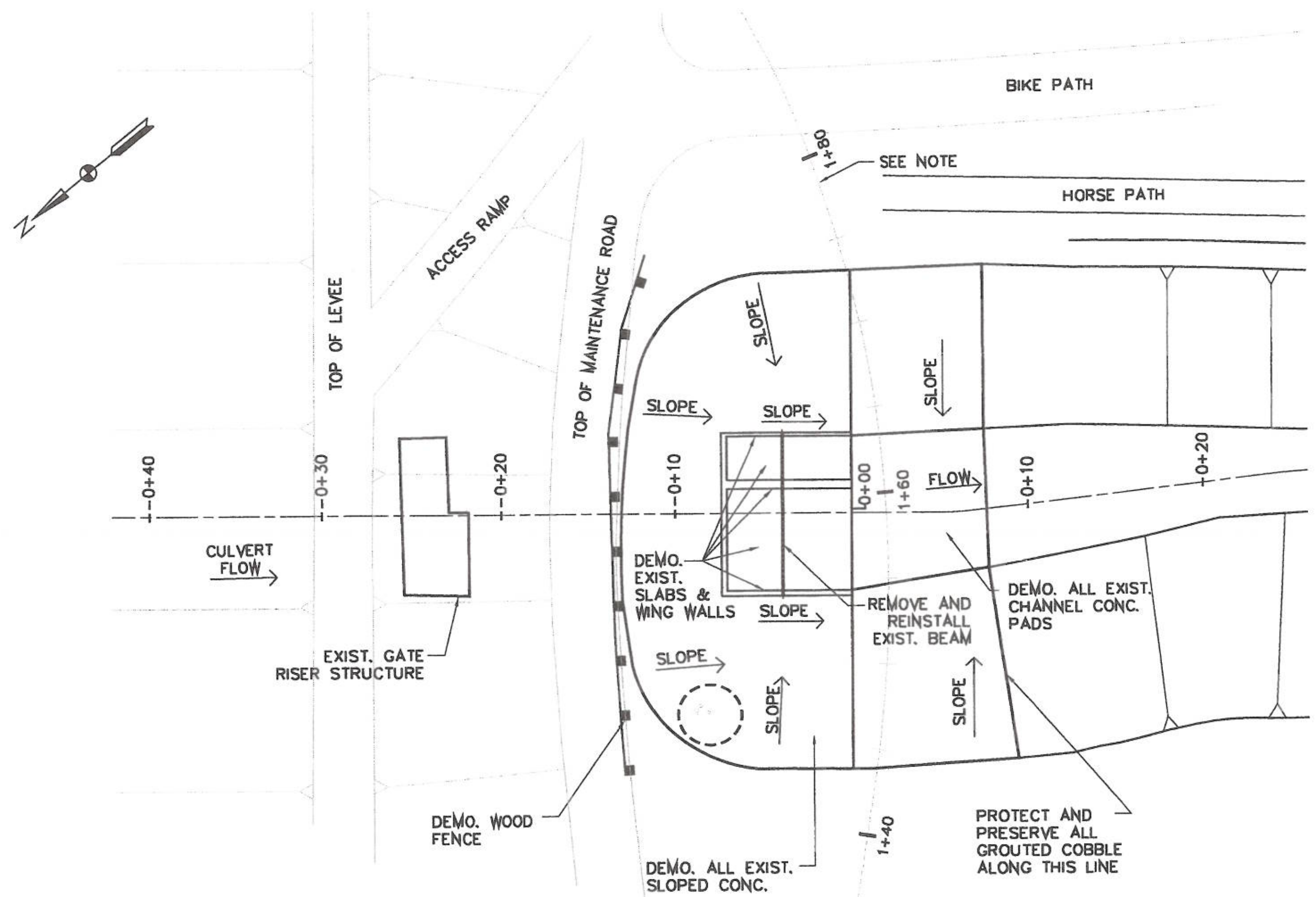
SACRAMENTO DISTRICT
IN-HOUSE DESIGN
1325 'J' STREET
SACRAMENTO, CA 95814-2922

Designed by: JSQ | Date: | Rev.
Dwn by: EDM | Spec No.: 1593 | Design file no:
Reviewed by: | Drawing Code: 90% SUBMISSION
Submitted by: /s/ Larry Crowley | File name: | Plot date: | Drwg scale: AS NOTED

AMERICAN RIVER CALIFORNIA
AMERICAN RIVER COMMON FEATURES
(REMAINING SITES) WRDA 1996
CONTRACT 1

SITE PLAN & PROFILE

Sheet reference number:
S-100
Sheet 15 of 21



DEMOLITION PLAN

SCALE: 1:200

NOTE: NO CONCRETE CAP EXISTS ON THIS SITE

GRAPHIC SCALE

1:200 0 1 2 4 8 12 16 20 m

AS BUILT

US Army Corps of Engineers
Sacramento District

AS BUILT

Designed by: JSQ
Dwn by: EDM
Spec No.: 1593
Reviewed by:
Submitted by: /s/ Larry Crowley
Date:
Design file no:
Drawing Code: 90% SUBMISSION
Drg scale: AS NOTED

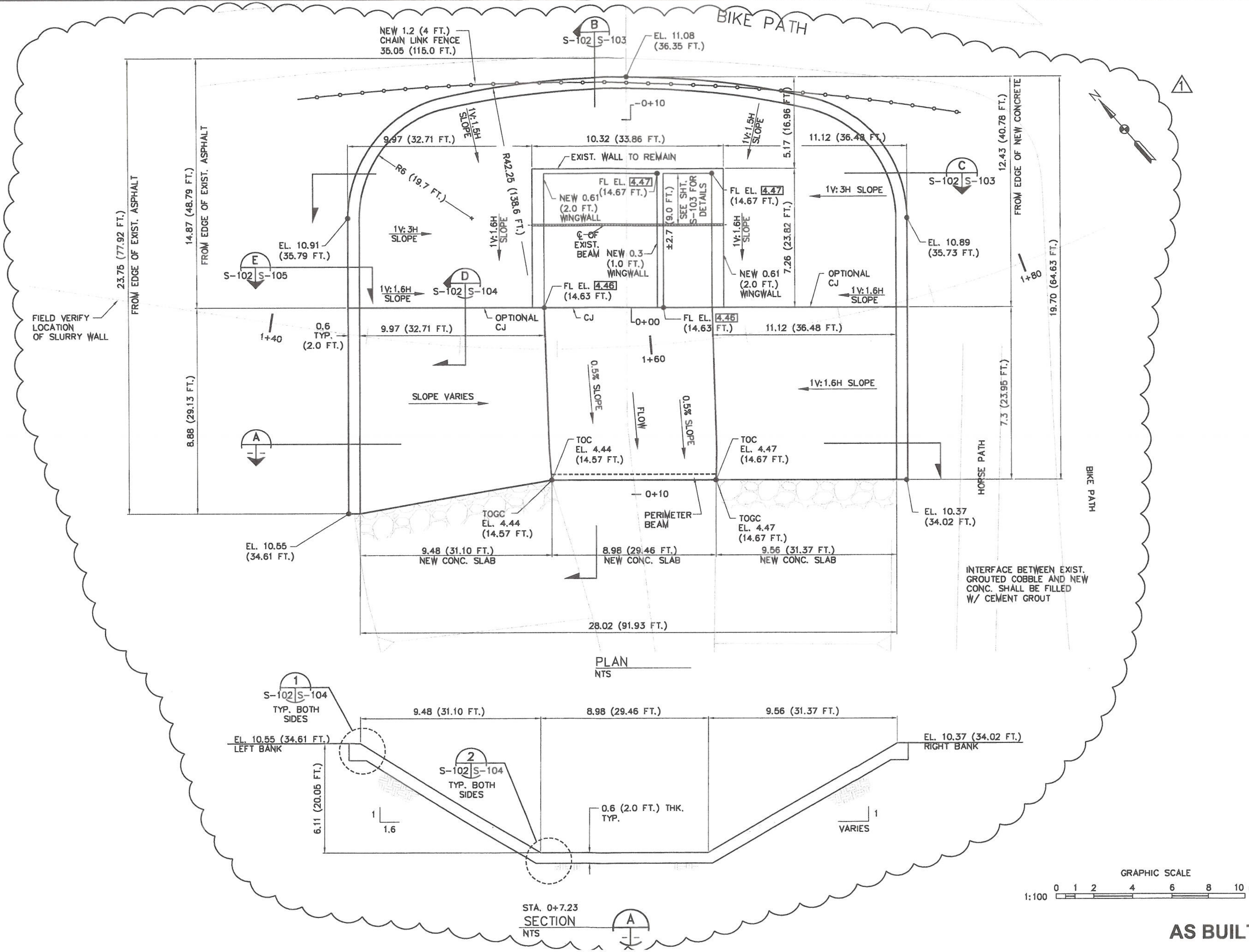
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SACRAMENTO DISTRICT
IN-HOUSE DESIGN
1325 'J' STREET
SACRAMENTO, CA 95814-2922

AMERICAN RIVER CALIFORNIA
AMERICAN RIVER COMMON FEATURES
(REMAINING SITES) WRDA 1996
CONTRACT I

DEMOLITION PLAN

Sheet reference number:
S-101
Sheet 16 of 21



AS BUILT

US Army Corps of Engineers
Sacramento District

Symbol	Description	Date	Approved
1	AS BUILT	10/23/01	TS

Designed by: JSQ
Dwn by: EDW
Spec No.: 1593
Reviewed by:
Drawing Code: 90% SUBMISSION
Submitted by: /s/ Larry Crowley
Plot scale: AS NOTED

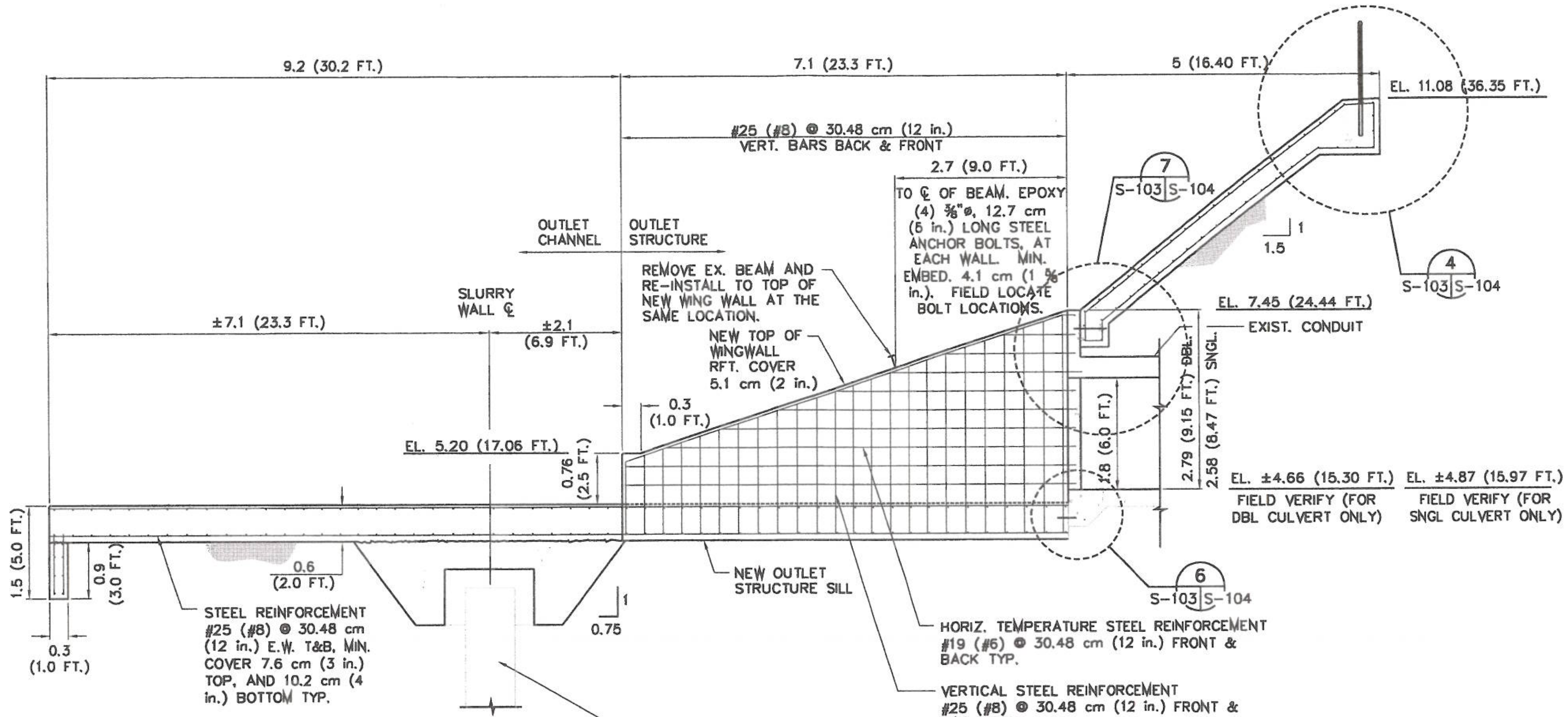
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SACRAMENTO DISTRICT
IN-HOUSE DESIGN
1325 'J' STREET
SACRAMENTO, CA 95814-2922

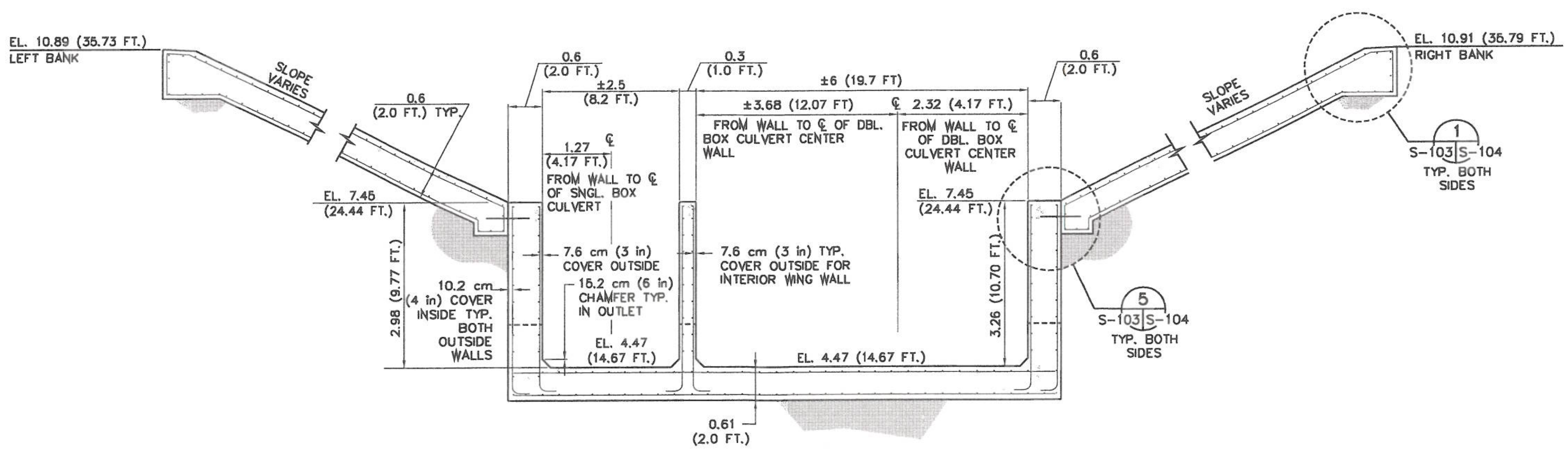
AMERICAN RIVER CALIFORNIA
AMERICAN RIVER COMMON FEATURES
(REMAINING SITES) WRDA 1996
CONTRACT 1

PLAN & SECTION

Sheet reference number:
S-102
Sheet 17 of 21



SECTION B
SCALE: 1:50 S-102 S-103



STA. -0+7.15
SECTION C
NTS S-102 S-103

GRAPHIC SCALE
1:100 0 1 2 4 6 8 10 m

AS BUILT

US Army Corps of Engineers Sacramento District

Symbol	Description	Date	Approved
	AS BUILT		

Designed by: JSO		Date:	Rev.
Dwn by: EDM	Spec No.: 1593	Design file no:	
Reviewed by:		Drawing Code: 90% SUBMISSION	
Submitted by: /s/ Larry Crowley		File name: Plot date: Dwg scale: AS_NOTED	

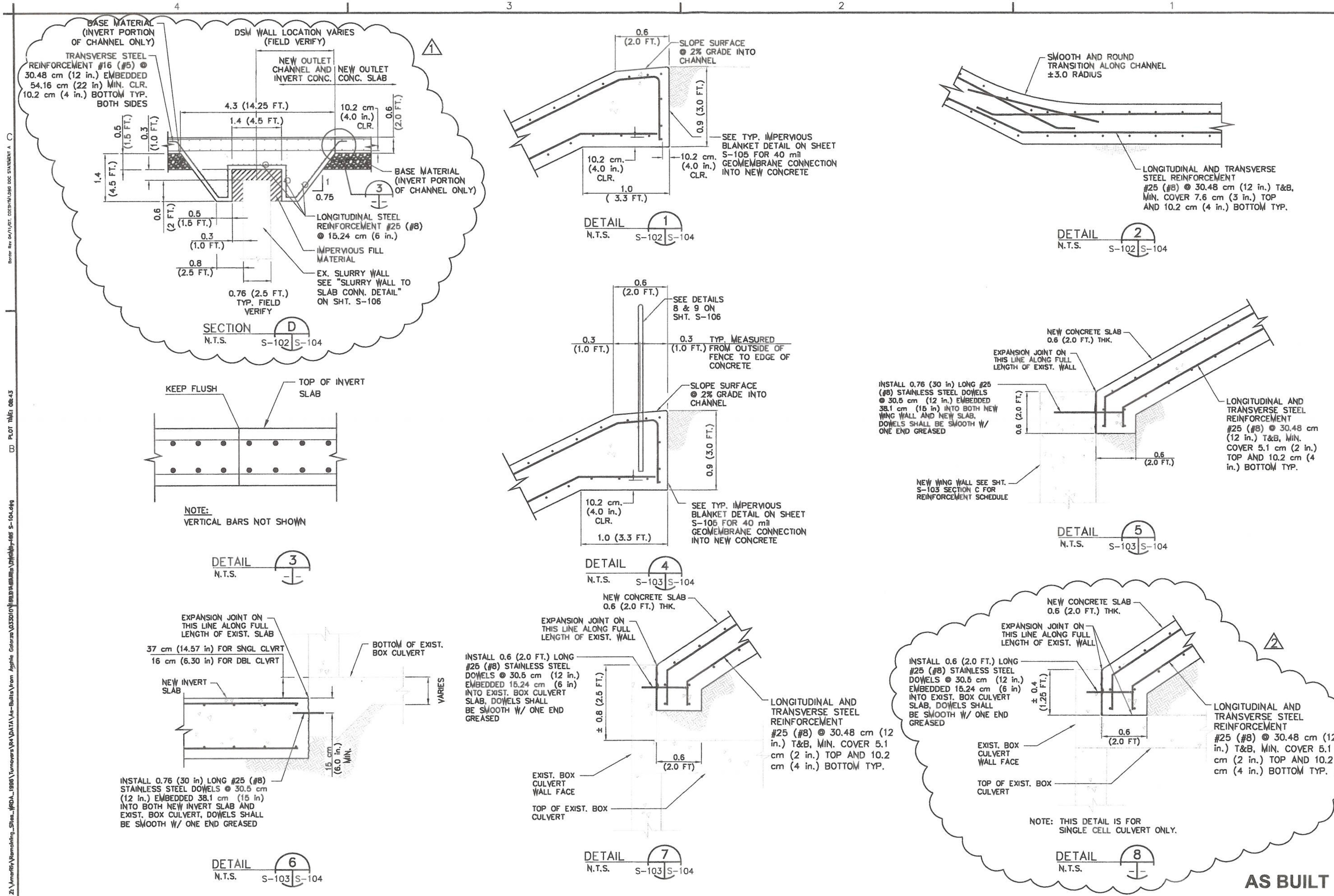
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SACRAMENTO DISTRICT
IN-HOUSE DESIGN
1325 'J' STREET
SACRAMENTO, CA 95814-2922

AMERICAN RIVER CALIFORNIA
AMERICAN RIVER COMMON FEATURES (REMAINING SITES) WRDA 1996
CONTRACT 1

SECTIONS AND DETAILS

Sheet reference number:
S-103
Sheet 18 of 21


BASE MATERIAL (INVERT PORTION OF CHANNEL ONLY)
DSM WALL LOCATION VARIES (FIELD VERIFY)
TRANSVERSE STEEL REINFORCEMENT #16 (#5) @ 30.48 cm (12 in.) EMBEDDED 54.16 cm (22 in) MIN. CLR. 10.2 cm (4 in.) BOTTOM TYP. BOTH SIDES
NEW OUTLET CHANNEL AND INVERT CONC.
NEW OUTLET CONC. SLAB
4.3 (14.25 FT.)
1.4 (4.5 FT.)
10.2 cm (4.0 in.) CLR.
0.6 (2.0 FT.)
0.5 (1.5 FT.)
0.3 (1.0 FT.)
1.4 (4.5 FT.)
BASE MATERIAL (INVERT PORTION OF CHANNEL ONLY)
0.75
0.6 (2 FT.)
0.5 (1.5 FT.)
0.3 (1.0 FT.)
0.8 (2.5 FT.)
LONGITUDINAL STEEL REINFORCEMENT #25 (#8) @ 15.24 cm (6 in.)
IMPERVIOUS FILL MATERIAL
EX. SLURRY WALL SEE "SLURRY WALL TO SLAB CONN. DETAIL" ON SHT. S-106
0.76 (2.5 FT.) TYP. FIELD VERIFY
SECTION D N.T.S. S-102 S-104
0.6 (2.0 FT.)
SLOPE SURFACE @ 2% GRADE INTO CHANNEL
0.9 (3.0 FT.)
SEE TYP. IMPERVIOUS BLANKET DETAIL ON SHEET S-105 FOR 40 mil GEOMEMBRANE CONNECTION INTO NEW CONCRETE
10.2 cm. (4.0 in.) CLR.
10.2 cm. (4.0 in.) CLR.
1.0 (3.3 FT.)
DETAIL 1 N.T.S. S-102 S-104
SMOOTH AND ROUND TRANSITION ALONG CHANNEL ±3.0 RADIUS
LONGITUDINAL AND TRANSVERSE STEEL REINFORCEMENT #25 (#8) @ 30.48 cm (12 in.) T&B, MIN. COVER 7.6 cm (3 in.) TOP AND 10.2 cm (4 in.) BOTTOM TYP.
DETAIL 2 N.T.S. S-102 S-104
KEEP FLUSH
TOP OF INVERT SLAB
NOTE: VERTICAL BARS NOT SHOWN
DETAIL 3 N.T.S.
0.6 (2.0 FT.)
SEE DETAILS 8 & 9 ON SHT. S-106
0.3 (1.0 FT.)
0.3 (1.0 FT.) TYP. MEASURED FROM OUTSIDE OF FENCE TO EDGE OF CONCRETE
SLOPE SURFACE @ 2% GRADE INTO CHANNEL
0.9 (3.0 FT.)
10.2 cm. (4.0 in.) CLR.
SEE TYP. IMPERVIOUS BLANKET DETAIL ON SHEET S-105 FOR 40 mil GEOMEMBRANE CONNECTION INTO NEW CONCRETE
1.0 (3.3 FT.)
DETAIL 4 N.T.S. S-103 S-104
NEW CONCRETE SLAB 0.6 (2.0 FT.) THK.
EXPANSION JOINT ON THIS LINE ALONG FULL LENGTH OF EXIST. WALL
INSTALL 0.76 (30 in) LONG #25 (#8) STAINLESS STEEL DOWELS @ 30.5 cm (12 in.) EMBEDDED 38.1 cm (15 in) INTO BOTH NEW WING WALL AND NEW SLAB. DOWELS SHALL BE SMOOTH W/ ONE END GREASED
0.6 (2.0 FT.)
0.6 (2.0 FT.)
LONGITUDINAL AND TRANSVERSE STEEL REINFORCEMENT #25 (#8) @ 30.48 cm (12 in.) T&B, MIN. COVER 5.1 cm (2 in.) TOP AND 10.2 cm (4 in.) BOTTOM TYP.
NEW WING WALL SEE SHT. S-103 SECTION C FOR REINFORCEMENT SCHEDULE
DETAIL 5 N.T.S. S-103 S-104
EXPANSION JOINT ON THIS LINE ALONG FULL LENGTH OF EXIST. SLAB
37 cm (14.57 in) FOR SNGL CLVRT
16 cm (6.30 in) FOR DBL CLVRT
BOTTOM OF EXIST. BOX CULVERT
NEW INVERT SLAB
VARIES
15 cm (6.0 in.) MIN.
INSTALL 0.76 (30 in) LONG #25 (#8) STAINLESS STEEL DOWELS @ 30.5 cm (12 in.) EMBEDDED 38.1 cm (15 in) INTO BOTH NEW INVERT SLAB AND EXIST. BOX CULVERT. DOWELS SHALL BE SMOOTH W/ ONE END GREASED
DETAIL 6 N.T.S. S-103 S-104
NEW CONCRETE SLAB 0.6 (2.0 FT.) THK.
EXPANSION JOINT ON THIS LINE ALONG FULL LENGTH OF EXIST. WALL
INSTALL 0.6 (2.0 FT.) LONG #25 (#8) STAINLESS STEEL DOWELS @ 30.5 cm (12 in.) EMBEDDED 15.24 cm (6 in) INTO EXIST. BOX CULVERT SLAB. DOWELS SHALL BE SMOOTH W/ ONE END GREASED
± 0.8 (2.5 FT.)
LONGITUDINAL AND TRANSVERSE STEEL REINFORCEMENT #25 (#8) @ 30.48 cm (12 in.) T&B, MIN. COVER 5.1 cm (2 in.) TOP AND 10.2 cm (4 in.) BOTTOM TYP.
0.6 (2.0 FT)
EXIST. BOX CULVERT WALL FACE
TOP OF EXIST. BOX CULVERT
DETAIL 7 N.T.S. S-103 S-104
NEW CONCRETE SLAB 0.6 (2.0 FT.) THK.
EXPANSION JOINT ON THIS LINE ALONG FULL LENGTH OF EXIST. WALL
INSTALL 0.6 (2.0 FT.) LONG #25 (#8) STAINLESS STEEL DOWELS @ 30.5 cm (12 in.) EMBEDDED 15.24 cm (6 in) INTO EXIST. BOX CULVERT SLAB. DOWELS SHALL BE SMOOTH W/ ONE END GREASED
± 0.4 (1.25 FT.)
LONGITUDINAL AND TRANSVERSE STEEL REINFORCEMENT #25 (#8) @ 30.48 cm (12 in.) T&B, MIN. COVER 5.1 cm (2 in.) TOP AND 10.2 cm (4 in.) BOTTOM TYP.
0.6 (2.0 FT)
EXIST. BOX CULVERT WALL FACE
TOP OF EXIST. BOX CULVERT
NOTE: THIS DETAIL IS FOR SINGLE CELL CULVERT ONLY.
DETAIL 8 N.T.S.

AS BUILT

US Army Corps of Engineers
Sacramento District

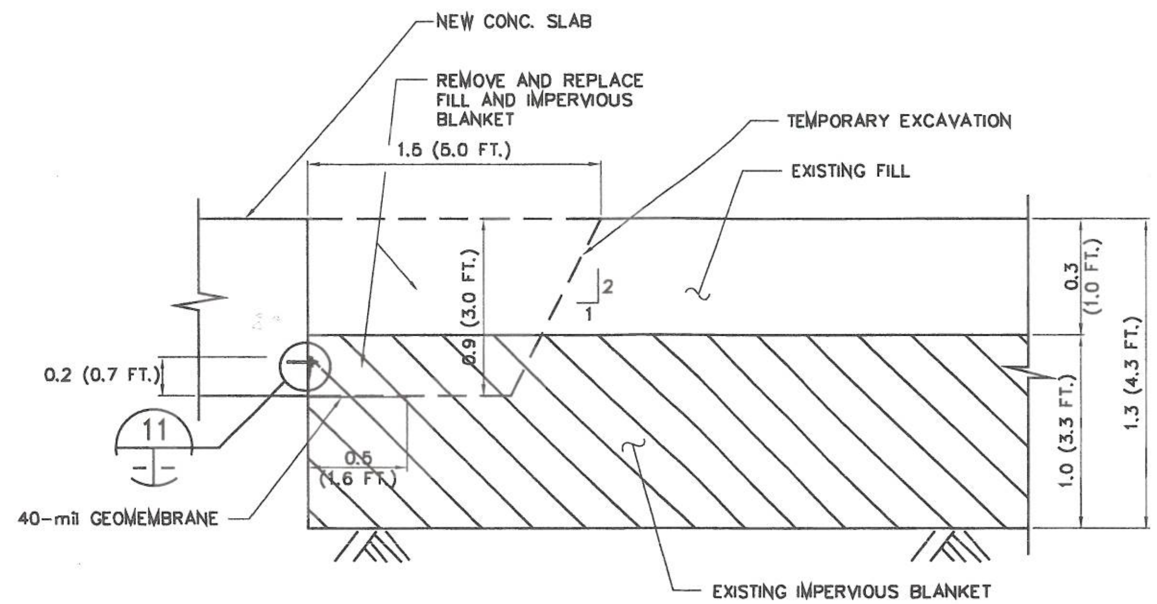
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SACRAMENTO DISTRICT
IN-HOUSE DESIGN
1325 'J' STREET
SACRAMENTO, CA 95814-2922

AMERICAN RIVER, CALIFORNIA
AMERICAN RIVER COMMON FEATURES (REMAINING SITES) WRDA 1996
CONTRACT 1

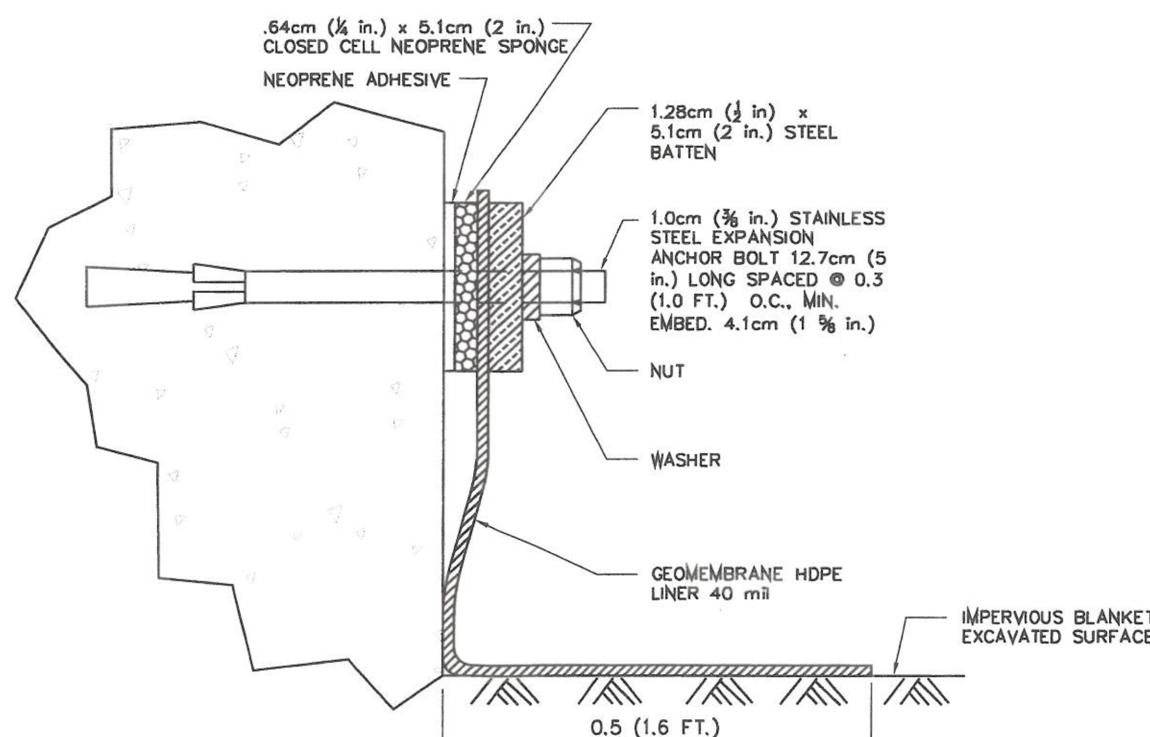
SECTIONS AND DETAILS

Sheet reference number:
S-104
Sheet 19 of 21



SECTION E (E S-102 S-105)
N.T.S.

TYPICAL IMPERVIOUS BLANKET DETAIL @ CONC. FACE
N.T.S.



DETAIL (11)
N.T.S.

AS BUILT

US Army Corps of Engineers Sacramento District

AS BUILT

AMERICAN RIVER CALIFORNIA
AMERICAN RIVER COMMON FEATURES (REMAINING SITES) WRDA 1996 CONTRACT 1

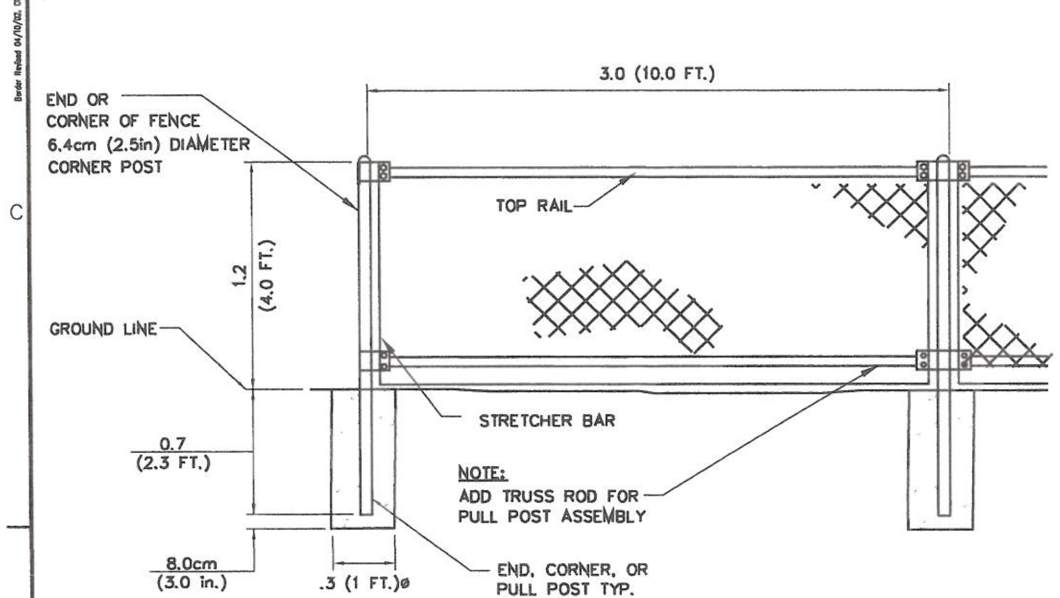
IMPERVIOUS BLANKET AND CONNECTION DETAILS

DEPARTMENT OF THE ARMY CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA

SACRAMENTO DISTRICT IN-HOUSE DESIGN 1325 'J' STREET SACRAMENTO, CA 95814-2922

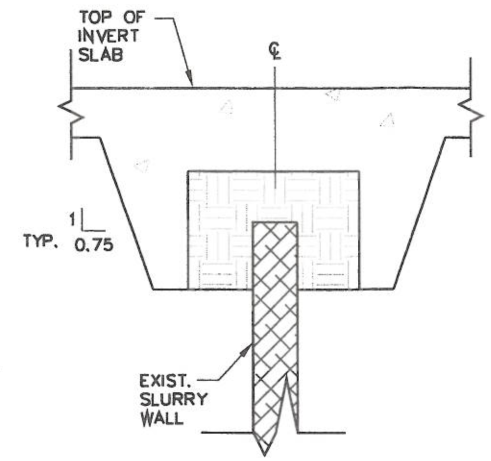
Designed by: JSO | Dwn by: EDM | Spec No.: 1593 | Reviewed by: | Submitted by: /s/ Larry Crowley | Date: | Design file no: | Drawing Code: 90% SUBMISSION | File name: | Plot date: | Dwg scale: AS NOTED | Rev.

Sheet reference number: S-105
Sheet 20 of 21

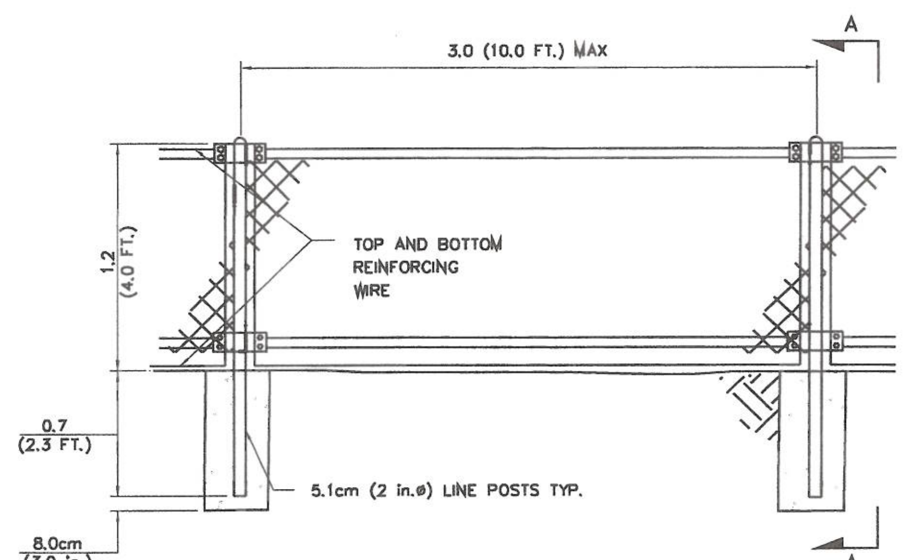


CORNER OR END PANEL ASS'Y
PULL POST ASS'Y SIMILAR (EXCEPT AS INDICATED)

DETAIL 8
N.T.S. S-103 S-104

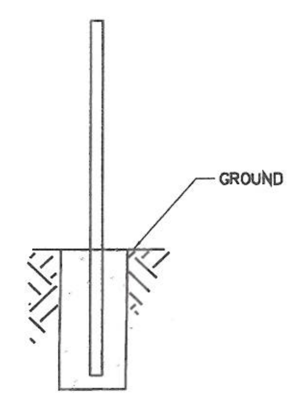


SLURRY WALL TO SLAB CONNECTION DETAIL
(NOT TO SCALE)



TYPICAL LINE FENCE DETAIL

DETAIL 9
N.T.S. S-103 S-104



VIEW A–A

GENERAL STRUCTURAL NOTES:

1. CONSTRUCTION: THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE JOB SITE IN A SAFE CONDITION AND EMPLOYING OSHA APPROVED CONSTRUCTION PRACTICES PERFORMED IN A WORKMANLIKE MANNER. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE DESIGN OF SHORING, FORMWORK AND OTHER TEMPORARY CONSTRUCTION STRUCTURES. CONSTRUCTION MATERIALS SHALL BE SPREAD OUT TO AVOID OVERLOADING INDIVIDUAL MEMBERS. PERIODIC JOB SITE VISITS BY THE OWNER AND/OR ENGINEER DO NOT CONSTITUTE REVIEW OR APPROVAL OF CONSTRUCTION TECHNIQUES BUT ARE INTENDED SOLELY FOR THE PURPOSE OF CHECKING GENERAL COMPLIANCE OF THE WORK WITH THE PROJECT CONSTRUCTION DOCUMENTS.

2. THE DRAWINGS: THESE DRAWINGS SHALL BE READ AND COORDINATED WITH ALL OTHER CONTRACT DRAWINGS, INCLUDING VENDOR DRAWINGS AND SUBCONTRACTOR SHOP DRAWINGS. SPECIFIC DIMENSIONS, DETAILS AND NOTES SHALL TAKE PRECEDENCE OVER GENERAL NOTES, TYPICAL DETAILS, MINIMUM CODE VALUES OR SCALED INFORMATION ON PLANS OR SECTIONS. ITEMS NOT SPECIFICALLY DETAILED SHALL GENERALLY FOLLOW OTHER SIMILAR DETAILS. DISCREPANCIES, CONFLICTS AND/OR UNCLEAR CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE CONTRACTING OFFICER AND/OR ENGINEER IMMEDIATELY.

3. THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD AND EXISTING CONCRETE DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

4. ALL FORMED CONCRETE SURFACES SHALL HAVE CLASS "C" FINISH EXCEPT FORMED CONCRETE SURFACES AGAINST WHICH BACKFILL IS PLACED SHALL HAVE CLASS "D" FINISH. SEE SPEC. SECTION 03 30 04.

5. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 19 mm UNLESS OTHERWISE SHOWN.

6. ALL FINISHED SURFACES WHERE A FLOAT OR TROWEL FINISH ARE REQUIRED SHALL HAVE TOOLED EDGES.

7. ALL REINFORCEMENT SPLICES, UNLESS OTHERWISE NOTED, SHALL CONFORM TO CLASS "B" SPLICE FOR fc'=35 MPa (5000 psi), AS SHOWN BELOW:

DEVELOPMENT LENGTH SCHEDULE		
Bar Size	ld (Metric (English))	Splice (Metric (English))
#25 (#8)	87cm (34in)	112cm (44in)
#19 (#6)	65cm (26in)	85cm (33in)
#16 (#5)	55cm (22in)	71cm (28in)

8. ALL BENDS AND HOOKS SHALL BE "STANDARD BENDS AND HOOKS" AS DETAILED IN ACI 318M-05.

9. UNLESS OTHERWISE SHOWN, STAGGER SPLICES IN ALTERNATE LONGITUDINAL SLAB REINFORCEMENT AT LEAST 1.2 METERS.

MATERIAL NOTES:

1. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 35 MPa (5000 psi) AT 28 DAYS (ACI 318M-05).

2. REINFORCING STEEL SHALL HAVE A MINIMUM YIELD STRENGTH OF 420 MPa (60 ksi) UNLESS NOTED OTHERWISE, AND SHALL CONFORM TO ASTM A 615. SEE SPECIFICATION SECTION 03 30 04.

3. ALL DOWELS SHALL BE STAINLESS STEEL BARS CONFORMING TO ASTM A615, UNLESS NOTED OTHERWISE.

4. ALL STRUCTURAL STEEL SHALL CONFORM TO ASTM SPECIFICATION A-36. UNLESS NOTED OTHERWISE.

AS BUILT

US Army Corps of Engineers
Sacramento District

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SACRAMENTO DISTRICT
IN-HOUSE DESIGN
1325 J STREET
SACRAMENTO, CA 95814-2922

AMERICAN RIVER
AMERICAN RIVER COMMON FEATURES
(COMMON FEATURES) WRDA 1996
CALIFORNIA

GENERAL STRUCTURAL
NOTES AND DETAILS

Sheet reference number:
S-106
Sheet 21 of 21

SAFCA
Sacramento
Area Flood
Control
Agency

January 19, 2011

Kent Zenobia
Department of Water Resources
Department of Flood Management
Project Delivery Branch - CVFPB/USACE Projects 3310 El Camino Avenue, Room 180
Sacramento, CA 95821

SUBJECT: AMERICAN RIVER COMMON FEATURES PROGRAM REMAINING SITES – SITE R4:

Dear Mr. Zenobia:

The U.S. Army Corps of Engineers recently reconstructed the outlet works of the gravity drains at the R4 site near Cal Expo. Representatives of the Sacramento Area Flood Control Agency (SAFCA) reviewed the design, visiting the site during construction and have reviewed the as-built plans and Operation and Maintenance (O&M) Manual.

We find the project to be acceptable to SAFCA and we are agreeable to accepting O&M responsibility for the site.

If you have any questions, please contact me at (916) 874-8737.

Sincerely,

Richard M. Johnson
Interim Executive Director
Sacramento Area Flood Control Agency

cc: Tim Kerr, ARFCD
Grant Kreinberg, SAFCA

Office 916-874-7606
Fax 916-874-8289

1007 - 7th Street, 7th Floor
Sacramento, CA 95814-3407

Attachment F- Written Notice of Acceptance of Completed Work

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
VALLEY RESIDENT OFFICE
2021 Jefferson Boulevard
West Sacramento, California 95691

April 30, 2010

C-0006

Contract No. W91238-09-D-0020, T.O. 0001 Repair Channel Outlet Structure R4, Sacramento, California

Subject: "Beneficial Occupancy of Repair Channel Outlet Structure R4"

RDA Contracting, Inc.
2900 Main Street, Ste. 208
Alameda, CA 94501

Gentlemen,

Construction of the Repair Channel Outlet Structure R4 project was accepted by USACE on September 1, 2009 without any outstanding deficiencies. Per our letter number C-0005 (dated April 30, 2010) all SWPPP obligations have been met and are considered terminated.

This is to inform you that, in the event it should become necessary to implement any of the warranty clauses of this contract, the Government will notify you. A prompt reply is expected to any request for repairs necessary under the warranty provisions of your contract.

Sincerely,

Cathy Wise, P.E., CCM
Administrative Contracting Officer

cc:
Contr Div
Con-ops Div
PM – John Hoge
Reading File
File

(415-10c)
GES/ges

WISE CW

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY **EDMUND G. BROWN JR.,** GOVERNOR

CENTRAL VALLEY FLOOD PROTECTION BOARD
3310 El Camino Ave., Rm. 151
SACRAMENTO, CA 95821
(916) 574-0609 FAX: (916) 574-0682
PERMITS: (916) 574-0685 FAX: (916) 574-0682

January 28, 2011

Colonel William J. Leady
District Engineer
Sacramento District
U.S. Army Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

Dear Colonel Leady,

In your July 1, 2010 letter to the Central Valley Flood Protection Board (Board), the U.S. Army Corps of Engineers transferred the recently completed portion of work (R4) of the American River Common Features Project to the Board, performed under the authority of the Water Resources Development Act of 1996 (WRDA 1996). Site R4 is located approximately 250 feet south of the Strong Ranch Slough Pump Station. You advised us that the work meets the requirements of the existing Operation and Maintenance Manual, American River – Part No. 1, Levee Construction from Carmichael Bluffs Downstream 8.3 miles. We understand that the work was completed in accordance with the original plans and specifications. We acknowledge receipt of As-Built Drawings and will forward a copy to the Sacramento Area Flood Control Agency (SAFCA). We acknowledge that the Corps has provided additions and revisions to the existing Operation and Maintenance Manual and that these additions and revisions are to be incorporated into our copies of the Operation and Maintenance Manual.

The Board, on behalf of the State of California, accepted the completed portion of work at its January 28, 2011 meeting and transferred the operation, maintenance, repair, replacement, and rehabilitation of Site R4 work to SAFCA.

If you have any questions, you may contact Kent Zenobia, Project Delivery Branch Chief, at (916) 574-2639.

Sincerely,

Jay Punia
Chief Executive Officer

cc: (Please see attached list of cc's)

cc: Mr. Randy Olsen, Chief
Readiness Branch
Sacramento District
U.S. Army Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

Mr. Richard Johnson, Interim Executive Director
Sacramento Area Flood District
1007 7th Street
Sacramento, California 95814

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY **EDMUND G. BROWN JR.,** GOVERNOR

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3310 El Camino Ave., Rm. 151
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(916) 574-0609 FAX: (916) 574-0682
PERMITS: (916) 574-0685 FAX: (916) 574-0682

January 28, 2011

Mr. Richard Johnson
Interim Executive Director
Sacramento Area Flood Control District
1007 7th Street
Sacramento, California 95814

Dear Mr. Johnson,

The U.S. Army Corps of Engineers (USACE) has recently completed the portion of work (R4) of the American River Common Features Project, performed under the authority of the Water Resources Development Act of 1996 (WRDA 1996). Richard Johnson, Interim Executive Director for the Sacramento Area Flood Control District (SAFCA) sent a letter dated January 19, 2011 to Kent Zenobia, Department of Water Resources, Project Delivery Branch Chief, which provided assurance of acceptance for the completed portion of work. The USACE has transferred the completed portion to the State of California for operation and maintenance (see enclosed letter). At its January 28, 2011 meeting, on behalf of the State of California, The Central Valley Flood Protection Board accepted the completed portion of work.

The Board hereby transfers the completed portion of work (R4) of the American River Common Features Project to SAFCA for operation, maintenance, repair, replacement, and rehabilitation. The USACE has advised the Board that the completed portion of work meets the requirements of the existing Operation and Maintenance Manual, American River – Part No. 1, Levee Construction from Carmichael Bluffs Downstream 8.3 miles. The USACE has provided additions and revisions to the existing O&M Manual and that these additions and revisions are to be incorporated into your copies of the Operation and Maintenance Manual. SAFCA will perform operation and maintenance in accordance with the amended Operation and Maintenance Manual. As-Built Drawings are enclosed.

If you have any questions, you may contact Kent Zenobia, Project Delivery Branch Chief, at (916) 574-2639.

Sincerely,

Jay S. Punia
Chief Executive Officer

cc: (Please see attached list)

cc: Colonel William J. Leady, P.E.
District Engineer
Sacramento District
U.S. Army Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

Mr. Randy Olsen, Chief Readiness Section
Sacramento District
U.S. Army Corps of Engineers
1325 J Street
Sacramento, California 95814-2922