AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE	OF PAGES
W02B0004	1	1

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. *(If applicable)*
0004	13 December 2002		

6. ISSUED BY CODE

LOS ANGELES DISTRICT, COE
CESPL-CT-WEST REGION BRANCH
P.O. BOX 532711
LOS ANGELES, CA 90053-2325

7. ADMINISTERED BY *(If other than Item 6)* CODE

8. NAME AND ADDRESS OF CONTRACTOR *(No., street, county, State and ZIP Code)*

CODE FACILITY CODE

(√) X

9A. AMENDMENT OF SOLICITATION NO.
DACW09-02-B-0004

9B. DATED *(SEE ITEM 11)*
17 OCTOBER 2002

10A. MODIFICATION OF CONTRACTS/ORDER NO.

10B. DATED *(SEE ITEM 13)*

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☒ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers ☐ is extended, ☒ is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing Items 8 and 15, and returning 1 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA *(If required)*

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

(√)	
	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: *(Specify authority)* THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES *(such as changes in paying office, appropriation date, etc.)* SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER *(Specify type of modification and authority)*

E. IMPORTANT: Contractor ☐ is not, ☐ is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION *(Organized by UCF section headings, including solicitation/contract subject matter where feasible.)*

PRADO DAM EMBANKMENT AND OUTLET WORKS,
RIVERSIDE COUNTY, CA

This amendment is issued to:

a. **REPLACE** project.pdf with project_4.pdf; PROJECT TABLE OF CONTENTS

b. **REPLACE** the following Specification Sections in the Solicitation with the enclosed Specification Sections:

00010_4.pdf; SECTION 00010, BID SCHEDULE
00100_4.pdf; SECTION 00100, INSTRUCTIONS TO BIDDERS
00800_4.pdf; SECTION 00800, Special Contract Requirements
00850_4.pdf; SECTION 00850, Rates of Wages
01151_4.pdf; SECTION 01151, SARI Relocation Geotechnical Investigation

(CONTINUED ON NEXT SHEET)

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER *(Type or print)*		16A. NAME AND TITLE OF CONTRACTING OFFICER *(Type or print)*	
15B. CONTRACTOR/OFFEROR *(Signature of person authorized to sign)*	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY *(Signature of Contracting Officer)*	16C. DATE SIGNED

BLOCK 14 – Continued

REPLACE the following Specification Sections in the Solicitation with the enclosed Specification Sections: (Continued)

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01200_4.pdf; SECTION 01200 General Requirements
01230_4.pdf; SECTION 01230 Safety Requirements
01270_4.pdf; SECTION 01270 Measurement and Payment
register_4.pdf;      Submittal register
01500_4.pdf; SECTION 01500 Quality Assurance
02100_4.pdf; SECTION 02100 Clear Site and Remove Obstructions
02130_4.pdf; SECTION 02130 Diversion and Control of Water
02200_4.pdf; SECTION 02200 Excavation
02316_4.pdf; SECTION 02316 Excavation, Trenching, and Backfilling for
                           Utilities Systems
02480_4.pdf; SECTION 02480 Mechanically Stabilized Earth Walls
02531_4.pdf; SECTION 02531 Sanitary Sewers
02600_4.pdf; SECTION 02600 Stone Protection
02612_4.pdf; SECTION 02612 PVC Lined Reinforced Concrete Sewer Pipe
02623_4.pdf; SECTION 02623 High Density Polyethylene (HDPE) Pipe
05615_4.pdf; SECTION 05615 Stoplogs
09880_4.pdf; SECTION 09880 PVC Liners for Concrete Pipe and Structures
13120_4.pdf; SECTION 13120 Digital Photo Documentation
15100_4.pdf; SECTION 15100 Valves
15120_4.pdf; SECTION 15120 Piping Specialties
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c. REPLACE the following Plans/Drawings in the Solicitation with the enclosed Plans/Drawings:

File No.	Sheet No.	Drawing Title
121/116 Rev. A	C-2	INDEX TO CONTRACT DRAWINGS, GENERAL LEGEND AND ABBREVIATIONS
121/117 Rev. A	C-3	INDEX TO CONTRACT DRAWINGS
121/120 Rev. A	C-6	EMBANKMENT KEY / REMOVAL PLAN, EAST HALF
121/121 Rev. A	C-7	EMBANKMENT GRADING WEST HALF
121/123 Rev. A	C-9	SITE GRADING, NORTH HALF
121/129 Rev. A	C-15	APPROACH AND PILOT CHANNEL GRADING PLAN
121/132 Rev. A	C-18	NORTH ACCESS ROAD & TOE ROAD IMPROVEMENT PLAN, PROFILE & SECTION
121/134 Rev. A	C-20	EAST ACCESS ROAD IMPROVEMENT PLAN, PROFILE AND SECTION
121/135 Rev. A	C-21	BORROW AREA ACCESS ROAD IMPROVEMENT PLAN
121/139 Rev. A	C-25	OUTLET CHANNEL PLAN AND PROFILE STA. 51+51 TO STA. 41+00
121/144 Rev. A	C-30	OUTLET CHANNEL STRUCTURAL NOTES AND DETAILS
121/146 Rev. A	C-32	OUTLET CHANNEL TRAPEZOIDAL. CHANNEL SUBDRAIN PLAN, TYPICAL SECTIONS AND DETAILS
121/147 Rev. A	C-33	OUTLET CHANNEL TRAPEZOIDAL CHANNEL SUBDRAIN DETAILS
121/154 Rev. A	C-40	CONDUIT CONSTRUCTION GRADING PLAN, STAGE 2C
121/155 Rev. A	C-41	CONDUIT CONSTRUCTION GRADING PLAN, STAGE 3
121/158 Rev. A	C-44	WATER WELL LOCATION AND CASING DETAILS
121/166 Rev. A	C-52	DOUBLE CABLE TRASH BOOM LAYOUT PLAN AND DETAILS
121/167 Rev. A	C-53	42 CULVERT EXTENSION PLAN, PROFILE AND DETAILS
121/168 Rev. A	C-54	WEST APPROACH CHANNEL WING WALL CROSS SECTIONS
121/169 Rev. A	C-55	EAST APPROACH CHANNEL WING WALL CROSS SECTIONS
121/170 Rev. A	C-56	INTAKE STRUCTURE AND TRANSITION CROSS SECTIONS
121/174 Rev. A	C-60	STILLING BASIN CROSS SECTIONS
121/175 Rev. A	C-61	STILLING BASIN CROSS SECTIONS
121/176 Rev. A	C-62	RUNOUT AND OUTLET CHANNEL CROSS SECTIONS STA. 48+00 TO STA. 36+00
121/180 Rev. A	C-66	UTILITY PLAN

PRADO DAM EMBANKMENT AND OUTLET WORKS, RIVERSIDE COUNTY, CA

121/190 Rev. A	A3	REG.INTAKE STRUCT. - GENERAL SECTION
121/191 Rev. A	A4	REG.INTAKE STRUCT. - GATE ROOM AND MAINTENANCE DECK PLAN - ELEVATIONS 500.0 AND 520.0
121/193 Rev. A	A6	REG.INTAKE STRUCT. - ACCESS TOWER DECK PLANS - ELEVATIONS 536.0 AND 608.0
121/195 Rev. A	A8	REG.INTAKE STRUCT. - ACCESS TOWER DECK PLANS - CONTROL ROOM DECK - ELEVATION 596.0
121/196 Rev. A	A9	REG.INTAKE STRUCT. - TYPICAL STAIRWAY & PIPE HANDRAILING - MISC DETAILS NO. 1
121/197 Rev. A	A10	REG.INTAKE STRUCT. - SHIP LADDER AND MISCELLANEOUS DETAILS NO. 2
121/203 Rev. A	S1	APPROACH CHANNEL WING WALLS - GENERAL PLAN AND EAST WALL ELEVATION
121/204 Rev. A	S2	APPROACH CHANNEL WING WALLS - WEST WALL ELEVATION & DETAILS
121/205 Rev. A	S3	REG.INTAKE STRUCT. - STRUCTURAL SECTIONS 1
121/206 Rev. A	S4	REG.INTAKE STRUCT. - STRUCTURAL SECTIONS 2
121/207 Rev. A	S5	REG.INTAKE STRUCT. - STRUCTURAL SECTIONS 3
121/208 Rev. A	S6	REG.INTAKE STRUCT. - FOUNDATION PLAN - ELEVATION 470
121/209 Rev. A	S7	REG.INTAKE STRUCT. - GATE ROOM DECK FRAMING PLAN
121/210 Rev. A	S8	REG.INTAKE STRUCT. - GATE ROOM DECK PLAN - ELEVATION 500
121/211 Rev. A	S9	REG.INTAKE STRUCT. - GATE ROOM ROOF ELEV 545 - EMERGENCY ELEVATOR DECK ELEV 536
121/212 Rev. A	S10	REG.INTAKE STRUCT. - ACCESS TOWER DECK PLANS - ELEVATION 536 TO ELEV 590
121/213 Rev. A	S11	REG.INTAKE STRUCT. - ACCESS TOWER DECK PLANS - ELEVATION 596 TO ROOF
121/214 Rev. A	S12	REG.INTAKE STRUCT. - FOUNDATION WALLS REINFORCEMENT
121/215 Rev. A	S13	REG.INTAKE STRUCT. - GATE ROOM DECK REINFORCEMENT
121/217 Rev. A	S15	REG.INTAKE STRUCT. - MAINT DECK PLAN ELEV 520 AND HYDRAULIC CONTROL PLATFORM ELEV 512
121/219 Rev. A	S17	REG.INTAKE STRUCT. - STRUCTURAL ELEVATION REINFORCEMENT 2
121/220 Rev. A	S18	REG.INTAKE STRUCT. - STRUCTURAL ELEVATION REINFORCEMENT 3
121/224 Rev. A	S22	REG.INTAKE STRUCT. - STRUCTURAL DETAILS 1
121/227 Rev. A	S25	REG.INTAKE STRUCT. - STRUCTURAL DETAILS 4
121/237 Rev. A	S35	REG.INTAKE STRUCT. - CONTROL HOUSE ACCESS BRIDGE - BENT DETAILS
121/241 Rev. A	S39	REGULATING TRANSITION STRUCTURE - PLAN
121/242 Rev. A	S40	REGULATING TRANSITION STRUCTURE - SECTIONS
121/244 Rev. A	S42	STILLING BASIN - PLAN AND PROFILE
121/246 Rev. A	S44	STILLING BASIN - TYPICAL SECTION
121/247 Rev. A	S45	STILLING BASIN ACCESS ROAD BRIDGE - GENERAL PLAN
121/248 Rev. A	S46	STILLING BASIN ACCESS ROAD BRIDGE - TYPICAL DECK SECTION, ABUTMENT AND PIER DETAILS
121/249 Rev. A	S47	STILLING BASIN ACCESS ROAD BRIDGE - DETAILS
121/250 Rev. A	S48	STILLING BASIN - WING WALLS
121/251 Rev. A	S49	STILLING BASIN - STOP LOGS
121/258 Rev. A	S56	OUTLET CHANNEL - GROUTED STONE DROP STRUCTURE - GENERAL PLAN
121/262 Rev. A	S60	EXISTING REGULATING INTAKE STRUCTURE - OUTLET CONDUIT PLUG
121/263 Rev. A	S61	EXISTING REGULATING INTAKE STRUCTURE - OUTLET CONDUIT PLUG DETAILS
121/265 Rev. A	S63	FLOAT WELL INTAKE - SECTIONS AND DETAILS 1
121/394 Rev. A	S65	MECHANICALLY STABILIZED EARTH WALLS INSPECTION ELEMENT PLACEMENT
121/395 Rev. A	S66	MECHANICALLY STABILIZED EARTH WALLS INSPECTION ELEMENT DETAILS
121/396 Rev. A	S67	MECHANICALLY STABILIZED EARTH WALLS INSTRUMENTATION
121/344 Rev. A	M30	EQUIPMENT SCHEDULES
121/371 Rev. A	E27	INTAKE STRUCTURE - EMCC AND LCC1 CABINETS LAYOUT

d. ADD the following Plans/Drawings to the Solicitation:

121/182	D-1	DEMOLITION PLAN FOR EXISTING REACHES IV-IV-A & IV-B
121/183	D-2	PLAN AND PROFILE - REACHES IV-A & IV-B RELOCATION
121/184	D-3	MISCELLANEOUS DETAILS
121/261	D-4	48-INCH SEWERS IN PRADO DAM OUTLET
121/323	D-5	APPROACH AND PILOT CHANNEL GRADING PLAN
121/324	D-6	STRUCTURAL DETAILS
121/363	D-7	BONNETED KNIFE GATE VALVE WITH BEVEL GEAR OPERATOR (TYP.)

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PROJECT TABLE OF CONTENTS

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SECTION 00010 - BID SCHEDULE

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
1	Mobilization and Preparatory Work	1	L.S.		
2	Diversion and Control of Water	1	L.S.		
3	Clear Site and Remove Obstructions - Outlet Works, Approach Channel, & Abutments	1	L.S.		
4	Clear Site and Remove Obstructions - Borrow Areas	1	L.S.		
5	Demolition of Existing Intake Structure and Access Bridge	1	L.S.		
6	Abandon Existing Outlet Conduit	1	L.S.		
7	**Excavation, Outlet Works - Sta. 0+00 to Sta. 10+00**	**692,100**	**C.Y.**		
8	**Excavation, Outlet Works - Sta. 10+00 to Sta. 18+13.5**	**470,700**	**C.Y.**		
9	**Excavation, Outlet Works - Sta. 18+13.5 to Sta. 49+93**	**317,000**	**C.Y.**		
10	**Excavation, Outlet Works - Sta. 49+93 to Sta. 54+00**	**48,000**	**C.Y.**		
11	**Derrick Stone**	**9,700**	**Tons**		
12	Excavation, Removal of Gravel Blanket	80,200	Tons		
13	Excavation, Removal of Stone Protection	6,300	Tons		
14	Excavation, Stripping	3,000	C.Y.		
15	Excavation, Toe	8,100	C.Y.		
16	Excavation, Existing Embankment Crest	51,500	C.Y.		
17	Foundation Preparation, Zone II Contact Area	1,200	S.Y.		
18	Embankment, Zone I **Material**	1,132,400	C.Y.		
19	Embankment, Zone II **Material**	233,600	C.Y.		
20	Embankment, Transition Zone **Material**	257,700	C.Y.		
21	Additional Rolling	60	Hours		
22	Compacted Fill, Levee	82,000	C.Y.		
23	Structural Backfill	23,500	C.Y.		
24	Miscellaneous Fill	208,500	C.Y.		
25	Mitigation Fill	4,900	C.Y.		
26	Subdrainage System, Outlet Works	1	L.S.		
27	Aggregate Base Course	6,000	Tons		
28	Asphalt Concrete Pavement	3,300	Tons		
29	Stone Protection	**108,800**	Tons		
30	Gravel Blanket Protection	37,500	Tons		
31	Bedding Material for Stone Protection	**54,400**	Tons		

32	Stone for Grouted Stone Protection	**8,000**	Tons		
33	Grouting Stone Protection	**2,000**	C.Y.		
34	Concrete, Intake Tower Structure				
	a. Concrete, Intake Tower Structure - Elev. 545' and Below	**19,700**	**C.Y.**		
	b. Concrete, Intake Tower Structure - Above Elev. 545'	**3,800**	**C.Y.**		
35	Concrete, Transition Structure	15,260	C.Y.		
36	Concrete, Outlet Conduit	17,855	C.Y.		
37	Concrete, Stilling Basin				
	a. Concrete, Stilling Basin Invert - Sta.18+13.50 to Sta.21+02.50	**8,400**	**C.Y.**		
	b. Concrete, Stilling Basin	**6,600**	**C.Y.**		
38	Concrete, Drop Structure Retaining Wall	467	C.Y.		
39	Concrete, Outlet Works Sta. 21+02 to Sta. 49+93	24,500	C.Y.		
40	Concrete, Access Road	230	C.Y.		
41	Concrete, Stop Log Pads	35	C.Y.		
42	Concrete, Lean Mix Concrete Backfill	7,200	C.Y.		
43	Concrete Reinforcement	6,418	Tons		
44	Structural Steel	**34**	**Tons**		
45	Miscellaneous Steel and Metal Work	1	L.S.		
46	Interceptor Drain	288	L.F.		
47	V-Ditch	445	L.F.		
48	Control House Access Bridge	1	L.S.		
49	Stilling Basin Access Road Bridge	1	L.S.		
50	Mechanically Stabilized Earth Walls	18,535	S.F.		
51	MSE Instrumentation	1	L.S.		
52	42" Culvert Extension	1	L.S.		
53	Outlet Works Side Drain, Sta. 33+68	1	L.S.		
54	Outlet Works Side Drain, Sta. 35+38	1	L.S.		
55	Outlet Works Side Drain, Sta. 41+60	1	L.S.		
56	Accusonic Flow Meters	**1**	**L.S.**		
57	SAWPA Relocation/Protection				
	a. 60-inch Sewer Pipe Encasement	299	L.F.		
	b. Raise Exist. 48-inch Dia. Precast Concrete Manhole	1	L.S.		
	c. SARI Pipeline Reaches IV-A and IV-B Relocation	**1**	**L.S.**		
	d. Abandonment of Existing 60-inch SARI Pipeline	**1**	**L.S.**		
	e. Dual 48-inch HDPE Pipeline in Existing Outlet Structure	**1**	**L.S.**		

	f. 48-inch PVC Lined RCP, Fittings and Valves	**1**	**L.S.**		
58	Water Distribution System				
	a. Chlorination Equipment	1	L.S.		
	b. Pressurized Water Storage Tank	1	L.S.		
	c. Water System Piping, Valves, and Appurtenances	1	L.S.		
	d. Concrete Well Slab Foundation	1	L.S.		
	e. 3" Dia. PVC Well Discharge Pipe	1,746	L.F.		
59	Water Well System				
	a. Bore Hole and Well Development	1	L.S.		
	b. Well System Electrical Distribution	1	L.S.		
60	Observation Well	4	EA.		
61	Double Cable Trash Boom	1	L.S.		
62	Metal Beam Guard Rail	3,063	L.F.		
63	Chain Link Fence and Gates				
	a. 5' Chain Link Fence	1,780	L.F.		
	b. 6' Chain Link Fence	2,820	L.F.		
	c. 6' Chain Link Fence w/ Slats	66	L.F.		
	d. Barbed Wire Fence	654	L.F.		
	e. 6' Chain Link Gate (W=10')	1	EA.		
	f. 6' Chain Link Gate (W=20')	1	EA.		
64	Pipe Gate	1	EA.		
65	Settlement Plates	25	EA.		
66	Survey Monuments	3	EA.		
67	Staff Gages	26	EA.		
68	Hydroseeding				
	a. First 62 Acres	62	Acre		
	b. Over 62 Acres	85	Acre		
69	Hydroseeding Maintenance				
	a. First 62 Acres	62	Acre		
	b. Over 62 Acres	85	Acre		
70	Generator and Storage Building	1	L.S.		
71	Gaging Station	1	L.S.		
72	Gage Station Electrical Distribution	1	L.S.		
73	Seismic Instrumentation	1	L.S.		
74	Stop Logs	16	EA.		

75	Regulating Outlet Slide Gates	6	EA.		
76	Emergency Closure Gates	2	EA.		
77	Low-Flow Outlet Control Valves	2	EA.		
78	Low-Flow Outlet Shut-Off Valves	2	EA.		
79	Low-Flow Bulkhead	**1**	**L.S.**		
80	Underhung Crane	1	L.S.		
81	Piping Systems	1	L.S.		
82	Plumbing	1	L.S.		
83	Washroom Accessories	1	L.S.		
84	Septic System	1	L.S.		
85	HVAC System	1	L.S.		
86	Power Distribution System	1	L.S.		
87	Generator Set	1	L.S.		
88	Fire Protection System	1	L.S.		
89	Passenger Elevator	1	L.S.		
90	Quality Assurance Support	1	L.S.		
91	As-built Drawings	1	L.S.		

SUB TOTAL ESTIMATED AMOUNT OF BASE BID (LINE ITEMS 0001-0091): $ -

Bid Item 92 - ALTERNATIVE 1

a.	**Cement, low heat**	**119,425**	**Cwt**		
b.	**Fly Ash**	**3,021**	**Tons**		
c.	**Water Reducing Admixture**	**878**	**Gal**		

SUBTOTAL ESTIMATED AMOUNT OF ALTERNATIVE 1 (LINE ITEMS 0092A-0092C): $ -

Bid Item 93 - ALTERNATIVE 2

a.	**Cement, regular heat**	**44,960**	**Cwt**		
b.	**Ground Granulated Blast Furnace Slag**	**5,058**	**Tons**		
c.	**Water Reducing Admixture**	**1,043**	**Gal**		

SUBTOTAL ESTIMATED AMOUNT OF ALTERNATIVE 2 (LINE ITEMS 0093A-0093C): $ -

BIDDERS ARE TO SUBMIT PRICES ON ALL LINE ITEMS IN THE BASE BID (0001-0091). IN ADDITION, BIDDERS MUST SUBMIT PRICES ON ALTERNATIVE 1 (0092A-0092C) OR ALTERNATIVE 2 (0093A-0093C) NOT BOTH. THE GOVERNMENT CONTEMPLATES AWARD OF ONE CONTRACT TO THE RESPONSIVE, RESPONSIBLE BIDDER WHO SUBMIT THE LOWEST BID FOR THE BASE BID AND ALTERNATIVE 1; OR THE LOWEST BID FOR THE BASE BID AND ALTERNATIVE 2. ANY BIDDER WHO SUBMITS A BID FOR BOTH ALTERNATIVE 1 AND ALTERNATIVE 2 WILL BE DEEMED NON-RESPONSIVE AND THEIR BID WILL BE REJECTED.

SECTION 00010 Bidders Notes/Bid Schedule

1. All extensions of the unit prices shown will be subject to verification by the Government. In case of variation between the unit price and the extension, the unit price will be considered to be the bid.

2. If a modification to a bid based on unit prices is submitted which provides for a lump sum adjustment to the total estimated amount, the application of the lump sum adjustment to each unit price in the Price Schedule must be stated. If it is not stated, the bidder agrees that the lump sum adjustment shall be applied on a pro rata basis to every unit price in the Price Schedule.

3. Prices must be submitted on all individual items of the Price Schedule, otherwise the bid will be considered non-responsive and will be rejected.

4. For the purpose of initial evaluation of bids, the following will be utilized in resolving arithmetic discrepancies found on the face of the Price Schedule as submitted by the bidder:

a. Obviously misplaced decimal points will be corrected;
b. In case of discrepancy between the unit price and the extended price, the unit price will govern;
c. Apparent errors in extensions of unit prices will be corrected;
d. Apparent errors in addition of lump sum and extended prices will be corrected.

5. For the purpose of bid evaluation, the Government will proceed on the assumption that the bidder intends the bid to be evaluated on the basis of unit prices the totals arrived at by the resolution of arithmetic discrepancies as provided above and the bid will be so reflected on the abstract of bids.

6. The lump sum “LS” line items in the Price Schedule are not “Estimated Quantity” line items and are not subject to the “Variation in Estimated Quantity” contract clause.

7. The Contract Clause 52.232-27, “Prompt Payment for Construction Contracts” requires that the name and address of the contractor official, to whom payment is to be sent, be the same as that in the contract or in a proper Notice of Assignment.

8. Principal Contracting Officer. The Contracting Officer who signs this contract will be the Principal Contracting Officer for this contract. However, any Contracting Officer assigned to the Los Angeles District, contracting within his authority, may take formal action on this contract when the Principal Contracting Officer is unavailable and the action needs to be taken.

9. Amounts and prices shall be indicated in either words or figures, NOT BOTH.

10. Payment of Electronic Funds Transfer (EFT) is the mandatory method of payment. The Contractors attention is directed to Contract Clause NO. 52.232-33 “Mandatory Information for Electronic Funds Transfer” located in Section 00700.

11. The bidder shall distribute his indirect costs (overhead, profit, bond, etc.,) over all items in the Price Schedule. The Government will review all submitted Price Schedules for any unbalancing of the items. Any submitted Price Schedule determined to be unbalanced may be considered non-responsive and cause the bidder to be ineligible for contract award.

12. The bidder shall furnish all plant, labor, material, equipment, etc., necessary to perform all work in strict accordance with the terms and conditions set forth in the contract in include all attachments thereto.

13. Some quantities are ESTIMATED, the bidders prices MUST BE FIRM.

14. Bidder is cautioned to check his Price Schedule carefully prior to submission. If the Price Schedule contains unit prices, they should be round off to the second decimal point only NOT EXTENDED FUTHER.

15. Bidders attention is directed to Section 00100 “Instructions to Bidders” Clause No. 52.0214-4001, entitled “Directions for Submitting Bids”. Please note that there are Special Instructions Pertaining to Hand-Carried Bids.

16. Contractor is required to fill in Cage code (Reference Section 00600, entitled "Required Central Contractor Registration" Mar 1998) and DUNS Number (Reference Section 00600, entitled, "Data Universal Numbering System (DUNS) Number" Jun1999) in Block No. 15 on Standard Form 1442, Name and Address Block (Cage Code under Code and DUNS No. under Facility Code respectively).

17. Bidders are to submit prices on all line items in the Base Bid (0001-0091). In addition, bidders must submit prices on Alternative 1 (0092A-0092C) or Alternative 2 (0093A-0093C) NOT BOTH. The Government contemplates award of one contract to the responsive, responsible bidder who submit the lowest bid for the Base Bid and Alternative 1; or the lowest bid for the Base Bid and Alternative 2. Any bidder who submits a bid for BOTH Alternative 1 and Alternative 2 will be deemed non-responsive and their bid will be rejected.

CERTIFICATE OF CORPORATE PRINCIPAL

1) IF THE OFFEROR IS A JOINT VENTURE, COMPLETE THE FOLLOWING:

(Company Name)	(Signature)	(Title)
(Company Name)	(Signature)	(Title)
(Company Name)	(Signature)	(Title)

2) IF THE OFFEROR IS PARTNERSHIP, LIST FULL NAME OF ALL PARTNERS:

(Company Name)	(Signature)	(Title)
(Company Name)	(Signature)	(Title)
(Company Name)	(Signature)	(Title)

3) IF THE OFFEROR IS A CORPORATION, THE FOLLOWING CERTIFICATION SHOULD BE COMPLETED:

CERTIFICATION AS TO CORPORATE PRINCIPAL

I, _____ , certify that I am the Secretary of the corporation named as principal in the

within contract; that _____ , who signed the said contract on behalf of the principal, was the

_____ of the corporation; that I know his signature and that his signature is genuine; and that said contract was duly signed, sealed and attested for in behalf of said corporation by authority of its governing body.

_____
CORPORATE PRINCIPAL

CORPORATE SEAL

_____
SECRETARY

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Section 00100 Instructions to Bidders

Section 00100

52.0000-4010 INQUIRIES

Perspective bidders/offerors should submit inquiries related to this solicitation by writing or calling the following (collect calls will not be accepted:

(1) For inquiries of a contractual nature (solicitation requirements, interpretation of contractual language) call:
Cindy Myrtetus
213-452-3247

For bid results only, call (213) 452-3235.

(2) All technical questions on the specification or drawings will be submitted in writing to:
Address:

USAED – Los Angeles District, ATTN: Steve Vaughn
P. O. Box 532711, ED-DA
Los Angeles, CA 90053-2325

Facsimile Number: 213-452-4248
e-mail address: stephen.h.vaughn@usace.army.mil

(3) Please include the solicitation number, project title and location of project with your questions. Written inquiries must be received by this office not later than 14 calendar days prior to bid opening date/date set for receipt of offers.

(4) Oral explanations or instructions are not binding. Any information given to a bidder/offeror which impacts the bid/offer will be given in the form of a written amendment to the solicitation.

52.0000-4023 SAFETY REQUIREMENTS

The bidder's attention is directed to the latest version of U.S Army Corps of Engineers Safety and Health Manual, EM 385-1-1, which will be strictly enforced. This publication may be obtained from the US Army Engineer District, Los Angeles, ATTN: Safety Office, P.O. Box 532711, Los Angeles, California 90053-2325.

52.0001-4004 BID RESULTS

The telephone number for bid results after the opening is Area Code (213) 452-3245.

52.211-2 AVAILABILITY OF SPECIFICATIONS LISTED IN THE DOD INDEX OF SPECIFICATIONS AND STANDARDS (DODISS) AND DESCRIPTIONS LISTED IN THE ACQUISITION MANAGEMENT SYSTEMS AND DATA REQUIREMENTS CONTROL LIST, DOD 5010.12-L (DEC 1999)

Copies of specifications, standards, and data item descriptions cited in this solicitation may be obtained--
(a) From the ASSIST database via the Internet at http://assist.daps.mil; or

(b) By submitting a request to the--Department of Defense Single Stock Point (DoDSSP), Building 4, Section D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Telephone (215) 697-2667/2179, Facsimile (215) 697-1462.

(End of provision)

52.214-1 SOLICITATION DEFINITIONS--SEALED BIDDING (JUL 1987)

"Government" means United States Government.

"Offer" means "bid" in sealed bidding.

"Solicitation" means an invitation for bids in sealed bidding.

(End of provision)

52.214-3 AMENDMENTS TO INVITATIONS FOR BIDS (DEC 1989)

(a) If this solicitation is amended, then all terms and conditions which are not modified remain unchanged.

(b) Bidders shall acknowledge receipt of any amendment to this solicitation (1) by signing and returning the amendment, (2) by identifying the amendment number and date in the space provided for this purpose on the form for submitting a bid, (3) by letter or telegram, or (4) by facsimile, if facsimile bids are authorized in the solicitation. The Government must receive the acknowledgment by the time and at the place specified for receipt of bids.

(End of provision)

52.214-4 FALSE STATEMENTS IN BIDS (APR 1984)

Bidders must provide full, accurate, and complete information as required by this solicitation and its attachments. The penalty for making false statements in bids is prescribed in 18 U.S.C. 1001.

(End of provision)

52.214-5 SUBMISSION OF BIDS (MAR 1997)

(a) Bids and bid modifications shall be submitted in sealed envelopes or packages (unless submitted by electronic means) (1) addressed to the office specified in the solicitation, and (2) showing the time and date specified for receipt, the solicitation number, and the name and address of the bidder.

(b) Bidders using commercial carrier services shall ensure that the bid is addressed and marked on the outermost envelope or wrapper as prescribed in subparagraphs (a)(1) and (2) of this provision when delivered to the office specified in the solicitation.

(c) Telegraphic bids will not be considered unless authorized by the solicitation; however, bids may be modified or withdrawn by written or telegraphic notice.

(d) Facsimile bids, modifications, or withdrawals, will not be considered unless authorized by the solicitation.

(e) Bids submitted by electronic commerce shall be considered only if the electronic commerce method was specifically stipulated or permitted by the solicitation.

52.214-6 EXPLANATION TO PROSPECTIVE BIDDERS (APR 1984)

Any prospective bidder desiring an explanation or interpretation of the solicitation, drawings, specifications, etc., must request it in writing soon enough to allow a reply to reach all prospective bidders before the submission of their bids. Oral explanations or instructions given before the award of a contract will not be binding. Any information given a prospective bidder concerning a solicitation will be furnished promptly to all other prospective bidders as an amendment to the solicitation, if that information is necessary in submitting bids or if the lack of it would be prejudicial to other prospective bidders.

(End of provision)

52.214-7 LATE SUBMISSIONS, MODIFICATIONS, AND WITHDRAWALS OF BIDS (NOV 1999)

(a) Bidders are responsible for submitting bids, and any modifications or withdrawals, so as to reach the Government office designated in the invitation for bids (IFB) by the time specified in the IFB. If no time is specified in the IFB, the time for receipt is 4:30 p.m., local time, for the designated Government office on the date that bids are due.

(b)(1) Any bid, modification, or withdrawal received at the Government office designated in the IFB after the exact time specified for receipt of bids is “late” and will not be considered unless it is received before award is made, the Contracting Officer determines that accepting the late bid would not unduly delay the acquisition; and--

(i) If it was transmitted through an electronic commerce method authorized by the IFB, it was received at the initial point of entry to the Government infrastructure not later than 5:00 p.m. one working day prior to the date specified for receipt of bids; or

(ii) There is acceptable evidence to establish that it was received at the Government installation designated for receipt of bids and was under the Government's control prior to the time set for receipt of bids.

(2) However, a late modification of an otherwise successful bid that makes its terms more favorable to the Government, will be considered at any time it is received and may be accepted.

(c) Acceptable evidence to establish the time of receipt at the Government installation includes the time/date stamp of that installation on the bid wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Government personnel.

(d) If an emergency or unanticipated event interrupts normal Government processes so that bids cannot be received at the Government office designated for receipt of bids by the exact time specified in the IFB and urgent Government requirements preclude amendment of the IFB, the time specified for receipt of bids will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume.

(e) Bids may be withdrawn by written notice received at any time before the exact time set for receipt of bids. If the IFB authorizes facsimile bids, bids may be withdrawn via facsimile received at any time before the exact time set for receipt of bids, subject to the conditions specified in the provision at 52.214-31, Facsimile Bids. A bid may be withdrawn in person by a bidder or its authorized representative if, before the exact time set for receipt of bids, the identity of the person requesting withdrawal is established and the person signs a receipt for the bid.

(End of provision)

52.214-9 Failure to Submit Bid. (JUL 1995)

Recipients of this solicitation not responding with a bid should not return this solicitation, unless it specifies otherwise. Instead, they should advise the issuing office by letter, postcard, or established electronic commerce methods, whether they want to receive future solicitations for similar requirements.

52.214-18 PREPARATION OF BIDS--CONSTRUCTION (APR 1984)

(a) Bids must be (1) submitted on the forms furnished by the Government or on copies of those forms, and (2) manually signed. The person signing a bid must initial each erasure or change appearing on any bid form.

(b) The bid form may require bidders to submit bid prices for one or more items on various bases, including--

(1) Lump sum bidding;

(2) Alternate prices;

(3) Units of construction; or

(4) Any combination of subparagraphs (1) through (3) above.

(c) If the solicitation requires bidding on all items, failure to do so will disqualify the bid. If bidding on all items is not required, bidders should insert the words "no bid" in the space provided for any item on which no price is submitted.

(d) Alternate bids will not be considered unless this solicitation authorizes their submission.

52.214-19 CONTRACT AWARD--SEALED BIDDING--CONSTRUCTION (AUG 1996)

(a) The Government will evaluate bids in response to this solicitation without discussions and will award a contract to the responsible bidder whose bid, conforming to the solicitation, will be most advantageous to the Government, considering only price and the price-related factors specified elsewhere in the solicitation.

(b) The Government may reject any or all bids, and waive informalities or minor irregularities in bids received.

(c) The Government may accept any item or combination of items, unless doing so is precluded by a restrictive limitation in the solicitation or the bid.

(d) The Government may reject a bid as nonresponsive if the prices bid are materially unbalanced between line items or subline items. A bid is materially unbalanced when it is based on prices significantly less than cost for some work and prices which are significantly overstated in relation to cost for other work, and if there is a reasonable doubt that the bid will result in the lowest overall cost to the Government even though it may be the low evaluated bid, or if it is so unbalanced as to be tantamount to allowing an advance payment.

52.214-34 SUBMISSION OF OFFERS IN THE ENGLISH LANGUAGE (APR 1991)

Offers submitted in response to this solicitation shall be in the English language. Offers received in other than English shall be rejected.

(End of provision)

52.214-35 SUBMISSION OF OFFERS IN U.S. CURRENCY (APR 1991)

Offers submitted in response to this solicitation shall be in terms of U.S. dollars. Offers received in other than U.S. dollars shall be rejected.

(End of provision)

52.0214-4001 DIRECTIONS FOR SUBMITING BIDS (MAR 2002)

Envelopes containing bids must be sealed, marked and addressed as follows:

MARK ENVELOPES:

Bid under IFB No. DACW09-02-B-0004
Bid Opening Date: February 6, 2003 AT 1:00 PM

ADDRESS ENVELOPES TO:

Department of the Army
U. S. Army Engineer District, Los Angeles
ATTN: Contracting Division
C/O: CINDY MYRTETUS
P. O. Box 532711
Los Angeles, CA 90053-2325

SPECIAL INSTRUCTIONS PERTAINING TO HAND-CARRIED BIDS:

Due to security precautions, all Corps of Engineers visitors/couriers are now required to check in at the Public Affairs Office (PAO), Suite 980, Wilshire Blvd, Los Angeles, CA. Bidders are no longer permitted to hand-carry their bids directly to Contacting Division without an authorized escort. **Bids may NOT be left unattended at the Public Affairs Office (PAO), Suite 980.**

Bidders who desire to hand-deliver their bids prior to the scheduled bid opening time/date must notify the Contracting Division to arrange for receipt of their bid by Contracting Division personnel. Normally the contact will be the Contract Specialist designated above. In the event the Contract Specialist cannot be reached, please call the main Contracting Division telephone number, 213-452-3231 or the following alternative telephone numbers -3233, -3245, -3234, or -3235, in order to request assistance.

30 minutes prior to the scheduled bid opening time/date, the Bid Opening Officer will be in the Public Affairs Office (PAO) Suite 980, to accept bids. After visitor in-processing, all bidders will subsequently be escorted to Bid Opening Room, where the bids will be publicly opened and read.

In order to expedite visitor processing, bidders are encouraged to complete the information requested on the Notice of Visitor(s) Form (attached). The completed form can be faxed to the Contract Specialist at (213)452-4184 or 4187, prior to the date for receipt of bids. In addition, no more than 2 visitors per firm will be permitted within the building. No exceptions will be made. The offeror is responsible for compliance with the security requirements and shall ensure that any company representative, courier or delivery personnel are aware of these special procedures pertaining to hand carried bids.

NOTICE OF VISITOR(S)

1. Date(s) of Visit *(Inclusive)*	**2. Arrival Time**	
3. Name of Visitor(s) *(Last, First)*	**4. Agency/Company of Visitor**	
5. Name of Person Being Visited *(Include Div, Br, Sec)*	**6. Suite Number**	**7. Telephone Number**
8. Contact Person *(if other than Person Being Visited)*		**9. Telephone Number**
10. Other Comments or Instructions		

- All visitors must report to the Public Affairs Office, Suite 980
- Visitors must use the Visitor Tag provided.
- Visitors must be escorted to Corps of Engineers floors
- Parking validation is only available for Engineering Division, Construction-Operations, and Information Management field personnel.
- Delivery personnel will be validated for 30 minutes only.

52.214-5000 ARITHMETIC DISCREPANCIES EFARS 52.214-5000

(a) For the purpose of initial evaluation of bids, the following will be utilized in resolving arithmetic discrepancies found on the face of the bidding schedule as submitted by bidders:

(1) Obviously misplaced decimal points will be corrected;

(2) Discrepancy between unit price and extended price, the unit price will govern;

(3) Apparent errors in extension of unit prices will be corrected;

(4) Apparent errors in addition of lump sum and extended prices will be corrected.

(b) For the purpose of bid evaluation, the Government will proceed on the assumption that the bidder intends his bid to be evaluated on the basis of the unit prices, the totals arrived at by resolution of arithmetic discrepancies as provided above and the bid will be so reflected on the abstract of bids.

(c) These correction procedures shall not be used to resolve any ambiguity concerning which bid is low.

(End of statement)

52.0214-4583 TELEGRAPHIC BIDS/OFFERS ARE NOT ACCEPTABLE

Any telegram to modify or withdraw a bid/offer sent to this office must be physically delivered to the office designated for receipt of bid/offer by the date and time set for bid opening/receipt of proposals. No one from this office will be dispatched to the local telegraph office to pick up any telegram for any reason.

52.0214-4584 FACSIMILE BIDS/OFFERS

Facsimile bids/offers, modifications thereto, or cancellations of bids/offers will not be accepted.

52.0214-4599 EVALUATION FOR AWARD

The Government contemplates award of one contract to the responsive, responsible bidder who submits the low bid for the total of all the items in the Bidding Schedule.

52.216-1 TYPE OF CONTRACT (APR 1984)

The Government contemplates award of a Firm Fixed Price contract resulting from this solicitation.

(End of clause)

52.225-12 NOTICE OF BUY AMERICAN ACT REQUIREMENT-- CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (FEB 2000)

(a) Definitions. Construction material, designated country construction material, domestic construction material, foreign construction material, and NAFTA country construction material, as used in this provision, are defined in the clause of this solicitation entitled “Buy American Act--Balance of Payments Program--Construction Materials under Trade Agreements” (Federal Acquisition Regulation (FAR) clause 52.225-11).

(b) Requests for determination of inapplicability. An offeror requesting a determination regarding the inapplicability of the Buy American Act or Balance of Payments Program should submit the request to the Contracting Officer in time to allow a determination before submission of offers. The offeror shall include the information and applicable supporting data required by paragraphs (c) and (d) of FAR clause 52.225-11 in the request. If an offeror has not requested a determination regarding the inapplicability of the Buy American Act or Balance of Payments Program before submitting its offer, or has not received a response to a previous request, the offeror shall include the information and supporting data in the offer.

(c) Evaluation of offers. (1) The Government will evaluate an offer requesting exception to the requirements of the Buy American Act or Balance of Payments Program, based on claimed unreasonable cost of domestic construction materials, by adding to the offered price the appropriate percentage of the cost of such foreign construction material, as specified in paragraph (b)(4)(i) of FAR clause 52.225-11.

(2) If evaluation results in a tie between an offeror that requested the substitution of foreign construction material based on unreasonable cost and an offeror that did not request an exception, the Contracting Officer will award to the offeror that did not request an exception based on unreasonable cost.

(d) Alternate offers. (1) When an offer includes foreign construction material, other than designated country or NAFTA country construction material, that is not listed by the Government in this solicitation in paragraph (b)(3) of FAR clause 52.225-11, the offeror also may submit an alternate offer based on use of equivalent domestic, designated country, or NAFTA country construction material.

(2) If an alternate offer is submitted, the offeror shall submit a separate Standard Form 1442 for the alternate offer, and a separate price comparison table prepared in accordance with paragraphs (c) and (d) of FAR clause 52.225-11 for the offer that is based on the use of any foreign construction material for which the Government has not yet determined an exception applies.

(3) If the Government determines that a particular exception requested in accordance with paragraph (c) of FAR clause 52.225-11 does not apply, the Government will evaluate only those offers based on use of the equivalent domestic, designated country, or NAFTA country construction material, and the offeror shall be required to furnish such domestic, designated country, or NAFTA country construction material. An offer based on use of the foreign construction material for which an exception was requested--

(i) Will be rejected as nonresponsive if this acquisition is conducted by sealed bidding; or

(ii) May be accepted if revised during negotiations.

(End of provision)

52.228-1 BID GUARANTEE (SEP 1996)

(a) Failure to furnish a bid guarantee in the proper form and amount, by the time set for opening of bids, may be cause for rejection of the bid.

(b) The bidder shall furnish a bid guarantee in the form of a firm commitment, e.g., bid bond supported by good and sufficient surety or sureties acceptable to the Government, postal money order, certified check, cashier's check, irrevocable letter of credit, or, under Treasury Department regulations, certain bonds or notes of the United States. The Contracting Officer will return bid guarantees, other than bid bonds, (1) to unsuccessful bidders as soon as practicable after the opening of bids, and (2) to the successful bidder upon execution of contractual documents and bonds (including any necessary coinsurance or reinsurance agreements), as required by the bid as accepted.

(c) The amount of the bid guarantee shall be 20% percent of the bid price or $3,000,000.00, whichever is less.

(d) If the successful bidder, upon acceptance of its bid by the Government within the period specified for acceptance, fails to execute all contractual documents or furnish executed bond(s) within 10 days after receipt of the forms by the bidder, the Contracting Officer may terminate the contract for default.

(e) In the event the contract is terminated for default, the bidder is liable for any cost of acquiring the work that exceeds the amount of its bid, and the bid guarantee is available to offset the difference.

52.228-4506 INDIVIDUAL SURETIES IN SUPPORT OF BID BONDS

Bidder/offerors utilizing individual sureties in support of a bid bond shall include a Standard Form (SF) 28 (Affidavit of Individual Surety), accompanied by a pledge of acceptable assets from each person acting as an individual surety, and include these with the SF 24 (Bid Bond), and the bid itself (see clause titled "Pledges of Assets," FAR 52.228-11). Pledges of acceptable assets shall be in the form of (1) evidence of an escrow account and/or (2) a recorded lien on real estate. If this is an RFP, failure to provide required documentation described herein may cause the offeror to be deemed "unacceptable".

52.228-4507 BID GUARANTEE FORM AND AMOUNT

When bids/proposals exceed $100,000, the offeror shall furnish a separated bid guarantee in accordance with the solicitation provision titled "Bid Guarantee", FAR 52.228-1. In accordance with FAR 28.101-2 the bid guarantee amount shall be a least 20 percent of the "bid price" but shall not exceed $3 million. When the penal sum is expressed as a percentage, a maximum dollar limitation may be stated. If there are

option line items on the Pricing Schedule (Schedule B), the term "bid price" is hereby defined as the total bid not to include any amount for line items designated as "options". In bids/proposals that contain "additives", the "bid price" is defined as the total of all bid items including additive line items. FAR 28.106-1 states that a Standard Form (SF) 24 shall be used for the bid bond. In accordance with FAR 28.202(a)(1), corporate sureties utilized must appear on the list contained in the Department of Treasury Circular 570 titled "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and Acceptable Reinsuring Companies."

52.232-38 SUBMISSION OF ELECTRONIC FUNDS TRANSFER INFORMATION WITH OFFER (MAY 1999)

The offeror shall provide, with its offer, the following information that is required to make payment by electronic funds transfer (EFT) under any contract that results from this solicitation. This submission satisfies the requirement to provide EFT information under paragraphs (b)(1) and (j) of the clause at 52.232-34, Payment by Electronic Funds Transfer--Other than Central Contractor Registration.

(1) The solicitation number (or other procurement identification number).

(2) The offeror's name and remittance address, as stated in the offer.

(3) The signature (manual or electronic, as appropriate), title, and telephone number of the offeror's official authorized to provide this information.

(4) The name, address, and 9-digit Routing Transit Number of the offeror's financial agent.

(5) The offeror's account number and the type of account (checking, savings, or lockbox).

(6) If applicable, the Fedwire Transfer System telegraphic abbreviation of the offeror's financial agent.

(7) If applicable, the offeror shall also provide the name, address, telegraphic abbreviation, and 9-digit Routing Transit Number of the correspondent financial institution receiving the wire transfer payment if the offeror's financial agent is not directly on-line to the Fedwire and, therefore, not the receiver of the wire transfer payment.

(End of provision)

52.233-2 SERVICE OF PROTEST (AUG 1996)

(a) Protests, as defined in section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the General Accounting Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgment of receipt from Lucia A. Carvajal, P. O. Box 532711, Los Angeles, CA 90053-2325

(b) The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

(End of provision)

52.236-27 SITE VISIT (CONSTRUCTION) (FEB 1995)

(a) The clauses at 52.236-2, Differing Site Conditions, and 52.236-3, Site Investigations and Conditions Affecting the Work, will be included in any contract awarded as a result of this solicitation. Accordingly, offerors or quoters are urged and expected to inspect the site where the work will be performed.

(b) Site visits may be arranged during normal duty hours by contacting Julie Martinez at 562. 861.1094. An organized site visit will be held on November 7, 2002 at 10:00 AM. Please meet at the following location:

2493 Pomona-Rincon Rd
Corona, CA
(which is at the entrance gate of the facility)

52.211-5000 EVALUATION OF SUBDIVIDED ITEMS (MAR 1995)—EFARS

Item Nos. 0034, 0037, 0057, 0058, 0059, 0063, 0068,and 0069 are subdivided into two or more estimated quantities and are to be separately priced. The Government will evaluate each of these items on the basis of total price of its sub-items.

(End of clause)

SECTION 00800 Special Contract Requirements

SECTION 00800

52.0001- 4001 CONTRACT ADMINISTRATION DATA

The Contract Administration Office for this contract subsequent to award is:

Department of the Army
Los Angeles District, Corps of Engineers
P.O. Box 532711
Los Angeles, California 90053-2325

ATTN: Cindy Myrtetus
Telephone No: Area Code (213) 452- 3247

Payment will be made by:

USACE Finance Center
ATTN: CEFC-AO-P
5270 Integrity Drive
Millington, TN 38054-5005

Submit Invoices to:

Refer to Block No. 26 of the Standard Form 1442, "Solicitation, Offer and Award" which will be completed at time of contract award.

52.211-10 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984)

The Contractor shall be required to (a) commence work under this contract within 1 calendar days after the date the Contractor receives the Notice to Proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than 1278 calendar days after the Contractor receives the Notice to Proceed. The time stated for completion shall include final cleanup of the premises.

(End of clause)

52.211-12 LIQUIDATED DAMAGES--CONSTRUCTION (SEP 2000)

(a) If the Contractor fails to complete the work within the time specified in the contract, the Contractor shall pay liquidated damages to the Government in the amount of $1,350.00 for each calendar day of delay until the work is completed or accepted.

(b) If the Government terminates the Contractor's right to proceed, liquidated damages will continue to accrue until the work is completed. These liquidated damages are in addition to excess costs of repurchase under the Termination clause.

(End of clause)

52.211-18 VARIATION IN ESTIMATED QUANTITY (APR 1984)

If the quantity of a unit-priced item in this contract is an estimated quantity and the actual quantity of the unit-priced item varies more than 15 percent above or below the estimated quantity, an equitable adjustment in the contract price shall be made upon demand of either party. The equitable adjustment shall be based upon any increase or decrease in costs due solely to the variation above 115 percent or below 85

percent of the estimated quantity. If the quantity variation is such as to cause an increase in the time necessary for completion, the Contractor may request, in writing, an extension of time, to be received by the Contracting Officer within 10 days from the beginning of the delay, or within such further period as may be granted by the Contracting Officer before the date of final settlement of the contract. Upon the receipt of a written request for an extension, the Contracting Officer shall ascertain the facts and make an adjustment for extending the completion date as, in the judgment of the Contracting Officer, is justified.

52.222-23 NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY FOR CONSTRUCTION (FEB 1999)

(a) The offeror's attention is called to the Equal Opportunity clause and the Affirmative Action Compliance Requirements for Construction clause of this solicitation.

(b) The goals for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Goals for minority participation for each trade	Goals for female participation for each trade
21% to 25.1%	6.9%

These goals are applicable to all the Contractor's construction work performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, the Contractor shall apply the goals established for the geographical area where the work is actually performed. Goals are published periodically in the Federal Register in notice form, and these notices may be obtained from any Office of Federal Contract Compliance Programs office.

(c) The Contractor's compliance with Executive Order 11246, as amended, and the regulations in 41 CFR 60-4 shall be based on (1) its implementation of the Equal Opportunity clause, (2) specific affirmative action obligations required by the clause entitled "Affirmative Action Compliance Requirements for Construction," and (3) its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade. The Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor, or from project to project, for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, Executive Order 11246, as amended, and the regulations in 41 CFR 60-4. Compliance with the goals will be measured against the total work hours performed.

(d) The Contractor shall provide written notification to the Deputy Assistant Secretary for Federal Contract Compliance, U.S. Department of Labor, within 10 working days following award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the --

(1) Name, address, and telephone number of the subcontractor;

(2) Employer's identification number of the subcontractor;

(3) Estimated dollar amount of the subcontract;

(4) Estimated starting and completion dates of the subcontract; and

(5) Geographical area in which the subcontract is to be performed.

(e) As used in this Notice, and in any contract resulting from this solicitation, the "covered area" is Los Angeles County, California.

52.228-12 Prospective Subcontractor Requests for Bonds. (OCT 1995)

In accordance with Section 806(a)(3) of Pub. L. 102-190, as amended by Sections 2091 and 8105 of Pub. L. 103-355, upon the request of a prospective subcontractor or supplier offering to furnish labor or material for the performance of this contract for which a payment bond has been furnished to the Government pursuant to the Miller Act, the Contractor shall promptly provide a copy of such payment bond to the requester.

52.228-14 IRREVOCABLE LETTER OF CREDIT (DEC 1999)

(a) "Irrevocable letter of credit" (ILC), as used in this clause, means a written commitment by a federally insured financial institution to pay all or part of a stated amount of money, until the expiration date of the letter, upon presentation by the Government (the beneficiary) of a written demand therefor. Neither the financial institution nor the offeror/Contractor can revoke or condition the letter of credit.

(b) If the offeror intends to use an ILC in lieu of a bid bond, or to secure other types of bonds such as performance and payment bonds, the letter of credit and letter of confirmation formats in paragraphs (e) and (f) of this clause shall be used.

(c) The letter of credit shall be irrevocable, shall require presentation of no document other than a written demand and the ILC (including confirming letter, if any), shall be issued/confirmed by an acceptable federally insured financial institution as provided in paragraph (d) of this clause, and--

(1) If used as a bid guarantee, the ILC shall expire no earlier than 60 days after the close of the bid acceptance period;

(2) If used as an alternative to corporate or individual sureties as security for a performance or payment bond, the offeror/Contractor may submit an ILC with an initial expiration date estimated to cover the entire period for which financial security is required or may submit an ILC with an initial expiration date that is a minimum period of one year from the date of issuance. The ILC shall provide that, unless the issuer provides the beneficiary written notice of non-renewal at least 60 days in advance of the current expiration date, the ILC is automatically extended without amendment for one year from the expiration date, or any future expiration date, until the period of required coverage is completed and the Contracting Officer provides the financial institution with a written statement waiving the right to payment. The period of required coverage shall be:

(i) For contracts subject to the Miller Act, the later of--

(A) One year following the expected date of final payment;

(B) For performance bonds only, until completion of any warranty period; or

(C) For payment bonds only, until resolution of all claims filed against the payment bond during the one-year period following final payment.

(ii) For contracts not subject to the Miller Act, the later of--

(A) 90 days following final payment; or

(B) For performance bonds only, until completion of any warranty period.

(d) Only federally insured financial institutions rated investment grade or higher shall issue or confirm the ILC. The offeror/Contractor shall provide the Contracting Officer a credit rating that indicates the financial institution has the required rating(s) as of the date of issuance of the ILC. Unless the financial institution issuing the ILC had letter of credit business of less than $25 million in the past year, ILCs over $5 million

must be confirmed by another acceptable financial institution that had letter of credit business of less than $25 million in the past year.

(e) The following format shall be used by the issuing financial institution to create an ILC:

_____

[Issuing Financial Institution's Letterhead or Name and Address]

Issue Date _____

IRREVOCABLE LETTER OF CREDIT NO. _____

Account party's name _____

Account party's address _____

For Solicitation No. _____(for reference only)

TO: [U.S. Government agency]

[U.S. Government agency's address]

1. We hereby establish this irrevocable and transferable Letter of Credit in your favor for one or more drawings up to United States $_____. This Letter of Credit is payable at [issuing financial institution's and, if any, confirming financial institution's] office at [issuing financial institution's address and, if any, confirming financial institution's address] and expires with our close of business on _____, or any automatically extended expiration date.

2. We hereby undertake to honor your or the transferee's sight draft(s) drawn on the issuing or, if any, the confirming financial institution, for all or any part of this credit if presented with this Letter of Credit and confirmation, if any, at the office specified in paragraph 1 of this Letter of Credit on or before the expiration date or any automatically extended expiration date.

3. [This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.] It is a condition of this Letter of Credit that it is deemed to be automatically extended without amendment for one year from the expiration date hereof, or any future expiration date, unless at least 60 days prior to any expiration date, we notify you or the transferee by registered mail, or other receipted means of delivery, that we elect not to consider this Letter of Credit renewed for any such additional period. At the time we notify you, we also agree to notify the account party (and confirming financial institution, if any) by the same means of delivery.

4. This Letter of Credit is transferable. Transfers and assignments of proceeds are to be effected without charge to either the beneficiary or the transferee/assignee of proceeds. Such transfer or assignment shall be only at the written direction of the Government (the beneficiary) in a form satisfactory to the issuing financial institution and the confirming financial institution, if any.

5. This Letter of Credit is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, 1993 Revision, International Chamber of Commerce Publication No. 500, and to the extent not inconsistent therewith, to the laws of _____ [state of confirming financial institution, if any, otherwise state of issuing financial institution].

6. If this credit expires during an interruption of business of this financial institution as described in Article 17 of the UCP, the financial institution specifically agrees to effect payment if this credit is drawn against within 30 days after the resumption of our business.

Sincerely,

_____

[Issuing financial institution]

(f) The following format shall be used by the financial institution to confirm an ILC:

_____
[Confirming Financial Institution's Letterhead or Name and Address]

(Date) _____

Our Letter of Credit Advice Number _____

Beneficiary: _____ [U.S. Government agency]

Issuing Financial Institution: _____

Issuing Financial Institution's LC No.: _____

Gentlemen:

1. We hereby confirm the above indicated Letter of Credit, the original of which is attached, issued by _____ [name of issuing financial institution] for drawings of up to United States dollars _____/U.S. $_____ and expiring with our close of business on _____ [the expiration date], or any automatically extended expiration date.

2. Draft(s) drawn under the Letter of Credit and this Confirmation are payable at our office located at _____.

3. We hereby undertake to honor sight draft(s) drawn under and presented with the Letter of Credit and this Confirmation at our offices as specified herein.

4. [This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.] It is a condition of this confirmation that it be deemed automatically extended without amendment for one year from the expiration date hereof, or any automatically extended expiration date, unless:

(a) At least 60 days prior to any such expiration date, we shall notify the Contracting Officer, or the transferee and the issuing financial institution, by registered mail or other receipted means of delivery, that we elect not to consider this confirmation extended for any such additional period; or

(b) The issuing financial institution shall have exercised its right to notify you or the transferee, the account party, and ourselves, of its election not to extend the expiration date of the Letter of Credit.

5. This confirmation is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, 1993 Revision, International Chamber of Commerce Publication No. 500, and to the extent not inconsistent therewith, to the laws of _____ [state of confirming financial institution].

6. If this confirmation expires during an interruption of business of this financial institution as described in Article 17 of the UCP, we specifically agree to effect payment if this credit is drawn against within 30 days after the resumption of our business.

Sincerely,

_____

[Confirming financial institution]

(g) The following format shall be used by the Contracting Officer for a sight draft to draw on the Letter of Credit:

SIGNED DRAFT

_____

[City, State]

(Date) _____

[Name and address of financial institution]

Pay to the order of _____ [Beneficiary Agency] _____ the sum of United States $_____. This draft is drawn under Irrevocable Letter of Credit No. _____.

_____

[Beneficiary Agency]

By: _____

52.228-15 Performance and Payment Bonds--Construction (JUL 2000)-

(a) Definitions. As used in this clause--

Original contract price means the award price of the contract; or, for requirements contracts, the price payable for the estimated total quantity; or, for indefinite-quantity contracts, the price payable for the specified minimum quantity. Original contract price does not include the price of any options, except those options exercised at the time of contract award.

(b) Amount of required bonds. Unless the resulting contract price is $100,000 or less, the successful offeror shall furnish performance and payment bonds to the Contracting Officer as follows:

(1) Performance bonds (Standard Form 25). The penal amount of performance bonds at the time of contract award shall be 100 percent of the original contract price.

(2) Payment Bonds (Standard Form 25-A). The penal amount of payment bonds at the time of contract award shall be 100 percent of the original contract price.

(3) Additional bond protection. (i) The Government may require additional performance and payment bond protection if the contract price is increased. The increase in protection generally will equal 100 percent of the increase in contract price.

(ii) The Government may secure the additional protection by directing the Contractor to increase the penal amount of the existing bond or to obtain an additional bond.

(c) Furnishing executed bonds. The Contractor shall furnish all executed bonds, including any necessary reinsurance agreements, to the Contracting Officer, within the time period specified in the Bid Guarantee provision of the solicitation, or otherwise specified by the Contracting Officer, but in any event, before starting work.

(d) Surety or other security for bonds. The bonds shall be in the form of firm commitment, supported by corporate sureties whose names appear on the list contained in Treasury Department Circular 570, individual sureties, or by other acceptable security such as postal money order, certified check, cashier's check, irrevocable letter of credit, or, in accordance with Treasury Department regulations, certain bonds or notes of the United States. Treasury Circular 570 is published in the Federal Register or may be obtained from the U.S. Department of Treasury, Financial Management Service, Surety Bond Branch, 401 14th Street, NW, 2nd Floor, West Wing, Washington, DC 20227.

(e) Notice of subcontractor waiver of protection (40 U.S.C. 270b(c). Any waiver of the right to sue on the payment bond is void unless it is in writing, signed by the person whose right is waived, and executed after such person has first furnished labor or material for use in the performance of the contract.

(End of clause)

52.0028-4001 REQUIRED INSURANCE

Insurance is required as follows:

a. Either Workman's Compensation or Employer's Liability Insurance with a minimum limit of $100,000.00.

b. General Liability. The Contracting Officer shall require bodily injury liability insurance coverage written on the comprehensive form or policy of at least $500,000.00 per occurrence.

c. Automobile Liability Insurance for Bodily Injury and Property Damage with minimum limits of $200,000.00 for injury or death of any one person; $500,000.00 for each accident or occurrence of bodily injury liability; and $20,000.00 for each accident or occurrence for property liability.

d. In every case the insurance coverage shall amount to at least the limits stated above. However, where the Financial Responsibility Compulsory Insurance Law of the State in which the installation is located requires higher limits, the Automobile Liability Insurance Policy should provide coverage of at least those limits.

Prior to the commencement of work hereunder, the Contractor shall furnish to the Contracting Office a certificate or written statement of the above required insurance. The policies evidencing required insurance shall contain an endorsement to the effect that cancellation or any material change in the policies adversely affecting the interests of the Government in such insurance shall not be effective until 10 days after written notice thereof to the Contracting Officer.

The Contractor agrees to insert the substance of this clause, including this paragraph, in all subcontracts

52.0231-4001 EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE (MAR 1995) EFARS 52-231-5000

(a) Allowable costs for construction and marine plant and equipment in sound workable condition owned or controlled and furnished by a contractor or subcontractor at any tier shall be based on actual cost data for each piece of equipment or groups of similar serial and series for which the Government can determine both ownership and operating costs from the contractor's accounting records. When both ownership and operating costs cannot be determined for any piece of equipment or groups of similar serial or series equipment from the contractor's accounting records, costs for that equipment shall be based upon the applicable provisions of EP 1110-1-8, "Construction Equipment Ownership and Operating Expense Schedule," Region VII. Working conditions shall be considered to be average for determining equipment rates using the formula provided in the schedule. For forward pricing, the schedule in effect at the time of negotiations shall apply. For retrospective pricing, the schedule in effect at the time the work was performed shall apply.

(b) Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d)(ii) and FAR 31.205-36 substantiated by certified copies of paid invoices. Rates for equipment rented from an organization under common control, lease-purchase or sale-leaseback arrangements will be determined using the schedule except that rental costs leased from an organization under common control that has an established practice of leasing the same or similar equipment to unaffiliated lessees are allowable. Costs for major repairs and overhaul are unallowable.

(c) When actual equipment costs are proposed and the total amount of the pricing action is over $25,000, cost or pricing data shall be submitted on Standard Form 1411, "Contract Pricing Proposal Cover Sheet." By submitting cost or pricing data, the contractor grants to the contracting officer or an authorizing representative the right to examine those books, records, documents and other supporting data that will permit evaluation of the proposed equipment costs. After price agreement the contractor shall certify that the equipment costs of pricing data submitted are accurate, complete and current.

(End of clause)

52.232-4001 CONTINUING CONTRACTS (ALTERNATE) (MAR 1995) EFARS 52-232-5002

(a) Funds are not available at the inception of this contract to cover the entire contract price. The sum of $100,000.00 has been reserved for this contract and is available for payment to the contractor during the current fiscal year. It is expected that Congress will make appropriations for future fiscal years from which additional funds, together with funds provided by one or more non-federal project sponsors will be reserved for this contract. The liability of the United States for payment beyond the funds reserved for this contract is contingent on the reservation of additional funds.

(b) Failure to make payment in excess of the amount currently reserved, or that may be reserved from time to time, shall not be considered a breach of this contract, and shall not entitle the contractor to a price adjustment under the terms of this contract except as specifically provided in paragraphs (e) and (h) below.

(c) The Government may at any time reserve additional funds for payments under the contract if there are funds available for such purpose. The contracting officer will promptly notify the contractor of any additional funds reserved for the contract by issuing and administrative modification to the contract.

(d) If earnings will be such that funds reserved for the contract will be exhausted before the end of any fiscal year, the contractor shall give written notice to the contracting officer of the estimated date of exhaustion and of additional funds which will be needed to meet payments due or to become due under this contract during that fiscal year. This notice shall be given not less than 45 nor more than 60 days prior to the estimated date of exhaustion.

(e) No payments will be made after exhaustion of funds except to the extent that additional funds are reserved for the contract. If and when sufficient additional funds are reserved, the contractor shall be entitled to simple interest on any payment that the contracting officer determines was actually earned under the terms of this contract and would have been made except for exhaustion of funds. Interest shall be computed from the time such payment would otherwise have been made until actually or constructively made, and shall be at the rate established by the Secretary of the Treasury pursuant to Public Law 92-41, 85 Stat 97, as in effect on the first day of the delay in such payment.

(f) Any suspension, delay, or interruption of work arising from exhaustion or anticipated exhaustion of funds shall not constitute a breach of this contract and shall not entitle the contractor to any price adjustment under a "Suspension of Work" or similar clause or in any other manner under this contract.

(g) An equitable adjustment in performance time shall be made for any increase in the time required for performance of any part of the work arising from exhaustion of funds or the reasonable anticipation of exhaustion of funds.

(h) If, upon the expiration of sixty (60) days after the beginning of the fiscal year following an exhaustion of funds, the Government has failed to reserve sufficient additional funds to cover payments otherwise due, the contractor, by written notice delivered to the contracting officer at any time before such additional funds are reserved, may elect to treat his right to proceed with the work as having been terminated. Such a termination shall be at no cost to the Government, except that, to the extent that

additional funds to make payment therefore are allocated to this contract, it may be treated as a termination for the convenience of the Government.

(i) If at any time it becomes apparent that the funds reserved for any fiscal year are in excess of the funds required to meet all payments due or to become due the contractor because of work performed and to be performed under this contract during the fiscal year, the Government reserves the right, after notice to the contractor, to reduce said reservation by the amount of such excess.

(j) The term "Reservation" means monies that have been set aside and made available for payments under this contract.

52.236-1 PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984)

The Contractor shall perform on the site, and with its own organization, work equivalent to at least 35% percent of the total amount of work to be performed under the contract. This percentage may be reduced by a supplemental agreement to this contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

52.236-4 PHYSICAL DATA (APR 1984)

Data and information furnished or referred to below is for the Contractor's information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

(a) The indications of physical conditions on the drawings and in the specifications are the result of site investigations by surveys.

(b) Weather conditions . The contractor shall satisfy himself as to the hazards likely to arise from weather conditions.

(c) Transportation facilities . The contractor shall make his own investigation of the conditions of existing public and private roads and clearances, restrictions, bridge load limits and other limitations affecting transportation and ingress and egress at the job site. The unavailability of transportation facilities or limitations thereof shall not become a basis for claims against the Government or extensions of time for completion of the work.

(d) N/A.

52.236-16 QUANTITY SURVEYS (APR 1984)

(a) Quantity surveys shall be conducted, and the data derived from these surveys shall be used in computing the quantities of work performed and the actual construction completed and in place.

(b) The Government shall conduct the original and final surveys and make the computations based on them. The Contractor shall conduct the surveys for any periods for which progress payments are requested and shall make the computations based on these surveys. All surveys conducted by the Contractor shall be conducted under the direction of a representative of the Contracting Officer, unless the Contracting Officer waives this requirement in a specific instance.

(c) Promptly upon completing a survey, the Contractor shall furnish the originals of all field notes and all other records relating to the survey or to the layout of the work to the Contracting Officer, who shall use them as necessary to determine the amount of progress payments. The Contractor shall retain copies of all such material furnished to the Contracting Officer.

52.236-21 SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FEB 1997)

(a) The Contractor shall keep on the work site a copy of the drawings and specifications and shall at all times give the Contracting Officer access thereto. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, the specifications shall govern. In case of discrepancy in the figures, in the drawings, or in the specifications, the matter shall be promptly submitted to the Contracting Officer, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at its own risk and expense. The Contracting Officer shall furnish from time to time such detailed drawings and other information as considered necessary, unless otherwise provided.

(b) Wherever in the specifications or upon the drawings the words "directed", "required", "ordered", "designated", "prescribed", or words of like import are used, it shall be understood that the "direction", "requirement", "order", "designation", or "prescription", of the Contracting Officer is intended and similarly the words "approved", "acceptable", "satisfactory", or words of like import shall mean "approved by," or "acceptable to", or "satisfactory to" the Contracting Officer, unless otherwise expressly stated.

(c) Where "as shown," as indicated", "as detailed", or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise. The word "provided" as used herein shall be understood to mean "provide complete in place," that is "furnished and installed".

(d) Shop drawings means drawings, submitted to the Government by the Contractor, subcontractor, or any lower tier subcontractor pursuant to a construction contract, showing in detail (1) the proposed fabrication and assembly of structural elements, and (2) the installation (i.e., fit, and attachment details) of materials or equipment. It includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the contractor to explain in detail specific portions of the work required by the contract. The Government may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.

(e) If this contract requires shop drawings, the Contractor shall coordinate all such drawings, and review them for accuracy, completeness, and compliance with contract requirements and shall indicate its approval thereon as evidence of such coordination and review. Shop drawings submitted to the Contracting Officer without evidence of the Contractor's approval may be returned for resubmission. The Contracting Officer will indicate an approval or disapproval of the shop drawings and if not approved as submitted shall indicate the Government's reasons therefore. Any work done before such approval shall be at the Contractor's risk. Approval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract, except with respect to variations described and approved in accordance with (f) below.

(f) If shop drawings show variations from the contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at the time of submission. If the Contracting Officer approves any such variation, the Contracting Officer shall issue an appropriate contract modification, except that, if the variation is minor or does not involve a change in price or in time of performance, a modification need not be issued.

(g) The Contractor shall submit to the Contracting Officer for approval four copies (unless otherwise indicated) of all shop drawings as called for under the various headings of these specifications. Three sets (unless otherwise indicated) of all shop drawings, will be retained by the Contracting Officer and one set will be returned to the Contractor.

52.0236-4001 PLANT AND MATERIAL REMOVAL AFTER CONTRACT TERMINATION (MAR 1996) EFARS 52.236-5000

Should this contract be terminated as provided in clause 52.232-4001

because of the failure of Congress to provide additional funds for its completion, the contractor may be permitted to remove plant and material on which payments for preparatory work have been made, subject to an equitable deduction from the amounts due the contractor to reimburse the United States for the unabsorbed value of such plant and material.

(End of clause)

52.249-4001 BASIS FOR SETTLEMENT OF PROPOSALS EFARS 52.249-5000

Actual costs will be used to determine equipment costs for a settlement proposal submitted on the total cost basis under FAR 49.206-2(b). In evaluating a terminations settlement proposal using the total costs basis, the following principals will be applied to determine allowable equipment costs:

(1) Actual costs for each piece of equipment, or groups of similar serial or series equipment, need not be available in the contractor's accounting records to determine total actual equipment costs.

(2) If equipment costs have been allocated to a contract using predetermined rates, those charges will be adjusted to actual costs.

(3) Recorded job costs adjusted for unallowable and unallowable expenses will be used to determine equipment operating expenses. [3]

(4) Ownership costs (depreciation) will be determined using the contractor's depreciation schedule (subject to the provisions of FAR 31.205-11).

(5) License, taxes, storage and insurance costs age normally recovered as an indirect expense and unless the contractor charges these costs directly to contracts, they will be recover through the indirect expense rate.

(End of Statement)

252.236-7001 CONTRACT DRAWINGS, MAPS, AND SPECIFICATIONS (AUG 2000)

(a) The Government will provide to the Contractor, without charge, one set of contract drawings and specifications, except publications incorporated into the technical provisions by reference, in electronic or paper media as chosen by the Contracting Officer.

(b) The Contractor shall--

(1) Check all drawings furnished immediately upon receipt;

(2) Compare all drawings and verify the figures before laying out the work;

(3) Promptly notify the Contracting Officer of any discrepancies;

(4) Be responsible for any errors that might have been avoided by complying with this paragraph (b); and

(5) Reproduce and print contract drawings and specifications as needed.

(c) In general--

(1) Large-scale drawings shall govern small-scale drawings; and

(2) The Contractor shall follow figures marked on drawings in preference to scale measurements.

(d) Omissions from the drawings or specifications or the misdescription of details of work that are manifestly necessary to carry out the intent of the drawings and specifications, or that are customarily

performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work. The Contractor shall perform such details as if fully and correctly set forth and described in the drawings and specifications.

(e) The work shall conform to the specifications and the contract drawings identified on the following index of drawings:

Title	File	Drawing No.
INDEX TO CONTRACT DRAWINGS, GENERAL LEGEND AND ABBREVIATIONS	121/116	C-2 OF 73
INDEX TO CONTRACT DRAWINGS	121/117	C-3 OF 73

(End of clause)

252.236-7002 OBSTRUCTION OF NAVIGABLE WATERWAYS. (DEC 1991)

(a) The Contractor shall --

(1) Promptly recover and remove any material, plant, machinery, or appliance which the contractor loses, dumps, throws overboard, sinks, or misplaces, and which, in the opinion of the Contracting Officer, may be dangerous to or obstruct navigation;

(2) Give immediate notice, with description and locations of any such obstructions, to the Contracting Officer; and

(3) When required by the Contracting Officer, mark or buoy such obstructions until the same are removed.

(b) The Contracting Officer may --

(1) Remove the obstructions by contract or otherwise should the Contractor refuse, neglect, or delay compliance with paragraph (a) of this clause; and

(2) Deduct the cost of removal from any monies due or to become due to the Contractor; or

(3) Recover the cost of removal under the Contractor's bond.

(c) The Contractor's liability for the removal of a vessel wrecked or sunk without fault or negligence is limited to that provided in sections 15, 19, and 20 of the River and Harbor Act of March 3, 1899 (33 U.S.C. 410 et. seq.).

252.247-7023 TRANSPORTATION OF SUPPLIES BY SEA (MAR 2000)

(a) Definitions. As used in this clause --

(1) "Components" means articles, materials, and supplies incorporated directly into end products at any level of manufacture, fabrication, or assembly by the Contractor or any subcontractor.

(2) "Department of Defense" (DoD) means the Army, Navy, Air Force, Marine Corps, and defense agencies.

(3) "Foreign flag vessel" means any vessel that is not a U.S.-flag vessel.

(4) "Ocean transportation" means any transportation aboard a ship, vessel, boat, barge, or ferry through

international waters.

(5) "Subcontractor" means a supplier, materialman, distributor, or vendor at any level below the prime contractor whose contractual obligation to perform results from, or is conditioned upon, award of the prime contract and who is performing any part of the work or other requirement of the prime contract.

(6) "Supplies" means all property, except land and interests in land, that is clearly identifiable for eventual use by or owned by the DoD at the time of transportation by sea.

(i) An item is clearly identifiable for eventual use by the DoD if, for example, the contract documentation contains a reference to a DoD contract number or a military destination.

(ii) "Supplies" includes (but is not limited to) public works; buildings and facilities; ships; floating equipment and vessels of every character, type, and description, with parts, subassemblies, accessories, and equipment; machine tools; material; equipment; stores of all kinds; end items; construction materials; and components of the foregoing.

(7) "U.S.-flag vessel" means a vessel of the United States or belonging to the United States, including any vessel registered or having national status under the laws of the United States.

(b)(1) The Contractor shall use U.S.-flag vessels when transporting any supplies by sea under this contract.

(2) A subcontractor transporting supplies by sea under this contract shall use U.S.-flag vessels if--

(i) This contract is a construction contract; or

(ii) The supplies being transported are--

(A) Noncommercial items; or

(B) Commercial items that--

(1) The Contractor is reselling or distributing to the Government without adding value (generally, the Contractor does not add value to items that it contracts for f.o.b. destination shipment);

(2) Are shipped in direct support of U.S. military contingency operations, exercises, or forces deployed in humanitarian or peacekeeping operations; or

(3) Are commissary or exchange cargoes transported outside of the Defense Transportation System in accordance with 10 U.S.C. 2643.

(c) The Contractor and its subcontractors may request that the Contracting Officer authorize shipment in foreign-flag vessels, or designate available U.S.-flag vessels, if the Contractor or a subcontractor believes that --

(1) U.S.-flag vessels are not available for timely shipment;

(2) The freight charges are inordinately excessive or unreasonable; or

(3) Freight charges are higher than charges to private persons for transportation of like goods.

(d) The Contractor must submit any request for use of other than U.S.-flag vessels in writing to the Contracting Officer at least 45 days prior to the sailing date necessary to meet its delivery schedules. The Contracting Officer will process requests submitted after such date(s) as expeditiously as possible, but the Contracting Officer's failure to grant approvals to meet the shipper's sailing date will not of itself constitute a compensable delay under this or any other clause of this contract. Requests shall contain at a minimum --

(1) Type, weight, and cube of cargo;

(2) Required shipping date;

(3) Special handling and discharge requirements;

(4) Loading and discharge points;

(5) Name of shipper and consignee;

(6) Prime contract number; and

(7) A documented description of efforts made to secure U.S.-flag vessels, including points of contact (with names and telephone numbers) with at least two U.S.-flag carriers contacted. Copies of telephone notes, telegraphic and facsimile message or letters will be sufficient for this purpose.

(e) The Contractor shall, within 30 days after each shipment covered by this clause, provide the Contracting Officer and the Division of National Cargo, Office of Market Development, Maritime Administration, U.S. Department of Transportation, Washington, DC 20590, one copy of the rated on board vessel operating carrier's ocean bill of lading, which shall contain the following information --

(1) Prime contract number;

(2) Name of vessel;

(3) Vessel flag of registry;

(4) Date of loading;

(5) Port of loading;

(6) Port of final discharge;

(7) Description of commodity;

(8) Gross weight in pounds and cubic feet if available;

(9) Total ocean freight in U.S. dollars; and

(10) Name of the steamship company.

(f) The Contractor agrees to provide with its final invoice under this contract a representation that to the best of its knowledge and belief --

(1) No ocean transportation was used in the performance of this contract;

(2) Ocean transportation was used and only U.S.-flag vessels were used for all ocean shipments under the contract;

(3) Ocean transportation was used, and the Contractor had the written consent of the Contracting Officer for all non-U.S.-flag ocean transportation; or

(4) Ocean transportation was used and some or all of the shipments were made on non-U.S.-flag vessels without the written consent of the Contracting Officer. The Contractor shall describe these shipments in the following format:

ITEM DESCRIPTION	CONTRACT LINE ITEMS	QUANTITY
TOTAL		

(g) If the final invoice does not include the required representation, the Government will reject and return it to the Contractor as an improper invoice for the purposes of the Prompt Payment clause of this contract. In the event there has been unauthorized use of non-U.S.-flag vessels in the performance of this contract, the Contracting Officer is entitled to equitably adjust the contract, based on the unauthorized use.

(h) The Contractor shall include this clause, including this paragraph (h), in all subcontractors under this contract that--

(1) Exceed the simplified acquisition threshold in Part 2 of the Federal Acquisition Regulation; and

(2) Are for a type of supplies described in paragraph (b)(3) of this clause.

(End of clause)

252.247-7024 NOTIFICATION OF TRANSPORTATION OF SUPPLIES BY SEA (MAR 2000)

(a) The Contractor has indicated by the response to the solicitation provision, Representation of Extent of Transportation by Sea, that it did not anticipate transporting by sea any supplies. If, however, after the award of this contract, the Contractor learns that supplies, as defined in the Transportation of Supplies by Sea clause of this contract, will be transported by sea, the Contractor --

(1) Shall notify the Contracting Officer of that fact; and

(2) Hereby agrees to comply with all the terms and conditions of the Transportation of Supplies by Sea clause of this contract.

(b) The Contractor shall include this clause; including this paragraph (b), revised as necessary to reflect the relationship of the contracting parties--

(1) In all subcontracts under this contract, if this contract is a construction contract; or

(2) If this contract is not a construction contract, in all subcontracts under this contract that are for--

(i) Noncommercial items; or

(ii) Commercial items that--

(A) The Contractor is reselling or distributing to the Government without adding value (generally, the Contractor does not add value to items that it subcontracts for f.o.b. destination shipment);

(B) Are shipped in direct support of U.S. military contingency operations, exercises, or forces deployed in humanitarian or peacekeeping operations; or

(C) Are commissary or exchange cargoes transported outside of the Defense Transportation System in accordance with 10 U.S.C. 2643.

(End of clause)

52.211-5001 VARIATIONS IN ESTIMATED QUANTITIES, SUBDIVIDED ITEMS (MAR 1995)—EFARS

This variation in estimated quantities clause is applicable only to Items Nos**. 0034, 0037, 0057, 0058, 0059, 0063, 0068 and 0069** (a) Variation from the estimated quantity in the actual work performed under any second or subsequent sub-item or elimination of all work under such a second or subsequent sub-item will not be the basis for an adjustment in contract unit price. (b) Where the actual quantity of work performed for Items Nos**. 0034, 0037, 0057, 0058, 0059, 0063, 0068 and 0069** is less than 85% of the quantity of the first sub-item listed under such item, the contractor will be paid at the contract unit price for that sub-item for the actual quantity of work performed and, in addition, an equitable adjustment shall be made in accordance with the clause FAR 52.211-18, Variation in Estimated Quantities. (c) If the actual quantity of work performed under Items Nos**. 0034, 0037, 0057, 0058, 0059, 0063, 0068 and 0069** exceeds 115% or is less than 85% of the total estimated quantity of the sub-item under that item and/or if the quantity of the work performed under the second sub-item or any subsequent sub-item under Items Nos. **0034, 0037, 0057, 0058, 0059, 0063, 0068 and 0069** exceeds 115% or is less than 85% of the estimated quantity of any such sub-item, and if such variation causes an increase or a decrease in the time required for performance of this contract the contract completion time will be adjusted in accordance with the clause FAR 52.211-18, Variation in Estimated Quantities.

(End of clause)

252.236-7004 PAYMENT FOR MOBILIZATION AND DEMOBILIZATION. (DEC 1991)

(a) The Government will pay all costs for the mobilization and demobilization of all of the Contractor's plant and equipment at the contract lump sum price for this item.

(1) 60 percent of the lump sum price upon completion of the contractor's mobilization at the work site.

(2) The remaining 40 percent upon completion of demobilization.

(b) The Contracting Officer may require the Contractor to furnish cost data to justify this portion of the bid if the Contracting Officer believes that the percentages in paragraphs (a) (1) and (2) of this clause do not bear a reasonable relation to the cost of the work in this contract.

(1) Failure to justify such price to the satisfaction of the Contracting Officer will result in payment, as determined by the Contracting Officer, of –

(i) Actual mobilization costs at completion of mobilization;

(ii) Actual demobilization costs at completion of demobilization; and

(iii) The remainder of this item in the final payment under this contract.

(2) The Contracting Officer's determination of the actual costs in paragraph (b)(1) of this clause is not subject to appeal.

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Section 00850 Rates of Wages

General Decision Number CA020036

General Decision Number **CA020036**
Superseded General Decision No. CA010036
State: California
Construction Type:
BUILDING
DREDGING
HEAVY
HIGHWAY
County(ies):
RIVERSIDE
BUILDING CONSTRUCTION PROJECTS; DREDGING PROJECTS (does not include hopper dredge work); HEAVY CONSTRUCTION PROJECTS (does not include water well drilling); HIGHWAY CONSTRUCTION PROJECTS

Modification Number	Publication Date
0	03/01/2002
1	03/08/2002
2	03/22/2002
3	03/29/2002
4	05/10/2002
5	05/17/2002
6	05/24/2002
7	06/07/2002
8	06/21/2002
9	07/05/2002
10	07/19/2002
11	08/02/2002
12	08/09/2002
13	08/23/2002
14	09/06/2002
15	09/20/2002
16	10/04/2002
17	10/25/2002
18	11/08/2002

COUNTY(ies):
RIVERSIDE

ASBE0005B 08/05/2002	Rates	Fringes
Includes the application of all insulating materials, protective coverings, coatings, and finishings to all types of mechanical systems		
INSULATOR/ASBESTOS WORKER	33.06	8.11

ASBE0005D 12/17/2001	Rates	Fringes
Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging and disposing of all insulation materials from		

mechnical systems, wheather they
contain asbestos or not:
HAZARDOUS MATERIAL HANDLER 16.00 2.30

BOIL0092F 10/01/2002

	Rates	Fringes
BOILERMAKER	31.96	13.30

BRCA0004U 05/01/2002

	Rates	Fringes
BRICKLAYER; MARBLE MASON	28.22	6.20

BRCA0018G 06/01/2002

	Rates	Fringes
TILE LAYERS	26.50	7.45
TILE FINISHERS	16.65	2.91
MARBLE FINISHER	19.90	3.56

BRCA0018K 12/01/2000

	Rates	Fringes
TERRAZZO WORKER	26.78	5.34
TERRAZZO FINISHER	20.53	5.34

CARP0002B 07/01/2001

	Rates	Fringes
DIVERS:		
Diver, wet	486.08 per day	5.61
Diver, stand-by	243.04 per day	5.61
Diver tender	235.04 per day	5.61

CARP0002Q 07/01/2002

	Rates	Fringes
Work on wood framed construction of single family residences, apartments or condominiums under 4 stories		
DRYWALL INSTALLERS	19.00	5.18
DRYWALL STOCKER/SCRAPPER	10.00	4.68
All other work		
DRYWALL INSTALLERS	29.00	6.68
DRYWALL STOCKER/SCRAPPER	10.00	4.68

CARP0003E 07/01/1998

	Rates	Fringes
CARPENTERS:		
Work on wood frame, tilt up or concrete block construction including but not limited to: shopping centers, stores, office buildings, fast food establishments, also including curb, gutter and sidewalks where the total cost of the project does not exceed seven and one-half million ($7,500,000.00) dollars.		
CARPENTERS:		
Carpenter, cabinet installer, insulation installer, floor worker and acoustical installer	22.75	6.28
Shingler	22.88	6.28
Roof loader of shingles	15.42	6.28

Saw filer	22.83	6.28
Table power saw operator	22.85	6.28
Pneumatic nailer or power stapler	23.00	6.28
Fence builder	20.30	6.28
Millwright	23.25	6.28
Pile driver; Derrick barge; Bridge or dock carpenter; Cable splicer; Heavy framer; Rockslinger	22.88	6.28
Head rockslinger	22.98	6.28
Rock barge or scow	22.78	6.28
Scaffold builder	17.00	6.28
All other work:		
CARPENTERS:		
Carpenter, cabinet installer, insulation installer, floor worker and acoustical installer	24.75	6.28
Shingler	24.88	6.28
Roof loader of shingles	17.42	6.28
Saw filer	24.83	6.28
Table power saw operator	24.85	6.28
Pneumatic nailer or power stapler	25.00	6.28
Fence builder	22.30	6.28
Millwright	25.25	6.28
Pile driver; Derrick barge; Bridge or dock carpenter; Cable splicer; Heavy framer; Rockslinger	24.88	6.28
Head rockslinger	24.98	6.28
Rock barge or scow	24.78	6.28
Scaffold builder	19.00	6.28

FOOTNOTE:
Work of forming in the construction of open cut sewers or storm drains, on operations in which horizontal lagging is used in conjunction with steel H-Beams driven or placed in pre-drilled holes, for that portion of a lagged trench against which concrete is poured, namely, as a substitute for back forms (which work is performed by piledrivers): $0.13 per hour additional.

CARP0003H 07/01/2001

	Rates	Fringes
MODULAR FURNITURE INSTALLER	14.99	5.805
LOW WALL MODULAR TECHNICIAN	18.22	5.805
FULL WALL TECHNICIAN	21.47	5.805

ELEC0011C 12/01/2001

	Rates	Fringes
COMMUNICATIONS AND SYSTEMS WORK:		
Installer	22.13	3% + 4.40
Technician	23.93	3% + 4.40

SCOPE OF WORK:
Installation, testing, service and maintenance of systems utilizing the transmission and/or transference of voice, sound, vision and digital for commercial, educational, security and

entertainment purposes for the following: TV monitoring and surveillance, background-foreground music, intercom and telephone interconnect, inventory control systems, microwave transmission, multi-media, multiplex, nurse call systems, radio page, school intercom and sound, burglar alarms, fire alarm (see last paragraph below) and low voltage master clock systems in commercial buildings.
Communication Systems that transmit or receive information and/or control systems that are intrinsic to the above listed systems; inclusion or exclusion of terminations and testings of conductors determined by their function; excluding all other data systems or multiple systems which include control function or power supply; excluding installation of raceway systems, conduit systems, line voltage work, and energy management systems.
Does not cover work performed at China Lake Naval Ordnance Test Station.
Fire alarm work shall be performed at the current inside wireman total cost package.

ELEC0440A 06/03/2002

	Rates	Fringes
ELECTRICIAN	28.28	3%+9.61
CABLE SPLICER	28.78	3%+9.61

ZONE PAY:
Zone A: Free travel zone for all contractors performing work in Zone A.
Zone B: Any work performed in Zone (B) shall add $8.00 per hour to the current wage scale. Zone (B) shall be the area from the eastern perimeter of Zone (A) to a line which runs north and south begininng at Little Morongo Canyon (San Bernardino/Riverside County Line), Southeast along the Coachella Tunnels, Colorado River Aqueduct and Mecca Tunnels to Pinkham Wash the South to Box Canyon Road, then southwest along Box Canyon Road to Highway 195 west onto 195 south to Highway 86 to Riverside/Imperial County Line.

ELEC1245C 06/01/2002

	Rates	Fringes
LINE CONSTRUCTION:		
Lineman; Cable splicer	33.16	4.5%+7.08
Equipment specialist (operates crawler tractors, commercial motor vehicles, backhoes, trenchers, cranes (50 tons and below), and overhead and underground distribution line equipment)	28.19	4.5%+6.80
Groundman	21.56	4.5%+6.80
Powderman	31.51	4.5%+6.84

ELEV0018A 09/15/2001

	Rates	Fringes
ELEVATOR MECHANIC	33.695	7.455

FOOTNOTE:
Vacation Pay: 8% with 5 or more years of service, 6% for 6 months to 5 years service. Paid Holidays: New Years Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and

Friday after, and Christmas Day.

ENGI0012C 07/01/2002

	Rates	Fringes
POWER EQUIPMENT OPERATORS:		
GROUP 1	27.85	11.85
GROUP 2	28.63	11.85
GROUP 3	28.92	11.85
GROUP 4	30.21	11.85
GROUP 5	30.43	11.85
GROUP 6	30.54	11.85
GROUP 7	30.66	11.85
GROUP 8	30.83	11.85
GROUP 9	30.93	11.85
GROUP 10	30.96	11.85
GROUP 11	31.04	11.85
GROUP 12	31.16	11.85
GROUP 13	31.33	11.85
GROUP 14	31.43	11.85
GROUP 15	31.54	11.85
GROUP 16	31.66	11.85
GROUP 17	31.83	11.85
GROUP 18	31.93	11.85
GROUP 19	32.04	11.85
GROUP 20	32.16	11.85
GROUP 21	32.33	11.85
CRANES, PILEDRIVING & HOISTING EQUIPMENT:		
GROUP 1	29.00	11.85
GROUP 2	29.78	11.85
GROUP 3	30.07	11.85
GROUP 4	30.21	11.85
GROUP 5	30.43	11.35
GROUP 6	30.54	11.85
GROUP 7	30.66	11.35
GROUP 8	30.83	11.85
GROUP 9	31.00	11.85
GROUP 10	32.00	11.85
GROUP 11	33.00	11.85
GROUP 12	34.00	11.85
GROUP 13	35.00	11.80
TUNNEL WORK:		
GROUP 1	30.28	11.85
GROUP 2	30.57	11.85
GROUP 3	30.71	11.85
GROUP 4	30.93	11.85
GROUP 5	31.04	11.85
GROUP 6	31.16	11.85
GROUP 7	31.46	11.85

FOOTNOTES: Workers required to suit up and work in a hazardous material environment: $1.00 per hour additional.

Combination mixer and compressor operator on gunite work shall be classified as a concrete mobile mixer operator.

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Bargeman; Brakeman; Compressor operator; Ditch Witch, with seat or similar type equipment; Elevator operator-inside; Engineer Oiler; Forklift operator (includes loed, lull or similar types under 5 tons; Generator operator; Generator, pump or

compressor plant operator; Pump operator; Signalman; Switchman
GROUP 2: Asphalt-rubber plant operator (nurse tank operator); Concrete mixer operator-skip type; Conveyor operator; Fireman; Forklift operator (includes loed, lull or similar types over 5 tons; Hydrostatic pump operator; oiler crusher (asphalt or concrete plant); Petromat laydown machine; PJU side dum jack; Screening and conveyor machine oeprator (or similar types); Skiploader (wheel type up to 3/4 yd. without attachment); Tar pot fireman; Temporary heating plant operator; Trenching machine oiler
GROUP 3: Asphalt-rubber blend operator; Bobcat or similar type (side steer); Equipment greaser (rack); Ford Ferguson (with dragtype attachments); Helicopter radioman (ground); Stationary pipe wrapping and cleaning machine operator
GROUP 4: Asphalt plant fireman; Backhoe operator (mini-max or similar type); Boring machine operator; Boxman or mixerman (asphalt or concrete); Chip spreading machine operator; Concrete cleaning decontamination machine operator; Concrete Pump Operator (small portable); Drilling machine operator, small auger types (Texoma super economatic or similar types - Hughes 100 or 200 or similar types - drilling depth of 30' maximum); Equipment greaser (grease truck); Guard rail post driver operator; Highline cableway signalman; Horizontal Directional Drilling Machine; Hydra-hammer-aero stomper; Micro Tunneling (above ground tunnel); Power concrete curing machine operator; Power concrete saw operator; Power-driven jumbo form setter operator; Power sweeper operator; Roller operator (compacting); Screed operator (asphalt or concrete); Trenching machine operator (up to 6 ft.); Vacuum or much truck
GROUP 5: Articulating material hauler; Asphalt plant engineer; Batch plant operator; Bit sharpener; Concrete joint machine operator (canal and similar type); Concrete planer operator; Dandy digger; Deck engine operator; Derrickman (oilfield type); Drilling machine operator, bucket or auger types (Calweld 100 bucket or similar types - Watson 1000 auger or similar types - Texoma 330, 500 or 600 auger or similar types - drilling depth of 45' maximum); Drilling machine operator (including water wells); Hydrographic seeder machine operator (straw, pulp or seed), Jackson track maintainer, or similar type; Kalamazoo Switch tamper, or similar type; Machine tool operator; Maginnis internal full slab vibrator, Mechanical berm, curb or gutter(concrete or asphalt); Mechanical finisher operator (concrete, Clary-Johnson-Bidwell or similar); Micro tunnel system (below ground); Pavement breaker operator (truck mounted); Road oil mixing machine operator; Roller operator (asphalt or finish), rubber-tired earth moving equipment (single engine, up to and including 25 yds. struck); Self-propelled tar pipelining machine operator; Skiploader operator (crawler and wheel type, over 3/4 yd. and up to and including 1-1/2 yds.); Slip form pump operator (power driven hydraulic lifting device for concrete forms); Tractor operator-bulldozer, tamper-scraper (single engine, up to 100 h.p. flywheel and similar types, up to and including D-5 and similar types); Tugger hoist operator (1 drum); Ultra high pressure waterjet cutting tool system operator; Vacuum blasting machine operator
GROUP 6: Asphalt or concrete spreading operator (tamping or finishing); Asphalt paving machine operator (Barber Greene or

similar type); Asphalt-rubber distribution operator; Backhoe operator (up to and including 3/4 yd.), small ford, Case or similar; Cast-in-place pipe laying machine operator; Combination mixer and compressor operator (gunite work); Compactor operator (self-propelled); Concrete mixer operator (paving); Crushing plant operator; Drill Doctor; Drilling machine operator, Bucket or auger types (Calweld 150 bucket or similar types - Watson 1500, 2000 2500 auger or similar types - Texoma 700, 800 auger or similar types - drilling depth of 60' maximum); Elevating grader operator; Grade checker; Gradall operator; Grouting machine operator; Heavy-duty repairman; Heavy equipment robotics operator; Kalamazoo balliste regulator or similar type; Kolman belt loader and similar type; Le Tourneau blob compactor or similar type; Loader operator (Athey, Euclid, Sierra and similar types); Ozzie padder or similar types; P.C. slot saw; Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pumpcrete gun operator; Rotary drill operator (excluding caisson type); Rubber-tired earth-moving equipment operator (single engine, caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator (multiple engine up to and including 25 yds. struck); Rubber-tired scraper operator (self-loading paddle wheel type-John Deere, 1040 and similar single unit); Self-propelled curb and gutter machine operator; Shuttle buggy; Skiploader operator (crawler and wheel type over 1-1/2 yds. up to and including 6-1/2 yds.); Soil remediation plant operator; Surface heaters and planer operator; Tractor compressor drill combination operator; Tractor operator (any type larger than D-5 - 100 flywheel h.p. and over, or similar-bulldozer, tamper, scraper and push tractor single engine); Tractor operator (boom attachments), Traveling pipe wrapping, cleaning and bendng machine operator; Trenching machine operator (over 6 ft. depth capacity, manufacturer's rating); Ultra high pressure waterjet cutting tool system mechanic; Water pull (compaction) operator

GROUP 7: Drilling machine operator, Bucket or auger types (Calweld 200 B bucket or similar types-Watson 3000 or 5000 auger or similar types-Texoma 900 auger or similar types-drilling depth of 105' maximum); Dual drum mixer, dynamic compactor LDC350 (or similar types); Monorail locomotive operator (diesel, gas or electric); Motor patrol-blade operator (single engine); Multiple engine tractor operator (Euclid and similar type-except Quad 9 cat.); Rubber-tired earth-moving equipment operator (single engine, over 50 yds. struck); Pneumatic pipe ramming tool and similar types; Prestressed wrapping machine operator; Rubber-tired earth-moving equipment operator (single engine, over 50 yds. struck); Rubber tired earth moving equipment operator (multiple engine, Euclid, caterpillar and similar over 25 yds. and up to 50 yds. struck), Tower crane repairman; Tractor loader operator (crawler and wheel type over 6-1/2 yds.); Woods mixer operator (and similar Pugmill equipment)

GROUP 8: Auto grader operator; Automatic slip form operator; Drilling machine operator, bucket or auger types (Calweld, auger 200 CA or similar types - Watson, auger 6000 or similar types - Hughes Super Duty, auger 200 or similar types - drilling depth of 175' maximum); Hoe ram or similar with compressor; Mass excavator

operator less tha 750 cu. yards; Mechanical finishing machine operator; Mobile form traveler operator; Motor patrol operator (multi-engine); Pipe mobile machine operator; Rubber-tired earth-moving equipment operator (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck); Rubber-tired self-loading scraper operator (paddle-wheel-auger type self-loading - two (2) or more units)
GROUP 9: Rubber-tired earth-moving equipment operator operating equipment with push-pull system (single engine, up to and including 25 yds. struck)
GROUP 10: Canal liner operator; Canal trimmer operator; Remote-control earth-moving equipment operator (operating a second piece of equipment: $1.00 per hour additional); Wheel excavator operator (over 750 cu. yds.)
GROUP 11: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine-up to and including 25 yds. struck)
GROUP 12: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)
GROUP 13: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine, Euclid, Caterpillar and similar, over 50 cu. yds. struck); Tandem tractor operator (operating crawler type tractors in tandem - Quad 9 and similar type)
GROUP 14: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, up to and including 25 yds. struck)
GROUP 15: Rotex concrete belt operator (or similar types); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds.and up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - multiple engine, up to and including 25 yds. struck)
GROUP 16: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)
GROUP 17: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - multiple engine,

Euclid, Caterpillar and similar type, over 50 cu. yds. struck)
GROUP 18: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, up to and including 25 yds. struck)
GROUP 19: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 yds. struck); Rubber-tired earth-moving equipment operator, operating with the tandem push-pull system (multiple engine, up to and including 25 yds. struck)
GROUP 20: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)
GROUP 21: Concrete pump operator-truck mounted; Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck)
CRANES, PILEDRIVING AND HOISTING EQUIPMENT CLASSIFICATIONS
GROUP 1: Engineer oiler; Fork lift operator (includes loed, lull or similar types)
GROUP 2: Truck crane oiler
GROUP 3: A-frame or winch truck operator; Ross carrier operator (jobsite)
GROUP 4: Bridge-type unloader and turntable operator; Helicopter hoist operator
GROUP 5: Hydraulic boom truck; Stinger crane (Austin-Western or similar type); Tugger hoist operator (1 drum)
GROUP 6: Bridge crane operator; Cretor crane operator; Hoist operator (Chicago boom and similar type); Lift mobile operator; Lift slab machine operator (Vagtborg and similar types); Material hoist and/or manlift operator; Polar gantry crane operator; Self Climbing scaffold (or similar type); Shovel, backhoe, dragline, clamshell operator (over 3/4 yd. and up to 5 cu. yds. mrc); Tugger hoist operator
GROUP 7: Pedestal crane operator; Shovel, backhoe, dragline, clamshell operator (over 5 cu. yds. mrc); Tower crane repair; Tugger hoist operator (3 drum)
GROUP 8: Crane operator (up to and including 25 ton capacity); Crawler transporter operator; Derrick barge operator (up to and including 25 ton capacity); Hoist operator, stiff legs, Guy derrick or similar type (up to and including 25 ton capacity); Shovel, backhoe, dragline, clamshell operator (over 7 cu. yds., M.R.C.)
GROUP 9: Crane operator (over 25 tons and up to and including 50 tons mrc); Derrick barge operator (over 25 tons up to and including 50 tons mrc); Highline cableway operator; Hoist operator, stiff legs, Guy derrick or similar type (over 25 tons up to and including 50 tons mrc); K-crane operator; Polar crane operator; Self erecting tower crane operator maximum lifting capacity ten tons
GROUP 10: Crane operator (over 50 tons and up to and including 100 tons mrc); Derrick barge operator (over 50 tons up to and including 100 tons mrc); Hoist operator, stiff legs, Guy derrick

or similar type (over 50 tons up to and including 100 tons mrc), Mobile tower crane operator (over 50 tons, up to and including 100 tons M.R.C.); Tower crane operator and tower gantry
GROUP 11: Crane operator (over 100 tons and up to and including 200 tons mrc); Derrick barge operator (over 100 tons up to and including 200 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 100 tons up to and including 200 tons mrc); Mobile tower crane operator (over 100 tons up to and including 200 tons mrc)
GROUP 12: Crane operator (over 200 tons up to and including 300 tons mrc); Derrick barge operator (over 200 tons up to and including 300 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 200 tons, up to and including 300 tons mrc); Mobile tower crane operator (over 200 tons, up to and including 300 tons mrc)
GROUP 13: Crane operator (over 300 tons); Derrick barge operator (over 300 tons); Helicopter pilot; Hoist operator, stiff legs, Guy derrick or similar type (over 300 tons); Mobile tower crane operator (over 300 tons)

TUNNEL CLASSIFICATIONS

GROUP 1: Skiploader (wheel type up to 3/4 yd. without attachment)
GROUP 2: Power-driven jumbo form setter operator
GROUP 3: Dinkey locomotive or motorperson (up to and including 10 tons)
GROUP 4: Bit sharpener; Equipment greaser (grease truck); Slip form pump operator (power-driven hydraulic lifting device for concrete forms); Tugger hoist operator (1 drum); Tunnel locomotive operator (over 10 and up to and including 30 tons)
GROUP 5: Backhoe operator (up to and including 3/4 yd.); Small Ford, Case or similar; Drill doctor; Grouting machine operator; Heading shield operator; Heavy-duty repairperson; Loader operator (Athey, Euclid, Sierra and similar types); Mucking machine operator (1/4 yd., rubber-tired, rail or track type); Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pneumatic heading shield (tunnel); Pumpcrete gun operator; Tractor compressor drill combination operator; Tugger hoist operator (2 drum); Tunnel locomotive operator (over 30 tons)
GROUP 6: Heavy Duty Repairman
GROUP 7: Tunnel mole boring machine operator

ENGI0012D 08/01/2002

	Rates	Fringes
POWER EQUIPMENT OPERATORS:		
DREDGING:		
Leverman	34.65	11.85
Dredge dozer	31.18	11.85
Deckmate	31.07	11.85
Winch operator (stern winch on dredge)	30.52	11.85
Fireman; deckhand and bargeman	29.98	11.85
Barge mate	30.59	11.85

IRON0002E 07/01/2002

	Rates	Fringes
IRONWORKERS:		
Fence erector	25.97	16.29

Ornamental, reinforcing and structural	26.86	16.29

FOOTNOTE: Work at Chocolate Mountains Naval Reserve-Niland additional $3.00 per hour.

LABO0001B 07/01/2002

	Rates	Fringes
BRICK TENDER	21.10	9.57

LABO0002H 07/01/2002

	Rates	Fringes
LABORERS:		
GROUP 1	20.10	9.98
GROUP 2	20.65	9.98
GROUP 3	21.20	9.98
GROUP 4	22.75	9.98
GROUP 5	23.10	9.98
TUNNEL LABORERS:		
GROUP 1	23.01	9.98
GROUP 2	23.33	9.98
GROUP 3	23.79	9.98
GROUP 4	24.48	9.98
GUNITE LABORERS:		
GROUP 1	22.84	12.73
GROUP 2	21.89	12.73
GROUP 3	18.35	12.73

FOOTNOTE: GUNITE PREMIUM PAY:

Workers working from a Bosn'n's Chair or suspended from a rope or cable shall receive 40 cents per hour above the foregoing applicable classification rates.

Workers doing gunite and/or shotcrete work in a tunnel shall receive 35 cents per hour above the foregoing applicable classification rates, paid on a portal-to-portal basis.

Any work performed on, in or above any smoke stack, silo, storage elevator or similar type of structure, when such structure is in excess of 75'-0" above base level and which work must be performed in whole or in part more than 75'-0" above base level, that work performed above the 75'-0" level shall be compensated for at 35 cents per hour above the applicable classification wage rate.

LABORER CLASSIFICATIONS

GROUP 1: Cleaning and handling of panel forms; Concrete screeding for rough strike-off; Concrete, water curing; Demolition laborer, the cleaning of brick if performed by a worker performing any other phase of demolition work, and the cleaning of lumber; Fire watcher, limber, brush loader, piler and debris handler; Flag person; Gas, oil and/or water pipeline laborer; Laborer, asphalt-rubber material loader; Laborer, general or construction; Laborer, general clean-up; Laborer, landscaping; Laborer, jetting; Laborer, temporary water and air lines; Material hose operator (walls, slabs, floors and decks); Plugging, filling of shee bolt holes; Dry packing of concrete; Railroad maintenance, repair track person and road beds; Streetcar and railroad construction track laborers; Rigging and signaling; Scaler; Slip form raiser; Tar and mortar; Tool crib or tool house laborer; Traffic control by any method; Window cleaner; Wire mesh pulling - all concrete pouring operations

GROUP 2: Asphalt shoveler; Cement dumper (on 1 yd. or larger mixer and handling bulk cement); Cesspool digger and installer; Chucktender; Chute handler, pouring concrete, the handling of the chute from readymix trucks, such as walls, slabs, decks, floors, foundation, footings, curbs, gutters and sidewalks; Concrete curer, impervious membrane and form oiler; Cutting torch operator (demolition); Fine grader, highways and street paving, airport, runways and similar type heavy construction; Gas, oil and/or water pipeline wrapper - pot tender and form person; Guinea chaser; Headerboard person - asphalt; Laborer, packing rod steel and pans; Membrane vapor barrier installer; Power broom sweeper (small); Riprap stonepaver, placing stone or wet sacked concrete; Roto scraper and tiller; Sandblaster (pot tender); Septic tank digger and installer(lead); Tank scaler and cleaner; Tree climber, faller, chain saw operator, Pittsburgh chipper and similar type brush shredder; Underground laborer, including caisson bellower
GROUP 3: Buggymobile person; Concrete cutting torch; Concrete pile cutter; Driller, jackhammer, 2-1/2 ft. drill steel or longer; Dri-pak-it machine; Gas, oil and/or water pipeline wrapper, 6-in. pipe and over, by any method, inside and out; High scaler (including drilling of same); Hydro seeder and similar type; Impact wrench multi-plate; Kettle person, pot person and workers applying asphalt, lay-kold, creosote, lime caustic and similar type materials ("applying" means applying, dipping, brushing or handling of such materials for pipe wrapping and waterproofing); Operator of pneumatic, gas, electric tools, vibrating machine, pavement breaker, air blasting, come-alongs, and similar mechanical tools not separately classified herein; Pipelayer's backup person, coating, grouting, making of joints, sealing, caulking, diapering and including rubber gasket joints, pointing and any and all other services; Rock slinger; Rotary scarifier or multiple head concrete chipping scarifier; Steel headerboard and guideline setter; Tamper, Barko, Wacker and similar type; Trenching machine, hand-propelled
GROUP 4: Asphalt raker, lute person, ironer, asphalt dump person, and asphalt spreader boxes (all types); Concrete core cutter (walls, floors or ceilings), grinder or sander; Concrete saw person, cutting walls or flat work, scoring old or new concrete; Cribber, shorer, lagging, sheeting and trench bracing, hand-guided lagging hammer; Head rock slinger; Laborer, asphalt-rubber distributor boot person; Laser beam in connection with laborers' work; Oversize concrete vibrator operator, 70 lbs. and over; Pipelayer performing all services in the laying and installation of pipe from the point of receiving pipe in the ditch until completion of operation, including any and all forms of tubular material, whether pipe, metallic or non-metallic, conduit and any other stationary type of tubular device used for the conveying of any substance or element, whether water, sewage, solid gas, air, or other product whatsoever and without regard to the nature of material from which the tubular material is fabricated; No-joint pipe and stripping of same; Prefabricated manhole installer; Sandblaster (nozzle person), water blasting, Porta Shot-Blast
GROUP 5: Blaster powder, all work of loading holes, placing and blasting of all powder and explosives of whatever type, regardless of method used for such loading and placing; Driller:

All power drills, excluding jackhammer, whether core, diamond, wagon, track, multiple unit, and any and all other types of mechanical drills without regard to the form of motive power; Toxic waste removal

TUNNEL LABORER CLASSIFICATIONS

GROUP 1: Batch plant laborer; Bull gang mucker, track person; Changehouse person; Concrete crew, including rodder and spreader; Dump person; Dump person (outside); Swamper (brake person and switch person on tunnel work); Tunnel materials handling person

GROUP 2: Chucktender, cabletender; Loading and unloading agitator cars; Nipper; Pot tender, using mastic or other materials (for example, but not by way of limitation, shotcrete, etc.); Vibrator person, jack hammer, pneumatic tools (except driller)

GROUP 3: Blaster, driller, powder person; Chemical grout jet person; Cherry picker person; Grout gun person; Grout mixer person; Grout pump person; Jackleg miner; Jumbo person; Kemper and other pneumatic concrete placer operator; Miner, tunnel (hand or machine); Nozzle person; Operating of troweling and/or grouting machines; Powder person (primer house); Primer person; Sandblaster; Shotcrete person; Steel form raiser and setter; Timber person, retimber person, wood or steel; Tunnel Concrete finisher

GROUP 4: Diamond driller; Sandblaster; Shaft and raise work

GUNITE LABORER CLASSIFICATIONS

GROUP 1: Nozzle person and rod person

GROUP 2: Gun person

GROUP 3: Rebound person

LABO0783I 08/07/2002

	Rates	Fringes
PLASTERER TENDER	23.00	10.17
PLASTER CLEAN-UP LABORER	20.45	10.17

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* LABO0882B 01/01/2002

	Rates	Fringes
ASBESTOS REMOVAL LABORER	20.97	7.65

SCOPE OF WORK: Includes site mobilization, initial site cleanup, site preparation, removal of asbestos-containing material and toxic waste, encapsulation, enclosure and disposal of asbestos-containing materials and toxic waste by hand or with equipment or machinery; scaffolding, fabrication of temporary wooden barriers and assembly of decontamination stations.

LABO1184A 07/01/2002

	Rates	Fringes
LABORERS - STRIPING:		
GROUP 1	20.65	8.42
GROUP 2	21.50	8.42
GROUP 3	23.82	8.42
GROUP 4	26.02	8.42

LABORERS - STRIPING CLASSIFICATIONS

GROUP 1: Protective coating, pavement sealing, including repair and filling of cracks by any method on any surface in parking lots, game courts and playgrounds; carstops; operation of all related machinery and equipment; equipment repair technician

GROUP 2: Traffic surface abrasive blaster; pot tender - removal

of all traffic lines and markings by any method (sandblasting, waterblasting, grinding, etc.) and preparation of surface for coatings. Traffic control person: controlling and directing traffic through both conventional and moving lane closures; operation of all related machinery and equipment
GROUP 3: Traffic delineating device applicator: Layout and application of pavement markers, delineating signs, rumble and traffic bars, adhesives, guide markers, other traffic delineating devices including traffic control. This category includes all traffic related surface preparation (sandblasting, waterblasting, grinding) as part of the application process. Traffic protective delineating system installer: removes, relocates, installs, permanently affixed roadside and parking delineation barricades, fencing, cable anchor, guard rail, reference signs, monument markers; operation of all related machinery and equipment; power broom sweeper
GROUP 4: Striper: layout and application of traffic stripes and markings; hot thermo plastic; tape traffic stripes and markings, including traffic control; operation of all related machinery and equipment

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LABO1184E 07/01/2002

	Rates	Fringes
SLURRY SEAL WORK		
LABORERS:		
Group 1	21.66	8.42
Group 2	22.86	8.42
Group 3	24.72	8.42
Group 4	26.32	8.42

GROUP 1 - Traffic Control Person & Serviceman; including work of installing and protecting utility covers, traffic delineating devices, posting of no parking and notifications for public convenience, surface cleaning by any method, repair and filing of cracks by any means, and other work not directly connected with the application of slurry seal.
GROUP 2 - Squeegeeman (finish); Traffic control person.
GROUP 3 - Applicator operator (line driver); Power broom sweeper operator; Operation of all related machinery and equipment; Shuttleman
GROUP 4 - Mix operator

PAIN0036A 07/01/2002

	Rates	Fringes
Work on service stations and and car washes; Small new commercial work (defined as construction up to and including 3 stories in height, such as small shopping centers, small stores, small office buildings and small food establishments); Small new industrial work (defined as light metal buildings, small warehouses, small storage facilities and		

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tilt-up buildings); Repaint
work (defined as repaint of
breweries, commercial
recreational facilities,
hotels which operate
commercial establishments
as part of hotel service,
and sports facilities);
Tenant improvement work
(defined as tenant
improvement work not
included in conjunction with
the construction of the
building, and all repainting
of tenant improvement projects
 PAINTER (including lead abatement)   21.75           5.89
All other work:
 PAINTER                              25.02           5.89
------------------------------------------------------------------
 PAIN0036H  10/01/2002
                                     Rates           Fringes
DRYWALL FINISHERS                     26.33           8.48
------------------------------------------------------------------
 PAIN0036R  06/01/2002
                                     Rates           Fringes
GLAZIERS                              29.20           8.45
FOOTNOTE:  Additional $1.25 per hour for work in a condo,
 from the third (3rd) floor and up
 Additional $1.25 per hour for work on the outside
 of the building from a swing state or any suspended contrivance,
from the ground up
------------------------------------------------------------------
 * PAIN1247B  03/01/2002
                                     Rates           Fringes
SOFT FLOOR LAYER                      25.95           6.25
------------------------------------------------------------------
 PLAS0200I  08/07/2002
                                     Rates           Fringes
PLASTERERS                            26.77           6.76
------------------------------------------------------------------
 PLAS0500B  07/01/2002
                                     Rates           Fringes
CEMENT MASON                          23.05           11.56
------------------------------------------------------------------
 PLUM0016A  07/01/2002
                                     Rates           Fringes
Work on strip malls, light
commercial, tenant improvement
and remodel work:
 PLUMBER & PIPEFITTER                 23.03           8.24
Work on new additions and
remodeling of bars,
restaurant, stores and
commercial buildings not to
exceed 5,000 sq. ft. of floor
space
 PLUMBER & PIPEFITTER                 28.92           9.44
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All other work:
PLUMBER & PIPEFITTER 29.81 10.01
Landscape and irrigation work:
PLUMBER & PIPEFITTER 23.27 9.56
Sewer and storm drain work:
PLUMBER & PIPEFITTER 20.25 9.75

PLUM0345A 07/01/2002

	Rates	Fringes
LANDSCAPE & IRRIGATION FITTER	23.27	9.56

ROOF0036B 09/01/2001

	Rates	Fringes
ROOFER	24.77	5.40
Duties limited to the following: Roof removal of any type of roofing or roofing material; or spudding, or sweeping; and/or clean-up; and/or preload in, or in preparing the roof for application of roofing, damp and/or waterproofing materials		
PREPARER	16.24	1.00

FOOTNOTE: Pitch premium: Work on which employees are exposed to pitch fumes or required to handle pitch, pitch base or pitch impregnated products, or any material containing coal tar pitch, the entire roofing crew shall receive $1.75 per hour "pitch premium" pay.

SFCA0669B 04/01/2002

	Rates	Fringes
SPRINKLER FITTER (FIRE)	28.75	6.05

SHEE0102G 07/01/2002

	Rates	Fringes
INDUSTRIAL Work on all air pollution control systems, noise abatement panels, blow pipe, air-veyor systems, dust collecting, baghouses, heating, air conditioning, and ventilating (other than creature comfort) and all other industrial work, including metal insulated ceilings		
SHEETMETAL WORKER	26.07	15.00

SHEE0102H 08/01/2002

	Rates	Fringes
COMMERCIAL: Work on all commercial HVAC for creature comfort and computer clean rooms, architectural metals, metal roofing and lagging, over insulation		
SHEET METAL WORKER	28.79	11.97

TEAM0011E 07/01/2002

	Rates	Fringes
TRUCK DRIVERS:		
GROUP 1	21.84	12.84
GROUP 2	21.99	12.84
GROUP 3	22.12	12.84
GROUP 4	22.31	12.84
GROUP 5	22.25	12.84
GROUP 6	22.37	12.84
GROUP 7	22.62	12.84
GROUP 8	22.87	12.84
GROUP 9	23.02	12.84
GROUP 10	23.37	12.84
GROUP 11	23.87	12.84

TRUCK DRIVER CLASSIFICATIONS

GROUP 1: Truck driver

GROUP 2: Driver of vehicle or combination of vehicles - 2 axles; Traffic control pilot car excluding moving heavy equipment permit load; Truck-mounted broom

GROUP 3: Driver of vehicle or combination of vehicles - 3 axles; Boot person; Cement mason distribution truck; Fuel truck driver; Water truck - 2 axle; Dump truck, less than 16 yds. water level; Erosion control driver

GROUP 4: Driver of transit mix truck, under 3 yds.; Dumpcrete truck, less than 6-1/2 yds. water level

GROUP 5: Water truck, 3 or more axles; Truck greaser and tire person ($0.50 additional for tire person); Pipeline and utility working truck driver, including winch truck and plastic fusion, limited to pipeline and utility work; Slurry truck driver

GROUP 6: Transit mix truck, 3 yds. or more; Dumpcrete truck, 6-1/2 yds. water level and over; Vehicle or combination of vehicles - 4 or more axle; Oil spreader truck; Dump truck, 16 yds. to 25 yds. water level

GROUP 7: A Frame, Swedish crane or similar; Forklift driver; Ross carrier driver

GROUP 8: Dump truck, 25 yds. to 49 yds. water level; Truck repair person; Water pull - single engine; Welder

GROUP 9: Truck repair person/welder; Low bed driver, 9 axles or over

GROUP 10: Dump truck - 50 yds. or more water level; Water pull - single engine with attachment

GROUP 11: Water pull - twin engine; Water pull - twin engine with attachments; Winch truck driver - $1.25 additional when operating winch or similar special attachments

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(ii)).

In the listing above, the "SU" designation means that rates listed under that identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations

indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01151

SARI RELOCATION GEOTECHNICAL INVESTIGATION

-- End of Section Table of Contents --

SECTION 01151

SARI RELOCATION GEOTECHNICAL INVESTIGATION

PART 1 GENERAL

1.1 GENERAL

This specification covers requirements for a geotechnical investigation along the proposed Reach IV-A and Reach IV-B pipelines. This investigation shall provide complete soil properties, parameters and geotechnical engineering recommendations for confirming design prior to construction of the subject project. All work shall be provided in strict accordance with the specifications.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D420	(1997) Standard Test Method for Distillation of Cut-Back Asphaltic (Bituminous) Products
ASTM D422	(1963; R 1990) Particle-Size Analysis of Soils
ASTM D698	(1998) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))
ASTM D854	(2002) Standard Test Methods for Specific Gravity of Soil Solids by Water Pycnometer
ASTM D1140	(2000) Standard Test Methods for Amount of Material in Soils Finer Than the No. 200 (75-um) Sieve
ASTM D1557	(1991) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu. m.))
ASTM D1586	(1999) Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils
ASTM D1587	(2000) Standard Practice for Thin-Walled Tube Sampling of Soils for Geotechnical

	Purposes
ASTM D2166	(2000) Standard Test Method for Unconfined Compressive Strength of Cohesive Soil
ASTM D2216	(1998) Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM D2435	(1996) Standard Test Method for One-Dimensional Consolidation Properties of Soils
ASTM D2487	(1998) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D2488	(2000) Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)
ASTM D2850	(1995) Standard Test Method for Unconsolidated-Undrained Triaxial CompressionTest on Cohesive Soils
ASTM D3080	(1998) Standard Test Method for Direct Shear Test of Soils Under Consolidated Drained Conditions
ASTM D3441	(1998) Standard Test Method for Mechanical Cone Penetration Tests of Soil
ASTM D3550	(2001) Standard Practice for Thick Wall, Ring-Lined, Split Barrel, Drive Sampling of Soils
ASTM D4220	(1995) Standard Practices for Preserving and Transporting Soil Samples
ASTM D4318	(1995a) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4769	(1988) Standard Specification for Woven and Warp Knitted Comforter Fabrics
ASTM D4829	(1995) Standard Test Method for Expansion Index of Soils

1.3 FIELD INVESTIGATION

The field investigation shall consist of drilling a minimum four borings in the upstream side along the pipeline alignments and one boring in the downstream side at the proposed knife gate valve installation. Exploratory borings shall be drilled with a mud rotary drilling rig, advancing to a minimum depth of 50 feet each below the lowest adjacent ground surface.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When

used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Laboratory Testing Program; G

SD-06 Test Reports

Geotechnical Report; G

1.5 FIELD INVESTIGATION REQUIREMENTS

1.5.1 Exploratory Drilling

(ASTM D420) shall be conducted using a 2.5-inch-inside-diameter (Modified California) split-spoon sampler with core-retainer tubes or rings (ASTM D1586 and ASTM D3550) and the Standard Penetration Test (SPT, per ASTM D1586) sampling technique may be used for performing the exploratory borings, provided an adequate number of undisturbed samples using three-inch-inside-diameter thinwalled Shelby-type tubes (ASTM D1587) are obtained from the representative clayey and silty soil samples for laboratory testing. A minimum four Shelby tube samples shall be collected if clayey and silty soils are encountered. In sandy soils, alternating samples shall be collected with Modified California sampler and SPT sampler and blow counts recorded. Soil samples shall be collected at intervals not exceeding 3 feet to a depth of 30 feet, and then at maximum intervals of 5 feet to the bottom of the boring and at all change of strata. Exploratory borings shall be logged in the field and soils classified per ASTM D2488 and samples preserved and transported per ASTM D4220 (Group B for disturbed samples, and Group D for undisturbed samples). Depth to ground water, if encountered during drilling, shall be reported.

1.5.2 Substitution Test

If electronic cone penetrometer test equipment (CPT, per ASTM D3441) is locally available, consideration will be given to substituting up to three of the borings by CPT soundings, including nearly-continuous (every 2 inches or less) tip resistance, sleeve friction, friction ratio, and pore water pressure measurements versus depth.

1.6 LABORATORY TESTING

The actual laboratory testing program shall be proposed by the Contractor after the completion of the field work, and reviewed and approved by the Contracting Officer before implementation of laboratory work. The following test types and ASTM standard test methods are anticipated, however, final test selection shall be based on actual subsurface soil conditions encountered during drilling.

1.6.1 Identification and Index Property Tests

Moisture Content and Dry Unit Weight (ASTM D2216)
Specific Gravity (ASTM D854)
Particle Size Analysis (ASTM D422)
Minus No. 200 Sieve (ASTM D1140)
Atterberg Limits (ASTM D4318)
Soil Classification (Standard Practice ASTM D2487)

1.6.2 Engineering Property Tests

Compaction (ASTM D1557, ASTM D698)
Unconfined Compression Test (ASTM D2166)
Unconsolidated-Undrained Triaxial Compression Test (ASTM D2850)
Consolidation Test (ASTM D2435)
Expansion Index Test (ASTM D4829)
Consolidated-Undrained Triaxial Compression Test (ASTM D4769)
Direct Shear Test (ASTM D3080)
Soil Corrosivity (pH, Chloride, Electrical Resistivity, and Sulfate Content)

1.7 GEOTECHNICAL REPORT

The results of the geotechnical investigation shall be presented as a written draft report (two copies) to the Contracting officer within four (4) weeks after field exploration is completed. The Contractor shall review and evaluate all existing and new field and laboratory test data to provide soil parameters and recommendations. Final report shall be submitted within two weeks upon receipt of review comments from the Contracting Officer and a minimum of 120 calendar days prior to ordering materials. Soil parameters shall include, but not necessarily be limited to, the following:

1.7.1 Geology and Seismicity

A discussion shall be provided regarding the general geologic setting of the site and potential geologic/seismic hazards, such as seismicity and faulting, ground rupture and slope instability.

1.7.2 Subsurface Conditions and Soil Property Characterization Data

a. Description of subsurface soil and ground water conditions;

b. Soil property characterization, including

c. Soil classification and index properties (dry unit weight, moisture content, grain size distribution, Atterberg limits);

d. In-situ soil penetration resistance (SPT and/or CPT);

e. Engineering property characteristics, including compressibility, rate of consolidation, shear strength, and soil corrosion potential.

1.7.3 Site Preparation, Earthwork, and Slope Stability Recommendations

a. Clearing and grubbing and top soil removal;

b. Excavation, including evaluation of any difficulties that might be expected during excavation operations; address stability of the bottom and side slopes of the excavation;

c. Requirements for shoring;

d. Construction dewatering;

e. Use of on-site soils for compacted fill;

f. Placement and compaction of soils for the support of structures; treatment of saturated soft clays and silts, and expansive, collapsible or otherwise unsuitable soils;

g. Shrinkage and bulking factors to be used for earthwork estimating;

h. Construction of temporary and permanent cut/fill slopes and slope protection;

i. Soil corrosion potential (aggressiveness to metallic and concrete structures); and

j. Geotechnical instrumentation, monitoring and testing anticipated for construction.

1.7.4 Foundation Design Recommendations

a. Most suitable foundation types and depths for different structures;

b. Allowable net soil bearing pressures for shallow foundations and recommended minimum dimensions and depths;

c. Pile types and design capacities, if required;

d. Estimated total and differential settlements due to consolidation for the recommended foundation types and sizes; effect of settlement on existing structures shall also be addressed;

e. Estimate total and differential settlements due to seismic shaking, including settlements of liquefied soils in the upstream side and seismically induced dry sand settlements in the down stream side.

f. Active and at-rest pressures for design of free-standing and restrained retaining walls/structures; Seismically induced earth pressures;

g. Allowable increase in shallow foundations bearing pressure (or/and pile capacity) values to resist short-term and transient loads such as seismic loads; and

h. Coefficient of subgrade reaction for mat foundation and concrete slab design if required, and recommended guidelines for size adjustments.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01200

GENERAL REQUIREMENTS

-- End of Section Table of Contents --

SECTION 01200

GENERAL REQUIREMENTS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ENGINEERING MANUALS (EM)

EM 385-1-1	(1996) U.S. Army Corps of Engineers Safety and Health Requirements Manual

FEDERAL SPECIFICATIONS (FS)

FS FF-B-575	(Rev C) Bolts, Hexagon and Square
FS FF-N-105	(Rev B; Am 3 Int Am 4) Nails, Brads, Staples and Spikes: Wire, Cut and Wrought
FS FF-N-836	(Rev B; Am 2) Nut: Square, Hexagon, Cap, Slotted, Castle, Knurled, Welding and Single Ball Seat
FS MM-L-751	(Rev H) Lumber; Softwood
FS TT-E-529	(Rev D) Enamel, Alkyd, Semi-Gloss
FS TT-P-25	(Rev E; Am 2) Primer Coating, Exterior (Undercoat for Wood, Ready-Mixed, White and Tints)

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST PS 1	(1983) Construction and Industrial Plywood

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Location of Contractor's Office

SD-02 Shop Drawings

Temporary Access and Haul Roads; G.

1.3 CONSTRUCTION SIGNS

The Contractor shall construct and/or erect the following signs. The signs shall be erected as soon as possible and within 15 days after commencement of work under this contract.

1.3.1 Construction Signs Shall Meet The Following Material Requirements

a. Lumber shall conform to FS MM-L-751, and shall be seasoned Douglas Fir, S4S, Grade D or better except that posts, braces and spacers shall be construction Grade (WCLB).

b. Plywood shall conform to NIST PS 1, grade A-C, Group 1, exterior type.

c. Bolts, Nuts and Nails. Bolts shall conform to FS FF-B-575, nuts shall conform to FS FF-N-836, and nails shall conform to FS FF-N-105.

d. Paints and Oils. Paints shall conform to FS TT-P-25 for primer and FS TT-E-529 for finish paint and lettering.

1.3.2 The Following Construction Signs Shall Be Constructed

a. One project sign at location designated by the Contracting Officer. The project sign shall be constructed as detailed in Figure 1 and Figure 2.

b. Eight hard hat signs at locations directed. Hard hat signs shall be constructed as detailed in Figure 3. Decals and safety signs will be furnished by the Contracting Officer.

c. Warning Signs facing approaching traffic on all haul roads crossing under overhead power transmission lines.

d. Warning Signs shall be constructed of plywood not less than ½ inch thick and shall be securely bolted to the supports with the bottom of the sign face 3 feet above the ground. The sign face shall be 2 x 4 feet and all letters shall be 4 inches in height. The text of the "Powerline" warning signs shall be "WARNING: OVERHEAD TRANSMISSION LINES".

e. Warning signs shall be placed indicating that explosives are being used in the area at locations designated by the Contracting Officer. The text of the "Explosives" warning signs shall be "WARNING: EXPLOSIVES BEING USED IN AREA".

1.3.3 Painting

All exposed surfaces and edges of plywood shall be given one coat of linseed oil and be wiped prior to applying primer. All exposed surfaces of signs and supports shall be given one coat of primer and 2 finish coats of white paint. Except as otherwise indicated, lettering on all signs shall be black and sized as indicated.

1.3.4 Bulletin Board at the Contractor's Office

A weatherproof bulletin board, approximately 36 inches wide and 30 inches high, with hinged glass door shall be provided adjacent to or mounted on the Contractor's project office. If adjacent to the office, the bulletin board shall be securely mounted on no less than 2 posts. Bulletin board and posts shall be painted or have other approved factory finish. The bulletin board shall be easily accessible at all times and shall contain wage rates, equal opportunity notice, and such other items required to be posted

1.4 LOCATION OF CONTRACTOR'S OFFICE

Location of the Contractor's Office shall be approved by the Contracting Officer. The Contractor's job site office shall be located so that people visiting, such as salespersons or personnel seeking employment, will not have to enter the work area to get to the office. No parking of private vehicles shall be permitted in the working areas except as otherwise approved. At approved locations, adequate parking areas shall be constructed for the Contractor's and subcontractor's employees. The office site and parking areas shall be adequately drained and have suitable access.

1.5 MAINTENANCE OF PROJECT FACILITIES

The Contractor shall maintain project facilities in good condition throughout the life of the project. Upon completion of work under this contract, facilities covered under this section will remain the property of the Government.

1.5.1 General

The Contractor shall be responsible for maintaining all project facilities, including the existing Prado Dam Resident Office and the laboratory buildings.

1.5.2 Maintenance Requirements

Maintenance of the project facilities shall include daily janitorial service, including cleaning of tile floors and washing of windows twice a month. Toilet facilities shall be kept clean and sanitary and fully supplied at all times. All janitorial services shall be performed at such a time and in such manner to least interfere with the use of the Government facilities, but only during periods when the building and trailers are occupied. Maintenance includes providing potable bottled water service, trash removal, servicing of sewage tank, monthly air conditioning service, and the payment of monthly billings associated with these utilities and services with the exception of the telephone and power billings. The project facilities shall be kept clear of debris. Trash service shall also be provided (3 cy trash dumpster with weekly pickups). The Contractor shall remove and dispose of all broken test cylinders from the testing laboratory bi-weekly. Any required replacement and/or repairs for the project facilities or grounds shall be performed by the Contractor at no additional cost to the Government. Maintenance shall also include bi-annual pest control service for all buildings and trailers.

1.6 SECURITY GUARD SERVICE

The Contractor shall provide 24 hour a day, seven day a week security guard service for the Prado Dam construction site. The security guard service shall perform hourly checks of various locations throughout the project

site, as directed by the Contracting Officer, to assure overall security and prevent vandalism and theft during non duty hours. A security guard shall be assigned to control the entrance gate to Prado Dam.

1.7 PROTECTION OF EXISTING WORK

Before beginning any cutting or removal work, the Contractor shall carefully survey the existing work and examine the drawings and specifications to determine the extent of the work. The Contractor shall take all necessary precautions to insure against damage to existing work to remain in place, to be reused, or to remain the property of the Government, and any damage to such work shall be repaired or replaced as approved by the Contracting Officer at no additional cost to the Government. The Contractor shall carefully coordinate the work of this section with all other work and construct and maintain shoring, bracing and supports, as required. The Contractor shall insure that structural elements are not overloaded and be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under any part of this Contract.

1.8 PUBLIC UTILITIES, NOTICES, AND RESTRICTIONS

1.8.1 General

The approximate location of all pipe lines, power and communication lines, and other utilities known to exist within the limits of the work are indicated on the drawings. The sizes, locations, and names of owners of such utilities are given from available information, but their accuracy is not guaranteed. Except as otherwise indicated on the drawings, all existing utilities will be left in place and the Contractor shall conduct his operations in such a manner that the utilities will be protected from damage at all times, or arrangements shall be made by the Contractor for their relocation at the Contractor's own expense. The Contractor shall be responsible for any damage to utilities known to exist and shall reimburse the owners for such damage caused by his operations.

1.8.2 Relocation or Removal

Utilities to be relocated or removed not as part of this contract are designated "To be Relocated by Others" or "To be Removed by Others", respectively. Utilities shown on the plans and not so designated will be left in place and be subject to the provisions of the CONTRACT CLAUSE: PROTECTION OF EXISTING VEGETATION, STRUCTURES, UTILITIES, AND IMPROVEMENTS. The Contractor may make arrangements with the owner for the temporary relocation and restoration of utilities not designated to be relocated, or for additional work in excess of the work needed to relocate utilities designated for relocation at no additional cost to the Government.

1.8.3 Utilities Not Shown

If the Contractor encounters, within the construction limits of the entire project, utilities not shown on the plans and not visible as of the date of this contract and if such utilities will interfere with construction operations, he shall immediately notify the Contracting Officer in writing to enable a determination by the Contracting Officer as to the necessity for removal or relocation. If such utilities are left in place, removed or relocated, as directed by the Contracting Officer, the Contractor shall be entitled to an equitable adjustment for any additional work or delay.

1.8.4 Coordination

The Contractor shall consult and cooperate with the owner of utilities that are to be relocated or removed by others to establish a mutual performance schedule and to enable coordination of such work with the construction work. These consultations shall be held as soon as possible after award of the contract or sufficiently in advance of anticipated interference with construction operations to provide required time for the removal or relocation of affected utilities.

The Contractor shall be responsible for coordinating their activities with other contractors performing work in the area. This shall include, but is not limited to, coordination with Caltrans and their Contractor for work on the Highway 71 bridge crossing the Santa Ana River and the future expansion of the 71/91 interchange.

The Contractor shall be responsible to coordinate with the United States Geological Survey (USGS) for the removal of instruments within the seismic sheds. The USGS contact for removal of the instruments at Prado Dam is:

Mr. Arnie Acosta
Telephone: (626) 583-7234
Pager: (818) 542-4638

or

Edna Anjal
Telephone: (626) 583-7235

USGS shall be notified a minimum of 30 days prior to the removal of the seismic sheds. The Contractor shall not attempt to remove any of the instruments and associated hardware, however, what remains shall become the property of the contractor for removal and disposal.

1.8.5 Notices

1.8.5.1 Utilities to be Relocated or Protected

The Contractor shall notify the Contracting Officer, in writing, 14 calendar days prior to starting work on any utility to be relocated or protected. On each relocation, notification shall include dates on which the Contractor plans excavation, by-pass work, removal work and/or installation work, as applicable. The Contractor shall also notify the following representatives of utility owners not less than 30 days, unless otherwise specified, prior to start of work in the vicinity of their respective utilities:

Southern California Gas Company
Mr. Tim Pearce
Telephone: (213) 244-2269

Southern California Edison Company
Mr. Bob Patterson
Telephone: (909) 930-8432

Santa Ana Watershed Project Authority (For SARI sewer)
Mr. Richard Smith
Telephone (909) 785-5411

1.8.5.2 Telephone Lines

The Contractor shall notify, 60 calendar days prior to permanent installation of all telephone lines.

1.8.5.3 Contractor Shall Notify the Contracting Officer

The Contractor shall notify the Contracting Officer, in writing, not less than 14 days in advance of the date on which he will complete trenching, excavation, fill or rough grading, as applicable, at each location where such completed work is required for temporary or permanent relocations by others. The Contractor shall allow a period of 14 calendar days at each relocation, after which time the Contractor may resume his operations.

1.8.5.4 Existing Bench Marks and R/W Markers

The Contractor shall notify the Contracting Officer, in writing, 7 days in advance of the time he proposes to remove any bench mark or right-of-way marker.

1.8.5.5 Spill Reporting

The Contractor shall notify the Contracting Officer immediately after all spills, regardless of quantity, including all personnel exposures. The Contractor shall submit a written notification not later than 7 calendar days after the initial notification. The written notification shall include the following:

a. Item spilled, leaked or releases in an unauthorized manner (Identification,Quantity and Manifest Numbers).

b. Whether the amount spilled, leaked or released in an unauthorized manner is EPA reportable and, if reported, a copy of the report.

c Exact location of the spill, leak or unauthorized release.

d. Nature of exposure to personnel.

e. Containment procedures initiated.

f. Anticipated cleanup and disposal procedures.

g. Disposal location of spill, leak or unauthorized release residue.

1.8.6 Restrictions

1.8.6.1 Representatives of Other Agencies

Personnel representing owners and agencies may be present for various portions of the work. However, the Contractor will be responsible only to the Contracting Officer.

1.8.6.2 Working Hours

The Contractor shall restrict all construction activities, including warming equipment, to the following schedule:

Monday through Friday	7 a.m. to 7 p.m.
Saturday	9 a.m. to 6 p.m.

Access to the job site will be allowed 30 minutes prior to starting time unless otherwise approved by the Contracting Officer. No work will be permitted on Sundays or Federal Holidays.

1.8.6.3 Water for Construction

Reference is made to the clause of the contract entitled "Permits and Responsibilities," which obligates the Contractor to obtain all required licenses and permits for construction, including water for construction. The Contractor shall be responsible for obtaining and paying all costs and fees associated with the acquisition of water for construction. Water rights within the Prado Basin are owned by the Orange County Water District (OCWD). The Contractor shall not intercept existing surface or subsurface flows at any time during the contract performance period. All water from dewatering shall be returned to the streambed. Additionally, water from the water well shown on the drawings to be constructed by this contract can not be used by Contractor for any purpose.

1.9 ROADS AND CULVERTS

1.9.1 Existing Roads

The work shall be planned in such a manner that traffic on the existing roads outside the actual construction areas shall be maintained at all times. Maintenance shall be as specified in paragraph: Maintenance of Roads. The work area shall be examined carefully relative to the order and scope of work to be performed, with respect to the limiting provisions of the plans and specifications. Additional work on the existing roads may be done by others during the life of this contract.

1.9.1.1 Existing Sound Walls

The Contractor is responsible for maintaining required noise levels as stated in 01410 ENVIRONMENTAL PROTECTION.

1.9.2 Temporary Access and Haul Roads

Plans shall be submitted for approval on all proposed access and haul roads and all deviations, whether within or outside the limits of the construction area, at least fifteen (15) calendar days prior to construction of such roads. The plans shall indicate width of road, direction of traffic, road markings, type of guardrail, curves, grades, runouts, and other information in sufficient detail for studying safety of the proposed roads. The plans shall include details for removal and obliteration of haul roads and temporary access roads and restoration of the area as specified in paragraph: Post-Construction Cleanup and Obliteration.

1.9.2.1 Haul Road Design References

Design of haul roads shall meet or exceed the requirements of the Corps of Engineers Safety and Health Requirement Manual, Section 30.D (EM 385-1-1). An applicable design guide is the Surface Mine Haulage Road Design Study by Skelly and Loy of Harrisburg, PA, prepared for the Bureau of Mines, Washington, DC, dated June 1976.

1.9.2.2 Haul Road Design

Roads shall be designed for the type of vehicles in use. The maximum sustained grade shall not exceed 10% with an absolute maximum grade of 15% for a distance not to exceed 200 linear feet. Each lane of travel shall provide clearance that is equal to one-half of the widest vehicle in use (a 12 ft. wide vehicle will require a 24 ft. travel lane). The minimum horizontal curve radius shall not be less than 25 ft. on the inside of the curve. Vertical curves shall be a minimum of 100 ft. and be designed with consideration of the change in grades, height of the driver's eyes, height of an object a minimum of 6 inches above the road surface, and required stopping distance. Curve widening, proper cross slopes and superelevations shall be provided as necessary. Road ditches and culverts shall be included to control surface drainage away from erodible areas. Culverts shall be provided along natural water courses intersected by the haul road fill and shall be maintained as specified in paragraph: Culverts. Design shall also include provisions to control runaway vehicles on steep grades such as an escape lane. Design shall be subject to the Contracting Officer's approval.

1.9.3 Public and Private Access Roads

When it is necessary for heavy equipment to operate on or to cross project roads or arterial roads, flaggers, signs, lights, and/or other necessary safeguards shall be furnished to safely control and direct the flow of traffic. When it is necessary to operate on existing roads outside the construction area, all necessary permits shall be obtained from the appropriate private or public authority. Work shall be conducted in such manner so as to obstruct and inconvenience traffic on existing roads outside the construction limits as little as possible. Spillage of earth, dusty materials, boulders, and mud on project roads or other roads shall not be permitted. If spillage cannot be prevented, the spillage shall be immediately removed and such areas shall be kept clear throughout the workday. At the conclusion of each workday, such traveled areas shall be cleared of spillage, boulders, and mud.

1.9.4 Maintenance of Roads

All roads shall be maintained regularly to provide vehicular access for the Government's vehicles and the Contractor's vehicles and equipment during the contract performance period. Road maintenance shall include: clearing and disposal of rock/mud slides on the roads and drainage ditches, repair of washouts, repair of potholes and ruts, regrading, and any incident which would restrict vehicular/equipment access. Prior to any alterations of any road alignment the Contractor shall receive approval from the Contracting Officer. Road maintenance and alterations shall be performed by the Contractor at no additional cost to the Government.

1.9.5 Temporary Culverts

Culverts shall be provided as required for road drainage. Culverts shall be corrugated metal pipe of adequate diameter. Dump stone or other energy dissipating structures shall be provided at all outlets of culverts to prevent undermining of pipe. Exact locations of the culverts shall be subject to approval by the Contracting Officer.

1.9.5.1 Culvert Maintenance

All culverts within the construction area, including the borrow areas, shall be maintained to provide unrestricted flow through the culverts. Culvert maintenance shall include debris cleaning, repair of failures, and

extension of culverts due to road alterations. Culvert maintenance shall be performed by the Contractor at no additional cost to the Government.

1.10 TRAFFIC SAFETY

1.10.1 Warning Devices

In accordance with Contract Clause ACCIDENT PREVENTION, signs, barricades, and warning devices shall be provided, installed, and maintained as are required for protection of vehicular traffic at any location where operations interfere with public or private roads. Signs, barricades, lights, and signals shall be in conformance with Part VI of the U.S. Department of Transportation Manual on Uniform Traffic Control Devices for Streets and Highways.

1.10.2 Rock and Gravel

Rock and gravel for use on haul roads and other facilities may be obtained from any source within the excavation limits or stockpiles within the project boundaries not designated for other use. The use of any such source shall be subject to approval by the Contracting Officer.

1.11 WATER CONTAMINATION

In order to prevent contamination of water along waterways, all refuse, oil, greases, and other petroleum products; all toxic materials; all cement or concrete; or water containing such materials shall be disposed of in a manner to prevent their entry into the water along waterways.

1.12 SCRAP MATERIAL

Materials indicated to be removed and not indicated to be salvaged, stored or reinstalled are designated as scrap and shall become the property of the Contractor and be removed from the site of work. The Contractor by signing this contract hereby acknowledges that he made due allowance for value, if any, of such scrap in the contract price.

1.13 ARCHAEOLOGICAL FINDINGS DURING CONSTRUCTION

Should the Contractor or any of his employees in the performance of this contract find or uncover any archaeological remains, he shall notify the Project Engineer immediately. Such notification will be a brief statement in writing giving the location and nature of the findings. Should the discovery site require archaeological studies resulting in delays and/or additional work, the Contractor will be compensated by an equitable adjustment under the General Provisions of the contract.

1.14 POST-CONSTRUCTION CLEANUP AND OBLITERATION

The Contractor shall obliterate all signs of temporary construction facilities such as haul roads, access roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, or any other vestiges of construction as directed by the Contracting Officer. Excavation, filling, regrading and plowing of roadways and other construction areas will require the areas to be restored to near natural conditions, which will permit the growth of vegetation thereon. The disturbed areas shall be graded and filled as required, and the areas scarified prior to placement of soil covering for hydroseeding.

1.15 PERMITS

1.15.1 General

Reference is made to the clause of the contract entitled "Permits and Responsibilities," which obligates the Contractor to obtain all required licenses and permits, including, but not necessarily limited to the following specified hereinbelow.

1.15.1.1 National Pollutant Discharge Elimination System (NPDES) Permit

The project requires an NPDES permit from the California State Water Resources Control Board, Division of Water Quality. The general permit requires development and implementation of Storm Water Pollution Prevention Plan (SWPPP) , which shall be maintained on-site throughout the construction period. **Contractor shall comply with the requirements of SECTION 01356: STORM WATER POLLUTION PREVENTION MEASURES**. Modifications to the plan as necessary to reflect Contractor's construction methods shall be submitted by the Contractor to the Government for approval.

1.15.2 Encroachment Permit and Traffic Detour Plan

The project has been designed to avoid construction on the shoulder and traveled way of the State Route 71. The Contractor is responsible for obtaining all permits for work on or around the SR 71 roadway. Information for an encroachment permit to implement a closure of the highway shoulder can be obtained at:

Office of Permits
Department of Transportation
464 W. Fourth Street, 6th Floor, MS 619
San Bernardino, CA 92401-1400
(909) 383-4536

Information for a traffic detour plan can be obtained at:

Operations Division
Department of Transportation
464 W. Fourth Street, 6th Floor, MS 619
San Bernardino, CA 92401-1400
(909) 383-5979

1.16 REQUIRED INSURANCE

1.16.1 General

The Contractor shall maintain insurance in full force and effect throughout the term of this contract. The policy or policies of insurance maintained by the Contractor shall provide the limits and coverages as set forth herein below.

1.16.2 Insurance

Insurance shall be in force the first day of the term of this contract.

1.16.3 Insurance Policy

Each insurance policy required by this contract shall contain the following three clauses:

a. "This insurance shall not be canceled, limited in scope of coverage or non-renewed until after 30 days written notice has been given to (1) Riverside County Flood Control and Water Conservation District, Attn: Steve Thomas, 1995 Market Street, P.O. Box 1033, Riverside, CA 92502-1033, (2) San Bernardino County Flood Control District, Attn: Vana Olsen, 825 East Third Street, San Bernardino, CA 92415-0835, and (3) Orange County Public Facilities and Resources Department, Attn: Herb Nakasone, 300 North Flower Street., P.O. Box 4048, Santa Ana, CA 92702-4048.

b. "All rights of subrogation are hereby waived against the County of Riverside, San Bernardino, and Orange and the members of the Board of Supervisors and elective or appointive officers or employees, when acting within the scope of their employment or appointment, and County Districts and their Board or Commissions which are governed by the County Board of Supervisors".

c. "As respects operation of the named insured performed on behalf of the Government, the following are added as additional insureds:

1. The San Bernardino County Flood Control District, County of San Bernardino, Orange County Public Facilities and Resources Department, County of Orange, Riverside County Flood Control and Water Conservation District, and the County of Riverside.

d. "It is agreed that any insurance maintained by the Orange County Public Facilities and Resources Department, and the County of Orange will apply in excess of, and not contribute with, insurance provided by this policy.

LIABILITY INSURANCE

COVERAGE	MINIMUM LIMITS
Comprehensive General Liability single limit including Completed Operation and a Broad Form Property Endorsement and Comprehensive Automobile Liability	$10,000,000 combined per occurrence.
Worker's Compensation	Statutory

1.16.4 Liability Insurance

Any liability insurance required by this contract shall not contain exclusions or endorsements which eliminate or limit coverage for the following:

a. Claims of liability for bodily injury or property damage caused by, resulting from, attributable or contributed to, or aggravated by the subsidence or other movement of soils or land as a result of landslide, consolidation, expansion, creep, shifting, sinking, or mud flow;

b. Claims of liability for bodily injury or property damage caused by, resulting from, attributable or contributed to, or aggravated by the actual, alleged, or threatened discharge, dispersal,

release or escape of any pollutants;

c. Completed Operations coverage;

d. Products coverage;

e. Broad Form Property Damage coverage;

f. Blanket Contractual coverage.

1.16.5 Fire and Extended Coverage

The Contractor shall purchase a course of construction property insurance policy to cover structures (excluding reinforced concrete structures) being built under the terms of this contract to at least 90 percent of their replacement cost. As a minimum, coverage shall be provided for replacement cost and for fire and the extended coverage perils.

1.16.6 Worker's Compensation

Each liability and worker's compensation insurance policy required by this contract shall contain clause numbers 12.3 (a.) and 12.3 (c.) above,and the following clause: "It is agreed that any insurance maintained by the County of Riverside, San Bernardino, and Orange will apply in excess of, and not contribute with, insurance provided by this policy."

1.16.6.1 Procuring of Required Policy

The procuring of such required policy or policies of insurance shall not be construed to limit Contractor's liability hereunder not to fulfill the indemnification provisions and requirements of this contract.

1.16.6.2 Contractor Agrees to Indemnify

Contractor agrees to indemnify and save harmless agency, its officers, employees, agents and volunteers from and against any and all claims, actions, losses, damages and/or liability arising out of this contract from any cause whatsoever, including the acts, errors or omissions of any person, except where such indemnification is prohibited by law.

1.17 PROGRESS PAYMENTS

1.17.1 Partial Pay Estimates

Partial pay estimates shall be submitted every month. The following items shall be submitted with the partial pay estimates to ensure prompt payment:

a. Project schedule Narrative and Earnings Monthly update reports as specified in Section 01320 PROJECT SCHEDULE, paragraph: Contractor Prepared Network Analysis System (NAS).

b. Safety report(s) in accordance with OSHA, CALOSHA, and the Corps of Engineers' EM 385-1-1.

c. Updated/current submittal register as specified in Section 01330 SUBMITTAL PROCEDURES, paragraph: Submittal Register (ENG FORM 4288).

d. Quality Control Reports as specified in Section 01451 CONTRACTOR

QUALITY CONTROL, paragraph: Documentation.

e. Updated forcasting of expenditure worksheets as specified in the paragraph below

1.17.2 Forecasting of Future Progress Payments

By July 15th of each year, the Contractor shall give the Contracting Officer the projected monthly earnings for the upcoming fiscal year (fiscal year begins in November). The Contracting Officer will provide a spreadsheet to the Contractor showing the different funding categories and their respective percentages for each bid item for the total contract amount after the issuance of notice to proceed (See attached FIGURE 5). Similar accounting information will be contained in any subsequent contract modification issued for this contract. Each pay period the Contractor shall forecast his expenditures for the following 3 pay periods, indicating the funding requirement for each accounting category. The updated worksheet (see FIGURE 6) shall be submitted with each partial pay estimate (e.g., submittal for partial pay estimate for the period of 15 DEC to 15 JAN will include a forecast of expenditures for the period of 15 JAN to 15 APR). Forecasting of expenditures is needed to assure sufficient funding for future progress payments. If the contractor’s actual earnings for any particular partial pay estimate exceed the funding available for payment due to inaccurate submittal of forecast expenditures, the contracting office can reject the contractor’s invoice as defective, and require the contractor to resubmit the invoice of an amount not exceeding the previously submitted forecast amounts.

1.18 NOTICE OF PARTNERSHIP

The Government intends to encourage the foundation of a cohesive partnership with the Contractor and its subcontractors. This partnership will be structured to draw on the strengths of each organization to identify and achieve reciprocal goals. The objectives are effective and efficient contract performance and intended to achieve completion within budget, on schedule, and in accordance with plans and specifications; and to develop a single cooperative management team focused on the success of the project to mutual benefit of all stakeholders. This partnership would be bilateral in makeup, and participation will be totally voluntary. Any cost associated with effectuating this partnership will be agreed to by both parties and will be shared equally with no change in contract price. An integral aspect of partnering is the resolution of disputes in a timely, professional, and non-adversarial manner through the use of issue clarification and problem solving. Alternate Dispute Resolution (ADR) methodologies will be encouraged in place of more formal dispute resolution procedures. ADR will assist in promoting and maintaining an amicable working relationship to preserve the partnership. ADR is a voluntary, nonbinding procedure available for use by the parties to this contract to resolve any dispute that may arise during performance. To implement this partnership initiative it is anticipated that within 60 days of Notice to Proceed the Contractor's on-site project manager and the Government's Resident Engineer would attend a two day partnership development seminar/team building workshop together with the Contractor's key on-site staff and key Government personnel. Follow-up workshops of 1 to 2 days duration would be held periodically throughout the duration of the contract as agreed to by the Contractor and Government.

1.19 ALTERNATIVE DISPUTES REVIEW PROCESS

In order to assist in the resolution of disputes or claims arising out of this project, this contract clause establishes an Alternative Disputes Review process. A Disputes Review Board will, by mutual agreement of the parties and in accordance with this clause, be established but is not intended to be a substitute for normal negotiated Government and Contractor dispute resolution. The parties shall establish the Board within 90 calendar days after the Notice to Proceed as set forth in Attachment 1. The Disputes Review Board will consider disputes referred to it and will provide non-binding recommendations to assist in the resolution of the differences between the Government and Contractor. The following alternative procedure may be used for dispute resolution. Specific procedures to be followed for disputes referred to the Disputes Review Board are set forth as attachments to this provision.

If the Contractor objects to any oral decision or order of the Contracting Officer or his Authorized Representative(s), the Contractor shall request in writing a written decision or order from the Government. Such request is not considered a dispute for purposes of the Contract Disputes Act.

After receipt of the Government's written decision or order the Contractor shall, if there is an objection to such decision or order, file a written protest with the Government, stating clearly and in detail the basis of the objection. The Government will consider any written protest and make a decision within 15 days from receipt of the written protest either agreeing or disagreeing with the protest. If there is not complete agreement, the matter can either be referred to the Disputes Review Board by mutual agreement of the Government and the Contractor, or the Contractor may request that the Contracting Officer issue a final decision on the matter, from which the contractor may pursue an appeal in accordance with the "Disputes" clause of the contract.

In the event the Government and the Contractor mutually agree to submit the dispute to the Disputes Review Board, the request for review must be instituted within 30 days of the date of receipt of the Government's last decision. Pending review by the Disputes Review Board of a dispute, the Contractor shall diligently proceed with the work as previously directed.

The Contractor and the Government shall each be afforded an opportunity to be heard by the Disputes Review Board and to offer evidence. The Disputes Review Board recommendations toward resolution of a dispute will be given in writing to both the Government and the Contractor within 30 days following conclusion of the proceedings before the Disputes Review Board.

Within 30 days of receiving the Dispute Review Board's recommendations, both the Government and the Contractor shall respond to the other in writing signifying that the dispute is either resolved or remains unresolved. If the Government and the Contractor are able to resolve their dispute, the Government will expeditiously process any required contract modifications. Should the dispute remain unresolved after 30 days following receipt of the Board's recommendations, the Contractor may submit a request for a Contracting Officer's decision under the "Disputes" clause of the contract.

The attached information at the end of this section forms a part of this Special Clause. The Alternative Disputes Review Process (Attachment 1) describes the purpose and function of the Disputes Review Board. The Disputes Review Board Three Party Agreement which sets out the terms between the parties (Attachment 2) must be completed and signed by both parties in accordance with the conditions in that Agreement. The Contract

Disputes Review Board Guidelines (Attachment 3) set forth the objective and responsibility of the Disputes Review Board. These attachments set out all the guidelines for this Special Clause providing an alternative disputes review process.

1.20 AVAILABILITY OF ADDITIONAL INFORMATION

1.20.1 Documentation and Reports

Additional design information and data are available through the Contracting Officer. Specific information available for review include: the Phase II GDM on the Santa Ana River Mainstem - Main Report & Supplemental Environmental Impact Statement, dated Auguts 1988; the Supplemental Final Environmental Impact Statement/Environmental Impact Report for Prado Basin and Vicinity dated November 2001; the Draft Feature Design Memorandum No. 12 Prado Dam Outlet Works; selected as-built drawings from 1938 through 1940; pump test data, and groundwater data. It is emphasized that significant changes have been incorporated into the Plans and Specifications from the designs proposed in the design memorandums. The design memorandums and other data are available for information purposes only and are not a part of the contract documents since they have been superseded by the Plans and Specifications.

1.20.2 Field Investigations

Prior to bid opening, the Contractor may make arrangements to access the site to perform geotechincal investigations on the following conditions:

Coordinate with the Prado Resident Office, Fernando Cano or Bob Garda, 48 hours in advance for access to the site. Access would be limited to standard work hours, Monday through Friday. Submit a hazard analysis and layout of proposed work to the Prado Resident Office for approval prior to commencement of any work.

A Corps of Engineers geologist or one of his representatives will observe the investigations. Contractor shall notify POC Dave Lukesh, (213) 452-3577, 72 hours in advance.

Notify the Corps' Cultural Resources Specialist, Stephen Dibble, (213) 452-3849, 48 hours prior to commencing investigations.

Activities shall not take place or interfere with Endangered Species in standing water or other sensitive locations. As long as the proposed activities occur outside of the active stream channel, and outside of vireo nesting season (which begins March 1), that should satisfy most environmental concerns.

Standard requirements concerning equipment use must also be met (i.e., equipment must be properly tuned and maintained to minimize air pollution, avoid leaks/contamination of soil and groundwater, don't refuel within the river channel, etc.).

Corps Safety Standards EM-385-1-1 shall apply.

PART 2 PRODUCTS (NOT APPPLICABLE)

PART 3 EXECUTION (NOT APPPLICABLE)

ALTERNATIVE DISPUTES REVIEW PROCESS - ATTACHMENT 1

DISPUTES REVIEW BOARD

1. Purpose.

The Disputes Review Board is an advisory body which may be created by mutual agreement of the Government and the Contractor for a particular construction project. The Board's function will be to assist in the resolution of claims, disputes or controversy between the Contractor and the Government. Any recommendations made by the Board will be advisory, and will not be binding upon either party.

2. General.

a. Definition. The Disputes Review Board process is a voluntary, expedited procedure, whereby an independent three-party Board is established to evaluate contract disputes and provide recommendations to the Government and its Contractor with the objective of resolving disputes.

b. The Board will consider disputes referred to it, and will furnish recommendations to the Government and Contractor to assist in the resolution of the differences between them. The Board will provide technical expertise to assist and facilitate the resolution of disputes.

3. Board Membership.

a. The Disputes Review Board shall consist of three individuals respected in the field of engineering for their ability and integrity, who are experienced with the processes anticipated to be used to construct the project: one member shall be selected by the Government; one member shall be selected by the Contractor; and, one member shall be selected by these first two members. The first two members shall be mutually acceptable to both the Government and the Contractor. If the two parties are unable to agree on these first two members, the mutual decision to submit disputes to a Disputes Review Board shall be considered terminated.

b. The two members acceptable to the Government and the Contractor will independently select the third member. If the two members are unable to select an acceptable third member, the decision to submit disputes to a Disputes Review Board shall be considered terminated.

c. No member shall have a financial interest in the contract, except for payment for services on the Disputes Review Board. Except for fee-based consulting services on other projects, no Board member shall have been employed by either party within a period of two years prior to award of the contract. No member shall have had substantial prior involvement in the project that could compromise his ability to impartially participate in the Board's activities.

4. Selection of the Disputes Review Board Procedure.

If the parties mutually agree that a Disputes Review Board should be established for work performed under a contract, the Government and the Contractor shall negotiate an agreement with their member within 60 calendar days after execution of the contract. The selection of the Disputes Review Board Alternative Disputes Review procedure for resolution of contract disputes shall be void if the two members are unable to select a third member

within 30 calendar days.

5. Procedure for Submitting Dispute to the Board.

a. If the Contractor objects to any oral decision or order of the Contracting Officer or his Authorized Representative(s), the Contractor shall request in writing a written decision or order from the Government.

b. After receipt of the Government's written decision or order the Contractor shall, if there is an objection to such decision or order, file a written protest with the Government, stating clearly and in detail the basis of the objection. The Government will consider any written protest and make a decision within 15 days from receipt of the written protest either agreeing or disagreeing with the protest. If there is not complete agreement, the matter can either be referred to the Disputes Review Board by mutual agreement of the Government and the Contractor, or the Contractor may request that the Contracting Officer issue a final decision on the matter, from which the Contractor may pursue an appeal in accordance with the "Disputes" clause of the contract.

c. In the event the Government and Contractor mutually agree to submit the dispute to the Disputes Review Board, the request for review must be instituted within 30 days of the date of receipt of the Government's last decision. Pending review of the Disputes Review Board of a dispute, the Contractor shall diligently proceed with the work as previously directed.

d. The Contractor and the Government shall each be afforded an opportunity to be heard by the Disputes Review Board and to offer evidence. The Disputes Review Board shall submit in writing recommendations towards factual (as opposed to legal) resolution of a dispute to both the Government and the Contractor within 30 days following conclusion of the proceedings before the Disputes Review Board.

e. Within 30 days of receiving the Dispute Review Board's factual recommendations, both the Government and the Contractor shall respond to the other in writing signifying that the dispute is either resolved or remains unresolved. If the Government and the Contractor are able to resolve their dispute, the Government will expeditiously process any required contract modifications. Failure of either party to respond within 30 days following the receipt of the Board's recommendations will be deemed acceptance of the Board's recommendations.

f. In appropriate cases the Contractor and the Government may agree that a dispute should be submitted to the Disputes Review Board, but that the dispute only warrants the efforts of one Board Member. In such cases the third Board Member will mediate the dispute without participation of the other two members. Other than submitting the dispute to only the third Board Member, the procedural requirements of the Alternative Disputes Review Board Process as set forth in paragraph 7a-e above will be followed.

6. Board Procedures.

a. The Disputes Review Board will formulate its own rules of operation. In order to keep abreast of construction progress, it is recommended that the members, as a Board, will visit the project at least quarterly, keep a current file and regularly meet with representatives of the Government and the Contractor. More frequent than quarterly site visits shall be as agreed between the Government, the Contractor and the Board. The Board should take these opportunities to make recommendations to either or

both, the Government and the Contractor to facilitate the construction and/or prevent problems from occurring.

b. Should the need arise to appoint a replacement Board member, the replacement member shall be appointed in the same manner as the original Board members were appointed. The selection of a replacement Board member shall begin promptly upon notification of the necessity for a replacement, and shall be completed within 30 calendar days. The Disputes Board Three Party Agreement will be supplemented to indicate changes in Board membership.

c. For further description of work, responsibilities and duties of the Disputes Review Board, and the Government and Contractor's obligations and responsibilities with respect to each other and to the Disputes Review Board, see the "Disputes Board Three Party Agreement" as set forth in attachment 2.

7. Expenses of the Board and Board Members.

Compensation for the Disputes Review Board members, and the expenses of operation of the Board, shall be shared by the Government and Contractor in accordance with the following:

a. The fees and expenses of all three members of the DRB shall be shared equally by the Government and the Contractor. The Contractor shall pay the invoices of all DRB members after approval by both parties. The Government shall reimburse the Contractor for one half of the approved invoices.

b. The Government at its expense will provide administrative services, such as conference facilities and secretarial services, to the Board.

8. Three Party Agreement.

a. The Contractor, the Government and all three members of the Board shall execute the "Disputes Review Board Three Party Agreement" within 30 calendar days following the final selection of the third member.

b. The "Disputes Review Board Three Party Agreement" and the "Contract Disputes Review Board Guidelines" to said Agreement are set forth in attachments 2 and 3.

ALTERNATIVES DISPUTES REVIEW PROCESS - ATTACHMENT 2

THREE PARTY AGREEMENT

THIS THREE PARTY AGREEMENT, made and entered into this _____ day of _____, 200_, between: The United States Army Corps of Engineers, acting through the Contracting Officer of the U.S. Army Engineer District, Los Angeles, hereinafter called the CORPS; the _____ company, hereinafter called the "CONTRACTOR," and the Disputes Review Board, hereinafter called the "BOARD" consisting of three members; _____; _____, and _____-.

WITNESSETH that,

WHEREAS, the CORPS and the CONTRACTOR are now engaged in the construction of the Prado Dam, Embankment, Outlet Works, and Appurtenances in Riverside County, California, under Contract No. DACW09-__-B-____; and

WHEREAS, the contract includes a provision authorizing, upon the mutual agreement of both the CORPS and the CONTRACTOR, the establishment and operation of a "Disputes Review Board" to assist in resolving disputes and claims; and

WHEREAS, the BOARD is composed of three members, one selected by the CORPS, one selected by the CONTRACTOR and the third member selected by these two;

NOW THEREFORE, in consideration of the terms, conditions, covenants and performance contained herein, or attached and incorporated and made a part hereof, the parties agree as follows:

I.

DESCRIPTION OF WORK

In order to assist upon mutual agreement by the CORPS and the CONTRACTOR in the resolution of disputes and claims between the CONTRACTOR and the CORPS, the contract provides for the establishment of a Disputes Review Board. The intent of the BOARD is to fairly and impartially consider any disputes mutually placed before it, and to provide written recommendations for resolution of such disputes to both the CORPS and the CONTRACTOR. The members of the BOARD shall perform all services necessary to participate in the BOARD's actions in accordance with the following Scope of Work.

II.

SCOPE OF WORK

The Scope of Work of the BOARD includes, but is not limited to, the following items of work.

A. Procedures.

Prior to consideration of an appeal, the BOARD shall establish rules that will govern the conduct of its business, and reporting procedures based upon guidelines which are made a part of the Special Clause entitled, "ALTERNATIVE REVIEW DISPUTES PROCESS." The BOARD's factual recommendations, resulting from their consideration of a dispute or claim, shall be furnished

in writing to the CORPS and the CONTRACTOR. The recommendations shall be based on the pertinent contract provisions and facts and circumstances involved in the dispute.

B. Construction Site Visits.

The members as a BOARD shall visit the project site at least quarterly to keep abreast of construction activities and to develop a familiarity for the work in progress. More frequent site visits may be warranted. The frequency, exact time and duration of these visits shall be as mutually agreed between the CORPS, the CONTRACTOR and the BOARD. The Board should take these opportunities to make recommendations to either or both, the Government and the Contractor to facilitate the construction and/or prevent problems from occurring.

C. BOARD Consideration of a Dispute or Claim.

In the event of a claim or dispute, the CORPS and the CONTRACTOR may mutually agree to submit such claim or dispute to the BOARD. Upon receipt by the BOARD of a written claim or dispute, the BOARD shall convene to review and consider the matter. Both the CORPS and the CONTRACTOR shall be given the opportunity to present their evidence at these meetings. It is expressly understood that the BOARD members are to act impartially and independently in consideration of the contract provisions and the facts and conditions surrounding any written claim or dispute presented by the CORPS or the CONTRACTOR. The BOARD's factual recommendations concerning any such claim or dispute are advisory and non-binding upon both the CORPS and the CONTRACTOR.

D. Time and Place of Board Meetings.

The time and location of BOARD meetings shall be determined by the BOARD.

III.

CONTRACTOR RESPONSIBILITY

The CONTRACTOR shall furnish one copy of all pertinent documents it might have, other than those furnished by the CORPS, which are or may become pertinent to the performance of the BOARD. Pertinent documents are any drawings or sketches, calculations, procedures, schedules or estimates or other documents which are used in the performance of the work or in justifying or substantiating the Contractor's position.

IV.

CORPS RESPONSIBILITIES

The CORPS shall furnish the following services and items.

A. Contract Related Documents.

The CORPS Shall furnish the BOARD three copies of the Contract documents, change orders, written instructions issued by the CORPS to the Contractor or other documents pertinent to the performance of the contract and therefore, necessary to the BOARD's work.

B. Coordination and Services.

The CORPS Contracting Officer's Representative for the contract will, in cooperation with the CONTRACTOR, coordinate the operations of the BOARD. The CORPS, acting through the Contracting Officer's Representative, will arrange or provide conference facilities at or near the contract site and provide secretarial and copying services.

C. BOARD Cost Records.

The Board will maintain complete cost records, which will be available for inspection by either party. Shared expenses include the members' wages and travel expense, local lodging and subsistence for the BOARD members, and direct non-salary costs associated with BOARD operations.

V.

COMPENSATION

A. Payment for services of the CORPS and CONTRACTOR appointed members of the BOARD and the third appointed member will be at the rates agreed to between the CORPS and the CONTRACTOR (for the third appointed member) and between each of them and their respective appointed member.

Compensation, travel, and costs, for the BOARD members, and the expenses of operation of the BOARD, shall be shared by the CORPS and the CONTRACTOR in accordance with the following:

a. The CORPS and the CONTRACTOR shall share equally in the BOARD members' wages, expenses, and travel.

b. The CORPS and the CONTRACTOR shall share equally the other reasonable and necessary expenses of the BOARD.

B. Fee - Third Appointed Member.

Payment for services rendered by the third member of the BOARD shall not exceed the daily billing rate of $_____, including travel time. This daily rate includes all direct labor costs, overhead and profit. Travel and subsistence expenses will be reimbursed at the actual cost, but shall not exceed the allowable amounts as provided by the Government's Joint Travel Regulations in effect at the time the expenses are incurred.

C. Direct Non-Salary Costs.

Direct non-salary costs of the BOARD will be reimbursed at the actual cost to the BOARD. These charges may include, but are not limited to; printing, long distance telephone calls, supplies, etc. The billing for non-salary costs, directly identifiable with the project, shall be an itemized listing to the charges supported by the original bills, invoices, expense accounts and miscellaneous supporting data retained by the BOARD members. Copies of the original supporting documents shall be supplied to the parties upon request.

D. Maximum Total Amount Payment.

The maximum total amount payable under this AGREEMENT for the BOARD's fee and travel costs, and the BOARD's direct non-salary costs, shall not exceed $_____, unless a prior supplemental AGREEMENT has been negotiated and executed by the CORPS and the CONTRACTOR.

E. Payments.

The BOARD may submit invoices to the CONTRACTOR for partial payment for work completed by the BOARD not more than once per month during the progress of the work. Such invoices shall be accompanied by a general description of activities performed during the billing period. The value of the work accomplished for partial payment shall be established by the billing from the BOARD members, and itemized direct non-salary costs incurred by the Board. The CONTRACTOR shall pay the invoices of the BOARD after approval by both parties. The CORPS shall reimburse the CONTRACTOR for one half of the approved invoices.

F. Inspection of Cost Records.

The BOARD shall keep available for inspection by representatives of the CORPS for a period of three years after final payment the cost records and accounts pertaining to this AGREEMENT.

VI.

TERMINATION OF AGREEMENT

The parties of this AGREEMENT mutually agree that this AGREEMENT may be terminated at any time by written notice by the CORPS or CONTRACTOR to the other party. BOARD members may withdraw from the BOARD by providing notice. BOARD members may be terminated for cause only by their original appointor. Therefore, the CORPS may only terminate the CORPS appointed member, the CONTRACTOR may only terminate the CONTRACTOR appointed member, and the first two members must agree to terminate the third member.

VII.

LEGAL RELATIONS

The parties hereto mutually understand and agree that the third BOARD member in the performance of any duties on the BOARD is acting in the capacity of an independent Contractor and not as an employee of either the CORPS or the CONTRACTOR. The board members are absolved of any personal or professional liability arising from the activites and recommendations of the BOARD.

VIII.

DISPUTES

Any dispute between the parties hereto, arising out of the work or other terms of this AGREEMENT, which cannot be resolved by negotiation and mutual concurrence between the parties, shall render this AGREEMENT terminated.

IX.

GENERAL

A. Notices.

All notices to be given herein shall be effective upon receipt and shall be in writing and personally delivered or mailed, first class,,postage

prepaid or given by telegram, facsimile or other similar means (followed by a confirmation by mail) to the parties. As the case may be, at the following address or such other address as may hereafter be designated, by the parties:

a. If to the CORPS:

Address to be provided.

b. If to the Contractor:

Address to be provided.

c. If to the BOARD Members:

Address to be provided.

B. Confidentiality.

No BOARD Member shall disclose to any person proprietary or confidential information of the CORPS or the Contractor, except as may be required by law.

In WITNESS WHEREOF, the parties hereto have executed this AGREEMENT as of the day and year first above written.

BOARD MEMBER

By: _____

Title: _____

BOARD MEMBER

By: _____

Title: _____

BOARD MEMBER

By: _____

Title: _____

CONTRACTOR

By: _____

Title: _____

U.S. ARMY CORPS OF ENGINEERS

By: _____

Title: Contracting Officer

ALTERNATIVE DISPUTES REVIEW PROCESS - ATTACHMENT 3

CONTRACT DISPUTES REVIEW BOARD

GUIDELINES

I.

OBJECTIVE

The principal objective of the Disputes Review Board (BOARD) is to provide technical advice to both parties that will assist in the resolution of disputes which would otherwise likely be resolved through the traditional litigative processes. If this objective is achieved, such disputes can be resolved promptly, with minimum expense, and with minimum disruption to the administration and performance of the work. It is not intended for the GOVERNMENT or the CONTRACTOR to default on their normal responsibility to amicably and fairly settle their differences by indiscriminately assigning disputes to the BOARD. It is intended that if mutually agreed to by the parties to constitute a Disputes Review Board for the purpose of attempting to resolve contract disputes, that the mere existence of the BOARD will encourage the CORPS and the CONTRACTOR to resolve potential disputes without the necessity of resorting to the formal appeal procedure under the "Disputes" clause of the contract.

II.

RESPONSIBILITY OF THE BOARD

A. The BOARD will provide technical advice and recommendations concerning controversy between the CONTRACTOR and the CORPS from construction arising under the contract. Primarily, the BOARD will consider interpretation of the plans and/or specifications, delays, acceleration of the work, scheduling, classification of extra work, changed conditions, design changes, and the like. During its regular visits to the job site, the BOARD will encourage the resolution of differences at the job level. The Board should take these opportunities to make recommendations to either or both, the Government and the Contractor to facilitate the construction and/or prevent problems from occurring.

B. During the period when the BOARD is in effect, other than by formal factual recommendations to both the CORPS and the CONTRACTOR, the BOARD will refrain from giving any advice or consultative services to either party. The BOARD members will act in a completely independent manner and will have no consultative or business connections with either party during their tenure as BOARD members.

C. Normally, the third BOARD member selected by the first two will act as Chairman for all activities. However, this may be delegated to another member from time to time.

III.

REGULAR CONSTRUCTION PROGRESS MEETINGS

A. All regular meetings will be held at or near the job site. Each meeting will consist of a round table discussion and a field inspection of the work being performed. The round table discussion will be conducted by a member of

the CORPS and will be attended by selected personnel from the CORPS and the CONTRACTOR. The agenda will generally be as follows:

1. Opening remarks by the CORPS Representative.

2. A description by the CORPS of work accomplished since the last meeting, the current status of the work, schedule-wise, and a forecast for the coming period.

3. An outline, by the CONTRACTOR, of potential problems and a description of proposed solutions.

4. An outline by the CORPS' Contracting Officer, or his authorized representative, as to the status of the work as he views it including potential problems and proposed solutions.

5. A brief description of potential claims or disputes which have surfaced since the last meeting.

6. A summary of the status of past disputes and claims.

B. The CORPS will prepare minutes of all regular meetings and circulate them for revision and/or approval by all concerned.

C. The field inspection will cover all active segments of the work, the BOARD being accompanied by both the CORPS and CONTRACTOR personnel.

D. The Board should take these opportunities to make recommendations to either or both, the Government and the Contractor to facilitate the construction and/or prevent problems from occurring.

IV.

HANDLING OF WRITTEN APPEALS

A. When a written appeal is referred to the BOARD by either party, it shall first decide when to conduct a hearing. For an urgent matter the BOARD should convene at its earliest convenience. All hearings shall commence no later than 30 days following transmittal of a dispute to the BOARD.

B. The BOARD may request that written documentation and arguments from both parties be sent to each individual member for study before the hearing begins.

C. Normally, the hearing will last no more than 2 days, and would be conducted at the job site. However, any location which would be more convenient to all parties and still provide all required facilities and access to necessary documentation would be satisfactory.

D. For hearings, the third member of the BOARD will act as Chairman, or he may appoint one of the other members. The CORPS and the CONTRACTOR shall have representatives at all hearings. The party initiating the dispute to the BOARD will discuss the dispute followed by the other party, each party being allowed equal time. Each party will then be allowed one or more rebuttals until all aspects are thoroughly covered. Each time a person testifies the BOARD members may ask questions, request clarification, or ask for further data. In large or complex cases more than two days of additional hearings may be necessary in order to consider all the evidence presented by both parties. However, no hearing on any single dispute will last for more

than 4 calendar days.

E. After the hearings are concluded, the BOARD shall meet in private and reach a conclusion supported by two or more members. Its factual (as opposed to legal) findings and recommendations, together with its reasons, shall then be submitted as a written report to both the CORPS and the CONTRACTOR within 30 days following completion of the hearings. The Board's recommendations shall be based on the pertinent contract provisions and facts and circumstances involved in the dispute.

F. The BOARD should make every effort to reach a unanimous decision. If this proves impossible, the dissenting member may prepare a minority report.

G. Although both parties should place weight upon the BOARD's recommendations, they are not binding. Either party may request the BOARD to reconsider its recommendation.

H. Position papers or other written material supplied to the BOARD are admissible in a subsequent proceeding unless the submitting party designates that they are submitted for settlement purposes only; in addition, any written report of the BOARD shall be admissible in such subsequent proceedings and each party hereby stipulates to its admissibility; and provided, further that if settlement is reached as a result of the recommendations of the BOARD, any material presented to the BOARD, as well as the recommended settlement, may be used to justify any contract modification which may result from the settlement.

I. It may not be necessary for the BOARD to keep a formal record of its sessions during the consideration of a dispute. This would depend partly upon the nature and magnitude of the dispute and upon the attitude of the parties.

V.

MISCELLANEOUS

It is not desirable to adopt hard and fast rules for the functioning of the BOARD. The entire procedure should be kept flexible so that it can adapt to changing situations. The BOARD should initiate, with the other parties' concurrence, new rules or modifications to old ones whenever this is deemed necessary. It is desirable to keep the hearings informal.

-- End of Section --

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01230

SAFETY REQUIREMENTS

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SECTION 01230

SAFETY REQUIREMENTS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ENGINEERING MANUALS (EM)

EM 385-1-1	(1996) U.S. Army Corps of Engineers Safety and Health Requirements Manual

OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)

Standards for Construction	(Title 29, Code of Federal Regulations Part 1926 as revised)

1.2 GENERAL

During the performance of this contract, the Contractor shall be responsible for conditions of the jobsite, including care and safety of all property, and safety of all persons whether or not employed by the Contractor. This requirement shall apply continuously and not be limited to normal working hours and shall apply to all activities both directly and indirectly associated with the performance of this contract. These requirements do not supersede, but are in addition to any federal, OSHA, state, or local regulations. If a conflict occurs between these requirements and current regulations, the more stringent shall apply.

1.2.1 OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA) STANDARDS

The Standards for Construction and the Corps of Engineers General Safety and Health Requirements Manual, EM 385-1-1, are both applicable to this contract. The most stringent requirement of the two standards will be applicable.

1.2.2 Responsibility of the Contractor

It shall be the responsibility of the Contractor to be familiar with the required health and safety regulations in the performance of this work.

1.2.3 Site Specific Safety

Pursuant to EM 385-1-1, the Contractor shall submit a Site-specific Safety and Health Plan. Should any unforeseen or site specific safety related factor, hazard or condition become evident during the performance of the work, the Contractor shall take immediate and prudent action to establish and maintain safe working conditions and to safeguard site personnel, the

public, and the environment. The Contractor shall immediately inform the Contracting Officer of such a condition and confirm the condition and its resolution in writing to the Contracting Officer within 24 hours.

1.2.4 Emergency

In the event of any emergency associated with or resulting from work at this site, the Contractor shall without delay: cease work activity on the site; take diligent action to remove or otherwise minimize the cause of the emergency; render full assistance to local authorities to remedy any impact on local residents or property; alert the Contracting Officer and Government; and institute whatever measures are necessary to prevent any repitition of the conditions or actions leading to or resulting in the emergency.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Accident Prevention Plan; G

SD-07 Certificates

Qualifications for Safety and Health Professional(s); G
Qualifications for Safety and Health Technicians; G
Delegation of Authority; G
Worker's compensation
Site-specific Safety and Health Plan; G
Activity Hazards Safety Analysis; G

1.4 PUBLIC SAFETY

Attention is invited to the CONTRACT CLAUSE: PERMITS AND RESPONSIBILITIES. The Contractor shall provide temporary fencing, barricades, and/or guards, as required, to provide protection in the interest of public safety. Whenever the Contractor's operations create a condition hazardous to the public, he shall furnish at his own expense and without cost to the Government, such flagmen and guards as are necessary to give adequate warning to the public of any dangerous conditions to be encountered and he shall furnish, erect, or maintain such fences, barricades, lights, signs and other devices as are necessary to prevent accidents and avoid damage or injury to the public. Flagmen and guards, while on duty and assigned to give warning and safety devices shall conform to applicable city, county, and state requirements. Should the Contractor appear to be neglectful or negligent in furnishing adequate warning and protection measures; the Contracting Officer may direct attention to the existence of hazards and the necessary warning and protective measures shall be furnished and installed by the Contractor without additional cost to the Government. Should the Contracting Officer point out the inadequacy of warning and protective measures, such action of the Contracting Officer shall not relieve the Contractor from any responsibility for public safety or abrogate his obligation to furnish and pay for those devices. The installation of any general illumination shall not relieve the Contractor

of his responsibility for furnishing and maintaining any protective facility.

1.5 ACCIDENT PREVENTION PLAN

The Contractor shall submit an Accident Prevention Plan which describes the methods by which the contract safety requirements of both EM 385-1-1 and this specification shall be met.

1.6 ACTIVITY HAZARD ANALYSIS

Based on the construction schedule, the Contractor shall submit a Activity Hazards Safety Analysis of each major phase of work prior to entering that phase of activity. The analysis shall include major or high risk hazards, as well as commonly recurring deficiencies that might possibly be encountered for that operation, and shall identify proposed methods and techniques of accomplishing each phase in a safe manner. The Prime Contractor's superintendent shall take active participation in the Activity Hazards Analysis, including the subcontractors' work. Prior to start of actual work a meeting shall be held with Prime Contractor, Government, and affected subcontractor to review the Activity Hazard Analysis. In addition, job site meetings shall be held to indoctrinate foreman and workers on details of this analysis.

1.7 LIGHTING

The Contractor shall provide a minimum of five (5) foot-candle lighting intensity for all construction areas, including borrow areas, during the contract performance period. Any lights used to illuminate construction activities shall be hooded and designed so as to reflect away from adjoining properties and public thoroughfares.

1.8 TEMPORARY ELECTRIC WIRING

1.8.1 Construction Equipment

In addition to the requirements of EM 385-1-1, all temporary wiring conductors installed for operation of construction tools and equipment shall be either Type TW or THW contained in metal raceways, or may be multiconductor cord. Temporary wiring shall be secured above the ground or floor in a workmanlike manner and shall not present an obstacle to persons or equipment. Open wiring may only be used outside of buildings, and then only in strict accordance with the provisions of the National Electrical Code.

1.8.2 Circuit Protection

All 15 and 20 ampere outlets which are not a part of the permanent wiring of a building or structure, shall have ground fault circuit interrupters (GFI) for personnel protection. GFI shall be provided for extension cords and for all permanent receptacles that are not properly grounded. A testing means shall be provided which will impose a measured fault of 5 milliamperes and result in tripping the GFI unit.

1.9 FIRE PREVENTION AND PROTECTION

The Contractor shall perform all work in a fire-safe manner and shall supply and maintain at each work area adequate fire-fighting equipment capable of extinguishing incipient fires. The Contractor shall comply with

all applicable Federal, local, and state fire-prevention regulations.

1.10 EXPLOSIVES

Blasting will be allowed.

1.11 PERMITS

Reference is made to the paragraphs; FIRE PREVENTION AND PROTECTION, EXPLOSIVES, and the clause of the contract entitled "PERMITS AND RESPONSIBILITIES", which obligates the Contractor to obtain all required licenses and permits

1.12 FIRST AID

The Contractor shall have at least one certified First Aid Technician on site at all times. This person may perform other duties, but must be immediately available to render first aid when needed. Certification shall consist of successful completion of an American Red Cross course in Multi Media First Aid and Cardio Pulminary Resuscitation (CPR).

1.13 ACCIDENT REPORTING

In accordance with EM 385-1-1, the Contractor shall submit a written salary of worker's compensation claims which have been filed by worker's in connection with work on the project. The summary shall be submitted at the time when the work is approximately 50 percent complete and at project completion. The summary shall include all subcontractors. The Contractor's and subcontractor's compensation insurance carrier shall certify that the summaries are "correct and true".

1.14 SAFETY PERSONNEL REQUIREMENTS

Full-time, on-site, safety coverage by Contractors shall be required at all times during this contract. This contract is considered high hazard and the following conditions and safety requirements are to be followed during the entire duration of this contract. The Contractor shall employ at the project site to cover all hours of work at least one Safety and Occupational Health Technician per shift to manage the Contractor's accident prevention program. In addition, the Contractor shall have one Safety and Occupational Health Professional to manage the overall Safety program. Duties which are not germane to the safety program, such as quality control or project engineering shall not be assigned to the Safety and Health staff. The principal safety person (the Safety Professional) shall report to and work directly for the Contractors on-site top manager, higher level official, or corporate safety office. The Safety and Health staff shall have the authority to take immediate steps to correct unsafe or unhealthful conditions. The presence of a Safety and Health person will not abrogate safety responsibilities of other personnel.

1.14.1 Qualifications for Safety and Health Professional(s)

a. Shall have a degree in engineering or safety in at least a four year program from an accredited school and in addition, shall have been engaged in safety and occupational health for at least two years, no time being credited to these two years unless it is in a position of responsibility with safety as a major duty; or

b. Shall have legal registration as a Professional Engineer,

Certified Safety Professional, or a Certified Safety Manager, and, in addition, shall have been engaged in safety and occupational health for at least one year no time being credited to this one year experience unless it is in a position of responsibility with safety as a major duty; or

c. Shall have degree other than that specified in (a) above and, in addition, shall have been engaged in safety and occupational health for at least three years' no time being credited to these three years unless it is in a position of responsibility with safety as a major duty; or

d. In lieu of a degree, shall have been engaged in safety and occupational health for at least five years, no time being credited to these five years unless it is in a position of responsibility with safety as a major duty;

e. First aid work is not creditable experience.

f. In addition to the above, the Safety and Occupational Health Professional(s) shall have at least two years experience in rock excavation work. Experience must have included blasting operations and excavation in rock slopes of the nature to be encountered in this contract.

1.14.2 Qualifications for Safety and Health Technicians

a. A bachelors degree in safety or an associated discipline and currently employed in a safety position; or

b. An associate degree in Safety or an associated discipline, three years field experience in Safety, and currently employed in a safety position; or

c. Five years field experience in safety or an associated discipline and currently employed in a safety position.

d. First Aid work is not creditable experience.

1.14.3 Delegation of Authority

The name and qualifications of nominated safety persons shall be furnished to the Contracting Officer (in resume format) for acceptability. A functional description of duties shall be provided prior to the pre-work conference. In addition, a copy of a letter from an authorized official of the Contractor which describes the duties and authority of the safety professional, including delegating sufficient authority to stop work and immediately correct the unsafe or unhealthful conditions.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01270

MEASUREMENT AND PAYMENT

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SECTION 01270

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 MOBILIZATION AND PREPARATORY WORK

Payment for Mobilization, and Preparatory Work will be made at the applicable contract price, which payment shall constitute full compensation for mobilization and preparatory work as specified in Special Clauses, paragraph: Payment for Mobilization and Preparatory Work. Contractor shall further comply to all requirements of Section 01200, "Control Requirements" and provide direct control for entire project which shall be included in payment for "Mobilization and Preparatory Work".

1.2 DIVERSION AND CONTROL OF WATER

Payment for Diversion and Control of Water will be made at the applicable contract price, which payment shall constitute full compensation for maintaining the work areas in a dry condition during construction; and providing and maintaining the cofferdam and all other means of seepage control, including dewatering wells. **Payment does not include dewatering for the SARI relocation work, for which separate payment is made.**

1.3 CLEAR SITE AND REMOVE OBSTRUCTIONS

1.3.1 Payment for Clear Site and Remove Obstructions, Outlet Works, Dam Foundation, Approach Channel and Abutments

Payment for Clear Site and Remove Obstructions, Outlet works, Approach Channel, and Abutments will be made for clearing and grubbing and removal of all obstructions within the areas for the dam foundation, abutments, approach channel, outlet works, and disposal and stockpiling of material. Except as otherwise specified, payment includes all applicable earthwork; removal of debris including miscellaneous structures, fences, waterlines, asphalt roads, and vegetation and cutting and backfilling existing piezometers, protection of existing utilities, disposal of all materials, and maintenance of these cleared areas once initial clearing is accomplished.

1.3.2 Payment for Clear Site and Remove Obstructions, Borrow Area

Payment for Clear Site and Remove Obstructions, Borrow Area, will be made at the applicable contract price, which payment shall constitute full compensation, for clearing and grubbing, and removal of all obstructions within the actual areas used for the borrow operation. Except as otherwise specified, payment includes all applicable earthwork; removal of existing structures and other indicated obstructions; removal of trash and debris, concrete irrigation pipes, and vegetation; removal of topsoil for salvage; protection of existing utilities; replacement or restoration of utilities; disposal of all materials, and maintenance of these areas throughout the duration of the contract. Final grading and spreading of stockpiled organic material in borrow areas shall be included in this bid item.

1.3.3 Payment for Demolition of Existing Intake Structure and Access Bridge

Payment for Demolition of Existing Intake Structure and Access Bridge will be made per the contract lump sum price for its demolition, removal and disposal from the site.

1.3.4 Payment for Abandon Existing Outlet Structure

Payment for the Abandon Existing Outlet Structure will be made at the applicable contract lump sum price, which payment shall constitute full compensation for labor, materials including sand backfill, shotcrete plug including reinforcement, drill and epoxy dowels, metallic waterstop, steel sealing plates, reinforced concrete cover slab, and for all equipment and tools required to complete the work.

1.3.5 Existing Embankment

No separate payment will be made for clear and grubbing the existing embankment. Therefore, all costs shall be included in the contract prices for the items to which the work applies.

1.3.6 Disposal Areas and Stockpile Areas

No separate payment will be made for clear and grubbing the disposal and stockpile areas. Therefore, all costs shall be included in the contract prices for the items to which the work applies.

1.4 EXCAVATION

1.4.1 Measurement

Unless specified or approved otherwise, excavation items will be measured for payment by computing the volume in cubic yards, using plotted surveyed cross sections and the average end area method. Excavated materials will **be** measured for payment from its original position. Paylines for excavation will be as shown on the plans. No measurement for payment will be made for over excavation, nor for construction, removal of haul roads, dressing, drainage and road surfacing materials, or for the disposal of the excavated materials from over excavation and construction and maintenance of access haul roads. No separate measurement for payment will be made for borrow area excavation except for Zone II borrow as identified.

1.4.2 Payment for **Excavation, Outlet Works Sta. 0+00 to Sta. 10+00**

Excavation methods and nature of materials encountered in the various types of excavation will not be classified for payment. Payment for **Excavation, Outlet Works Sta. 0+00 to Sta. 10+00** will be made at the applicable contract price, which payment constitutes full compensation for excavating, hauling, stockpiling, processing, and disposition of the excavated material. Excavation for the Approach Channel, Pilot Channel, and Wingwalls shall be included in this bid item.

1.4.3 Payment for Excavation, Outlet Works Sta. 10+00 to Sta. 18+13.50

Excavation methods and nature of materials encountered in the various types of excavation will not be classified for payment. Payment for Excavation, Outlet Works Sta. 10+00 to Sta. 18+13.50 will be made at the applicable contract price, which payment constitutes full compensation for excavating, hauling, stockpiling, processing, and disposition of the excavated material. All materials, procedures, and miscellaneous items associated

with the rock reinforcement system of the vertical excavation or protection of the rock from slaking or spalling are included in this unit price.

1.4.4 **(Deleted)**

1.4.5 Payment for **Excavation, Outlet Works Sta. 18+13.50 to Sta. 49+93**

Excavation methods and nature of materials encountered in the various types of excavation will not be classified for payment. Payment for **Excavation, Outlet Works Sta. 18+13.50 to Sta. 49+93** will be made at the applicable contract price, which payment constitutes full compensation for excavating, hauling**,** stockpiling, processing, and disposition of the excavated material. Excavation required for the stilling basin wingwalls shall be **included in this unit bid price**.

1.4.6 Payment for **Excavation, Outlet Works Sta. 49+93 to Sta. 54+00**

Excavation methods and nature of materials encountered in the various types of excavation will not be classified for payment. Payment for **Excavation, Outlet Works Sta. 49+93 to Sta. 54+00** will be made at the applicable contract price, which payment constitutes full compensation for excavating, hauling stockpiling, processing, and disposition of the excavated material. Excavation required for the downstream drop structure, toe protection, and cut off walls shall be included in this unit bid price.

1.4.7 Payment for Excavation, Borrow Areas

No separate payment will be made for excavation of borrow material. Therefore, all costs shall be included in the applicable contract prices for the items to which the work applies.

1.4.8 Payment for Excavation, Removal of Gravel Blanket

Payment for Excavation, Removal of Gravel Blanket will be made at the applicable contract price, which payment constitutes full compensation for excavating, hauling and stockpiling the quantity of gravel that meets the specified gradation of the excavated material.

1.4.9 Payment for Excavation, Removal of Stone Protection

Payment for Excavation, Removal of Stone Protection will be made at the applicable contract price, which payment constitutes full compensation for excavating, hauling and stockpiling the quantity of salvaged stone that meets the gradation for stone for 15-inch grouted stone.

1.4.10 Payment for Excavation, Stripping

Payment for Excavation, Stripping will be made at the applicable contract price, which payment shall constitute full compensation for excavation, hauling, and disposition of the stripped material from the dam abutments.

1.4.11 Payment for Excavation, Toe

Payment for Excavation, Toe will be made at the applicable contract price, which payment shall constitute full compensation for excavation along the toe of the dam to the lines and grades as shown on the plans, hauling and disposition of the excavated material.

1.4.12 Payment for Excavation, Existing Embankment Crest

Payment for Excavation, Existing Embankment Crest will be made at the applicable contract price, which payment shall constitute full compensation for excavation of all materials, except existing stone and gravel protection, to the lines and grades and hauling the excavated material to a stockpile, and protection of the existing impervious material integrity and moisture content. Excavation for the embankment key trench shall be included in this bid item.

1.4.13 Excavation Stockpile Areas

No separate payments will be made for excavation of stockpile areas. All costs therefore shall be included in the applicable embankment fill items.

1.4.14 Stockpiling

No separate payment will be made for stockpiling material. Therefore, all costs shall be included in the applicable contract prices for the items to which the work applies.

1.4.15 Disposal

No separate payment will be made for disposal of excavated material. Therefore, all costs shall be included in the applicable contract prices for the items to which the work applies.

1.5 EMBANKMENTS

1.5.1 Measurement

Measurement for Payment for Embankments will be made between the required excavation and the embankment limit lines, or between the ground lines and embankment lines, as indicated or staked in the field. Quantities will be computed in cubic yards by the average end area method and the planimeter will be considered a precise instrument for measuring plotted cross sections. No measurement for payment will be made for backfill of any over excavation for temporary access and haul roads for the Contractor's convenience.

1.5.2 Foundation Preparation, Zone II Contact Area

1.5.2.1 Measurement

Foundation preparation required to prepare the exposed rock area foundation in the Zone II contact area shall be measured for payment on the basis of the number of square yards of foundation actually prepared as directed and approved for Zone II placement. Measurement shall be parallel to the slope. Any cleaning required subsequent to foundation approval shall not be measured for payment.

1.5.2.2 Payment

Payment for Foundation Preparation, Zone II Contact Area will be made at the applicable contract price, which payment shall constitute full compensation for all operations in connection therewith, including air cleaning prior to surface treatment and placement of embankment material.

1.5.3 Payment for Embankment, Zone I Material

Payment for Embankment, Zone I Material will be made at the applicable contract price, which payment shall constitute full compensation for obtaining any necessary borrow material, placing, benching the existing embankment, spreading, discing and compacting the fill, complete.

1.5.4 Payment for Embankment, Zone II Material

Payment for Embankment, Zone II Material will be made at the applicable contract price, which payment shall constitute full compensation for obtaining any necessary material from stockpile or borrow, placing, spreading, discing and compacting the fill, complete. **Payment for excavating, processing and stockpiling the Zone II material within the designated borrow areas, as specified in section 02212, is included in this bid item.**

1.5.5 Payment for Embankment, Transition Zone Material

Payment for Embankment, Transition Zone Material will be made at the applicable contract price, which payment shall constitute full compensation for obtaining any necessary borrow material, placing, benching the existing embankment, spreading, discing and compacting the fill, complete.

1.5.6 Trenches

No separate payment will be made for backfilling trenches for utilities and pipelines. All costs therefore shall be included in the applicable contract prices for the items to which the work applies.

1.5.7 Subgrade Preparation

No separate payment will be made for subgrade preparation and all costs in connection therewith shall be included in the contract prices for items to which the work applies.

1.5.8 Backfill for Directed Overcut

Backfill for directed overcut, except unsatisfactory material, will be measured and paid for under the applicable contract price for the type of fill placed therein. Where there is no applicable contract item, an adjustment in the contract price will be made.

1.5.9 Additional Rolling

1.5.9.1 Measurement

Additional rolling required in addition to the number of passes specified will be measured on the basis of the number of hours during which the rolling equipment, approved for this job, is operated in making additional required passes. In computing the number of hours worked by the rolling equipment, only the time of actual operation will be included. Time lost by rolling equipment on account of refueling, greasing, oiling, breakdowns or replacement of parts will not be measured.

1.5.9.2 Payment

Payment for Additional Rolling will be made at the applicable contract price, which payment shall constitute full compensation for all cost

incidental to additional rolling.

1.6 FILLS AND SUBGRADE PREPARATION

1.6.1 Measurement

Measurement for Payment for Fills and Subgrade Preparation will be made between the required excavation and structure lines and the fill limit lines, or between the ground lines and fill lines, as indicated or staked in the field. Quantities will be computed in cubic yards by the average end area method and the planimeter will be considered a precise instrument for measuring plotted cross sections. No measurement for payment will be made for backfill of any over excavation for temporary access and haul roads for the Contractor's convenience.

1.6.2 Payment for Compacted Fill, Levee

Payment for Compacted Fill, Levee will be made at the applicable contract price, which payment shall constitute full compensation for obtaining any necessary borrow material, placing, spreading and compacting the fill, complete.

1.6.3 Payment for Structural Backfill

Payment for Structural Backfill will be made at the applicable contract price, which payment shall constitute full compensation for obtaining any necessary borrow material, placing, spreading and compacting the fill, complete.

1.6.4 Miscellaneous Fill

Payment for Miscellaneous Fill will be made at the applicable contract price, which payment shall constitute full compensation for obtaining any necessary borrow material, placing, spreading and compacting the fill, complete.

1.6.5 Payment for Mitigation Fill

Payment for Mitigation Fill will be made at the applicable contract price, which payment shall constitute full compensation for obtaining any necessary borrow material, placing, spreading and compacting the fill, complete.

1.7 SUBDRAINAGE SYSTEM

1.7.1 Measurement

Measurement for Subdrainage System shall be lump sum. Items and other appurtenances not identified shall be considered incidental and no measurement or payment shall be made and shall be considered as included in the applicable contract price for the item to which the work applies and no additional compensation will be allowed.

1.7.2 Payment for Subdrainage System, Outlet Works

Payment for Subdrainage System, Outlet Works will be made at the applicable contract lump sum price for all piping, fittings, collector boxes, cleanouts, gravel material and sand filter, perforated collector pipes, and all miscellaneous items associated with the subdrain system which shall

constitute full compensation for providing subdrainage system, complete in place.

1.8 AGGREGATE BASE COURSE

1.8.1 Measurement

The Unit measurement for the aggregate base course will be the ton (2,000 pounds). The Contractor shall weight each load on a certified platform scale and furnish the Contracting Officer with duplicate Weigh Master's Certificates showing the actual net weights. One ticket shall be furnished to the plant inspector and one ticket to the inspector at the construction site.

1.8.2 Payment for Aggregate Base Course

Payment for Aggregate Base Course will be made at the applicable contract price, which payment shall constitute full compensation for aggregate base course, complete including subgrade preparation.

1.9 ASPHALT CONCRETE PAVEMENT

1.9.1 Measurement

The unit of measurement for the asphalt concrete pavement will be the ton (2,000 pounds). The Contractor shall weigh each load on a certified platform scale and shall furnish the Contracting Officer with duplicate Weigh Master's Certificates showing the actual net weights. One delivery ticket shall be furnished to the plant inspector and one delivery ticket to the inspector. The bituminous mixture shall be weighed after mixing and no deduction will be made for the weight of bituminous material incorporated therein. Asphalt concrete pavement used for the convenience of the Contractor will not be measured for payment.

1.9.2 Payment for Asphalt Concrete Pavement

Payment for Asphalt Concrete Pavement will be made at the applicable contract price, which payment shall constitute full compensation for asphalt concrete surfacing, complete, including tack coat, appurtenant work, and quality control testing. Payment will not include asphalt concrete pavement for which separate payment is provided. Payment will not be made for excessive thickness.

1.10 STONE PROTECTION

1.10.1 Measurement

The Unit measurement for the aggregate base course will be the ton (2,000 pounds). The Contractor shall weight each load on a certified platform scale and furnish the Contracting Officer with duplicate Weigh Master's Certificates showing the actual net weights. One ticket shall be furnished to the plant inspector and one ticket to the inspector at the construction site.

1.10.2 Payment for Stone Protection

Payment for Stone Protection will be made at the applicable contract unit prices per ton, which shall constitute full compensation for obtaining transporting, stockpiling (if applicable),and placing the stone, complete.

1.10.3 Payment for Gravel Blanket Protection

Payment for Gravel Blanket Protection will be made at the applicable contract unit prices per ton, which shall constitute full compensation for obtaining and placing the gravel blanket, complete.

1.10.4 Payment for Bedding Material for Stone Protection

Payment for Bedding Material for Stone Protection will be made at the applicable contract unit prices per ton, which shall constitute full compensation for obtaining and placing the bedding material, complete.

1.10.5 Payment for Stone for Grouted Stone Protection

Payment for Stone for Grouted Stone Protection will be made at the applicable contract unit prices per ton, which shall constitute full compensation for obtaining and placing the stone, complete.

1.10.6 Payment for Derrick Stone

Payment for Derrick Stone will be made at the applicable contract unit prices per ton, which shall constitute full compensation for obtaining and placing the stone, complete.

1.11 GROUTING STONE PROTECTION

1.11.1 Measurement

The quantity of grout to be paid for will be measured to the nearest cubic yard by weighing all ingredients in trial batches of grout and converting each batch to absolute volume; the volume thus determined and the number of batches of grout of corresponding proportions acceptably placed in the work shall be used to determine the quantity of grout.

1.11.2 Payment for Grouting Stone Protection

Payment for Grouting Stone Protection will be made at the applicable contract price, which payment shall constitute full compensation for materials including Portland Cement, mixing, transporting, placing, finishing, and curing grout used for grouting stone protection complete.

1.12 WATER DISTRIBUTION SYSTEM

1.12.1 Measurement

The pipe work to be performed under these specifications will be listed in the contract items by size or size and class and what other information is necessary for identification. The length of pipe will be the horizontal projection designated by the Engineer.

Items and other appurtenances not identified shall be considered incidental and no measurement or payment shall be made and shall be considered as included in the applicable contract prices for the items to which the work applies and no additional compensation will be allowed.

1.12.2 Payment for Chlorination Equipment

Payment for the chlorination equipment shall include all labor, equipment

and materials for the installation of the dry pellet chlorinator and related equipment required for proper operation, including, but not limited to mounting system, injection piping, chlorine hopper, and pellets.

1.12.3 Payment for Pressurized Water Storage Tank

Payment for the water storage tank shall include all labor, equipment and materials for the installation of the tank including, but not limited to the pressurized tank, mounting plate, bolts, and tank pressure adjustments as required for proper system operation.

1.12.4 Payment for Water System Piping, Valves, and Appurtenances

Payment for water system piping, valves, and appurtenances shall include all labor, equipment and materials required for installation, including, but not limited to, control valves, shutoff valves, check valves, air/vac valves, water meter, pressure switch, pressure gauge, PVC pressure piping and fittings, copper pressure tubing and fittings, PVC and steel drainage piping and fittings, pipe couplings, flange and isolation kits, blow-off assembly, adjustable pipe supports, gravel drainage pit, pipe tape wrap, and related appurtenances from the top of the well casing to a point 5-feet from the Well Slab Foundation.

1.12.5 Payment for Concrete Well Slab Foundation

Payment for the well slab shall include all materials, labor, and equipment required for the installation of the reinforced concrete foundation, as indicated on the plans.

1.12.6 Payment for 3" Diameter PVC Well Discharge Pipe

Payment for 3" Diameter PVC Pipe, will be made at the applicable contract unit price per lineal foot of pipe including 6-inch steel casing, casing insulators, casing seals, Schedule 40 pipe, Schedule 80 pipe, fittings and appurtenances, and trenching, shoring, bedding and backfill, which payment shall constitute full compensation for all work, complete in place.

1.13 WATER WELLS

1.13.1 Measurement

Measurement of pipe work, bore holes, and pumps and appurtenances to be performed under these specifications will be listed in the contract items by size, or size and class or whatever other information is necessary for identification.

Items and other appurtenances not identified shall be considered incidental and no measurement or payment shall be made and shall be considered as included in the applicable contract prices for the items to which the work applies and no additional compensation will be allowed.

1.13.2 Payment for Bore Hole and Well Development

Payment for the 6" well shall be made at the applicable contract lump sum price per well for a given diameter and depth, and shall include all equipment, labor, and materials required to bore the well; install the casing, screening, gravel pack, cement seal, gravel feed tube, well seal, submersible well pump, torque arrestor, discharge piping to the top of the casing, and related fittings and appurtenances; log and test soil samples;

clean and disinfect; and pump test the well.

1.14 OBSERVATION WELLS

1.14.1 Payment for Observation Wells

Payment for Observation Wells will be made at the applicable contract unit price per each, which payment shall constitute full compensation for providing the observation wells including pipe perforated and solid, borehole, casing, gravel pack, seal, concrete cap and steel, locking cover, which shall constitute full compensation for all work, complete in place.

1.15 STORM DRAIN AND DRAINAGE FACILITIES

1.15.1 Payment for 42" Culvert Extension

Payment for the 42" Culvert Extension will be made at the applicable contract lump sum price, which payment shall constitute full compensation for labor, materials including RCP, concrete encasement, inlet and outlet, riprap, excavation, backfill, formwork, concrete, portland cement, steel reinforcement and for all equipment and tools required to complete the work.

1.15.2 Payment for Outlet Works Channel Side Drains

Payment for Outlet Channel Side Drains will be made at the applicable contract lump sum price which shall include all trenching shoring, bedding material, R.C.P. backfill, reinforced concrete outlet and inlet structures, and flap gates, which shall constitute full compensation for providing all work, complete in place.

1.16 ACCUSONIC FLOW METERS

Payment for Accusonic Flow Meters will be made at the applicable contract **lump sum price which payment shall constitute full compensation for all labor, materials, equipment and tools required to complete the work as specified in SECTION 13310, including velocity transducer assemblies, acoustic transducer, cables, flowmeter, transmitter**, complete in place.

1.17 SAWPA RELOCATION/PROTECTION

1.17.1 Measurement

The pipe work and sanitary sewer facilities to be performed under these specification will be listed in the contract items by size or size and class and whatever other information is necessary for identification. The length of pipe to be paid will be the horizontal projection designated by the engineer.

Payment or other items to complete the work such as manholes and concrete encasement shall be measured and paid for as separate items.

Items and other appurtenances not identified shall be considered incidental and no measurement or payment shall be made and shall be considered as included in the applicable contract prices for the items to which the work applies and no additional compensation will be allowed.

1.17.2 Payment for 60-inch Sewer Pipe Encasement

Payment for 60-inch Sewer Pipe Encasement will be made at the applicable

contract unit price per lineal foot, which shall constitute full compensation for providing all work, complete in place, as shown on the Plans.

1.17.3 Payment for Raising Exist. 48-inch Diameter Precast Concrete Manhole

Payment for raising existing 48-inch diameter precast concrete manhole to new channel grade including new precast concrete manhole rings and top slab, concrete collar, cover, excavation, and backfill will be made at the applicable contract lump sum price, which shall constitute full compensation for providing all work, complete in place, as shown on the Plans.

1.17.4 Payment for SARI Pipeline Reaches IV-A and IV-B Relocation

Payment for construction of approximately 1,030 linear feet of new 48-inch HDPE, SDR-21 SARI Pipeline Reaches IV-A and IV-B Relocation just north of the Prado Dam Existing Outlet Works, including exploratory drilling and geotechnical investigation, pipe, bypassing, shoring, sheeting, dewatering, excavation, bedding, backfill, geotextile fabric including removal of existing interfering 36" and 42" pipeline will be made at the applicable contract lump sum price, which shall constitute full compensation for providing all work, complete in place, as shown on the Plans.

1.17.5 Payment for Abandonment of Existing 60-inch SARI pipeline

Payment for Abandonment of Existing 60-inch steel pipeline in existing outlet works, including: excavation, dewatering, bypassing, concrete plug, concrete slurry, and sand will be made at the applicable contract lump sum price, which shall constitute full compensation for providing all work, complete in place, as shown on the Plans.

1.17.6 Payment for Construction of Dual 48-inch Pipeline in Existing Outlet Structure

Payment for construction of approximately 1,572 linear feet of new 48-inch HDPE pipe SDR-21 in existing Outlet Works to new knife gate valves (approximate existing station 12+84), including; pipe, anchors, concrete encasement and select fill will be made at the applicable contract lump sum price, which shall constitute full compensation for providing all work, complete in place, as shown on the Plans.

1.17.7 Payment for 48-inch PVC Lined RCP, Fittings and Valves

Payment for construction of two Knife gate valves, concrete encasement, excavation, bedding and backfill, and approximately 366 linear feet of RCP piping and welded steel pipe fittings up to approximate Station 16+50 will be made at the applicable contract lump sum price, which shall constitute full compensation for providing all work, complete in place, as shown on the Plans.

1.18 METAL BEAM GUARDRAIL

1.18.1 Measurement

Measurement for Meal Beam Guardrail will be made to the nearest linear foot horizontally along the centerline from end-to-end of the metal guardrail in place.

1.18.2 Payment for Metal Beam Guardrail

Payment for Metal Beam Guardrail will be made at the applicable contract unit price, which payment shall constitute full compensation for the metal beam guardrail, complete, including posts, blocking, reflector assembly, flares, bridge transitions, terminal sections, all required earthwork and painting.

1.19 CHAIN LINK FENCE AND GATES

1.19.1 Measurement

Measurement of Chain Link Fencing will be made to the nearest linear foot horizontally along the centerline from end-to -end of the fence in place. Gates shall be measured per each based upon type.

1.19.2 Payment of Chain Link Fence

Payment for Chain Link Fencing will be made at the applicable contract unit price, which payment shall constitute full compensation for the fencing, complete in place including concrete foundations.

1.19.3 Payment for Chain Link Fence Gates

Payment for Chain Link Fence Gates will be made at the applicable contract price, which payment shall constitute full compensation for the gates, complete.

1.19.4 Payment for Chain Link Fence with Slats

Payment for the Chain Link Fence with Slats will be made at the applicable contract unit price, which payment shall constitute full compensation for the fencing and slats, complete in place including concrete foundations.

1.19.5 Payment for Pipe Gates

Payment for Pipe Gates will be made at the applicable contract price, which payment shall constitute full compensation for the gates, complete.

1.19.6 Payment for Barbed Wire Fence

Payment for the Barbed Wire Fence will be made at the applicable contract unit price, which payment shall constitute full compensation for the fencing, complete in place including concrete foundations.

1.20 SETTLEMENT PLATES

Measurement and Payment for Settlement Plates will be made at the applicable contract unit price per each, which payment shall constitute full compensation for providing the settlement plates, including all required earthwork, pipe and cap, mortar pad, timber posts, and bolts, complete.

1.21 SURVEY MONUMENTS

Measurement and Payment for Survey Monuments will be made at the applicable contract unit price per each, which payment shall constitute full compensation for providing the survey monuments, including all required earthwork, pipe and cap, mortar pad, and bolts, complete.

1.22 STAFF GAGES

Measurement and Payment for Staff Gages will be made at the applicable contract unit price per each, which payment shall constitute full compensation for materials, and installation necessary for the work, complete in place.

1.23 HYDROSEEDING

1.23.1 Measurement and Payment for Hydroseeding

Measurement and Payment for Hydroseeding will be made at the applicable contract unit price per acre, which payment shall constitute full compensation for hydroseeding, complete, **including spreading topsoil from stockpiles, furnishing and placing supplemental topsoil, grading, tillage, soil preparation, soil admixtures, fertilizing, seeding, mulching, water and watering operations and maintenance of areas to be seeded.**

1.23.2 **Hydroseeding Maintenance**

Measurement and Payment for Hydroseeding Maintenance will be made at the applicable contract unit price per acre, which payment shall constitute full compensation for maintenance during the seed establishment period of the hydroseeded area for twelve (12) months, including water and all maintenance watering, weeding, trash removal, fertilizing, repairs and reseeding as required by Section 02900: Hydroseeding.

1.24 CONCRETE

1.24.1 Measurement

Measurement of concrete will be made on the basis of the actual volume of concrete per cubic yard within the pay line, of each item as indicated on the drawings. Measurement of concrete placed against the sides of any excavation without the use of intervening forms will be made only within the pay lines of the structure. No deductions will be made for rounded of beveled edges or space occupied by reinforcement, voids or embedded items which are either less than 5 cubic feet in volume or one square foot in cross section. Concrete wasted or used for the convenience of the Contractor will not be included in measurement for payment. No separate measurement will be made for concrete which is placed in structures for which payment is made on a lump sum basis.

1.24.2 Payment for the Government-Designed Mixture Concrete

Payment will be made at the applicable contract price for the various items, which payments shall constitute full compensation for labor, materials, including formwork, (except cement, pozzolan, steel reinforcement, water-reducing admixture, and embedded parts for which other payment is provided), and for all equipment and tools required to complete the work. Embedded items shall be included in the cost of the concrete except when other payment is specifically provided.

1.24.2.1 Concrete, Intake Tower Structure - Elev. 545' and below

Payment for the Concrete, Intake Tower Structure - Elev. 545' and below will be made at the applicable contract price, which payment shall constitute full compensation for all concrete placed in the intake tower

structure, Elev.545' and below, complete. Concrete and/or nonshrink grout placed in blockouts where metal work items are shown are incidental to the metalwork items.

1.24.2.2 Concrete, Stilling Basin Invert - Sta.18+13.50 to Sta.21+02.50

Payment for the Concrete, Stilling Basin Invert - Sta.18+13.50 to Sta.21+02.50 will be made at the applicable contract price, which payment shall constitute full compensation for all concrete placed in the stilling basin invert between Sta.18+13.50 and Sta.21+02.50, including the invert and apron slab, complete. Baffle blocks, end sill, and wall elements are not included in this bid item.

1.24.3 Payment for the Contractor-Designed Mixture Concrete

Payment will be made at the applicable contract price for the various items, which payments shall constitute full compensation for labor, materials, including formwork, cement, pozzolan, water-reducing admixture, waterstops (except steel reinforcement for which other payment is provided), and for all equipment and tools required to complete the work. Embedded items shall be included in the cost of the concrete except when other payment is specifically provided.

1.24.3.1 Concrete, Intake Tower Structure - Above Elev. 545'

Payment for the Concrete, Intake Tower Structure - Above Elev. 545' will be made at the applicable contract price, which payment shall constitute full compensation for all concrete placed in the intake tower structure above Elev.545', complete. Concrete and/or nonshrink grout placed in blockouts where metal work items are shown are incidental to the metalwork items.

1.24.3.2 Concrete, Stilling Basin

Payment for the Concrete, Stilling Basin will be made at the applicable contract price, which payment shall constitute full compensation for all concrete placed in the stilling basin between Sta.18+13.50 and Sta.21+02.50, excluding concrete for the stilling basin invert for which separate payment is made, complete.

1.24.3.3 Payment for Concrete, Transition Structure

Payment for the Concrete, Transition Structure will be made at the applicable contract price, which payment shall constitute full compensation for labor, materials including formwork, portland cement, waterstops (except steel reinforcement for which other payment is provided), and for all equipment and tools required to complete the work. Embedded items shall be included in the cost of the concrete except when other payment is specifically provided.

1.24.3.4 Payment for Concrete, Outlet Conduit

Payment for the Concrete, Outlet Conduit will be made at the applicable contract price, which payment shall constitute full compensation for labor, materials including formwork, portland cement, waterstops (except steel reinforcement for which other payment is provided), and for all equipment and tools required to complete the work. Embedded items shall be included in the cost of the concrete except when other payment is specifically provided.

1.24.3.5 Payment for Concrete, Drop Structure Retaining Wall

Payment for the Concrete, Drop Structure Retaining Wall will be made at the applicable contract unit price, which payment shall constitute full compensation for labor, materials including formwork, portland cement, waterstops, earthwork (except steel reinforcement for which other payment is provided), and for all equipment and tools required to complete the work. Embedded items shall be included in the cost of the concrete except when other payment is specifically provided. The earthwork included shall be only that earthwork which is located outside the limits of earthwork for which other payment is provided.

1.24.3.6 Payment for Concrete, Outlet Works Sta. 21+02 to Sta. 49+93

Payment for the Concrete, Outlet Works Sta. 21+02 to Sta. 49+93 will be made at the applicable contract unit price, which payment shall constitute full compensation for labor, materials including formwork, portland cement (except steel reinforcement for which other payment is provided), and for all equipment and tools required to complete the work. Embedded items shall be included in the cost of the concrete except when other payment is specifically provided. The concrete cut off wall is included in this bid item.

1.24.3.7 Payment for Concrete, Access Road

Payment of Concrete, Access Road will be made at the applicable contract unit price, which payment shall constitute full compensation for labor, materials including formwork, portland cement (except steel reinforcement for which other payment is provided), and for all equipment and tools required to complete the work. Embedded items shall be included in the cost of the concrete except when other payment is specifically provided.

1.24.3.8 Payment for Concrete, Stop Log Storage Area

Payment of Concrete, Stop Log Storage Area will be made at the applicable contract unit price, which payment shall constitute full compensation for labor, materials including formwork, portland cement (except steel reinforcement for which other payment is provided), and for all equipment and tools required to complete the work. Embedded items shall be included in the cost of the concrete except when other payment is specifically provided.

1.24.3.9 Payment for Double Cable Trash Boom

Payment for the Double Cable Trash Boom will be made at the applicable contract lump sum price, which payment shall constitute full compensation for labor, materials including reinforced concrete anchors, cables, anchorage, connections, pontoons, and for all equipment and tools required to complete the work.

1.24.3.10 Payment for Concrete, Lean Mix Concrete Backfill

Payment for the Concrete, Lean Mix Concrete Backfill will be made at the applicable contract price, which payment shall constitute full compensation for labor, materials including portland cement (except steel reinforcement for which other payment is provided), and for all equipment and tools required to complete the work. Embedded items shall be included in the cost of the concrete except when other payment is specifically provided.

1.25 PORTLAND CEMENT

1.25.1 Measurement

The quantity to be paid for will be the number of hundred weight (100 pounds) of Portland Cement used in Government-designed mixture concrete, paid for on a cubic yard basis unless specifically expected, wasted or used for the convenience of the Contractor. The quantity to be paid for will be determined by multiplying the approved batch weight for Portland Cement by the number of batches or cubic yards of concrete placed within the paylines and divided by 100. No payment under this item will be made for Portland cement in grout, Cement in excess concrete transferred from one placement to another placement of lesser cement content will be paid under the lesser cement content concrete unless over-order and transfer were directed.

1.25.2 Payment

Payment for Portland Cement will be made at the applicable contract price, which payment shall constitute full compensation for providing and storage of Portland cement.

1.26 FLY ASH

1.26.1 Measurement

The quantity to be paid for will be the number of tons (2,000 pounds) of Fly Ash used in Government-designed mixture concrete, paid for on a cubic yard basis unless specifically expected, wasted or used for the convenience of the Contractor. The quantity to be paid for will be determined by multiplying the approved batch weight for Fly Ash by the number of batches or cubic yards of concrete placed within the paylines and divided by 2,000.

1.26.2 Payment

Payment for Fly Ash will be made at the applicable contract price, which payment shall constitute full compensation for providing and storage of fly ash.

1.27 GRANULATED GROUND BLAST FURNACE SLAG

1.27.1 Measurement

The quantity to be paid for will be the number of tons (2,000 pounds) of Granulated Ground Blast Furnace Slag used in Government-designed mixture concrete, paid for on a cubic yard basis unless specifically expected, wasted or used for the convenience of the Contractor. The quantity to be paid for will be determined by multiplying the approved batch weight for Granulated Ground Blast Furnace Slag by the number of batches or cubic yards of concrete placed within the paylines and divided by 2,000.

1.27.2 Payment

Payment for Granulated Ground Blast Furnace Slag will be made at the applicable contract price, which payment shall also constitute full compensation for providing and storage of the Granulated Ground Blast Furnace Slag.

1.28 WATER REDUCING ADMIXTURE

1.28.1 Measurement

The quantity of water reducing admixture used in the Government-designed mixture concrete will be measured by the number of gallons of water reducing admixture placed in the concrete based on the pay line quantity and the approved mix design. Water reducing admixture wasted or used for the convenience of the Contractor will not be included in measurement for payment.

1.28.2 Payment

Payment for Water Reducing Admixture will be made at the applicable contract price, which payment shall also constitute full compensation for providing the water reducing admixture; and furnishing of storage, batching, and recording equipment.

1.29 CONCRETE REINFORCEMENT

1.29.1 Measurement

The quantity of steel reinforcement, placed in concrete as described hereinbefore in paragraph: CONCRETE REINFORCEMENT will be measured on the basis of length of bars placed in accordance with the shop drawings or bar schedules. The measured lengths will be converted to weights for the size of bars listed by the use of the unit weights per linear foot contained in ASTM A 615. Steel in splices (in bars up to an including #11 bars) indicated on the contract drawings where directed or approved will be measured by payment. The unit of weight shall be tons (2,000 pounds). Embedded miscellaneous metal not paid for under other pay items shall be measured and paid for under Bid Item "Miscellaneous Steel and Metalwork."

1.29.2 Payment

Payment for steel reinforcement, embankment will be made at the applicable contract unit price, which payment shall constitute full compensation to provided all reinforcing steel, except concrete reinforcement placed in concrete paid for on a lump sum basis for which separate payment is provided. Payment shall also include temporary support and spacing of the reinforcement.

1.30 STRUCTURAL STEEL

1.30.1 Measurement

The quantity of structural steel items will be measured by weight in tons (2,000) as listed below.

a. Computed weights per fabricated piece or assembly for the various pieces classified or shown on the shop drawings shall be indicated on the shop drawings submitted for approval. For pieces shown on Contractor-approved shop drawings, the computed weights shall be submitted for approval along with a copy of the Contractor-approved shop drawings. When measurement of complicated shapes can be determined more readily by scale weight per fabricated piece of assembly, certified scale weights may be used when specifically approved. Computed weights for payment will be the net calculated weights based on the dimensions indicated on the shop drawings. The weight of rolled shapes and plates will be computed on the basis of their nominal weights and

dimensions. In calculating the net weights, all copes, cuts, and all open holes except rivet and bolt holes will be deducted. No additional weight will be calculated for overweight allowance, protective coatings, allowance of milling, grip length or rivets and bolts, cut washers and butt, groove, and fillet welds. No measurement will be made for material wasted or used for the Contractor's convenience or which is not required. For computing the weight of the structural steel metal work use 0.283 pounds per cubic inch.

b. Structural steel items can be measured by scale weights. Weights will be determined from the manufacturer's published net weights, or when these are not available, from the certified scale weights. Certified scale weights shall be furnished or the weighing shall be done in the presence of the Government. The weights shall be net weights without boxes, crates, containers, or supporting members required for packing or transportation. The weight of material used in additional items authorized for the convenience of the Contractor will be deducted from the scale weight. The weight to be deducted will be calculated using the nominal weight per cubic inch times the measured and/or calculated volumes of the additional items.

1.30.2 Payment for Structural Steel

Payment of Structural Steel will be made at the applicable contract price, which payment shall constitute full compensation for providing the structural steel items listed in STRUCTURAL STEEL AND MISCELLANEOUS METAL including anchors, fasteners, accessories, welding, galvanizing, painting, and inspection, complete.

Item listed in STRUCTURAL STEEL AND MISCELLANEOUS METAL pertaining to regulating outlets slide gates, emergency closure gates, and low-flow bulkheads shall, however, be excluded from payment for structural steel, and which shall be included with the respective items for payment.

1.31 MISCELLANEOUS STEEL AND METALWORK

Payment for miscellaneous steel and metalwork will be made at the applicable contract price, which payment shall constitute full compensation for providing the miscellaneous steel and metalwork items listed in STRUCTURAL STEEL AND MISCELLANEOUS METAL including anchors, fasteners, accessories, welding, galvanizing, painting, and inspection, complete.

1.32 INTERCEPTOR DRAIN

1.32.1 Measurement

Measurement for Interceptor Drain will be made to the nearest linear foot horizontally along the centerline from end-to-end of the concrete interceptor drain in place.

1.32.2 Payment for Interceptor Drain

Payment for Interceptor Drain will be made at the applicable contract unit price, which payment shall constitute full compensation for furnishing and placing concrete Interceptor Drain, including portland cement (except steel reinforcement for which other payment is provided), complete in place.

1.33 V-DITCH

1.33.1 Measurement

Measurement for V-Ditch will be made to the nearest linear foot horizontally along the centerline from end-to-end of the concrete v-ditch in place.

1.33.2 Payment for V-Ditch

Payment for V-Ditch will be made at the applicable contract unit price, which payment shall constitute full compensation for furnishing and placing concrete V-Ditch, including portland cement, complete in place.

1.34 STRUCTURES

1.34.1 Payment for Control House Access Bridge

Measurement and Payment for Control House Access Bridge will be made at the applicable contract lump sum price which payment shall constitute full compensation for all labor, materials, equipment and tools required to complete the work, including but not limited to structure excavation and backfill, structural concrete, reinforcement, joints seals, elastomeric bearing pads and life railing, in place.

1.34.2 Payment for Stilling Basin Access Road Bridge

Measurement and Payment for Stilling Basin Access Road Bridge will be made at the applicable contract lump sum price which payment shall constitute full compensation for all labor, materials, equipment and tools required to complete the work, including but not limited to precast voided slab units with concrete topping, reinforcing steel, joint seal, concrete barrier, and tubular hand railing, in place.

1.34.3 Payment for Mechanically Stabilized Earth Walls

Measurement and Payment for Mechanically Stabilized Earth Walls will be made at the applicable contract unit price per square foot which payment shall constitute full compensation for all labor, materials, equipment and tools required to complete the work including granular backfill material, leveling pad, concrete, steel reinforcing, soil reinforcing, joint materials, end sections, filter cloth and face panels, and instrumentation, complete in place.

1.34.4 Payment for Generator and Storage Building

Measurement and Payment for Generator and Storage Building will be made at the applicable contract lump sum price which payment shall constitute full compensation for all labor, materials, equipment and tools required to complete the work, including but not limited to structure excavation and backfill, reinforced concrete walls, footing, floor slabs, lightweight concrete roof over metal deck and steel framing, louvers, and architectural features, in place.

1.34.5 Payment for Gaging Station

Measurement and Payment for Gaging Station will be made at the applicable contract lump sum price including 48-inch diameter gage well, which payment shall constitute full compensation for all labor, materials, equipment and

tools required to complete the work, including but not limited to structure excavation and backfill, reinforced masonry walls, footing, floor slab, lightweight concrete roof over metal deck, vents door, and architectural features, in place.

1.35 MSE INSTRUMENTATION

Payment for MSE Instrumentation will be made at the applicable contract lump sum price for all work related to the installation of the instrumentation for the MSE Walls, which shall constitute full compensation for providing all materials, complete in place.

1.36 ELECTRICAL

1.36.1 Payment for Well System Electrical Supply and Distribution

Measurement and Payment for Well System Electrical Supply and Distribution will be made at the applicable contract lump sum price which payment shall constitute full compensation for all labor, materials, and equipment required to complete the work, in place.

1.37 GAGE STATION ELECTRICAL DISTRIBUTION

Payment for Gage Station Electrical Supply and Distribution will be made at the applicable contract lump sum price which payment shall constitute full compensation for all labor, materials, and equipment required to complete the work, in place.

1.38 SEISMIC INSTRUMENTATION

Payment for Seismic Instrumentation will be made at the applicable contract lump sum price which payment shall constitute full compensation for all labor, materials, and equipment required to complete the work, in place, including concrete vault, piping, conduit, earthwork, electrical work and connections and other appurtenant items. Payment does not include the seismic instrument, which will be supplied by others.

1.39 STOP LOGS

Measurement and Payment for Stop Logs will be made at the applicable contract lump sum price which payment shall constitute full compensation for all labor, materials, equipment and tools required to complete the work, including but not limited to structural steel, bolts, fasteners, guides, accessories, seals, **welding, painting,** and inspection, in place.

1.40 REGULATING OUTLET SLIDE GATES

Payment for Regulating Outlet Slide Gates will be made at the applicable contract price, which payment shall constitute full compensation for furnishing all plant, labor, materials, and equipment; and performing all work required to design, fabricate, assemble, furnish, paint, install and test regulating outlet service gates, including gate frames (bodies), bonnets, bonnet covers and accessories, hydraulic power system, piping, valving, electrical controls, position indicating equipment, and other appurtenant items to make an operational system as specified in SECTION 11290, HYDRAULIC POWER SYSTEMS FOR REGULATING OUTLET GATES, SECTION 15097, REGULATING OUTLET SLIDE GATES, and SECTION 16051, CONTROL SYSTEM - REGULATING OUTLET GATES.

1.41 EMERGENCY CLOSURE GATES

Payment for Emergency Closure Gates will be made at the applicable contract price, which payment shall constitute full compensation for furnishing all plant, labor, materials, and equipment; and performing all work required to design, fabricate, assemble, furnish, paint, install, and test two (2) 11-foot by 19.67-foot Emergency Closure Gates with two lifting (pick up) beams, and six (6) sets of gate frames, guides, seal seats, storage facilities and accessories as specified in SECTION 15095, EMERGENCY CLOSURE GATES FOR REGULATING OUTLETS.

1.42 LOW-FLOW OUTLET CONTROL VALVES

Payment for Low-Flow Outlet Control Valves will be made at the applicable contract price, which payment shall constitute full compensation for furnishing all plant, labor, materials, and equipment; and performing all work required to design, furnish, paint, and install electric motor operated 36-inch, knife gate valves, operators, and appurtenant equipment in the low flow outlet works as specified in SECTION 15099, LOW FLOW OUTLET KNIFE GATE THROTTLING VALVES AND OPERATORS and SECTION 16052, CONTROL SYSTEM - LOW FLOW OUTLET THROTTLING AND SHUT-OFF VALVES.

1.43 LOW-FOLW OUTLET SHUT-OFF VALVES

Payment for Low-Flow Outlet Shut-Off Valves will be made at the applicable contract price, which payment shall constitute full compensation for furnishing all plant, labor, materials, and equipment; and performing all work required to design, furnish, paint, and install electric motor operated 36-inch, butterfly shutoff valves, operators, and appurtenant equipment in the low flow outlet works as specified in SECTION 15098, BUTTERFLY SHUTOFF VALVE, OPERATORS AND ACCESSORIES, and SECTION 16052, CONTROL SYSTEM - LOW FLOW OUTLET THROTTLING AND SHUT-OFF VALVES.

1.44 LOW-FLOW BULKHEAD

Payment for Low-Flow Bulkhead will be made at the applicable **lump sum** contract price, which payment shall constitute full compensation for furnishing all plant, labor, materials, and equipment; and performing all work required to design, fabricate, assemble, furnish, paint, install and test the 4-foot by 4-foot Maintenance Bulkhead with lifting (pick up) beam, **two sets of** gate frames, guides, seal seats, storage facilities and accessories for the low flow outlets as specified in SECTION 15096, MAINTENANCE BULKHEAD FOR LOW FLOW OUTLETS.

1.45 UNDERHUNG CRANE

Payment for Underhung Crane will be made at the applicable contract price, which payment shall constitute full compensation for furnishing all plant, equipment, labor and materials, and performing all work necessary to complete the design and to fabricate, deliver, erect, install, paint, and test the regulating outlet (RO) gate room underhung bridge crane complete with underhung beams, monorail beam, hoist and controls.

1.46 PIPING SYSTEMS

Payment for Piping Systems will be made at the applicable contract price, which payment shall constitute full compensation for providing all piping, fittings, valves, equipment, and appurtenances necessary to furnish and install the minimum discharge system piping, fill lines for RO water

conduits, vent piping, and instrumentation piping, complete.

1.47 PLUMBING

Payment for Plumbing will be made at the applicable contract price, which payment shall constitute full compensation for all plant, labor, equipment, appliances, and materials; and performing all operations in connection with the installation of plumbing of the Control Tower and the Generator and Storage Building, including but not limited to piping, fittings, valves, equipment, and appurtenances, complete as specified under SECTION 15400, PLUMBING, GENERAL PURPOSE. Payment will not be made for items such as the minimum discharge system piping, fill lines for RO water conduits, instrumentation piping, and washroom accessories for which separate payment is provided.

1.48 WASHROOM ACCESSORIES

Payment for Washroom Accessories will be made at the applicable contract price, which payment shall constitute full compensation for furnishing all equipment, labor, and materials, and performing all work necessary to complete the design and to deliver, erect, install, and test the washroom accessories as specified in SECTION 10800, WASHROOM ACCESSORIES.

1.49 SEPTIC SYSTEM

Payment for Septic System will be made at the applicable contract price, which payment shall constitute full compensation for all plant, labor, equipment, appliances, and materials; and performing all operations in connection with the installation of the septic system, including septic tank, leach field, piping, connections, and associated earthwork, supports and appurtenant structures to a point 5 feet from the building, where the plumbing system for the Control Tower is terminated, complete as specified under SECTION 15400, PLUMBING, GENERAL PURPOSE and SECTION 02531, SANITARY SEWERS.

1.50 HVAC SYSTEM

Payment for HVAC System will be made at the applicable contract price, which payment shall constitute full compensation for furnishing all plant, labor, materials, and equipment; and performing all work required to design, furnish, install and test the HVAC system and other appurtenant items to make an operational system as specified in SECTION 15950, HEATING, VENTILATING AND AIR CONDITIONING (HVAC) CONTROL SYSTEMS, SECTION 15990, TESTING, ADJUSTING, AND BALANCING OF HVAC SYSTEMS, and SECTION 15995, COMMISSIONING OF HVAC SYSTEMS.

1.51 POWER DISTRIBUTION SYSTEM

Payment for Power Distribution System will be made at the applicable contract price, which payment shall constitute full compensation for all plant, labor, equipment, appliances, and materials; and performing all operations in connection with the installation of the power distribution, lighting, and telephone systems for the Control Tower and Generator and Storage Building, complete as specified in SECTION 16415, ELECTRICAL WORK, INTERIOR. No separate measurement and payment will be made under this bid item for electrical or lighting work for which separate payment is provided.

1.52 GENERATOR SET

Payment for Generator Set will be made at the applicable contract price, which payment shall constitute full compensation for providing the diesel generator set, complete and totally functional, with all necessary ancillary equipment to include air filtration; starting system; generator controls, protection, and isolation; instrumentation; lubrication; fuel system; cooling system; and engine exhaust system as specified in SECTION 16264, DIESEL-GENERATOR SET, STATIONARY 15-300 KW, STANDBY APPLICATIONS.

1.53 FIRE PROTECTION SYSTEM

Payment for Fire Protection System will be made at the applicable contract price, which payment shall constitute full compensation for providing all equipment, accessories, and materials to design, furnish, install and test the central fire alarm system for the Outlet Control House complete and operational as specified in SECTION 13851, FIRE DETECTION AND ALARM SYSTEM and SECTION 13853, CENTRAL FIRE ALARM SYSTEM, DIGITAL ALARM COMMUNICATOR TYPE.

1.54 PASSENGER ELEVATOR

Payment for Passenger Elevator will be made at the applicable contract price, which payment shall constitute full compensation for furnishing all plant, labor, materials, and equipment; and performing all work required to design, furnish, and install the elevator system and other appurtenant items to make an operational system as specified in SECTION 14320, ELEVATORS, ELECTRIC.

1.55 QUALITY ASSURANCE SUPPORT

Measurement and Payment for Contractor furnished Quality Assurance Support will be made at the applicable contract lump sum price which payment shall constitute full compensation for testing personnel, vehicles, equipment and supplies, labor, material and equipment required to provide Quality Assurance. Payment will be made on a percentage complete throughout the duration of the contract.

1.56 AS-BUILT DRAWINGS

Payment for As-built drawings will be made at the applicable contract price, which payment shall constitute full compensation for all costs incurred by the Contractor in the preparation and furnishing of approved as-built drawings in Intergraph Microstation electronic file format and printed hardcopies as specified in SECTION 01702, AS-BUILT DRAWINGS.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

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							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01151	SD-03 Product Data															
			Laboratory Testing Program	1.6	G													
			SD-06 Test Reports															
			Geotechnical Report	1.7	G													
		01200	SD-01 Preconstruction Submittals															
			Location of Contractor's Office	1.4														
			SD-02 Shop Drawings															
			Temporary Access and Haul	1.9.2	G													
			Roads															
		01230	SD-01 Preconstruction Submittals															
			Accident Prevention Plan	1.5	G													
			SD-07 Certificates															
			Qualifications for Safety and	1.14.1	G													
			Health Professional(s)															
			Qualifications for Safety and	1.14.2	G													
			Health Technicians															
			Delegation of Authority	1.14.3	G													
			Worker's compensation	1.13														
			Site-specific Safety and Health	1.2.3	G													
			Plan															
			Activity Hazards Safety Analysis	1.6	G													
		02130	SD-01 Preconstruction Submittals															
			Cofferdam System	1.4	G													
			Water Control Plan	1.8	G													
		02200	SD-01 Preconstruction Submittals															
			Excavation Plan	1.9	G													

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		02200	SD-05 Design Data															
			Rock reinforcement system															
			Cofferdam	3.1.1														
			SD-06 Test Reports															
			Testing of Gravel Blanket	3.8.2														
		02316	SD-05 Design Data															
			Trench Excavation	3.1.1	G													
			SD-06 Test Reports															
			Field Density Tests	3.5.3														
			Testing of Backfill Materials	3.5.2														
		02480	SD-02 Shop Drawings															
			Shop drawings		G													
			SD-05 Design Data															
			Design calculations	1.3.2	G													
			Instrumentation	1.3.3	G													
			Instrumentation	1.3.3	G													
			SD-07 Certificates															
			Soil Reinforcement and	2.2														
			Attachment Devices															
			Joint Materials	2.3														
			SD-08 Manufacturer's Instructions															
			Instructions		G													
		02531	SD-01 Preconstruction Submittals															
			Waste Water Disposal Method		G													
			SD-02 Shop Drawings															
			Fabrication drawings	2.7.2.2	G													

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		02531	36-inch Reinforced Concrete		G													
			Pipeline (RCP)															
			Method of Dewatering	3.1.2.1	G													
			Slope Ttrench and Shoring															
			SD-03 Product Data															
			Sanitary sewer piping, fittings, and		G													
			joints															
			Manholes		G													
			Temporary Sewer Bypass System	3.5	G													
			Sewer Bypass Implementation	3.5.2	G													
			Plan															
			SD-05 Design Data															
			Design calculations of 48' HDPE		G													
			and RCP sewer piping															
			Steel Pipe	2.1.3	G													
			Design calculations of sewer		G													
			manhole structures															
			Method of 36' S.A.R.I. Line		G													
			reconnection															
			Invert elevations, lateral locations		G													
			Method of Restraint of 60-inch		G													
			S.A.R.I. Line during construction of															
			concrete encasement															
			Qualified Operator	3.5.1	G													
			SD-06 Test Reports															
			Pothole	1.2														

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		02531	SD-07 Certificates															
			Sanitary sewer piping, fittings,		G													
			joints															
			Shop-applied lining and coating		G													
			Leakage Tests	3.1.3	G													
			Steel Manhole Structures															
			36-inch Reinforced Concrete															
			Pipeline															
			Statement of Satisfactory															
			Installation															
			Joints	2.1.3.2														
			Bracing Excavations	3.1.2.3														
			SD-08 Manufacturer's Instructions															
			Installation procedures for sewer		G													
			piping															
			Manufacturer's Installation															
			Instructions for 36-inch RCP															
		02600	SD-03 Product Data															
			Stone Sources	2.1.3														
			SD-05 Design Data															
			Method of placement	3.2.1	G													
			SD-06 Test Reports															
			Stone Quality Testing	2.1.4.2														
			Gradation Sampling and Testing	2.1.5.2														
			SD-07 Certificates															
			Waybills and Delivery Tickets	3.4.2														

SUBMITTAL REGISTER

CONTRACT NO.
DACW09-02-B-0004

TITLE AND LOCATION
PRADO DAM EMBANKMENT AND OUTLET WORKS

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAG# RAPH	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY						REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02612	SD-01 Preconstruction Submittals															
			Pipe and Fittings	1.1	G													
			SD-02 Shop Drawings															
			Reinforced Concrete Pipe	2.1	G													
			SD-04 Samples															
			Gaskets	2.2.2														
			SD-06 Test Reports															
			Aggregates	2.1.3	G													
			Manufacturer Test Data	2.2.2.1	G													
			SD-07 Certificates															
			Notarized Affidavit	2.2.3	G													
			Affidavits	2.2.2.1	G													
		02623	SD-01 Preconstruction Submittals															
			Materials	1.1	G	G												
			SD-02 Shop Drawings															
			Drawings	3.1														
			SD-03 Product Data															
			Pipe Resins	2.1.1	G													
			HDPE Manufacturer	1.4.1														
			SD-06 Test Reports															
			Resin Evaluation	1.4.2	G													
			Finished Product Evaluation	1.4.3	G													
			SD-07 Certificates															
			HDPE Pipe	1.4.1	G													
			Resin	2.1.6	G													
			Stress Regression Testing	1.4.4														

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CONTRACT NO.
DACW09-02-B-0004

TITLE AND LOCATION
PRADO DAM EMBANKMENT AND OUTLET WORKS

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAG # RAPH	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY						REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02623	SD-08 Manufacturer's Instructions															
			Installation	3.1														
		05615	SD-02 Shop Drawings															
			Detail Drawings	2.3.1	G													
			SD-03 Product Data															
			Welding	2.3.3	G													
			Materials	2.1														
			Materials Disposition Records															
			SD-06 Test Reports															
			Tests, Inspections, and	2.4														
			Verifications															
		09880	SD-02 Shop Drawings															
			PVC Liner		G													
			SD-03 Product Data															
			PVC Liner		G													
			Transverse Welding Strip	3.7	G													
			SD-04 Samples															
			Weld Specimen	3.1.1	G													
			SD-07 Certificates															
			PVC Liner		G													
			SD-08 Manufacturer's Instructions															
			PVC Liner		G													
			SD-09 Manufacturer's Field															
			Reports															
			PVC Liner		G													
		13120	SD-03 Product Data															

SUBMITTAL REGISTER

CONTRACT NO.
DACW09-02-B-0004

TITLE AND LOCATION
PRADO DAM EMBANKMENT AND OUTLET WORKS

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAG # RAPH	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY						REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		13120	Digital Camera	2.1														
			Digital Camcorder	2.2														
			Photo Management System	2.3														
		15100	SD-02 Shop Drawings															
			System Description	1.6	G													
			SD-06 Test Reports															
			Factory Testing	2.3.5.1	G													
			SD-07 Certificates															
			Certifications	1.5.2	G													
			SD-08 Manufacturer's Instructions															
			Valves and Appurtenances	3.1.1														
			SD-10 Operation and Maintenance															
			Data															
			Maintenance	1.8														
		15120	SD-03 Product Data															
			Sleeve Couplings	2.4.1	G													
			SD-07 Certificates															
			Manufacturer's Certification	1.4.3	G													

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DIVISION 02 - SITE WORK

SECTION 02100

CLEAR SITE AND REMOVE OBSTRUCTIONS

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SECTION 02100

CLEAR SITE AND REMOVE OBSTRUCTIONS

PART 1 GENERAL

1.1 PROTECTION

1.1.1 Protection of Existing Work

Before beginning any cutting or demolition work for removals, the Contractor shall carefully survey the existing work and examine the drawings and specifications to determine the extent of the work. The Contractor shall take all necessary precautions to insure against damage to existing work to remain in place or to be reused, and any damage to such work shall be repaired or replaced as approved by the Contracting Officer at no additional cost to the Government. The Contractor shall carefully coordinate the work of this section with all other work and construct and maintain shoring, bracing and supports, as required. The Contractor shall insure that structural elements are not overloaded and be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under any part of this contract.

1.1.2 Environmental Protection

All work and Contractor operations shall comply with the requirements of SECTION 01410: ENVIRONMENTAL PROTECTION.

1.2 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 REQUIREMENTS

3.1.1 General

Except as hereinafter specified, and/or indicated, areas to be cleared and grubbed will be limited to actual excavation areas and areas on which fills and/or structures are to be placed. The removal of trees, shrubs, turf, and other vegetation outside of these areas shall be held to a minimum and care shall be exercised not to damage any trees, shrubs, turf, or vegetation which can be left in place. **Clearing operations are restricted to seasonal limitations as stated in Section 01410: ENVIRONMENTAL PROTECTION.**

3.1.2 Existing Structures and Obstructions

The Contractor shall clear the site, including all fill, borrow, and excavation areas, and remove and dispose of all existing structures and obstructions for project construction, except as otherwise noted on the drawings. Obstructions which are designated or specified to be removed but which are not designated or specified to be removed by others shall be removed by the Contractor. Except as otherwise specified, obstructions designated to be removed by others will be removed in sufficient time to preclude interference with the Contractor's operations. Utility relocations are not considered to be obstructions.

3.1.3 Clearing

Clearing shall consist of the removal of all trees, brush, rubbish, fences and other objectionable material. Trees shall be cut a maximum of one foot above ground surface. Other vegetation shall be cut off flush or slightly below the original ground surface. Clearing operations shall be conducted so as to prevent damage to trees, structures, and installations under construction, or to remain in place, and to provide for the safety of employees and others. All rubbish, waste dumps, and debris areas shall be cleared.

3.1.4 Grubbing

Grubbing shall consist of removing all stumps, roots, logs, and other objectionable vegetable matter in the required fills, borrow, foundation areas, and all excavation areas. In grubbing out stumps and roots, all roots or other timber shall be removed to the extent specified hereinafter. Stumps shall be pulled, not cut off.

3.1.5 Utilities

Prior to removing an obstruction, all applicable utility relocations shall have been coordinated as required per SECTION 01200: GENERAL REQUIREMENTS.

3.2 AREAS TO BE CLEARED AND GRUBBED

3.2.1 Existing Embankment

All features not otherwise specified in Section 02200: EXCAVATION, shall be removed and disposed of.

3.2.2 Outlet Works, Approach Channel and Abutments

The area to be excavated for the outlet works, approach channel and abutments shall be cleared and grubbed by the Contractor. In areas where soil or overburden will be excavated for direct use in embankment or for stockpiling, roots 1-1/2 inches or more in diameter will be removed to a depth of 18 inches below natural ground surface. In areas where soil and overburden is to be excavated and wasted, grubbing shall be required only to the extent needed to prepare for excavation. Clearing and grubbing includes the removal of all interfering items including existing asphalt structures fences, wells and all other items identified on plans or interfering with the work, but not identified on the plans.

3.2.3 Borrow Areas

Clearing and grubbing in the borrow areas shall be done only in the areas

where material is to be excavated and removed. Roots 1-1/2 inches or more in diameter, shall be removed to a depth of 18 inches below the original ground surface.

3.2.4 Disposal Areas and Stockpile Areas

Disposal areas shall be cleared to the extent needed for disposal of waste material. Stockpile areas shall be cleared to the extent needed for stockpiling, blending, and recovery of material. Stockpile areas may be developed within the workments identified on the plans for this project. Disposal and stockpile areas shall not be grubbed. Permanent disposal areas as identified on the plans shall be used only for the disposal of non-degradable materials (i.e. concrete and earth). **At the designated permanent disposal areas shown on the plans just north and just south of the existing outlet structure, the Contractor shall not be permitted to place any demolished concrete debris, or large boulders over the proposed 48-inch SARI pipelines within 4 feet from the edge of the new 48-inch pipe outside diameter at both sides up to finished grade.** Organic material and vegetation striped from the dam site shall be hauled and stockpiled adjacent to the borrow sites. The organic material and vegetation stockpiled shall be spread uniformly throughout the borrow site upon completion of the excavation from the selected borrow site.

3.2.5 Demolition of Existing Intake Structure and Access Bridge

Existing intake structure and access bridge shall be removed to the extent and limits shown on the plans. Concrete removal shall be performed without damage to any structure that is to remain in place.

Blasting or similar methods of fracturing concrete by explosive release of energy or impact of a projectile on the surface of the concrete will be permitted.

3.2.6 Abandon Existing Intake Structure and Access Bridge

Existing outlet conduit and transition structure, where shown on the plans to be abandoned, shall be abandoned in place. All resulting openings into the existing intake structure shall be plugged with shotcrete barrier, and the existing bypass inlet and outlet pipes shall be sealed. The entrance to the existing gate well shall also be covered with a reinforced concrete slab.

The structures to be abandoned shall be backfilled with sand to the extent and limits shown on the plans, by any method acceptable to the Contracting Officer which completely fills the conduits and transition structure. Sand backfill material shall be clean, free draining, and free from roots and other deleterious substances.

The openings into the existing intake structure shall be securely closed by a reinforced shotcrete plug which is epoxy doweled all around into the existing structure. A pair of peripheral metallic waterstop epoxied in grooves shall be added to provide a watertight barrier.

The existing bypass inlet pipe with sand backfill shall be plugged with a steel plate welded to the pipe. The existing bypass outlet pipe shall also be sealed with a steel plate. The existing gate well entrance shall be covered with a reinforced concrete slab per detail shown on the plans.

The demolition and/or abandonment of the existing intake structure and

access bridge may not commence without prior approval of the Contracting Officer. The existing outlet conduit and transition structure shall not be abandoned until the new intake structure is completely operational and has been accepted.

3.2.7 Removal of Existing Railroad Piers

The existing piers in the vicinity of the outlet channel shall be removed to one foot below the subgrade for the channel.

3.2.8 Other Areas

Any area where embankment fill will be placed or where facilities will be excavated, such as road and dike fill or the approach channel excavation, shall be cleared and grubbed. Roots 1-1/2 inches or more in diameter shall be removed to a depth of 18 inches below existing ground surface.

3.3 DISPOSAL OF CLEARED, GRUBBED, AND REMOVED MATERIAL

All material removed, except material specified and/or indicated to be stockpiled, is designated as scrap, shall become the property of the Contractor, and shall be removed from the site. All rubble, trash, debris that is degradable shall be disposed of in an approved landfill. The Contractor may dispose of approved materials to the permanent disposal site to the greatest extent possible. Excess material shall be disposed of offsite. Unsuitable materials from clearing operations may be temporarily used for diversion and control of water. Disposal of unsuitable materials shall be in accordance with the requirements of SECTION 02200: EXCAVATION.

-- End of Section --

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DIVISION 02 - SITE WORK

SECTION 02130

DIVERSION AND CONTROL OF WATER

-- End of Section Table of Contents --

SECTION 02130

DIVERSION AND CONTROL OF WATER

PART 1 GENERAL

1.1 GENERAL

It is anticipated that storm, surface, ground and or other waters will be encountered at various times and locations during the work as a result of groundwater, rainfall and/or the Santa Ana River and the operation of the dam. Such waters may interfere with Contractor's operation and may cause damage to the construction by flooding, lateral erosion, sedimentation or pollution if not properly controlled by the Contractor. The Contractor, by submitting a bid assumes all of said risk and the Contractor acknowledges that a bid was prepared accordingly. The responsibility of the Contractor for protection of work is specified in paragraph: Damage to Work.

Prado Dam will be operated during the construction period to provide flood control and water conservation benefits. Operation of the dam during the construction period is outlined in a Corps document entitled "Prado Dam Interim Water Control During Construction" that the Corps plans to make available to bidders around 3 December 2002. The Contractor shall plan his activities so as they do not interfere with the operation of the dam, as described in the said document. Should a conflict between construction and the operation of the dam arise, the dam will be operated with priority given to public safety, flood control and water conservation.

The Contractor shall conduct its operations in such a manner that storm or other waters may proceed without diversion or obstruction along existing drainage courses. Diversion of water for short reaches in order to protect construction in progress will be permitted.

The Contractor shall conduct construction operations to protect water from being polluted with fuels, oils, bitumens or other harmful materials, and shall be responsible for removing said materials upon completion of project construction.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Cofferdam System; G

Water Control Plan; G

1.3 MAINTENANCE OF DAM OPERATION

The Contractor is responsible for following the sequence and stages of construction as outlined in the paragraph: Sequence of Construction, in order to maintain the operation and integrity of Prado Dam. The existing outlet works must remain in operation until the new outlet works and runout channel are complete. The new outlet works must be operational and accepted prior to any demolition of the existing outlet works. The Contractor shall maintain access to the existing outlet works and control tower via the SR-71 at all times until the new outlet works is accepted. Specifically, the Contractor shall not hinder the dam tender's access to any part of the dam, existing outlet channel and downstream gage station at any time. The Contractor shall not compromise the integrity or functionality of the existing dam embankment nor take any action that lowers the maximum elevation at which water can be stored at any time, other than what is stated hereinbelow.

The embankment of Prado Dam shall be constructed in stages to maintain the integrity of the Dam. Specific requirements include

a. Construct the outlet works in the stages identified in the plan documents,

b. Excavate the existing Dam crest and reconstruct only between May 1 and August 1.

c. Plan the work cycle with consideration for the flood seasons and water conservation operations.

The contractor shall not plan or rely on any special operation of the dam to protect his work or work area.

1.3.1 Sequence of Construction

The order of work established in this section is for the purpose of maintaining the operation and integrity of the existing dam. The Contractor is responsible for the development of his own construction schedule, but shall incorporate and comply with the sequence of construction as defined in this section. Adjustments in the sequence require the approval of the Contracting Officer and must be coordinated with the District's Reservoir Regulation Section (Brian Tracy, phone: (213) 452-3527, fax: (213) 452-4202.

Phase 1

1. Coordinate the relocation of SCE and SCG electric and gas line facilities by the utility agencies.

2. Clear the Dam and borrow sites. Commence development of borrow sites and borrow haul roads.

3. Construct the cofferdam as part of the Stage 1 grading including the Contractor’s designed seepage control system.

4. Construct the Stage 1 portion of the outlet works intake facility, transition structure, conduit and stilling basin;

5. Concurrent with the Stage 1 construction, remove and stockpile the gravel blanket on the south side of the embankment. Commence construction of south embankment to elevation 558.

Phase 2

1. Construct over the completed portions of the conduit, the specified materials to the lines and grades identified in the Stage 2 a and Stage 2 b grading. Prior to commencement of the Stage 2 c grading, install gates in the intake structure in a closed position. The integrity of the dam shall be secured prior to proceeding with Stage 2 c construction.

2. Construct Stage 2 c grading and conduit, remove cofferdam.

3. Construct runout channel leaving an opening for the existing runout channel in order to maintain operation of existing dam.

Phase 3

1. Construct Stage 3 grading which includes the completion of the dam embankment over the conduit constructed during Stage 2 c, approach and pilot channel grading.

2. Excavate existing dam crest between May 1 and August 1 and proceed with raising embankment to final grade between Sta. 8+00 and end of project.

3. Complete interior of outlet works. Install access bridge, electrical systems, well and waterline, sewer facilities, complete and transfer operations of dam from existing outlet works to new outlet works, complete paving of all access road and embankment except for SR-71 access road and beginning of embankment.

Phase 4

1. Remove existing access bridge and demobilize outlet works.

2. Construct Dual 48-inch HDPE Pipelines in Outlet Works. Construct new Knife Gate Valves and associated 48-inch steel and RCP piping.

3. Construct SARI Reaches IV-A and IV-B Relocation.

4. Excavate existing dam crest between beginning of project and Sta. 8+00 between May 1 and August 1 complete embankment.

5. Plug existing outlet works, complete runout channel, fill existing runoff channel to final grade.

6. Final projects: close borrow sites, hydroseed and demobilize equipment.

The Contractor shall protect the existing 36" SARI Reach IV-B and 42" SARI Reach IV-A and 42" SARI Reach 4 while in service.

The Contractor shall not implement any haul road for Stage 1 grading that will breach the integrity of the existing dam. Any Contractor developed haul roads that deviate from the Stage 1 grading design shall require the approval of the Contracting Officer.

1.4 COFFERDAM SYSTEM

The cofferdam and seepage control system are a required part of the diversion and control of the water plan. The Constructed cofferdam system will have a minimum crest elevation at 525. The cofferdam system shall be constructed as specified in Section 02200: EXCAVATION. Alternate designs may be submitted for approval by the Contracting Officer for the configuration of the cofferdam and the seepage control features.

1.4.1 Water Conservation Storage

To the extent that flood protection is not compromised and environmental constraints are met, Prado Dam is utilized to store flood runoff and release water at a rate that can be recharged to groundwater downstream by the Orange County Water District (OCWD). Pool regulation differs during the winter flood season and the non-flood season.

Winter Flood Season. (1 October to 28 February) Pool elevation for water conservation will not exceed 494 feet.

Non-Flood Season. (1 March to 30 September) The allowable maximum reservoir elevation for water conservation is increased from 494 feet to 505 feet. An outflow of 200-600 cubic-feet per second is maintained as requested by the OCWD until the pool is exhausted. The pool may be maintained until 31 August. The month of September is designated for maintenance purposes. Maintenance activities that require a dry reservoir will be performed at this time.

1.5 EXISTING OUTLET WORKS

As stated above, Prado Dam will be operated during the construction period as prescribed in the Corps document entitled "Prado Dam Interim Water Control During Construction" Plan. The Plan describes schedules for water releases based upon the water surface elevation in the reservoir, downstream conditions and the inflow forecast. It is the responsibility of the Contractor for protection of work against flows as specified in the paragraph: By-Pass Capacities.

1.5.1 By-Pass Capacities

The Contractor shall plan for protecting downstream work against releases from the existing and/or new outlet works of up to 6,000 cfs from 15 November to 15 April, and 600 cfs from 16 April to 14 November, as measured using the existing dam gate ratings published in the 1994 Water Control Manual for Prado Dam & Reservoir.

1.5.2 Downstream Diversion Activities

The Contractor shall conduct all diversion operations in such a manner as to avoid adversely impacting conditions downstream of the project. The Contractor is responsible for flows from diversion operations until they reenter the existing active natural Santa Ana River low-flow channels and these flows shall be returned to its pre-diversion condition. If, in the opinion of the Contracting Officer, the outflows released from the diversion activities have or are causing changes to the geomorphology of the canyon, the Contractor shall take immediate remedial measures to return the downstream channel to its pre-diversion condition. These measures will be performed by the Contractor without additional costs to the Government.

1.6 BORROW AREAS

Surface drainage from the borrow areas shall be controlled by dikes, ditches, sump pumps, drainage pipes, etc. Suitable drainage facilities shall be provided to protect existing facilities which are to remain in place. The Contractor shall submit a borrow site drainage plan for the Contracting Officer's review and approval.

1.7 DRAINAGE DITCHES AND SUMPS

The location and depth of any bypass drainage ditch or sump shall be subject to Government approval. Special precautions shall be taken to avoid impairing the permanent subgrade or embankment foundation. Any excavation below the foundation subgrade shall be refilled with compacted fill in accordance with the SECTION 02200: EXCAVATION and Section 02212: EMBANKMENT by and at the expense of the Contractor.

1.8 WATER CONTROL PLAN

Thirty (30) calendar days prior to construction of the diversion facilities specified in paragraph: Sequence of Construction, the Contractor shall submit plans showing the proposed methods to dewater each working area and control the water from rain, sheet flow, streamflows, and other surface water. The plans shall show the scheme of operations and a complete layout of drainage pipes, pumps, diversion channels, cofferdams, etc. The Contractor shall assume full responsibility for the adequacy of his dewatering and control methods. Prior notice to the Contracting Officer of the Contractor's method of dewatering will in no way release the Contractor from the fulfillment of his obligations or make the Government, in any manner, responsible for any losses due to failure or inadequacy of the dewatering and control method used.

1.8.1 Damage to Work

Except as herein provided, damage to all work (including temporary construction), utilities, materials, equipment and plant shall be repaired to the satisfaction of the Contracting Officer at the Contractor's expense, regardless of the cause of such damage. As specified in the CONTRACT CLAUSE: PERMITS AND RESPONSIBILITIES "The Contractor shall be responsible for all materials-delivered and work performed until completion and acceptance of the entire work, except for any completed unit of work which may have been accepted under the contract." However, if any part of the work performed by the Contractor is damaged by surface flows during a flood event in which the by-pass capacities as stated above are exceeded, the Contractor will make the repairs as ordered by the Contracting Officer and compensation for such repairs will be made at the applicable contract unit or lump sum prices as fixed and established in the contract. If, in the opinion of the Contracting Officer, there are no contract unit or lump sum prices applicable to any part of such work an equitable adjustment pursuant to CONTRACT CLAUSE: CHANGES, will be made as full compensation for the repairs of that part of the accepted permanent work for which there are no applicable contract unit or lump sum prices.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.`

-- End of Section --

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DIVISION 02 - SITE WORK

SECTION 02200

EXCAVATION

-- End of Section Table of Contents --

SECTION 02200

EXCAVATION

PART 1 GENERAL

1.1 GENERAL INFORMATION

Excavation shall consist of the removal and appropriate disposal of every type of material encountered except materials covered by the provisions of the SECTION 02100: CLEAR SITE AND REMOVE OBSTRUCTIONS, or from other areas as directed, to the lines, grades and elevations indicated. The material to be removed may include but is not limited to earth, silt, clay, sand, gravel, cobbles, conglomerate, alluvium, and rock. "Rock" is defined as either fresh, decomposed, or weathered in-place bedrock. Excavation for permanent cuts shall be made to the slope lines indicated. Excavation shall be performed in a manner which will not impair the subgrade. Except as otherwise directed or specified, the finished surface of subgrade which will form the foundation for concrete structures (except for excavation in rock) shall be not more than plus or minus 1.0 inch from the indicated grade at any point when tested with a 10-foot straight edge. Any excavation or overcut made outside the payment lines indicated on the drawings or staked in the field shall be refilled with suitable earth or concrete in an approved manner by and at the expense of the Contractor, except where such overcut is directed or specified, in which case payment for such overcut and fill will be made at the applicable contract unit prices for the type of excavation and fill made. Excavation in rock within the limits of the Zone II material contact area shall be done in such a manner that abrupt changes in slope are avoided. The Zone II material contact area refers to the area of contact of the bedrock against which the Zone II material is placed. Methods used to achieve these slopes shall conform to the requirements specified in paragraph: EXCAVATION, ROCK.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 2487	(1998) Classification of Soils for Engineering Purposes (Unified Soil Classification System)

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Excavation Plan; G

An excavation plan will be required. See PARAGRAPH, EXCAVATION PLAN.

SD-03 Product Data

(Deleted)

SD-05 Design Data

Rock reinforcement system

Design and backup calculations of rock reinforcement system for vertical excavation of bedrock discussed in PARAGRAPH, VERTICAL EXCAVATION OF ROCK WITHIN THE OUTLET CONDUIT EXCAVATION.

Cofferdam

Design and construction procedures for cofferdam and cutoff.

SD-06 Test Reports

Testing of Gravel Blanket

Downstream gravel gradation and thickness test results.

1.4 AVAILABILITY OF ADDITIONAL INFORMATION

Additional design information and data are available through the Contracting Officer. Information relevant to this specification is included in the Phase II General Design Memorandum on the Santa Ana River (Prado Dam), the Draft Feature Design Memorandum No. 12 Prado Dam Outlet Works, pump test data, and groundwater data. It is emphasized that significant changes have been incorporated into the Plans and Specifications from the designs proposed in the design memorandums. The design memorandums and other data are available for information purposes only and are not a part of the contract documents since they have been superseded by the Plans and Specifications.

1.5 EQUIPMENT

All plant, equipment, tools, and machines used in the performance of the work covered by this section shall be subject to the approval of the Contracting Officer, and shall be maintained in satisfactory working condition at all times. Excavating equipment used in the areas from which fill and borrow materials are obtained shall be capable of excavating to varying depths and of producing the necessary blending required to consistently meet the specified gradation requirements.

1.6 EXCAVATION LIMITS

Limits of excavation for the various structures and parts of the work are as indicated on the drawings, but the right is reserved to increase or decrease the depth or areal extent of excavation if, in the opinion of the

Contracting Officer, the conditions encountered warrant such modifications. Except as otherwise directed, the Contractor shall make all excavations to the profiles and sections indicated.

1.7 DISPOSAL OF EXCAVATED MATERIAL

Excavated material meeting the requirements of SECTION 02250, FILLS AND SUBGRADE PREPARATION or SECTION 02212, EMBANKMENT, for embankment or fill shall be placed in the embankment, stockpile or fill areas as approved by the Contracting Officer. The Contractor shall stockpile approved excavation materials as delineated in PARAGRAPH, EXCAVATION, BORROW AREAS, as well as materials that cannot be feasibly sequenced into immediate placement as backfill or embankment fill in areas approved by the Contracting Officer; no additional payment will be made for stockpiling or rehandling from stockpile to place of final disposition. Materials not meeting the requirements defined in SECTION 02212, EMBANKMENT, PART 2, PRODUCTS, or SECTION 02250, FILLS AND SUBGRADE PREPARATION, PART 2, PRODUCTS from the borrow areas and required excavations, and unsatisfactory material, as defined in PARAGRAPH, REMOVAL OF UNSATISFACTORY SOILS, shall become the Contractor's property and shall either be removed from the site or wasted in the on site permanent disposal areas to the extent that they can be accommodated, at the Contractor's option.

1.8 PRESERVATION OF PROPERTY

All excavation operations shall be conducted in such a manner that improvements which are to remain in place permanently will not be damaged or subjected to settlement or horizontal embankment movement.

1.9 Excavation Plan

An excavation plan, including methods and equipment to be used in excavating each area or feature, location of existing structures to be removed or remain, methods of blending and stockpiling excavated material, locations of stockpile and temporary disposal areas, proposed methods for transporting material from the borrow area to the embankment or stockpiles, precautions to be taken to protect the existing spillway and to ensure that excavation operations do not go beyond the limits shown, methods to be used for protecting the rock foundation of the outlet works, measures to be taken to minimize or preclude affects of slaking of bedrock, procedures for providing a uniform surface in which cobbles and boulders would not project more than 9 inches from the specified plane of excavatioin, haul roads into and out of excavations (including haul roads for material excavated from below the top of the conduit elevation), and location of proposed structures, including fences, signs, trailers, conveyor systems, stationary processing equipment, staging areas and designated parking areas, shall be submitted to the Contracting Officer for approval thirty (30) calendar days prior to commencing excavation. The excavation plan shall include the Contractor's proposal for removing material meeting the requirements for Zone II to expose the surface of materials meeting the requirements of Zone I.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 COFFERDAM AND DEWATERING

3.1.1 Cofferdam

Prior to the Stage I excavation, a cofferdam shall be constructed as shown in the plans. Zone II material shall be used. The cofferdam shall be constructed in accordance with all specifications pertinent to Zone II fill delineated in Section 02212. Prior to placement of fill, weaker surface materials and organics shall be removed and the surface proof-rolled by 4 passes of a 10 ton vibratory steel wheeled roller. A contractor-designed impervious cutoff shall be provided between the top of the existing ground surface and the bedrock. It should be noted that the depth to bedrock in this area is variable and not well defined. The cofferdam and impervious cutoff shall be designed and stamped by a licensed professional engineer authorized to use the title "Geotechnical Engineer" in the State of California. The engineer's analysis shall show that the system has a factor of safety of three or greater against failure by seepage and piping when analyzed for pool elevation at the top of the cofferdam and assuming steady state seepage. The analysis, plans and supporting design documentation shall be submitted to the Contracting Officer a minimum of 10 days prior to commencing excavation for the conduit.

3.1.2 Dewatering

Field investigations indicate that both the bedrock and soil will be saturated along much of the required excavation. Temporary cut slopes will probably destabilize if not dewatered. The general design assumption for the groundwater level between Stations 10+00 and approximately Station 15+50 was that the groundwater is at the top of bedrock, unless the top of bedrock is below elevation 500 feet, in which case the groundwater elevation was assumed to be at elevation 500 feet. Laboratory test data indicates the coefficient of permeability of the bedrock to be between 0.005 and 0.1 feet per day. In the vicinity of the stilling basin, field data indicates that the groundwater may be within 20 feet of the ground surface. Pump tests of the alluvium downstream of the embankment indicate a permeability of approximately 280 feet per day.

3.2 EXCAVATION, SOIL, OUTLET WORKS STATION 0+00 TO 18+13.50

The native soil consists of three units. The most extensive and thickest consists of sand and gravel, with occasional cobbles and boulders (generally increasing in number with depth) up to about 18 inches. The sand and gravel unit is overlain by a thin and discontinuous silt and fine-grained sand deposit, which in turn is partially overlain by a wedge of reddish, gravelly fan deposits and poorly bedded clayey and gravelly silt and sand. In addition to the native soil, artificial fill will be encountered. Soil excavation consists of the removal and disposal to the indicated lines and grades of any and all alluvial and artificial fill materials between the existing ground surface and the top of bedrock. (In general, that work which occurs under the trace of the modified embankment or embankment extension is treated in SECTION 02212, while that which is outside of the trace of the embankment is treated in SECTION 02250.)

3.2.1 Blending of Excavated Soil

Soil from required excavation which meet the requirements for fill as specified in SECTION, 02212, EMBANKMENT, or SECTION, 02250, FILLS AND SUBGRADE PREPARATION, may be used in the embankment or fill areas as approved by the Contracting Officer. Soil shall be excavated so as to produce maximum blending.

3.3 EXCAVATION, ROCK

3.3.1 General

Rock excavation consists of the removal and disposal of any and all bedrock. Rock excavation shall be to the lines and grades shown on the contract drawings. Because of the weakly cemented nature of the sedimentary bedrock, the low measured P-wave velocities, and previous construction history, it is anticipated that the bedrock can be mechanically excavated and shaped to the specified tolerances. The bedrock along the outlet works alignment is the Sycamore Canyon member of the Tertiary-age, sedimentary, Puente Formation. Investigations indicate that the bedrock surface is an old erosional surface exhibiting known local relief of up to 40 feet. The bedrock at the left abutment outcrop shows signs of subaerial weathering at the overburden contact and the overlying basal conglomerate occasionally contains fragments of weathered sandstone and siltstone. In general, the bedrock grades between silty sandstone and sandy siltstone with occasional shale or mudstone intervals. The rock has the following general characteristics: gradational contacts; massive; indistinct bedding surfaces; weak cementation; and moderate density. Bedding is nearly perpendicular to the outlet works alignment, dipping steeply upstream. Groundwater will be encountered during excavation. Dewatering will be required. Within the Outlet Works excavation, between Outlet Works Stations 10+00 and 14+00, the slope in the bedrock shall be no steeper than 1V:1H in any direction measured between the bench and the top of bedrock as shown on the drawings. The rock excavation shall be done in such a manner as to protect the integrity of the underlying rock. This may require specialized equipment and techniques. Ripping of the rock will not be permitted within 3 feet of the finished surface of the subgrade. Blasting will not be allowed.

3.3.2 Tolerances for Rock Excavation

Deviations from the lines and grades shown on the drawings or established by the Contracting Officer for excavation in rock shall be within tolerance limits of plus or minus 1.5-inches, except for those excavations against which concrete structures are to be constructed.

3.3.3 Excavation, Existing Concrete Cutoff Wall Within Outlet Conduit Trench

As shown on the drawings, an existing concrete cutoff wall will be encountered during excavation of the outlet works conduit trench. Within the excavation, the wall shall be removed in a manner which minimizes disturbance to the surrounding, non-excavated material. The final cut edge of the wall shall parallel the slope. The remaining portion of the cutoff wall shall not protrude from the trench slope by more than 3 inches. All loose and fractured material surrounding the wall shall be removed by hand excavation and disposed of. The combined total volume of loose and fractured material removed by hand from both slopes around the cutoff wall shall not exceed four cubic yards. The hand excavation shall leave the rock surface in a condition satisfactory for the placement of concrete fill. Following approval of the Contracting Officer, the void between the rock and the wall shall be backfilled with concrete. Prior to placement of the concrete, the designated areas for placement shall be thoroughly cleaned using approved methods. The designated areas shall be moistened such that absorption of water from the concrete will be minimized, however, no standing water will be allowed. Where the wall protrudes from the slope, concrete shall be applied in a manner to create a smooth transition from the outer edge of the wall to the slope. Concrete materials, properties, and procedures shall conform to the applicable requirements of

SECTION 03305, CONCRETE.

3.3.4 Disposition of Excavated Rock

Material from rock excavation which meet the requirements for embankment or fill as specified in SECTION, 02212, EMBANKMENT, or SECTION, 02250, FILLS AND SUBGRADE PREPARATION, may be used in the embankment or fill areas as approved by the Contracting Officer.

3.3.5 Prevention of Slaking or Spalling of Rock

In general, the bedrock grades between silty sandstone and sandy siltstone with occasional shale or mudstone intervals. At his discretion, the Contractor may apply shotcrete, asphalt emulsion, or another product approved by the Contracting Officer to the siltstone, shale, and mudstone, to prevent air slaking or spalling of rock.

3.3.6 Abutments

All vegetation, loose soil, and weathered rock should be removed down to a material having physical properties equal to or better than the overlying embankment fill. Abutment slopes should be as smooth and flat as feasible at the embankment contact to improve compaction of fill against the abutment. At the right abutment, the minimum depth of excavation at the contact with the existing embankment shall be to the top of the cutoff wall.

3.4 VERTICAL EXCAVATION OF ROCK WITHIN THE OUTLET CONDUIT EXCAVATION

3.4.1 General

The Contractor shall excavate the rock below the top of the conduit between Stations 10+00 and 16+50.50 to vertical slopes. The tower area (between Stations 9+00 and 10+00) shall be excavated as shown in the drawings.

3.4.2 Tolerances

Excavations for concrete structures have certain reference lines designated as "A" line and "B" line. The "A" line is located 6 inches inside the "B" line. The "A" line represents the outer edge of the conduit walls shown in the plans and thus is the inner tolerance limit inside which no rock will be permitted to project. Any projections inside the "A" line shall be removed. The "B" line is the line to which measurement for payment of excavation will be made, and is considered to be the final excavation line indicated on the drawings. Measurement for payment will be made to this line regardless of whether the limit of the actual excavation falls inside or outside of it, but sufficient excavation inside this line shall be performed to provide for the proper installation of slope reinforcement and placement of concrete. Any excavation beyond the "B" line shall be replaced with concrete complying with applicable portions of these specifications without additional cost to the Government.

3.4.3 Reinforcement System

The Contractor shall design a rock reinforcement system to ensure the integrity of the vertical cut. The design shall be developed and stamped by a qualified Engineer licensed in the State of California having at least five years design experience with similar support systems. The plans and supporting design documentation shall be submitted to the Contracting

Officer. No element of the rock reinforcement system shall project beyond the "A" line.

3.5 EXCAVATION, SOIL, OUTLET WORKS STATION 18+13.50 TO 54+00

The excavation for the access roads and channels shall consist of the removal and disposal of all materials to the lines and grades indicated on the drawings. Suitable excavated materials shall be placed within the fill portions of the roads, channel levees, or wasted as necessary. All access and haul roads shall be maintained as specified in SECTION 01200: GENERAL REQUIREMENTS, paragraph: Roads and Culverts in PRADO DAM EMBANKMENT, OUTLET WORKS AND APPURTENANCES. Open work gravel lenses, nested cobbles and boulders, debris, and unsatisfactory material shall be removed from the sides and bottom of the excavation to the extent directed by the Contracting Officer, and refilled in accordance with SECTION 02250, FILLS AND SUBGRADE PREPARATION.

3.6 EXCAVATION, BORROW AREAS

3.6.1 General

Borrow shall be taken from the indicated borrow areas. In all borrow areas except for Borrow Area B, varying thicknesses of Zone II materials overlie the Zone I materials. The eastern two-thirds of Borrow Area B has been disturbed by recent construction activity and the existence and extent of a Zone II layer is uncertain. The transition from Zone II to Zone I materials may be gradual or indistinct and the Contractor is responsible for obtaining materials that meet the requirements specified in SECTION 02212, EMBANKMENT. As discussed above, the excavation plan shall include the Contractor's plan for removing material meeting the requirements for Zone II to expose the surface of materials meeting the requirements of Zone I. In all borrow areas, the Zone II materials to be placed in the embankment at elevation 566 or below shall be removed and placed in stockpiles of sufficient depth to permit reloading with a Holland loader, or any other suitable type of loader capable of making a vertical cut that will result in complete blending of the full depth of the stockpile. Zone II materials to be placed above elevation 566 shall be excavated in a manner which will produce maximum blending of materials from top to bottom of the excavation. In order to obtain uniform moisture content, prewetting of the Zone II materials at the borrow areas or stockpile areas shall be required. The underlying Zone I material shall be excavated in a manner which will produce maximum blending of materials from top to bottom of the excavation. The depth of excavation will vary and shall at all times be controlled to produce the specified gradations. The excavation shall be conducted in such a manner that the excavated area will not pond water. The Contractor is responsible for all construction haul roads. The Contractor shall construct and maintain such roads throughout their required use as specified in SECTION 01200: GENERAL REQUIREMENTS, paragraph: Roads and Culverts in PRADO DAM EMBANKMENT, OUTLET WORKS AND APPURTENANCES. Permanent excavated slopes shall not be steeper than 2H:1V, except as approved by the Contracting Officer. The borrow areas shall be left in a neat condition, graded to drain and in accordance with the requirements specified in SECTION 01410: ENVIRONMENTAL PROTECTION.

3.6.2 Location Change

Whenever, in the opinion of the Contracting Officer, it is necessary to change the location of the excavating equipment working in the borrow areas in order to obtain specified material, or to avoid areas of unsuitable

materials, the Contractor shall move his equipment to a new location at no additional cost to the Government. The Contractor shall provide sufficient personnel in the borrow areas to monitor the excavation and direct the disposition of all excavated materials.

3.6.3 Protection of Area Underlying Future Dike

As shown in the drawings, a dike will be built adjacent to Borrow Areas B and C under future contracts. This area shall be left in an undisturbed state except as approved in writing by the Contracting Officer.

3.6.4 Excavation of Zone II Materials

Erosion due to wind or flowing water shall be controlled during borrow operations. Areas of surface water concentration shall be drained into silt ponds to remove sediment prior to water being discharged from the borrow site into existing drainages. Reclamation shall occur concurrently with excavation to the extent possible given operational constraints of the ongoing excavation. See SECTION 02130, DIVERSION AND CONTROL OF WATER, for reclamation requirements.

3.6.5 Excavation of Zone I Materials

In general, Zone I materials underlie the Zone II materials at all borrow sites. Unsuitable materials shall be disposed. Excavation shall be performed in a manner and sequence that will provide drainage at all times. Excavations shall be kept free from water while construction therein is in progress. Upon completion of excavation from borrow areas, stockpiled growth media from stripping operations shall be spread over the excavated surface and the area revegetated according to the requirements of SECTION 02900: HYDROSEEDING.

3.6.6 Excavation of Zone I Select Materials

Zone I Select materials are to be excavated from the Zone I Select Sub-Borrow Area within Borrow Area A. Select Zone I materials are to be used as structural backfill. The intent is to utilize those materials with the lowest percentage passing the number 200 sieve available. Following removal of the upper materials, the Zone I Select materials shall be excavated to an approximately vertical cut face of not less than 10 feet. The excavation shall be performed in a manner which will produce maximum blending of materials from top to bottom of the excavation. The depth of excavation will vary and shall at all times be controlled to produce the specified gradations. The excavation shall be conducted in such a manner that the excavated area will not pond water. The Zone I Select borrow area shall not be used for regular Zone I material until such excavation is approved by the Contracting Officer.

3.7 EXCAVATION FOR STRUCTURES

Excavation for all structures shall be made accurately to the lines, grade, and elevations shown. Trenches and foundation pits shall be of sufficient size to permit the placement and removal of forms for the full length and width of structure, footings, and foundations as shown. Foundation material shall be cleaned of loose debris and cut to a firm level surface. Loose disintegrated rock and thin strata shall be removed. When concrete is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation. Where the top of bedrock is below the elevation required for the bottom of the tower, outlet conduit or

stilling basin, the soil shall be over-excavated two feet, or to the top of bedrock, and backfilled with lean mixture concrete, as directed by the Contracting Officer. The quantity of lean mix backfill required as a result of this overexcavation shall not exceed 100 cubic yards.

3.8 EXCAVATION OF EXISTING EMBANKMENT

The crest of the existing embankment shall be excavated as shown in the drawings to allow for the creation of a continuous impervious core. Reasonable measures shall be taken during excavation of the crest to separate the existing impervious core material from the existing pervious upstream and downstream shell materials. The existing road, riprap, bedding, and other surface materials are to be removed in a timely manner prior to the excavation so as to minimize damage or loss of material.

3.8.1 Removal of Gravel Blanket, Stone Protection

The existing gravel blanket on the downstream slope is to be removed as late as feasible prior to placement of the embankment material to minimize erosion or other damage to the existing embankment surface. The gravel shall be stockpiled for reuse. Existing documentation describes the upstream stone protection as 12-inch stone over 6-inch spalls. Both the stone and spalls shall be removed from the embankment. The stone shall be stockpiled for later use as grouted stone. The spalls may be reused where the gradation permits. Care shall be taken with the stone and gravel so as to minimize breakdown and preclude contamination. Stone protection which is disturbed due to the construction process shall be replaced without cost to the Government by the Contractor. The replacement stone and bedding shall conform to that specified for new stone protection.

3.8.2 Testing of Gravel Blanket

Prior to removing the gravel blanket, the contractor shall verify the thickness and gradation of the gravel blanket. The thickness and gradation results shall be submitted to the Contracting Officer 10 days prior to removal of the gravel blanket.

3.8.3 Excavation of Existing Embankment Crest

The crest of the existing embankment shall be lowered as shown on the drawings. The crest excavation shall occur in the months of May, June, or July. Excavation of the crest shall not commence until the modified embankment has been raised to elevation 558.0 or greater and the Contractor has received approval to proceed from the Contracting Officer. In addition to the lowering of the embankment crest, a key trench will be required as shown in the drawings. The length of trench allowed to remain open prior to backfilling shall not exceed 150 feet.

3.8.4 Disposition of the Excavated Crest Material

Materials meeting the gradation requirements specified in SECTION 02212, EMBANKMENT, shall be reused in the modified embankment. Materials from the existing pervious upstream shell and existing pervious downstream shell shall be used as Zone I or Transition Zone fill, depending on the gradation. Additional blending of the excavated embankment material may be necessary to satisfy the requirements of Zone I or Transition Zone fill. Material from the existing Select Impervious Zone shall be placed in the Zone II stockpile.

3.8.5 Protection of Existing Impervious Material Moisture Content

After the crest has been lowered as shown on the plans, care shall be taken to maintain the pre-excavation moisture content of the existing core material. Any materials in which the moisture content changes by plus or minus 2 percent prior to placement of the impervious material shall be removed and replaced. Note that this is a general rule that will be applied wherever the existing impervious material is exposed, whether in the embankment or abutments.

3.8.6 Left Abutment

In addition to the key trench shown in the plans in the left abutment between the existing embankment and the new outlet works, additional excavation will be required between the new outlet works and the spillway. In this area a six-foot deep key trench shall be shall be excavated underlying the trace of the Zone II fill. Slopes of the trench shall be no steeper than 1H:1V.

3.9 REMOVAL OF UNSATISFACTORY SOILS

The removal of in-situ soils which are unsatisfactory for foundations of the embankment, structures, and roads may be required in certain areas. The Contractor will be required to excavate any such areas to the depth directed and backfill the areas with compacted fill conforming to the requirements of SECTION 02250: FILLS AND SUBGRADE PREPARATION and SECTION 02212EMBANKMENT. Unsatisfactory soils include those which contain sod, roots, brush, debris, trash or other objectionable material, and those classified in ASTM D 2487 as MH, CH, OH, and OL.

3.10 RECORDS

The Contractor shall keep and furnish to the Contracting Officer accurate logs and records of all operations pertaining to the preparation and excavation procedures. The records shall be submitted daily with the Quality Control Report and shall include the following: The number, size, type, and make of all equipment used in the excavation process.

3.11 (Deleted)

-- End of Section --

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DIVISION 02 - SITE WORK

SECTION 02316

EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS

-- End of Section Table of Contents --

SECTION 02316

EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 798	(1997a) Installing Factory-Made Corrugated Steel Pipe for Sewers and Other Applications
ASTM D 422	(1963; R 1990) Particle-Size Analysis of Soils
ASTM D 1557	(1991) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu. m.))
ASTM D 2321	(1989; R 1995) Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
ASTM D 2487	(1998) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1996el) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1996) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

1.2 DEGREE OF COMPACTION

Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-05 Design Data

Trench Excavation; G

Design for the trench excavation method for the SARI sewer relocation.

SD-06 Test Reports

Field Density Tests
Testing of Backfill Materials

Copies of all laboratory and field test reports within 24 hours of the completion of the test.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Satisfactory Materials

Satisfactory materials shall consist of any material classified by ASTM D 2487 as GW, GP, GM, GP-GM, GC, GP-GC, GM-GC, SW, SP, SM, SW-SH, SC, SW-SC, SP-SM, SP-SC, CL, ML, and CL-ML **and containing less than 50 percent low-expansive (expansioin index less than 50) fines passing the No. 200 sieve**.

2.1.2 Unsatisfactory Materials

Unsatisfactory materials shall be materials that do not comply with the requirements for satisfactory materials. Unsatisfactory materials include, but are not limited to, those materials containing roots and other organic matter, trash, debris, frozen materials and stones larger than 3 inches. Unsatisfactory materials also include man-made fills, refuse, or backfills from previous construction. 36-inch S.A.R.I. line backfill 3 feet above the top of pipe may contain stones up to 3/4 of the compacted layer thickness.

2.1.3 Unyielding Material

Unyielding material shall consist of rock and gravelly soils with stones greater than 3 inches in any dimension or as defined by the pipe manufacturer, whichever is smaller.

2.1.4 Unstable Material

Unstable material shall consist of materials too wet to properly support the utility pipe, conduit, or appurtenant structure.

2.1.5 Select Granular Material

Select granular material shall consist of well-graded sand, gravel, crushed gravel, crushed stone or crushed slag composed of hard, tough and durable particles, and shall contain not more than 10 percent by weight of material passing a No. 200 mesh sieve and no less than 95 percent by weight passing the 1 inch sieve. The maximum allowable aggregate size shall be 1 inches, or the maximum size recommended by the pipe manufacturer, whichever is smaller.

PART 3 EXECUTION

3.1 EXCAVATION

Excavation shall be performed to the lines and grades indicated. During excavation, material satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench equal to 1/2 the depth of the excavation, but in no instance closer than 2 feet. Excavated material not required or not satisfactory for backfill shall be removed from the site and shall be disposed of by the Contractor. Grading shall be done as may be necessary to prevent surface water from flowing into the excavation, and any water accumulating therein shall be removed to maintain the stability of the bottom and sides of the excavation. Unauthorized overexcavation shall be backfilled in accordance with paragraph BACKFILLING AND COMPACTION at no additional cost to the Government.

3.1.1 Trench Excavation

Trench walls shall be vertical, unless deeper excavation requires other provisions. The Contractor shall design and submit for approval to the Contracting Officer a proposed trench excavation method for the **48-inch HDPE** S.A.R.I. sewer relocation upstream of the dam, which shall be in accordance with all applicable safety requirements. The **48-inch HDPE** S.A.R.I. sewer shall be trenched in accordance with the details shown on the plans. The bottom of the trench shall be accurately graded to provide uniform bearing and support for each section of the conduit at every point along its length.

3.1.2 Trench Excavation for Pipe Culverts, Storm Drains, and Drainage Structures

The width of trenches at any point below the top of the pipe shall be not greater than the outside diameter of the pipe plus 24 inches to permit satisfactory jointing and thorough tamping of the bedding material under and around the pipe. Sheeting and bracing where required shall be placed within the trench width as specified. Care shall be taken not to overexcavate. Where trench widths are exceeded, redesign with a resultant increase in cost of stronger pipe or special installation procedures shall be necessary. Cost of this redesign and increased cost of pipe or installation shall be borne by the Contractor without additional cost to the Government

3.1.3 Removal of Unstable Material

Where wet or otherwise unstable soil incapable of properly supporting the pipe, as determined by the Contracting Officer, is unexpectedly encountered in the bottom of a trench, such material shall be removed to the depth required and replaced to the proper grade with select granular material, compacted as provided in paragraph BACKFILLING. When removal of unstable material is due to the fault or neglect of the Contractor in his performance of shoring and sheeting, water removal, or other specified requirements, such removal and replacement shall be performed at no additional cost to the Government.

3.2 BEDDING

The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe. Pipe bedding shall be select granular material.

3.2.1 Concrete Pipe

When no bedding class is specified or detailed on the drawings, concrete pipe shall be bedded carefully in a soil foundation accurately shaped and rounded to conform to the lowest one-fourth of the outside portion of circular pipe or to the lower curved portion of pipe arch for the entire length of the pipe or pipe arch. When necessary, the bedding shall be tamped. Bell holes and depressions for joints shall be only of such length, depth, and width as required for properly making the particular type of joint.

3.2.2 Corrugated Metal Pipe

Bedding for corrugated metal pipe and pipe arch shall be in accordance with ASTM A 798. It is not required to shape the bedding to the pipe geometry.

3.2.3 Plastic Pipe

Bedding for PVC and PE pipe shall meet the requirements of ASTM D 2321. Bedding, haunching, and initial backfill shall be either Class IB or II material.

3.3 BACKFILLING AND COMPACTION

Unless otherwise noted the following shall be used. Backfill material shall consist of satisfactory select granular material. Initial backfill shall be placed in an 8 inch loose layer thickness for compaction by hand tamping. **The subsequent backfill layer shall be placed at 6 inches loose thickness or less. Each layer shall be compacted to at least 90 percent maximum density unless otherwise specified.**

3.3.1 Trench Backfill

Trenches shall be backfilled to the grade shown. The trench shall be backfilled to 2 feet above the top of pipe prior to performing the required pressure tests, unless otherwise shown.

3.3.2 **48-** Inch S.A.R.I. Sewer Line Backfill

The **proposed 48-inch** S.A.R.I. sewer shall be backfilled in accordance with the Plans and these specifications. The contractor is given the option to slurry backfill the line at his own expense. **General fill shall be satisfactory material.** The material used in Pipe and Bedding Zone shall consist of select granual material. The Trench Zone shall consist of satisfactory materials and miscellaneous fill, as shown on the plans.

3.3.3 Backfilling Storm Drain Pipe in Trenches

After the pipe has been properly bedded, selected material from excavation or borrow, at a moisture content that will facilitate compaction, shall be placed along both sides of pipe in layers not exceeding 6 inches in compacted depth. The backfill shall be brought up evenly on both sides of pipe for the full length of pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe. Each layer shall be thoroughly compacted with mechanical tampers or rammers. This method of filling and compacting shall continue until the fill has reached an elevation of at least 12 inches above the top of the pipe. The remainder of the trench shall be backfilled and compacted by spreading and rolling or compacted by mechanical rammers or tampers in layers not exceeding 8

inches. Tests for density will be made as necessary to ensure conformance to the compaction requirements specified elsewhere in this paragraph. Where it is necessary in the opinion of the Contracting Officer, any sheeting or portions of bracing used shall be left in place and the contract will be adjusted accordingly. Untreated sheeting shall not be left in place beneath structures or pavements.

3.3.4 Backfilling Storm Drain Pipe in Fill Sections

For pipe placed in fill sections, backfill material and the placement and compaction procedures shall be as specified elsewhere in this paragraph. The fill material shall be uniformly spread in layers longitudinally on both sides of the pipe, not exceeding 6 inches in compacted depth, and shall be compacted by rolling parallel with pipe or by mechanical tamping or ramming. Prior to commencing normal filling operations, the crown width of the fill at a height of 12 inches above the top of the pipe shall extend a distance of not less than twice the outside pipe diameter on each side of the pipe or 12 feet, whichever is less. After the backfill has reached at least 12 inches above the top of the pipe, the remainder of the fill shall be placed and thoroughly compacted in layers not exceeding 8 inches.

3.4 SPECIAL REQUIREMENTS

Special requirements for both excavation and backfill relating to the specific utilities are as follows:

3.4.1 Telephone Lines

Trenches shall be of a depth to provide a minimum cover of 30 inches from the existing ground scarface, or from the indicated finished grade, whichever is lower, to the top of the pipe.

3.4.2 Water Lines

Trenches shall be of a depth to provide a minimum cover of 3 feet 6 inches from the existing ground surface, or from the indicated finished grade, whichever is lower, to the top of the pipe.

3.4.3 Electrical Distribution System

Direct burial cable and conduit or duct line shall have a minimum cover of 30 inches from the finished grade, unless otherwise indicated.

3.4.4 Plastic Marking Tape

Warning tapes shall be installed directly above the pipe, at a depth of 18 inches below finished grade unless otherwise shown. Tape shall be as specified in TABLE 1, and shall bear a continous printed inscription describing the specific utility.

TABLE 1. Tape Color

Red:	Electric
Yellow:	Gas, Oil, Dangerous Materials
Orange:	Telephone, Telegraph, Television, Police, and Fire Communications
Blue:	Water Systems
Green:	Sewer Systems

3.5 TESTING

Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Government.

3.5.1 Testing Facilities

Tests shall be performed by an approved commercial testing laboratory or may be tested by facilities furnished by the Contractor. No work requiring testing will be permitted until the facilities have been inspected and approved by the Contracting Officer. The first inspection shall be at the expense of the Government. Cost incurred for any subsequent inspection required because of failure of the first inspection will be charged to the Contractor.

3.5.2 Testing of Backfill Materials

Characteristics of backfill materials shall be determined in accordance with particle size analysis of soils ASTM D 422 and moisture-density relations of soils ASTM D 1557. A minimum of one particle size analysis and one moisture-density relation test shall be performed on each different type of material used for bedding and backfill.

3.5.3 Field Density Tests

Tests shall be performed in sufficient numbers to ensure that the specified density is being obtained. A minimum of one field density test per lift of backfill for every 600 feet of installation shall be performed. One moisture density relationship shall be determined for every meters 1500 cubic yards of material used. Field in-place density shall be determined in accordance with ASTM D 2922. The nuclear gage shall have a built in trench corrector function which shall be used when tests are performed in a trench. The calibration curves shall be checked and adjusted using the sand cone method as described in paragraph Calibration of the ASTM publication. ASTM D 2922 results in a wet unit weight of soil and when using this method, ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with density calibration checks as described in ASTM D 3017. The calibration checks of both the density and moisture gauges shall be made at the beginning of a job, on each different type of material encountered, at intervals as directed by the Contracting Officer. Copies of calibration curves, results of calibration tests, and field and laboratory density tests shall be furnished to the Contracting Officer. Trenches improperly compacted shall be reopened to the depth directed, then refilled and compacted to the density specified at no additional cost to the Government.

-- End of Section --

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SECTION 02480

MECHANICALLY STABILIZED EARTH WALLS

PART 1 GENERAL

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SECTION 02480

MECHANICALLY STABILIZED EARTH WALLS

PART 1 GENERAL

PART 1 GENERAL

1.1 GENERAL INFORMATION

This section specifies the materials and construction of mechanically stabilized earth walls in conformance with the lines, grades, details and dimensions shown on the plans and approved design and shop drawings.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36	(1997ael) Carbon Structural Steel
ASTM A 53	(1999b) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 82	(1997a) Steel Wire, Plain, for Concrete Reinforcement
ASTM A 123	(2000) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 153	(1998) Zinc-Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 185	(1997) Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
ASTM A 325	(1997) Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A 497	(1997) Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement
ASTM A 570	(1997) Structural Steel, Sheet and Strip, Carbon, Hot-Rolled
ASTM A 572	(1999) High-Strength Low-Alloy Columbium-Vanadium Structural Steel
ASTM A 722	(1995) Uncoated High-Strength Steel Bar

	for Prestressing Concrete
ASTM D 512	Current Manual
ASTM D 516	Current Manual
ASTM D 648	(1998) Deflection Temperature of Plastics Under Flexural Load
ASTM D 698	(1998) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))
ASTM D 1752	(1984; R 1996) Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
ASTM D 3080	Current Manual
ASTM G 51	Current Manual
ASTM G 57	Current Manual

1.3 SYSTEM DESCRIPTION

1.3.1 General

The mechanically stabilized earth wall shall consist of a non-structural leveling pad, precast concrete facing panels, and metal soil reinforcement elements mechanically connected to each facing panel. The wall face panel shall extend up into the coping as shown on the plans. Where walls intersect at an angle, a special vertical corner element panel shall be used. The corner element panel shall cover the joint of the panels that abut the corner, and allow for independent movement of the abutting panels.

Standard facing panels shall have at least two levels of earth reinforcements to stabilize the panels against the rotation. Top and bottom half panels shall have at least one level of earth reinforcement.

1.3.2 Design Requirements

The estimated base width shown on the plans is based on the soil parameters and seismic loading indicated and shall be verified by the wall manufacturer. The design by the wall manufacturer shall effectively retain the earth for the loading conditions and the contours, profile or slope line shown on the plans. Estimated length of soil reinforcement is shown on the plans and shall be verified by the wall manufacturer. Design calculations for all the wall elements shall be made by a registered professional engineer experienced in the design of **mechanically stabilized** earth retaining structures.

1.3.3 Instrumentation Requirements

Contractor shall provide **the various** instrumentation required at the **specified** locations for each wall, as shown on the plan. The primary purpose of instrumentation is to provide quantitative data to assess settlement, stress, **displacement and other** data useful to verify design parameters and assumptions and verify the performance of the wall. A

variety of instruments are being utilized in a comprehensive monitoring program to ensure that all critical **elements** are covered sufficiently.

The selection of the monitoring instruments is to **ensure reliable** and dependable data of adequate **accuracy can** be obtained throughout the period **specified**.

Proper installation of instruments is critical to achieving reliable performance and obtaining desired information. Written step-by-step procedures should be prepared, making use of the manufacturers instruction manual. **Contractor installed instrumentation shall be coordinated with and approved by the Contracting Officer. Regular calibration and maintenance of hardware will be required over the life of the project.**

Instrumentation shall be required for monitoring horizontal and vertical displacements of the wall facing, soil pressures on the facing or on a vertical plane near the facing and the base of the wall, **bearing pressures within the earth mass, horizontal displacements in the retained fill,** tensile forces in the reinforcement, and soil reinforcement corrosion. The locations for the instruments have been determined based on the design **areas of interest** and long term monitoring of **the** instruments.

(Deleted)
The following instrumentation shall be provided:

1.3.3.1 Inspection Elements

Contractor shall provide inspection elements as shown on the plans to determine loss of metal**. Elements shall** be placed in each wall system at the location shown on the plans to **monitor** 100-year **design** life.

Inspection elements shall be fabricated of material representative of the soil reinforcement. A set of inspection elements shall be provided for each wall at the location shown on the plans. Inspection elements shall be provided for inspection at 5 years, 10-years and at 10-year intervals thereafter. Locate inspection wire or strip at mid-length of full-face panels.

(Deleted)

1.3.3.2 Strain Gages

The distribution of tension in the reinforcement shall be determined using strain gages. This information is used indirectly to determine the location of the failure plane and distribution of earth pressure within the reinforced soil. Strain gages are set at predetermined intervals along **selected** reinforcing elements. Near the bottom of the wall the gages are **concentrated near** the facing panels whereas in the upper half of the wall gages are concentrated at a distance from the face **equal to**thirty percent of the height (0.3 H), as shown on the plans. **Sixteen reinforcing strips are to be instrumented at each wall.**

The strain gages shall be applied on both the upper and lower surfaces of the reinforcing at each measuring point to eliminate the effects of local bending, and wired to **form** one measuring point. The strain gages shall be applied directly to the steel with outer layer of zinc galvanizing **ground** off to expose the bare steel. The application of strain gages shall follow the manufacturers recommendations. The wired area and gage face shall be coated and sealed to prevent moisture infiltration. Once **installed the**

measurements can be read with a strain indicator. **The number of measuring points to be instrumented along each reinforcing strip shall be as shown on the plans.**

Strain gages and wiring shall have an in-place service life of 50 years.

1.3.3.3 Load Cells

Load cells shall be installed to provide a measurement of internal lateral and vertical stress, the distribution of facing stress, and the bearing stress. Load cells shall be installed in the backfill at the locations shown on the plans.

Earth pressure cells are typically made of steel and are more rigid than soils and can result in over-prediction or under-prediction of stress. To reduce the conformance error, the horizontal earth pressure cells, measuring vertical stress shall be placed in a 1-inch bed of sand, and covered with 1 inch of sand. The bedding sand shall be the granular backfill used in the reinforced zone with the large gravel sized particles **removed.** The vertical earth pressure cells, measuring horizontal stress shall be placed in the same fashion as the horizontal cells.

The vertical earth pressure cells measuring horizontal stress at the facing shall be seated against the concrete panel and shall be caulked and protected.

Earth pressure cells shall also be placed horizontally on the first backfill level, **concurrent** with the first level of reinforcement, to measure the applied bearing stress. **Horizontal pressure cells shall also be placed adjacent to each vertical pressure cell at the wall face.**

A set of pressure cells shall also be placed at approximately 0.3H away from the facing to measure the distribution of **horizontal** stress within the reinforced soil.

A minimum of 18 horizontal and 14 vertical pressure cells are required at each wall as shown on the plans. Pressure cells and wiring shall have an in-place service life of 50 years.

1.3.3.4 Settlement Indicator Plate

A settlement plate consists of a square **steel** plate **or steel angle** attached at various locations of the wall facing. Surveying methods are used to monitor the magnitude and rate of horizontal and vertical deformation of the surface monuments. An accurate record **must be** made of the initial location of the plate for reference. **Settlement indicator plates shall be located as shown on the plans.**

1.3.3.5 Inclinometers

Inclinometers are tilt-sensing devices for monitoring **deformation normal** to the axis of a flexible pipe by means of a probe passing along the pipe. The probe contains gravity sensing transducers designed to measure inclination with respect to the vertical. The pipe is installed in a near vertical alignment, so that the inclinometer provides data for defining subsurface horizontal deformation.

An inclinometer system consists of four components: a guide casing, a portable probe, a portable readout unit and a graduated electrical cable.

Guide casings made of ABS are provided by the inclinometer manufacturer. After installation of the casing and surveying of its tip location, the probe is lowered to the bottom and an inclination readout is made. Additional readings are made as the probe is raised incrementally to the top of the casing, providing data for determination of initial casing alignment. The differences between the initial readings and a subsequent set define any change in alignment.

Three inclinometers shall be installed in the reinforced earth section **at each wall**, one right behind the facing panels, one 15 feet behind the facing panels, and one 30 feet back from the facing panels. The inclinometer casings shall be installed in holes drilled **a minimum of 3 feet into** bedrock.

At the Contractors option and in concurrence with the Contracting Officer digital electronic inclinometers may be used in lieu of conventional probe-type inclinometers which are attached to the wall at predetermined locations with gravity sensing transducer with an option for continuous automatic reading, or an option for connection to a measuring device. **Electronic inclinometers, if used, shall have a minimum in-place service life of 50 years.**

1.3.3.6 Pre-cast Instrumentation Vault

All electrical instrumentation at each wall shall be wired to a common instrumentation vault located as shown on the plans. The vault shall be pre-cast concrete and sized to accommodate all required wiring and electrical panels necessary for reading the various electrical instrumentation. Pre-cast vaults located at the stilling basin walls shall have an HS20 traffic load rated cover.

1.3.3.7 Instrumentation Wiring

All wiring for electrical instrumentation (strain gages, load cells, and electronic inclinometers, if used) shall be placed and protected to provide a minimum of 50 years service life. The contractor shall develop a gage numbering system that identifies the gage type and location. The numbering system shall be submitted to the Contracting Officer for review and approval. The approved numbering system shall be used at the instrumentation vault to clearly and permanently label each wire or group of wires from each electrical instrument in the wall.

1.3.3.8 Electrical Meters

Upon completing installation of all electronic instrumentation, wiring and the instrumentation vault, Contractor shall deliver to the Contracting Officer one complete set of all electronic instruments, meters and probes required to take measurements on all electronic instrumentation. This shall include all instructions, specifications, and manufacturers data for all electrical equipment and gages.

1.3.4 **(Deleted)**

1.3.5 Safety Factors

The minimum factors of safety shall be as follows:

1.5 against pullout of the reinforcements based on pullout resistance

at 0.75 inch deformation for a representative backfill. (i.e. the resulting deformation should not exceed 0.75 inch at 1.5 times the design load). The design stress in the reinforcement shall be 0.55Fy.

1.5 against sliding of the mass

2.0 against bearing capacity failure

1.5 for overall slope stability

For earthquake loading: 1.5 against sliding

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Shop drawings; G.

The Contractor shall prepare and submit for approval complete shop drawings showing details and materials for the work, reinforcement details, joints between facing units, etc. Elements of fabricated items inadvertently omitted on plans shall be detailed by the fabricator and indicated on the shop drawings.

SD-05 Design Data

Design calculations; G.

Design calculations shall be submitted for the wall design including facing panel reinforcement and soil reinforcement.

Instrumentation; G

Description of proposed instrumentation shall submitted and approved prior to installation.

SD-07 Certificates

Soil Reinforcement and Attachment Devices
Joint Materials

Certified test reports of required material tests shall be submitted prior to the use of the materials in the work.

SD-08 Manufacturer's Instructions

Instructions; G

Manufacturer's recommended instructions for installation.

PART 2 PRODUCTS

2.1 CONCRETE FACING PANELS

Concrete facing panels shall have a minimum thickness of 5 1/2 inches and a minimum concrete cover on reinforcing steel of 1-1/2 inches. Cement shall be Types II or V, low alkali and shall conform to the requirements of ASTM C 150. Concrete shall have a minimum compressive strength of 4,000 psi at 28 days. The maximum water-cement ratio shall be 0.45.

Additives containing chloride shall not be used without the approval of the Engineer. Soil reinforcement attachment and lifting devices shall be set in place to the dimensions and tolerances shown on the plans and called out in these specifications.

Joints between facing panels shall be as shown on the drawings.

2.1.1 Testing and Inspection

Acceptability of the precast units shall be determined on the basis of compressive strength tests and visual inspection. The precast units shall be considered acceptable when compressive strength test results indicate conformance to the 28-day requirement. Panels shall be considered acceptable for placement in the wall when the seven-day initial strength equals or exceeds 85 percent of the 28-day requirement.

2.1.2 Casting

The panels shall be cast face down in level forms supported on a flat working surface. Guides shall be used to locate and support soil reinforcement attachment devices set in the back face of the panel. The concrete in each panel unit shall be placed without interruption and shall be consolidated by the use of an approved vibrator, supplemented by such hand tamping as may be necessary to force the concrete into the comers of the forms and to prevent the formation of stone pockets or cleavage planes. Clear form oil or release agent shall be used throughout the casting operation.

2.1.3 Curing

The units shall be cured for a sufficient length of time so that the concrete will develop the specified compressive strength. Any production lot which does not conform to the strength requirements of Section 2.1.7, Compressive Strength, shall be rejected.

2.1.4 Removal of Forms

The forms shall remain in place until they can be removed without damage to the unit.

2.1.5 Concrete Finish

Unless otherwise indicated on the plans or elsewhere in the specifications, the concrete surface for the front face shall have an ordinary steel form finish, and for the rear face an unformed finish. The rear face of the panel shall be free of open pockets of aggregate and surface distortions in excess of 1/4 inch.

2.1.6 Tolerances

All units shall be manufactured within the following tolerances with

respect to the dimensions shown on the shop drawings:

a. Soil Reinforcement Attachment Devices Locations -- Lateral position of soil reinforcing attachment devices shall be within one inch. Embedment measured from the back face of the panel shall be within + 1/4 inch, - 1/2 inch.

b. Panel Dimensions -- All panel dimensions shall be within 1/4 inch. All hardware embedded in the panel with the exception of attachment devices shall be within 1/4 inch.

c. Panel Squareness -- Squareness, as detern3ined by the difference between the two diagonals, shall not exceed 1/2 inch.

d. Panel Surface Finish -- Surface defects on smooth-formed surfaces, measured on a length of 5 feet, shall not exceed 1/4 inch. Surface defects on textured-finished surfaces, measured on a length of 5 feet, shall not exceed 5/16 inch.

2.1.7 Compressive Strength

Acceptance of the concrete panels, with respect to compressive strength, shall be determined on the basis of production lots. A production lot is defined as a group of panels that shall be represented by a single set of compressive strength samples and shall consist of not more than 80 panels or a single day's production, whichever is less.

Acceptance of a production lot will be made on the compressive testing as per Section 03305, CONCRETE.

2.1.8 Acceptance Criteria

Precast panels shall be accepted for use in wall construction provided the concrete strength meets or exceeds the minimum compressive strength requirement, the soil reinforcement connection devices and the panel dimensions are within tolerances and any chipping, cracks, honeycomb or other defects are repaired to the satisfaction of the Contracting Officer.

2.1.9 Marking

The date of manufacture, the production lot number, and the piece-mark shall be clearly marked on the side of each panel.

2.1.10 Handling, Storage and Shipping

All units shall be handled, stored and shipped in such a manner to prevent chipping, cracks, fractures and excessive bending stresses. For units found unsatisfactory to the Contracting Officer, they shall be replaced with a new unit at no additional cost to the Government. Panels shall be stored and shipped in stacks, front face down. Firm blocking, of sufficient thickness to prevent the attachment devices from contacting the panel above, shall be located immediately adjacent to the attachment devices. Lifting inserts shall be installed on the top edge of the precast panels to permit lifting at the project site.

2.2 SOIL REINFORCEMENT AND ATTACHMENT DEVICES

All soil reinforcement and attachment devices shall be carefully inspected to insure they are true to size and free from defects that may impair their

strength and durability. Soil reinforcement shall either be welded wire mats or ribbed reinforcing strip and shall be galvanized.

Steel reinforcement elements shall be designed to have a corrosion resistance durability to ensure the minimum design life of 100 years. The required sacrificial thickness shall be provided in addition to the required structural reinforcement thickness to compensate for the effects of corrosion.

The galvanization and carbon steel loss rates shall be as follows:

Galvanization Loss = 15 µm/yr for first 2 years
= 4 µm/yr for subsequent years

Carbon Steel Loss = 12 µm/yr after zinc depletion

2.2.1 Welded Wire Mats

W11 and W20 steel wire shall conform to ASTM A 82. The welded wire mat shall conform to ASTM A 185. D11 and D20 deformed steel wire may be substituted for W11 and W20 steel wire. The welded wire mat utilizing deformed steel wire shall conform to ASTM A 497. Galvanizing shall conform to the requirements of ASTM A 123 such that the corrosion rate is no greater than 1.3 mils/year. Splicing of the welded wire mat along its length shall be by an approved mechanical coupler which will develop the minimum tensile strength of the wire. The coupler at the mat connections shall be a seamless steel sleeve. It shall be applied over the button-headed wires and swaged by means of a hydraulic press. The coupler shall develop the minimum tensile strength of the wire without exceeding a total slip of the wires of 0.25 inch.

The connector plate steel shall conform to ASTM A 36. The connector bolt shall conform to ASTM A 325. The button on the button-headed wires shall conform to the requirements of ASTM A 722.

Pipe for the pipe pin shall conform to ASTM A 53, standard weight, except the weight of the zinc coating per square foot of actual surface shall average not less than 2.0 ounces and no individual specimen shall show less than 1.8 ounces.

Resin bonded cork for horizontal joints shall conform to ASTM D 1752, Type II with compressive load of not less than 100 psi.

2.2.2 Ribbed Reinforcing Strips

Ribbed reinforcing strips shall be hot rolled from bars to the required shape and dimensions. Ribbed reinforcing strips shall have nominal dimensions of 2 inches wide and 3/16 inch thickness conforming to ASTM A 572, Grade 65. Galvanizing shall conform to the requirements of ASTM A 123. The minimum coating thickness shall be 2 oz/SF.

Tie strips and splice plates shall be shop fabricated of hot rolled steel conforming to the minimum requirements of ASTM A 570, Grade 50. Galvanizing shall conform to the minimum requirements of ASTM A 123 or ASTM A 153. The minimum coating thickness shall be 2 oz/SF.

Fasteners shall consist of hexagonal cap screw bolts and nuts conforming to the minimum requirements of ASTM A 325. Galvanizing shall conform to the

minimum requirements of ASTM A 153.

2.3 JOINT MATERIALS

Joint materials shall be installed to the dimensions and thicknesses in accordance with the plans and approved shop drawings.

2.3.1 Joint Cover

Horizontal and vertical joints between panels shall be covered by a geotextile. The geotextile may be either a non-woven needle punched polyester geotextile or a woven monofilament polypropylene geotextile. The geotextile filter fabric shall be attached to the rear of the facing panels with an adhesive prior to backfill placement.

2.4 GRANULAR BACKFILL MATERIAL

The granular backfill material for mechanically stabilized earth retaining structures with metallic soil reinforcement shall consist of material free from organic material and substantially free of shale or other soft, poor durability particles; shall not contain slag aggregate or recycled materials, such as glass, shredded tires, portland cement concrete rubble, asphaltic concrete rubble, or other unsuitable material as determined by the Engineer; and shall meet the following requirements:

Gradation Requirements

Sieve Size	Percentage Passing
6"	100
3"	78 - 100
No. 4	---
No. 30	0 - 60
No. 200	0 - 25

Property Requirements

Test	Requirement	
Sand Equivalent	12 min.	
Plasticity Index	10 max.	
Minimum Resistivity	1000 ohm-cm min.	643 (ASTM G 57)
Chlorides	100 ppm max.	422 (ASTM D 512)
Sulfates	200 ppm max.	417 (ASTM D 516)
pH	5.5 to 10.0	643 (ASTM G 51)

If 12 percent or less passes the No. 200 sieve and 50 percent or less passes the No. 4 sieve, the Sand Equivalent and Plasticity Index requirements shall not apply.

The friction angle of the granular backfill used in the reinforced fill zone for the internal stability design of the wall shall be 35 degrees. The friction angle shall be determined by the standard direct shear test, (ASTM D 3080), utilizing a sample of the material compacted to 95 percent at optimum moisture content (ASTM D 648). Before construction begins, the material selected shall be subject to approval to conformance with this frictional requirement. Conformance with the test requirements shall be the responsibility of the Contractor.

PART 3 EXECUTION

3.1 FOUNDATION PREPARATION

The foundation for the structure shall be graded level for a width equal to or exceeding the length of the soil reinforcements, or as shown on the plans. Prior to wall construction, the foundation, if not in rock, shall be compacted as directed by the Engineer.

At each panel foundation level, concrete leveling pad shall be provided to the design elevations shown on the plans. Allowable elevation to tolerances are +0.01 foot (1/8 inch), and -0.02 foot (1/4 inch), from the design elevation.

3.2 WALL ERECTION

Panels shall be handled by means of lifting devices set into the upper edge of the panels. Panels shall be placed vertically in successive horizontal lifts as backfill placement proceeds. As backfill material is placed behind the panels, the panels shall be maintained in a vertical position. External bracing is required for the initial lift. Vertical and horizontal alignment tolerances shall not exceed 3/4 inch in 10 feet. The overall vertical tolerance of the wall (plumbness from top to bottom) shall not exceed 3/4 inch per 10 feet of wall height.

3.3 PLACEMENT OF SOIL REINFORCEMENT

Prior to placing the first layer of soil reinforcement, backfill shall be placed and compacted in accordance with Section, Backfill Placement.

Soil reinforcement shall be placed normal to the face of the wall. If skewing of the reinforcing strips is required due to obstructions in the reinforced fill, the maximum skew angle shall not exceed 15 degrees from the normal position unless specifically designed.

3.4 BACKFILL PLACEMENT

Backfill material shall be placed and compacted simultaneously with the erection of the facing panels. Placement and compaction shall be accomplished without distortion of the soil reinforcement or displacement of facing panels. Any wall materials which become damaged or disturbed during backfill placement shall be either removed and replaced at the Contractor's expense or corrected, as directed by the Contracting Officer. Any backfill material placed within the reinforced soil mass which does not meet the requirements of this specification shall be corrected or removed and replaced at the Contractor's expense, as directed by the Contracting Officer.

Backfill shall be compacted to 95 percent of the maximum density as determined by ASTM D 698.

The maximum lift thickness before compaction shall not exceed 10 inches, regardless of the vertical spacing between layers of soil reinforcements. The Contractor shall decrease this lift thickness, if necessary, to obtain the specified density. Prior to placement of the soil reinforcements, the backfill elevation, after compaction, shall be 2 inches above the attachment device elevation from a point approximately 12 inches behind the back face of the panels to the free end of the soil reinforcement, unless otherwise shown on the plans.

Structure backfill at the front of the wall shall be completed prior to backfilling more than 15 feet above the bottom of the lowermost face element. Hand-held or hand-guided compacting equipment shall be used to compact structure backfill material within 3 feet of the facing panels.

At each level of the soil reinforcement, the structure backfill shall be constructed to a plane 0 - 1 foot above the elevation of the soil reinforcement connection, and shall start 3 feet from the back of the face panel and extend for at least the remaining length of soil reinforcement. This grading shall be complete before placing the next layer of soil reinforcement.

3.5 **(Deleted)**

-- End of Section --

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SANITARY SEWERS

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SECTION 02531

SANITARY SEWERS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ASME B31.1	(1998) Power Piping

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 94	(1998c) Ready-Mixed Concrete
ASTM C 443	(1994) Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
ASTM C 478	(1997) Precast Reinforced Concrete Manhole Sections
ASTM C 478M	(1997) Precast Reinforced Concrete Manhole Sections (Metric)
ASTM C 828	(1990) Low-Pressure Air Test of Vitrified Clay Pipe Lines
ASTM C 924	(1989) Concrete Pipe Sewer Lines by Low-Pressure Air Test Method
ASTM D 412	(1998; Rev. A) Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension
ASTM D 624	(1991) Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
ASTM D 1784	(1992) Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
ASTM D 2680	(1995)Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping
ASTM D 2751	(1996a) Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings

ASTM D 3034	(1998) Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM D 3212	(1996a) Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM D 3350	(1993) Polyethylene Plastics Pipe and Fittings Materials
ASTM F 402	(1993) Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings
ASTM F 714	(1994) Polyethylene (PE) Plastic pipe (SDR-PR) Based on Outside Diameter
ASTM F 794	(1995a) Poly(Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter
ASTM F 894	(1995) Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe
ASTM F 949	(1996a) Poly(Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C200	(1997) Steel Water Pipe 6 in. (150 mm) and Larger
AWWA C205	(1995) Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 In. (100 mm) and Larger - Shop Applied
AWWA C206	(1997) Field Welding of Steel Water Pipe
AWWA C208	(1996) Dimensions for Fabricated Steel Water Pipe Fittings
AWWA M11	Current Manual

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 49	(1994) Hazardous Chemicals Data
NFPA 325M	(1991) Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids
NFPA 704	(1990) Identification of the Fire Hazards of Materials

UNI-BELL PVC PIPE ASSOCIATION (UBPPA)

UBPPA UNI-B-6	(1990) Recommended Practice for the Low-Pressure Air Testing of Installed Sewer Pipe

UBPPA UNI-B-9	(1990; Addenda 1994) Recommended Performance Specification for Polyvinyl Chloride (PVC) Profile Wall Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter (Nominal Pipe Sizes 4-48 inch)

1.2 GENERAL REQUIREMENTS

The construction required herein shall include the 36-inch diameter sewer relocation upstream of Prado Dam (S.A.R.I. Line Reach IVB, Section 1)**, the 42-inch diameter sewer relocation upstream of Prado Dam (S.A.R.I Line Reach IV-A)** and the Reinforced Concrete Encasement of the 60-inch diameter sewer downstream of the Prado Dam (S.A.R.I. Line Reach IV). Appurtenant structures and building sewers and leach field is also to be constructed for the Control Tower to a point 5 feet from the building, to which the sewer system is to be connected. The septic tank and leach field shall be as specified under Section 15400, "Plumbing, General Purpose." The Contractor shall replace damaged material and redo unacceptable work at no additional cost to the Government. Excavation and backfilling is specified in Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS. Backfilling shall be accomplished after inspection by the Contracting Officer. Before, during, and after installation, plastic pipe and fittings shall be protected from any environment that would result in damage or deterioration to the material. The Contractor shall have a copy of the manufacturer's instructions available at the construction site at all times and shall follow these instructions unless directed otherwise by the Contracting Officer. Solvents, solvent compounds, lubricants, elastomeric gaskets, and any similar materials required to install the plastic pipe shall be stored in accordance with the manufacturer's recommendation and shall be discarded if the storage period exceeds the recommended shelf life. Solvents in use shall be discarded when the recommended pot life is exceeded.

Upon contract award the Contractor shall pothole the 60-inch S.A.R.I. Line as identified on the plans under the new Dam Outlet Channel, see Sheet C-26. **The Contractor shall pothole the connection points to the 36-inch S.A.R.I. reach IV-B and to the 42-inch S.A.R.I. reach IV-A to verify horizontal location and vertical invert elevation for making the connection so that the pipe alignment and elevation may be determined prior to construction. The Contractor shall perform geotechincal borings and submit geotechnical investigation in conformance with Section 01151.**

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Waste Water Disposal Method; G.

The method proposed for disposal of waste water from hydrostatic tests.

SD-02 Shop Drawings

Fabrication drawings; G

Detailed fabrication drawings for any pipe specials, including cleanouts and outlet sleeves.

36-inch Reinforced Concrete Pipeline (RCP); G.

Drawings showing the proposed pipeline connection diagrams with details of connections to existing pipelines, new pipe, and manholes, if different from shown on plans.

Method of Dewatering; G.

Detailed Drawings showing the proposed dewatering system including all pumps, motors, fuel storage, fencing, pipeline, valving, and appurtenances.

Slope Ttrench and Shoring

Submit slope trench and shoring calculations and drawings shall prior to deep trench excavations. Such drawings shall be prepared by (with seal affixed) a California Licensed Civil Engineer.

SD-03 Product Data

Sanitary sewer piping, fittings, and joints; G.
Manholes; G.

Submit manufacturer's standard drawings or catalog cuts, except submit both drawings and cuts for push-on and rubber-gasketed bell-and-spigot joints. Include information concerning gaskets with submittal for joints

Temporary Sewer Bypass System; G
Sewer Bypass Implementation Plan; G

Detailed Catalog cut sheets for each component of the temporary bypass system, including but not limited to the proposed wastewater containment system and the proposed pumping system; including all pumps, motors, fuel storage, fencing, pipeline, valving, and appurtenances, as they apply.

SD-05 Design Data

Design calculations of **48" HDPE and** RCP sewer piping; G.

Steel Pipe; G

Design calculations of sewer manhole structures; G.

Method of 36" S.A.R.I. Line reconnection; G.

Invert elevations, lateral locations; G.

Method of Restraint of 60-inch S.A.R.I. Line during construction of concrete encasement; G.

Qualified Operator; G

SD-06 Test Reports

Pothole Data

Report identifying the exact location and grade of the existing 60-inch RCP sewer crossing under the new outlet channel between the limits of grading, and specifically at the low flow channel. Report shall identify the survey benchmark used, which shall be the same as that used in the development of the topography contours and elevations identified on the Construction Drawings.

SD-07 Certificates

Sanitary sewer piping, fittings, joints; G
Shop-applied lining and coating; G
Leakage Tests; G

Certificates shall attest that tests set forth in each applicable referenced publication have been performed, whether specified in that publication to be mandatory or otherwise and that production control tests have been performed at the intervals or frequency specified in the publication. Other tests shall have been performed within three (3) years of the date of submittal of certificates on the same type, class, grade, and size of material as is being provided for the project.

Steel Manhole Structures

Certificate shall identify that the manhole structures are constructed to be installed as alignment or grade breaks in a watertight wastewater conveyance system that flows by gravity and is subject to as much as 70 psi of external stress (total, soil and water) with atmospheric pressure inside the manholes.

36-inch Reinforced Concrete Pipeline

Certificate shall identify that the pipeline is constructed to be installed as a watertight wastewater conveyance system that flows by gravity and is subject to as much as 70 psi of external stress (total, soil and water pressure) with atmospheric pressure inside the pipe.

Statement of Satisfactory Installation
Joints

A statement signed by the principal officer of the contracting firm stating that the installation is satisfactory and in accordance with the contract plans and specifications and the manufacturer's prescribed procedures and techniques, upon completion of the project and before final acceptance.

Bracing Excavations

Copy of permit from the Division of Industrial Safety submitted prior to deep trench excavations.

SD-08 Manufacturer's Instructions

Installation procedures for sewer piping; G.

Manufacturer's Installation Instructions for 36-inch RCP

PART 2 PRODUCTS

2.1 PIPE

Pipe shall conform to the respective specifications and other requirements specified below.

2.1.1 Plastic Pipe

Acrylonitrile-butadiene-styrene (ABS) and polyvinyl chloride (PVC) composite sewer piping shall conform to ASTM D 2680. Size 8 inch through 15 inch diameter.

2.1.1.1 PVC Pipe

ASTM D 3034, Type PSM with a maximum SDR of 35, Size 15 inches or less in diameter. Smooth interior. PVC shall be certified by the compounder as meeting the requirements of ASTM D 1784, cell Class 12454B. The pipe stiffness shall be greater than or equal to 735/D for cohesionless material pipe trench backfills.

2.1.1.2 High Density Polyethylene Pipe

ASTM F 894, Class 63, size 18 inch through 120 inch. ASTM F 714, size 4 inch through 48 inch. The polyethylene shall be certified by the resin producer as meeting the requirements of ASTM D 3350, cell Class 334433C. The pipe stiffness shall be greater than or equal to 1170/D for cohesionless material pipe trench backfills.

2.1.2 Reinforced Concrete Pipe (S.A.R.I. Line Sewer)

Concrete pipe for S.A.R.I. Line sewer shall be of reinforced concrete design and conform to the applicable ASTM standards listed, herein. All pipe shall be new, and constructed for the specific application, as indicated on the drawings and in these specifications by a manufacturer that has no less than 30 years design and construction experience with said pipe material.

2.1.2.1 Dimensions and Construction

Pipe shall have a minimum internal diameter of not less than 36 inches. Pipe lengths shall be 16 feet. Pipe thickness shall be designed to provide a D-Load of 4000, and not exceed 7-1/2 inches. Pipe shall have a dual, steel wall reinforcement cage design. Pipes shall be constructed in vertical casting forms. Pipes shall be certified for the application indicated by the Plans and these specifications.

2.1.2.2 Joints

Pipe joints shall be flush with no flared bell and spigot ends. They shall have steel flanges and a rubber O-Ring Gaskets on inside pipe mating surfaces but not on ends of pipe. Joint gap shall receive a field applied cement mortar, Type V for sewer applications. Joints shall be constructed to resist a total external stress of 70 psi (total water and soil pressure)

when pressure inside the pipe is at atmospheric conditions.

2.1.2.3 Lining

PVC Lining shall be cast integrally with the pipe in accordance with Section 09880, PVC LINERS FOR CONCRETE PIPE AND STRUCTURES, and the SSPWC.

2.1.2.4 Coating

Coating shall be shop applied Coal Tar Epoxy to a minimum of 2 mils.

2.1.3 Steel Pipe (**48**" S.A.R.I. Line)

Steel pipe shall be in accordance with AWWA C200 and AWWA M11. Design calculations shall be provided by the manufacturer and stamped by a Civil Engineer.

(Deleted)

2.1.3.1 General

Welded steel pipe and fittings shall be manufactured of steel plate with a minimum thickness of 3/8-inch diameter, unless otherwise noted on the plans or designed by manufacturer and approved.

Pipe materials, fabrications and shop testing of straight pipe; shall conform to the requirements of Section 207-10, "STEEL PIPE," of the SSPWC.

All pipe and fittings shall be in accordance with the latest revision of the applicable AWWA Standards.

2.1.3.2 Joints

Joints shall receive full-penetration, circumferential welds all the way around the joint. Welds shall be performed by welders certified in the type of welding required. All field welds shall be inspected. All welding shall be certified in accordance with Appendix II of the "Code of Pressure Piping: (ASME B31.1)
or AWWA C206, "Standard for Field Welding of Steel Water Pipe Joints." See also, Section 05120 "STRUCTURAL STEEL AND MISCELLANEOUS METAL WORK."

2.1.3.3 Flanges

Pipe flanges and blind flanges shall be per AWWA 207, "Steel Pipe Flanges for Waterworks Service."

2.1.3.4 Fittings

Fittings shall be per AWWA C208, "Dimensions for Fabricated Steel Water Pipe Fittings."

2.1.3.5 Lining

Except as otherwise provided, welded steel pipe and fittings shall be lined with cement mortar in accordance with AWWA C205, "Standard Cement-Mortar Protective Lining and Coating for Steel Water Pipe." Additionally, an interior PVC lining shall be placed on the inside of the pipe per Section 09880, "PVC LINERS FOR CONCRETE PIPE AND STRUCTURES," and per manufacturer's recommendations.

2.1.3.6 Coating

All buried pipe and fittings shall receive a cement mortar coating, except as otherwise indicated. The cement mortar coating shall be in accordance with AWWA C205, "Standard for Cement-Mortar Protective Lining and Coating for Steel Water Pipe." The date of coating shall be plainly marked on the inside of each pipe length. Additionally, steel pipe shall receive a minimum of 2-mils of exterior coal tar epoxy coating over the cement mortar coating by the manufacturer.

2.2 FITTINGS

Fittings shall be compatible with the pipe supplied and shall have a strength not less than that of the pipe. Fittings shall conform to the respective specifications and other requirements specified below.

2.2.1 Plastic Pipe

ABS and PVC composite sewer pipe fittings shall conform to ASTM D 2680.

2.2.1.1 ABS Pipe

ASTM D 2751.

2.2.1.2 PVC Pipe

ASTM D 3034 for type PSM pipe. ASTM F 949 for corrugated sewer pipe with a smooth interior. UBPPA UNI-B-9 and ASTM F 794, Series 46, for ribbed sewer pipe with smooth interior.

2.2.1.3 High Density Polyethylene Pipe

ASTM F 894.

2.3 JOINTS

Joints installation shall comply with the manufacturer's instructions.

2.3.1 Plastic Pipe

Flexible plastic pipe (PVC or high density polyethylene pipe) gasketed joints shall conform to ASTM D 3212.

2.3.1.1 ABS Pipe

ASTM D 2751, solvent weld or bell and spigot O-ring joint, size 12 inches or less in diameter, dimensions and tolerances in accordance with Table 2 therein.

2.3.1.2 High Density Polyethylene Pipe

Rubber gasket joints shall conform to ASTM C 443.

2.3.2 Reinforced Concrete Pipe

Deflection of **48**-inch sewer pipe joints shall not be allowed, unless approved by the Contracting Officer. Joints for the **48**-inch sewer shall be watertight and constructed per the details provided by the pipe

manufacturer. All **48**-inch sewer pipeline joint exteriors shall receive a field applied polyurethane coating, Type 2. The coating shall be applied in two coats to a minimum thickness of 60 mils in accordance with the manufactures recommendations and Section 09920, COATING SYSTEMS. Coverage at joint shall extend a minimum of 2 feet each side of the joint.

2.4 BRANCH CONNECTIONS

Branch connections shall be made by use of regular fittings or solvent cemented saddles as approved. Saddles for ABS and PVC composite pipe shall conform to Figure 2 of ASTM D 2680; saddles for ABS pipe shall comply with Table 3 of ASTM D 2751; and saddles for PVC pipe shall conform to Table 4 of ASTM D 3034.

2.5 FRAMES AND COVERS

Frames and covers shall be cast iron, ductile iron or reinforced concrete, unless otherwise indicated in the drawings. Cast iron frames and covers shall be as indicated or shall be of type as suitable for the application, circular, without vent holes. The frames and covers shall have a combined weight of not less than 400 pounds. Reinforced concrete frames and covers shall be as indicated or shall conform to ASTM C 478 or ASTM C 478M. The word "Sewer" shall be stamped or cast into covers so that it is plainly visible.

2.6 CEMENT MORTAR

Cement mortar shall be Type V cement, for use with sewers, unless otherwise specified.

2.6.1 Portland Cement

Portland cement shall conform to Type V for concrete used in concrete sewer pipe, concrete pipe fittings, and manholes and type optional with the Contractor for cement used in concrete cradle, concrete encasement, and thrust blocking.

2.6.2 Portland Cement Concrete

Portland cement concrete shall conform to ASTM C 94, compressive strength of 4000 psi at 28 days, except for concrete cradle and encasement or concrete blocks for manholes. Concrete used for cradle and encasement shall have a compressive strength of 2500 psi minimum at 28 days. Concrete in place shall be protected from freezing and moisture loss for 7 days.

2.7 STRUCTURES

2.7.1 Precast Reinforced Concrete Manhole Sections

Precast reinforced concrete manhole sections shall conform to ASTM C 478, except that portland cement shall be as specified herein. Joints shall be cement mortar, an approved mastic, rubber gaskets, a combination of these types; or the use of external preformed rubber joint seals and extruded rolls of rubber with mastic adhesive on one side, or as shown on the drawings. Manholes shall be lined with a PVC liner in accordance with Section 09880: PVC LINERS FOR CONCRETE PIPE AND STRUCTURES.

2.7.2 Steel Manholes (S.A.R.I. Line)

The following specifications apply to the 36-inch diameter Santa Ana Regional Interceptor (S.A.R.I.) Reach IVB, Section 1 Manholes, as located and identified on the Plans.

2.7.2.1 Construction and Shipping

Manholes shall be constructed of shop fabricated steel pipe in accordance with the latest applicable AWWA Standards; to the dimensions, and location shown on the Plans. Manhole riser pipe and manhole base shall be shipped loose to the jobsite for field welding. The base tee, bends, eccentric reducers, and steel pipeline connection spools shall be welded together at the shop. No flanges shall be allowed on below grade components.

2.7.2.2 Design

The manholes shall be designed to withstand an external stress of 70 psi (total water and soil pressure), with only atmospheric pressure inside the manhole. Complete shop fabrication drawings and calculations shall be submitted for approval. The manhole components shall be completely shop fabricated.

2.7.2.3 Lining and Coating

The manholes shall be shop lined and coated as indicated. They shall be 100% spark tested by the fabricator for holidays in the field after being set in place. Field coating touch-up shall be as necessary and as directed by the Contracting Officer. Manholes shall receive a PVC liner in accordance with Section 09880, "PVC LINERS FOR CONCRETE PIPE AND STRUCTURES," and manufactures recommendations. Exposed portions of steel shall receive an epoxy coating as indicated on the Plans.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Adjacent Facilities

3.1.1.1 Water Lines

Where the location of the sewer is not clearly defined by dimensions on the drawings, the sewer shall not be closer horizontally than 10 feet to a water-supply main or service line, except that where the bottom of the water pipe will be at least 12 inches above the top of the sewer pipe, the horizontal spacing may be a minimum of 6 feet. Where gravity-flow sewers cross above water lines, the sewer pipe for a distance of 10 feet on each side of the crossing shall be fully encased in concrete or shall be acceptable pressure pipe with no joint closer horizontally than 3 feet to the crossing. The thickness of the concrete encasement including that at the pipe joints shall be not less than 4 inches.

3.1.2 Pipe Laying

a. Pipe shall be protected during handling against impact shocks and free fall and the pipe interior shall be free of extraneous material.

b. Pipe laying shall proceed upgrade with the spigot ends of bell-and-spigot pipe and tongue ends of tongue-and-groove pipe pointing in the direction of the flow. Each pipe shall be laid

accurately to the line and grade shown on the drawings. Pipe shall be laid and centered so that the sewer pipe and lining system has a uniform invert. As the work progresses, the interior of the sewer shall be cleared of all superfluous materials.

c. The specified grade and alignment will be considered met if the inspectors field measurements show compliance with a maximum departure from stated grade of 1-inch or 0.08 feet. The maximum rate of departure from and return to the established grade shall not exceed 1/16-inch or 0.0005 feet per linear foot. The maximum departure from established alignment shall not exceed 1-1/4 inches or 0.1 foot on tangents and 2-inches or 0.17 feet on curves. Departure from and return to established alignment shall not exceed 1/4-inch or 0.02 feet per linear foot.

d. Before making pipe joints all surfaces of the portions of the pipe to be joined shall be clean and dry. Lubricants, primers, and adhesives shall be used as recommended by the pipe manufacturer. The joints shall then be placed, fitted, joined, adjusted, and patched and sealed per the manufacturer's recommendations and the drawings to obtain the degree of water tightness required.

e. Installations of solvent weld joint pipe, using ABS or PVC pipe and fittings shall be in accordance with ASTM F 402. All required precautions shall be taken to assure adequate trench ventilation and protection for workers installing the pipe.

3.1.2.1 Trenches

EXTENSIVE DEWATERING OF TRENCHES SHALL BE ANTICIPATED. Construction of the **48**-inch Santa Ana River Interceptor (S.A.R.I.) Line without dewatering shall require special approval by the Engineer prior to signing of Contract. Contractor shall submit a full and complete descriptive proposal of the method of dewatering (or the method of construction without dewatering) to the Engineer. Sufficient drawings and details shall be submitted so that the Engineer can make an evaluation.

The soils report prepared by John R. Byerly, Inc. on January 12, 1981, entitled: Preliminary Soils Investigation, Santa Ana Watershed Project Authority, Santa Ana River Interceptor Sewer, Reach IV-B, Corona Area, Riverside County, California, which was prepared for the existing 36-inch S.A.R.I. Line constructed in 1981, suggests certain permeability factors with regard to estimates of flow for determination of pumping requirements. CONTRACTOR SHALL MAKE HIS OWN DETERMINATIONS but the Soil Engineer's results suggest that the well point dewatering method may be difficult to use because of the long time indicated to dewater the inplace material. Dewatering cross trench sumps placed at either end of a working trench, excavated prior to or simultaneously with dewatering pumping, may be indicated.

Disposal of trench water shall be such that it is not a menace to the public health or safety and it shall be in accordance with Regional Water Quality Control Board Standards, and other affected public jurisdictions.

Trenches shall be kept free of water and as dry as possible during bedding, laying, and jointing and for as long a period as required. When work is not in progress, open ends of pipe and fittings shall be satisfactorily closed so that no trench water or other material will enter the pipe or fittings. All trenches shall be in conformance with the latest OSHA safety

requirements, and applicable codes and standards. See also SECTION 02316, "EXCAVATION, TRENCHING AND BACKFILLING FOR UTILITIES."

3.1.2.2 Maximum and Minimum Width of **48**-inch S.A.R.I. Line Trench

Difficult caving trench conditions are expected throughout. The drawings show minimum trench width requirements and define "controlled" trench as approximately **12** feet at top of pipe and "overwidth" trench as being greater in width than the "controlled," and bedding and backfill is predicated on these two conditions. No special payments are provided for overwidth trench conditions and Contractor shall bid as he sees fit in accordance with his expectations and be prepared to do whatever is necessary to obtain the specified results. If "overwidth" trench conditions obtain where the pipe strength is matched to "controlled" trench, the pipe shall be replaced or the bedding condition shall be upgraded, as approved by the **Contracting Officer**.

3.1.2.3 Bracing Excavations

The permit from the Division of Industrial Safety shall be submitted to the Engineer prior to deep trench excavations. Also, slope trench and shoring calculations and drawings shall be submitted by Contractor to Engineer prior to deep trench excavations. Such drawings shall be prepared by (with seal affixed) a California Licensed Civil Engineer.

Thick timber sheeting for trench support shall not be removed from the trench (after backfilling) and shall be cut off at the top of the pipe. Thin steel sheeting may be removed, subject to **Contracting Officer**'s judgment as to whether there is a potential for detrimental side subsidence of trench sidewall support.

3.1.2.4 Bedding

If foundation soils are disturbed by or loosened by upward seepage of water or an uncontrolled flow of water, the affected areas shall be excavated and replaced with the imported crushed rock (C.R.) **a minimum of 1-foot additional depth. Install structural geogrid where and as indicated.**

3.1.2.5 Backfill

As soon as possible after the joint is made, sufficient backfill material shall be placed along the pipe to prevent pipe movement off line or grade. Plastic pipe shall be completely covered to prevent damage from ultraviolet light. See SECTION 02316, "EXCAVATION, TRENCHING AND BACKFILLING FOR UTILITIES," SECTION 02250, "FILLS AND SUBGRADE PREPARATION" and the plans for materials and other requirements. **Install geotextile encapsulation where and as indicated.**

3.1.2.6 Width of Trench

If the maximum width of the trench at the top of the pipe, as specified in Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS, is exceeded for any reason other than by direction, the Contractor shall install at no additional cost to the Government such concrete cradling, pipe encasement, or other bedding required to support the added load of the backfill.

3.1.2.7 Joints

Joints between different pipe materials shall be made as specified, using approved jointing materials.

3.1.2.8 Handling and Storage

Pipe, fittings and joint material shall be handled and stored in accordance with the manufacturer's recommendations. Storage facilities for plastic pipe, fittings, joint materials and solvents shall be classified and marked in accordance with NFPA 704, with classification as indicated in NFPA 49 and NFPA 325M.

3.1.3 Leakage Tests

Lines shall be tested for leakage by low pressure air testing, infiltration tests or exfiltration tests, as appropriate. Low pressure air testing for PVC pipe shall be as prescribed in UBPPA UNI-B-6. Low pressure air testing procedures for other pipe materials shall use the pressures and testing times prescribed in ASTM C 828 and ASTM C 924, after consultation with the pipe manufacturer. Prior to infiltration or exfiltration tests the trench shall be backfilled up to at least the lower half of the pipe. If required, sufficient additional backfill shall be placed to prevent pipe movement during testing, leaving the joints uncovered to permit inspection. Visible leaks encountered shall be corrected regardless of leakage test results. Leakage as measured by either the infiltration test or exfiltration test shall not exceed 0.2 gallons per inch diameter per 100 feet of pipeline per hour. When leakage exceeds the maximum amount specified, satisfactory correction shall be made and retesting accomplished. Testing, correction, and retesting shall be made at no additional cost to the Government.

3.1.4 Testing **48**-inch S.A.R.I. Line

The following shall apply for leakage testing fo the **48**-inch S.A.R.I. Line.

3.1.4.1 General

Contractor shall clean and dewater each section of pipeline of water and foreign matter such as mud and solid unsuitable materials in preparation for Inspector's visual inspection. Visual inspection will be made prior to testing. Contractor shall provide additional cleaning as the Inspector may find warranted.

All types of pipe allowed in these specifications shall be tested for leakage and joint integrity by internal water pressure test and water infiltration test as well as by visual inspection from the interior of the pipe. The pipeline shall pass both tests and excessive leakage visually observed, which is the result of a bad joint, shall be repaired as necessary.

3.1.4.2 Water Infiltration Test

The end of the sewer at the upper structure shall be closed sufficiently to prevent the entrance of water, and pumping of groundwater shall be discontinued for at least 3 days, after which the section shall be tested for infiltration.

The water infiltration test shall be done after the water pressure test. Measured infiltration shall not exceed 100 gallons per inch diameter per mile of line for 36-inch diameter pipe, for example:

E = ((100 x 36) / (5,280 x 1,440)) x L; where E is infiltration in GPM and

L = The length tested in feet

3.1.4.3 Water Pressure Test

Preparatory to testing, the section of the pipeline to be tested shall be filled with water and placed under a slight pressure for at least 48 hours. The pipeline shall then be brought up to a water test pressure of 10 psi at the highest elevation of the test section. This water pressure shall be maintained for a period of not less than 4 hours.

Accurate means shall be provided for measuring the quantity of water required to maintain full pressure on the line for the test period, which volume shall not exceed:

For SI Units:

L=CND(square root of P)/32,600

For U.S. Std. Measure:

L=CND(square root of P)/1,850

Where:

L = Maximum allowable leakage in liters (gallons) per hour for section of pipeline tested.
N = Number of joints in length tested.
D = Diameter of pipe in mm (inches)
P = Test pressure in kPa (psi).
C = C shall be taken as 1.0 for all types of pipe in the specifications.

3.1.5 Test for Deflection

When flexible pipe is used, a deflection test shall be made on the entire length of the installed pipeline not less than 30 days after the completion of all work including the leakage test, backfill, and placement of any fill, grading, paving, concrete, or superimposed loads. Deflection shall be determined by use of a deflection device or by use of a spherical, spheroidal, or elliptical ball, a cylinder, or circular sections fused to a common shaft. The ball, cylinder, or circular sections shall have a diameter, or minor diameter as applicable, of 92.5 percent of the inside diameter of the pipe, but 95 percent for RPMP and RTRP. A tolerance of plus 0.5 percent will be permitted. The ball, cylinder, or circular sections shall be of a homogeneous material throughout, shall have a density greater than 1.0 as related to water at 39.2 degrees F, and shall have a surface brinell hardness of not less than 150. It shall be center bored and through bolted with a 1/4 inch minimum diameter steel shaft having a yield strength of 70,000 psi or more, with eyes at each end for attaching pulling cables. The eye shall be suitably backed with flange or heavy washer such that a pull exerted on the opposite end of the shaft shall produce compression throughout the remote end of the ball, cylinder or circular section. Circular sections shall be so spaced that the distance from the external faces of the front and back sections shall equal or exceed the diameter of the circular section. Failure of the ball, cylinder, or circular section to pass freely through a pipe run, either by

being pulled through or by being flushed through with water, shall be cause for rejection of that run. When a deflection device is used for the test in lieu of the ball, cylinder, or circular sections described, such device shall be approved prior to use. The device shall be sensitive to 1.0 percent of the diameter of the pipe being measured and shall be accurate to 1.0 percent of the indicated dimension. Installed pipe showing deflections greater than 7.5 percent of the normal diameter of the pipe, or 5 percent for RTRP and RPMP, shall be retested by a run from the opposite direction. If the retest also fails, the suspect pipe shall be replaced at no cost to the Government.

3.2 (Deleted)

3.3 (Deleted)

3.4 MANHOLES

3.4.1 General

Manholes shall be constructed as indicated. Pipe connections shall be made in accordance with the manufacturer's recommendation. Manholes shall be first set in place as indicated on the Plans, then pipeline shall be connected. Connection manholes to the existing 36-inch S.A.R.I line will be made per the approved method submitted by the Contractor, and as recommended by the pipe manufacturer.

3.4.2 Jointing, Plastering and Sealing

Mortar joints shall be completely filled and shall be smooth and free from surplus mortar on the inside of the manhole. Mortar and mastic joints between precast rings shall be full-bedded in jointing compound and shall be smoothed to a uniform surface on both the interior and exterior of the manhole. Installation of rubber gasket joints between precast rings shall be in accordance with the recommendations of the manufacturer. Precast rings may also be sealed by the use of extruded rolls of rubber with mastic adhesive on one side.

3.4.3 Frames and Covers

Unless otherwise indicated, tops of frames and covers shall be set flush with finished grade in paved areas or 2 inches higher than finished grade in unpaved areas. Frame and cover assemblies shall be sealed to manhole sections using external preformed rubber joint seals that meet the requirements of ASTM D 412 and ASTM D 624, or other methods specified in paragraph: Jointing, Plastering and Sealing, unless otherwise specified.

3.4.4 Excavation, Bedding, and Backfill for 36" S.A.R.I. Line Manholes

Manhole excavation shall be performed when the 36" S.A.R.I. Line is excavated, with the exception that the manholes located at the points of connection to the existing system shall be excavated just prior to making the connection. Precautions shall be taken to restrain the exposed S.A.R.I. line when making the connection to the existing system, so that the existing alignment and grade are not disturbed, as well as the function of the system. Bedding shall be Unyielding Material, as defined in Section 02316, "EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS," and backfill shall be Select Granular Material, as defined by Section 02316,

"EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS." Manhole Excavation, Bedding, and Backfill limits shall be similar to 36" S.A.R.I. Line trench.

3.5 TEMPORARY SEWER BYPASS SYSTEM

3.5.1 General

It is considered to be possible to plug the S.A.R.I. Line during periods of low flow at night to make the connection of **the 48-inch lines to Reaches IV-A and IV-B of** the existing system. At the time of design, SAWPA indicated the following flow rates, which they have experienced:

Low Average Flow Rate in December 1999 = 2.9442 million gallons per day (mgd)
Average Flow Rate in June 2000 = 5.9337 mgd

It was estimated by SAWPA that this line will experience the following flow rates in the year 2001.

Estimated Peak Flow Rate in 2001 = 4-7 mgd
Estimated Low Nighttime Flow Rate in 2001 = 2.0 mgd

The Contractor shall contact SAWPA to obtain the most up to date peak and low flow rate information, as required to design the bypass system needed to make the connection of the **48**-inch S.A.R.I. Line to the existing system. The bypass system shall be proposed and submitted for approval.

Santa Ana Watershed Project Authority (SAWPA)
Phone: (909) 785-5411
Contact: Eldon Horst, Executive Manager Engineering/Planning Division
Regarding: Santa Ana Regional Interceptor (S.A.R.I.) Line, Reach IVB, Section 1 Relocation

The Contractor shall provide all labor, materials, equipment and power required to install, test and maintain a temporary sewer bypass system. The bypass system shall be in accordance with these specifications. All costs associated with permitting, installing, testing, operating and maintaining the sewer bypass, shall be the responsibility of the Contractor, and there shall be no additional compensation to the Contractor.

The Contractor shall also provide containment to prevent discharge into the streambed in the vicinity of the work being performed. The containment shall be adequate to contain all raw wastewater discharged into the streambed, and prevent it from continuing downstream or infiltrating into the groundwater. The containment shall be completed prior to beginning any excavation for work for the sewer pipeline connections.

All materials and equipment specified herein are to be used exclusively for the sewer bypass system. The sewer bypass system shall include the required pumps, piping manifolds, suction pipeline, force main and plugs for the upstream and downstream manholes. The bypass system shall be installed, tested and ready for operation prior to the beginning of any excavation. The sewer bypass system shall remain operational until work on the connections to the 36-inch sewer are completed, the excavations are backfilled, and all work related to the connections has been approved by the Contracting Officer. In the event of delays to work being performed for the pipeline connections, the Contractor shall receive no additional compensation for sewer bypass system.

A qualified operator, approved by the Contracting Officer, shall be employed for the duration of the pipeline connection work. The operator shall be on site and ready to startup and operate the Sewer Bypass System at anytime during construction. An operator shall remain on-site 24-hours per day, while the bypass system is in operation.

The Contractor shall protect bypass and secure the pump area by means of temporary chainlink fencing in accordance with these specifications.

3.5.2 Sewer Bypass Implementation Plan

The Contractor shall submit a Sewer Bypass Implementation Plan to the Contracting Officer for approval at least one (1) month prior to the required implementation. The Sewer Bypass Implementation Plan shall include a detailed step-by-step procedure for the installation. Should a pumping system be used for sewer bypass, it shall include suction and discharge piping, plugs for each pipe in the manholes, startup and operation of the Sewer Bypass System. Notification of appropriate regulatory agencies shall be coordinated by SAWPA.

3.5.3 Force Main

Should a pumping system be used for sewer bypass, it shall be a temporary force main consisting of 16-inch diameter standard steel pipeline. The force main shall be installed parallel to the existing 36-inch sewer with adequate clearance so as not to interfere with the excavation and installation of the new **48**-inch sewer pipeline. The Contractor shall provide victaulic couplings or other means of thrust restraint, as approved by the Contracting Officer.

Portions of the force main may need to be buried to maintain access for construction equipment. In such cases, the Contractor shall take precautions to protect existing subsurface utilities in place and provide adequate cover over the pipeline to withstand H-20 traffic loads. Construction equipment shall cross the force main in a perpendicular direction. At no time shall construction equipment travel longitudinally above buried portions of the force main. In no case, shall construction equipment be parked or stored over the force main.

The force main shall be hydrostatically pressure tested at 120 percent of maximum operating pressure, as determined in Section 3.5.4. There shall be no leakage from the force main at any time.

3.5.4 Pumping Equipment

Should a pumping system be used for sewer bypass, it shall be capable of providing peak sewer system flowrates during time of bypass operation; see paragraph 3.5.1, this section. All pumps shall be of equal capacity and a redundant pump shall be provided. All pumps shall be skid-mounted, self-priming type, diesel powered, and capable of providing a minimum of 20 feet of suction head and the Total Dynamic Head (TDH), as required for each point of connection, to bypass flow from the manhole immediately upstream to the manhole immediately downstream of the work.

All pumping equipment, including but not limited to pumps, piping manifolds, suction and discharge headers, shall be installed within a secured, fenced enclosure. All pumping equipment shall be tested to the satisfaction of the Contracting Officer prior to work beginning in the

streambed.

Pumps shall be of variable speed, which can be manually operated. The pumping system startup and operation procedure shall be included in the step-by-step procedure for the Sewer Bypass Implementation Plan provided by the Contractor. The Contractor shall make provisions such that additional diesel fuel is available as required to keep pumps operating for the duration of the sewer pipeline connection work.

3.5.5 Manhole Structures

Access to the manholes is to remain closed at all times while the sewer is in normal operation. When the Sewer Bypass System is implemented, the Contractor shall install a balloon-type plug, or approved equal in each end of the 36-inch RCP pipelines to prevent discharge to the streambed.

Once the Sewer Bypass System is implemented, the high water level in the upstream manhole shall not exceed a level which would cause another upstream manhole structure to overflow with wastewater, or cause adverse effect in any way to the S.A.R.I. Line.

3.5.6 Notification in Event of Bypass System Failure

In the event of failure of the Sewer Bypass System, the Contractor shall immediately notify the Contracting Officer and SAWPA. Notification of appropriate regulatory agencies shall be coordinated by SAWPA. The Contractor shall stop all other work on the project until the Sewer Bypass System has been returned to satisfactory operation, as determined by the Contracting Officer.

The Contractor shall be responsible for all costs associated with the cleanup of the Santa Ana River or any other bodies of water or areas impacted by sewage spilled. The Contractor shall also be responsible for all fines and penalties assessed by the California Department of Fish & Game, the Regional Water Quality Control Board or any other agency having jurisdiction over the impacted areas. There shall be no additional compensation to the Contractor.

3.6 CLEANOUTS AND OTHER APPURTENANCES

Cleanouts and other appurtenances shall be installed where shown on the drawings or as directed by the Contracting Officer, and shall conform to the detail of the drawings.

-- End of Section --

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DIVISION 02 - SITE WORK

SECTION 02600

STONE PROTECTION

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SECTION 02600

STONE PROTECTION

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 33	(1997) Concrete Aggregates
ASTM C 88	(1990) Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C 127	(1988; R 1993) Specific Gravity and Absorption of Coarse Aggregate
ASTM C 131	(1996) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 136	(1996a) Sieve Analysis of Fine and Coarse Aggregates
ASTM C 295	(1990) Petrographic Examination of Aggregates for Concrete
ASTM C 535	(1989) Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM D 1141	(1975; R 1980) Substitute Ocean Water
ASTM D 3740	(1996) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM D 5519	(1994) Particle Size Analysis of Natural and Man-Made Riprap Materials
ASTM E 548	(1994) General Criteria Used for Evaluating Laboratory Competence

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When

used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Stone Sources

Name and location of quarry.

SD-05 Design Data

Method of placement; G

The following shall be submitted in accordance with Section 01330 if the source of riprap is not from the listed sources.

SD-06 Test Reports

Stone Quality Testing
Gradation Sampling and Testing

Quality compliance and gradation test results performed in accordance with 2.1.4 and 2.1.5.

SD-07 Certificates

Waybills and Delivery Tickets

Copies of waybills and delivery tickets shall be submitted as stated in paragraph: Waybills and Delivery Tickets.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Definitions

2.1.1.1 Rounded Stone

Stone which is obtained from alluvial deposits and is nearly spherical and well rounded.

2.1.1.2 Angular Stone

Stone which is obtained from bedrock deposits and is angular in shape.

2.1.2 General

The Contractor shall make all arrangements, pay all royalties, and secure all permits for the procurement, furnishing, and transporting of stone. The Contractor shall vary the quarrying, processing, loading, and placing operations, to produce the sizes and quality of stone specified. If the stone being furnished by the Contractor does not fully meet all the requirements of these specifications , the Contractor shall furnish, at no additional cost to the Government, other stone meeting the requirements of these specifications.

2.1.3 Stone Sources

2.1.3.1 Stone from Project Excavation

Stone conforming to these specifications will not be available from the required excavation(s). Except for salvaged stone, the required stone will need to be obtained from offsite sources.

2.1.3.2 Salvaged Stone

The downstream gravel blanket and the existing upstream stone protection affected by the new construction shall be removed and salvaged as indicated on the plans. The existing stone protection will not meet the gradation specified for stone protection but does satisfy the requirements for **15-inch** grouted stone.

2.1.3.3 Source Authorization

Before any stone is produced from a source for completion of the work under this contract, the source of stone must be authorized by the Contracting Officer's Representative. Authorization of a stone source shall not be construed as a waiver of the right of the Government to require the Contractor to furnish stone which complies with these specifications. Materials produced from localized areas, intervals, or strata will be rejected, when such materials do not comply with the specifications.

2.1.3.4 Source Development

Before a proposed source or sources of stone will be considered for sampling and testing, the Contractor must demonstrate that the source has sufficient stone to fulfill the contract requirements. If sufficient amounts of stone conforming to these specifications are not available from a source or sources used in the work, the Contractor shall submit stone from another source for authorization.

2.1.3.5 Source Documentation

Authorization of a proposed stone source will be based on test results and/or service records. In general, current Corps of Engineers test results shall be required, as outlined in paragraph: Quality Compliance Testing, below. In special cases, however, the Contracting Officer's Representative may elect to use either past Corps of Engineers test results, test results from other agencies or private laboratories, or service records. A service record is considered to be acceptable if stone from the proposed source has remained sound and functional after at least 10 years of exposure on a project similar to the one to be constructed under these specifications.

2.1.3.6 Listed Stone Sources

The following are a few of the sources within the project area (and some that are farther away), which have either undergone recent quality compliance testing for use on Corps of Engineers projects or have acceptable service records:

Source Name	Nearest City
Harlow	Corona
Corona-Pacific	Corona
All-American Asphalt	Corona

Source Name	Nearest City
3M	Corona
Eagle Valley	Corona
Pebbly Beach	Catalina
Pyrite Street	Riverside
Ormond (Atkinson)	Riverside
Slover Mountain	Colton
Fish Canyon	Azusa
Gillibrand	Newhall

Listing of a stone source is not to be construed as to current or future availability of the source, authorization of all materials from the source, nor as a waiver of inspection and testing of the source. Stone produced from any listed source must meet all the requirements set forth in these specifications. Listing of a stone source is also not to be construed as an indication that the source can produce the total quantity of stone required for the project. Stone may be furnished from other sources designated by the Contractor and authorized by the Contracting Officer's Representative,
subject to the conditions stated herein.

2.1.4 Stone Quality

2.1.4.1 Quality Compliance Testing

If the Contractor proposes to furnish stone from an unlisted source, or a listed source which has not been tested in 5 years, the Contractor shall have evaluation tests performed on stone samples collected from the proposed source. The quarry investigation shall be performed by the Contracting Officer's Representative, a representative of the Contractor, a representative of the Quarry and an engineering geologist from the Geotechnical Branch of the Los Angeles District. The samples shall be submitted a minimum of 30 days in advance of the time when the stone will be required in the work. No work requiring testing shall be permitted until the laboratory has been inspected and approved. Samples of stone from a proposed source shall be taken at the quarry by the Contracting Officer's Representative, the Superintendent of the quarry, the Contractor and an engineering geologist from the Geotechnical Branch of the Los Angeles District. The samples shall consist of at least 300 pounds of stone. The quarry faces and the stockpiles to be used shall be examined and sampled. The Contractor will then ship the samples at the Contractor's expense to the approved Laboratory. The tests to which the stone shall be subjected and the required results are discussed below. All expenses of the testing shall be paid for by the Contractor. The laboratory to perform the required testing shall be approved based on compliance with ASTM E 548 and relevant paragraphs of ASTM D 3740. The laboratory will be under the direct supervision of a state licensed Civil Engineer, Geologist or Engineering Geologist. The results of the tests shall be delivered to the Contracting Officer's Representative as soon as they are received from the laboratory.

2.1.4.2 Stone Quality Testing Requirements

Stone shall be subjected to such tests as are necessary to demonstrate to the satisfaction of the Contracting Officer's Representative that the materials are acceptable for use in the work. At a minimum, the stone shall meet the following test requirements:

Test	Test Method	Requirement

Specific Gravity (Bulk SSD)	ASTM C 127	2.60 minimum
Absorption	ASTM C 127	2.0% maximum
Wetting and Drying	SPD Test Procedure(1)	No fracturing(3)
Sulfate Soundness	ASTM C 88(2)	10% max.loss(4)
Abrasion Loss	ASTM C 535	40% max. loss(4)

In addition to the above tests, the stone shall be subjected to a petrographic and X-ray diffraction analysis, in accordance with ASTM C 295(5). The stone must not contain any expansive clays. Stone for grouted stone protection shall not contain excessive amounts of deleterious minerals, associated with alkali-silica or alkali-carbonate reactions, as described in ASTM C 33.

NOTE: (1): Test procedure for wetting and drying test. The entire sample is carefully examined, and representative test specimens are selected. The sample should be large enough to produce two cut slabs, each 25 millimeters (1 inch) thick (+/-6 millimeters), with a minimum surface area of 0.019 square meters (28.8 square inches) on one side. Two chunks, approximately seventy-six by one-hundred two millimeters (3 by 4 inches), are also chosen. The slabs and chunks are carefully examined under a low-power microscope, and all visible surface features are noted and recorded. The specimens are then oven-dried at 60 degrees C., for eight hours, cooled, and weighed to the nearest tenth of a gram. The test specimens are photographed, to show all surface features, before the test. The chunks and slabs are then subjected to fifteen cycles of wetting and drying. One slab and one chunk are soaked in fresh tap water, the other slab and chunk are soaked in salt water, prepared in accordance with ASTM D 1141. Each cycle consists of soaking for sixteen hours, at room temperature and then drying in an oven for eight hours, at 60 degrees C. After each cycle, the specimens are examined with the low-power microscope, to check for opening or movement of fractures, flaking along edges, swelling of clays, softening of rock surfaces, heaving of micaceous minerals, breakdown of matrix material, and any other evidence of weakness developing in the rock. The cycle in which any of these actions occurs is recorded. After fifteen cycles, the slabs and chunks are again carefully examined, and all changes in the rocks are noted and recorded. The test specimens, together with all particles broken-off during the test, are oven-dried, weighed, and photographed.

NOTE: (2): The test shall be made on 50 particles, each weighing 100 grams (0.22 lbs.), +/-25 grams, in lieu of the gradation given in ASTM C 88.

NOTE: (3): Weakening and loss of individual surface particles is permissible, unless bonding of the surface grains softens and causes general disintegration of the surface material.

NOTE: (4): Stone which has a loss greater than the specified limit will be accepted, if the Contractor demonstrates that the stone has a satisfactory service record.

NOTE: (5): The test procedure for Petrographic and X-ray Diffraction is performed according to ASTM C 295, except for the following:

(a) A color, microscopic photograph shall be made of each stone type, and the individual minerals within the stone shall be identified by labels and arrows, upon the photograph.

(b) A very detailed macroscopic and microscopic description shall be made of the stone, to include all the mineral constituents,

individual sizes, their approximate percentages, and mineralogical histories. A description of stone hardness, texture, weathering, and durability factors shall also be discussed.

(c) A written summary of the suitability of stone for use as riprap, based on the Petrographic and X-ray tests and the results of ASTM C 535, shall be presented in the final laboratory report on stone quality.

2.1.4.3 Stone Acceptance Criteria

Prior to placement, all stone shall be subject to acceptance, by the Contracting Officer's Representative. Acceptance of any stone shall not constitute acceptance of all stone from a source. All accepted stone shall be as follows:

a. of the same lithology as the original stone from which test results or service records were taken, as a basis for authorization of the source;

b. sound, durable, hard, and free of laminations, weak cleavages, undesirable weathering, or blasting or handling-induced fractures (or fracture zones, which subtend more than 1/3 of the total circumference
of the stone, along the plane of fracturing);

c. of such character that the stone will not disintegrate from the action of air, water, or the conditions of handling and placing; and,

d. clean and free from earth, clay, refuse, or adherent coatings.

e. Ungrouted Stone: Ungrouted stone shall be angular quarried material, with a shape which assures interlocking with adjacent stone, and with the greatest dimension of each piece not greater than 3 times the least dimension.

f. Stone for Grouted Stone: Stone for grouted stone protection may be either rounded stone or angular quarried material, with a shape which assures reasonable adhesion with cement grout, yet allows flow of grout throughout the layer, to ensure adequate bonding. The greatest dimension of each piece shall be not greater than 3 times the least dimension.

g. Bedding Material or Filter Stone: Bedding material or filter stone obtained from an authorized source shall meet all the requirements specified herein, but shall have a percentage of wear not to exceed 45 percent, when tested in accordance with ASTM C 131.

2.1.5 Gradation

2.1.5.1 General

All points on individual grading curves shall be between the boundary limits, as defined by smooth curves, drawn through specified grading limits and plotted on a mechanical analysis diagram. The individual grading curves shall not exhibit abrupt changes in slope, denoting skip-grading or scalping of certain sizes. Specified grading of all material shall be met both at the source and as-delivered to the project. In addition, material

not meeting the required grading, because of segregation or degradation during placement, shall be rejected. If test results show that stone does not meet the required grading, the hauling operation will be stopped immediately and will not resume, until processing procedures are adjusted, and a gradation test is completed, showing that gradation requirements are met. All gradation tests shall be at the expense of the Contractor.

a. Derrick Stone: Derrick stone shall be select quarry stone, reasonably well-graded between 1 and 7.5 tons, with at least 50 percent of the total number of stones weighing greater than 2.5 tons.

b. Rip-rap: Riprap shall be quarried, angular stone, reasonably well-graded, within the limits specified below, when tested in accordance with ASTM D 5519, Test Method A. In addition to riprap, this gradation will be used for 24-inch grouted stone.

Weight of Individual Pieces (pounds)	Percent Smaller (by weight)
1000	100
500	50-100
250	30-50
50	0-15
20	0-5

c. Stone for Grouted Stone: Stone for grouted stone shall be reasonably well-graded and within the limits specified above for 24-inch grouted stone and within the limits specified below for 15-inch grouted stone, when tested in accordance with ASTM D 5519, Test Method A. Salvaged stone shall be acceptable for grouted stone provided that not more than 5 percent is less than 5 pounds by weight.

Weight of Individual Pieces (pounds)	Percent Smaller (by weight)
200	100
100	75-100
50	40-75
20	10-40
5	0-5

d. Bedding Material and Downstream Gravel Blanket: Bedding material and the downstream gravel blanket shall be well-graded, between the limits specified below, when tested in accordance with ASTM C 136.

Sieve Size	Percent Finer (by weight)
4 inch	100
3 inch	90-100
1-1/2 inch	70-90
3/4 inch	45-70
3/8 inch	20-45

Sieve Size	Percent Finer (by weight)
No. 4	0-15

2.1.5.2 Gradation Sampling and Testing

Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Government. Tests shall be performed by an approved testing laboratory, on samples selected by the Contracting Officer's Representative. Testing may be done by the Contractor, subject to approval by the Contracting Officer's Representative. If the Contractor elects to establish testing facilities, approval of such facilities shall be based on compliance with ASTM E 548, and no work requiring testing will be permitted, until the Contractor's facilities have been inspected and approved by the Contracting Officer's Representative. Testing shall be supervised by a registered Civil Engineer, experienced in rock-testing. The Government reserves the right to perform check-tests and to use the Contractor's sampling and testing facilities to make the tests. One gradation test shall be required at the beginning of production, prior to delivery of stone from the source to the project site. A minimum of one additional test shall be required for each 5000 tons of stone placed. Each sample shall consist of not less than 5 tons of stone, selected at random from the production run for the first test or from stone placed on grade or stockpiled on-site for required additional tests. All sampling and gradation tests performed by the Contractor shall be observed by the Contracting Officer's Representative.

2.1.6 Rejected Stone

Stone of unsuitable quality and/or size distribution, as required by these specifications, shall be rejected. Any rejected stone shall be promptly removed from the project, at no expense to the Government. Any portions of the work covered by these specifications containing rejected stone will be considered incomplete.

PART 3 EXECUTION

3.1 FOUNDATION PREPARATION

3.1.1 General

Subgrade preparation for material placement shall conform to the provisions of SECTION 02212 EMBANKMENT, and SECTION 02250 FILLS AND SUBGRADE PREPARATION. Areas on which bedding material or stone is to be placed shall be trimmed and dressed to conform to cross-sections, indicated or directed, within an allowable tolerance of plus or minus 1 inch from the theoretical slope-lines and grades. Where such areas are below the allowable minus tolerance limit, they shall be brought to grade by filling with earth, similar to the adjacent material and well-compacted, or by filling with approved material, and no additional payment will be made for any material thus required. Immediately prior to placing the bedding material, the prepared base shall be inspected by the Contracting Officer's Representative, and no material shall be placed thereon, until that area has been approved.

3.2 PLACEMENT

3.2.1 General

Except as otherwise specified, the limits of stone in place shall follow, with reasonable variation, the indicated lines and slopes, without continuous under- or overbuilding. Templates shall be placed at adequate intervals, as determined by the Contracting Officer's Representative, to accurately delineate the surface of the work being placed. For all stonework, the Contractor shall submit the method of placement to the Contracting Officer's Representative for approval, before placement begins.

3.2.2 Bedding Material and Downstream Gravel Blanket

Bedding material and the downstream gravel blanket shall be spread uniformly on the prepared base, in a satisfactory manner, to the neat lines indicated or directed. Placing of material by methods which will tend to segregate particle sizes will not be permitted. Material shall not be dropped from a height of more than 18 inches. Any damage to the prepared surface of the base, during placing of the bedding material shall be repaired, before proceeding with the work. Compaction of the bedding material will not be required, but it shall be finished, to present a reasonably even surface, free from mounds or windrows. A tolerance of plus or minus 1 inch from the slope-lines and grades, when measured with a 10-foot straight edge, will be allowed in each finished course, except that either extreme of such tolerance shall not be continuous over an area greater than 200 square feet.

3.2.3 Riprap

Riprap shall be placed in a manner to produce a reasonably well-graded mass, with the minimum practicable percentage of voids, and shall be constructed to the lines and grades indicated or directed. Stone shall be placed to its full course thickness, in one operation, from the bottom of the slope or lowest portion requiring placement, to the top of the slope and in a manner to avoid displacing the underlying material. Material shall not be dropped from a height of more than 18 inches. Method of placement shall be submitted to the Contracting Officer's Representative, for approval, prior to commencement of placement operations. The Contractor shall maintain the stone protection until accepted, and any material displaced by any cause, shall be replaced, at his expense, to the lines and grades shown on the drawings. Self-propelled equipment shall not be used on the embankment slopes. Hand-placing, barring, or placing by crane will be required only to the extent necessary, to secure the results specified. Placing stone by dumping into chutes or by similar methods, likely to cause segregation, will not permitted. A tolerance of minus 2 to plus 2 inches from the indicated slope-lines and grades will be allowed in the finished surface, except that either extreme of such tolerance shall not be continuous over an area greater than 200 square feet.

3.2.4 Stone for Grouted Stone

Stone for grouted stone shall be placed in such a manner to produce a reasonably well-graded mass and to insure that all individual stones can be satisfactorily embedded in grout. Method of placement shall be submitted to Contracting Officer's Representative, for approval, prior to commencement of placement operations. Stone shall be placed to its full course thickness, in one operation, and in such a manner to avoid displacing the underlying material. Material shall not be dropped from a height of more than 18 inches. The Contractor shall maintain the stone protection until accepted, and any material displaced by any cause shall be replaced at his expense, to the lines and grades indicated. Self-propelled equipment shall not be used on the slopes. Hand-placing, barring, or

placing by crane will be required only to the extent necessary, to secure the results specified. Placing stone by dumping into chutes or by similar methods, likely to cause segregation will not be permitted. A tolerance of minus 2 to plus 2 inches, from the indicated slope-lines and grades will be allowed in the finished surface, except that either extreme of such tolerance shall not be continuous over an area greater than 200 square feet. Use of thin, flat stones will not be permitted.

3.3 DEMONSTRATION SECTION

3.3.1 General

Prior to placement of riprap, the Contractor shall construct a section, to demonstrate his proposed operations for production placement. The section shall demonstrate procedure and capability of grading and placing stone protection within the tolerances specified. The demonstration section shall be 100 feet in length, placed in the area of stone protection at the downstream toe, and shall conform to all applicable specifications.

3.3.1.1 Methods and Equipment

Methods and equipment employed for placement shall demonstrate the adequacy for use in placement of rip-rap and shall conform with the requirements specified herein. The quantities of all materials placed within the section shall be accurately tabulated and provided immediately to the Contracting Officer's Representative, for comparison with the computed quantities.

3.3.2 Demonstration Section Evaluation

The Contractor shall not proceed in placing stonework, prior to the approval of the demonstration section. Within a period of 7 days after completion of the section, the Contracting Officer's Representative shall determine the adequacy of the section to function as part of the permanent construction. The Contractor shall be notified as to the acceptability of the section and may be directed to modify methods of construction, and remove the section, if necessary.

3.3.3 Removal of Demonstration Section

If removal of the demonstration section is required, it shall be conducted in such a manner as to maintain the integrity of the underlying subgrade. The Contractor shall make his own arrangements for disposal in areas not located on the site.

3.4 DELIVERY

All stone delivered by rail or truck shall be weighed, and the scale tickets shall be certified, by authorized weighers. All railroad cars and trucks used for delivering stone shall be plainly numbered.

3.4.1 Scales

Scales used for measurement shall, at the option of the Contractor, be either public scales or approved scales, provided by the Contractor. Weighing shall be at the point nearest the work at which the public scale is available or at which it is practicable for the Contractor to provide a scale. Scales shall be standard truck scales of the beam type. The scales shall be of sufficient size and capacity to accommodate all trucks used in

hauling the material. Scales shall be tested, approved, and sealed by an inspector of the State Inspection Bureau, charged with scales inspection, within the state in which the project is located. Scales shall be calibrated and resealed as often as necessary, to insure continuous accuracy. The necessary number of standard weights for testing the scales shall be on hand at all times, and, if an official inspection bureau of the state is not available, the scales will be tested by the Contracting Officer's Representative.

3.4.2 Waybills and Delivery Tickets

Copies of waybills or delivery tickets shall be submitted to the Contracting Officer's Representative, during the progress of the work. The Contractor shall furnish the Contracting Officer's Representative scale tickets for each load of material weighed; these tickets shall include tare weight, identification mark of each vehicle weighed, plus date, time, and location of the loading. Tickets shall be furnished at the point and time individual loads arrive at the work site. A master log of all vehicle loading shall be furnished for each day of loading operation. The Contractor shall file with the Contracting Officer's Representative the master log of loadings, certified waybills and/or certified tickets, within 24 hours of material delivery. Prior to the final payment, the Contractor shall furnish written certification that the material recorded on the submitted waybills and/or certified tickets was actually used in the construction covered by the contract. Weigh tickets will not be required for salvage stone. For bidding purposes the in-place weight of the salvaged stone shall be assumed to be 115 pounds per cubic foot.

-- End of Section --

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PVC LINED REINFORCED CONCRETE SEWER PIPE

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SECTION 02612

PVC LINED REINFORCED CONCRETE SEWER PIPE

PART 1 GENERAL

1.1 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals necessary and install and test PVC lined reinforced concrete pipe for sewers complete as shown on the Drawings and as specified herein.

All pipe and fittings shall be manufactured for this project and no pipe shall be furnished from stock.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C33	(2002a) Concrete Aggregates
ASTM C76	(2002) Reinforced Concrete Culvert, Storm Drain and Sewer Pipe
ASTM C150	(2002a) Portland Cement
ASTM C361	(1999) Standard Specification for Reinforced Concrete Low-Head Pressure Pipe
ASTM C443	(2002) Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
ASTM C828	(2001) Low-Pressure Air Test of Vitrified Clay Pipe Lines

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Pipe and Fittings; G

Within 30 days of the Notice to Proceed submit the name of the pipe and fitting supplier and a list of materials to be furnished.

SD-02 Shop Drawings

Reinforced Concrete Pipe; G

Shop drawings showing layout and details of reinforcement, joint, method of manufacture and installation of pipe, specials and fittings, and a schedule of pipe lengths (including the length of individual pipes by diameter) for the entire job.

SD-04 Samples

Gaskets

Submit gaskets for tests at least 30 days before joining any the pipe.

SD-06 Test Reports

Aggregates; G

Submit with the shop drawings documentation that the fine and course aggregates to be used in manufacture of the concrete pipe comply with the requirements below. Documentation shall be less than 6 months old and shall indicate the source of the aggregates and the date of the analysis.

Manufacturer Test Data; G

Submit certified test data for O-Ring gaskets.

SD-07 Certificates

Notarized Affidavit; G

Prior to each shipment of pipe, submit certified test reports that the pipe was manufactured and tested in accordance with the ASTM Standards specified herein.

Affidavits; G

Submit certified test affidavits for O-Ring gaskets for compliance with these requirements

1.4 QUALITY ASSURANCE

1.4.1 Acceptance Tests

The manufacturer shall perform the acceptance tests specified in ASTM C76, Paragraph 5.1.2.

1.4.2 Pipe Inspection at Plant

Reinforced concrete pipe manufactured for this Contract may be inspected at the plant for compliance with this Section by an independent testing laboratory provided by Government. The manufacturer's cooperation in these inspections shall be required.

1.4.3 Pipe Inspection on Job Site

Inspection of the pipe will be made by the Contracting officer along with representatives of SAWPA after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the requirements specified herein, even though pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall immediately be removed from the job.

PART 2 PRODUCTS

2.1 REINFORCED CONCRETE PIPE

2.1.1 Pipe

Except as otherwise specified herein, pipe shall conform to ASTM C76, Class 3000-D, Wall A. The pipe interior shall be smooth and even, free from roughness, projections, indentations, offsets, or irregularities of any kind. The concrete mass shall be dense and uniform.

2.1.2 Cement

Cement shall be non-air-entraining portland cement conforming to ASTM C150, Type II. The use of any admixture shall be subject to the specific approval of the Contracting Officer.

2.1.3 Aggregates

Fine aggregate shall consist of washed inert natural sand conforming to the requirements of ASTM C33, except for gradation, with a maximum loss of 8 percent when subjected to 5 cycles of the soundness test using magnesium sulfate. Coarse aggregate shall consist of well-graded crushed stone or washed gravel conforming to the requirements of ASTM C33, except for gradation, with a maximum loss of 8 percent when subjected to 5 cycles of the soundness test using magnesium sulfate. Documentation that the aggregates to be used in the manufacture of reinforced concrete pipe meet these requirements shall be submitted to the Contracting Officer.

2.1.4 Concrete and Reinforcement

The 28-day compressive strength of the concrete, as indicated by cores cut from the pipe shall be equal to or greater than the design strength of the concrete. The concrete mass shall be dense and uniform. The average absorption shall not exceed 6.0 percent of the dry weight and no specimen shall exceed 6.3 percent. Reinforcement shall be circular for all concrete pipes. Quadrant steel shall not be used. Reinforcement shall be installed in both the bell and the spigot. At least one circumferential reinforcement wire shall be in both the bell and spigot area and reinforcement in the bell and spigot shall be adequate to prevent damage to concrete during shipping, handling and after installation. When cores indicate that reinforcing steel has less than 85 percent bond the pipe shall be subjected to a 3-edge bearing test to 13 psi to verify strength and water tightness.

2.1.5 Reason for Rejection

Pipe may be rejected for any of the following reasons:

1. Exposure of any steel reinforcement in any surface of the pipe.

2. Transverse reinforcing steel found to be in excess of 1/4-inch out of specified position after the pipe is molded.

3. Any shattering or flaking of concrete at a crack.

4. Voids, with the exception of a few minor bugholes, on the interior and exterior surfaces of the pipe exceeding 1/4-inch in depth unless properly and soundly pointed with mortar or other approved material.

5. Unauthorized application of any wash coat of cement or grout. Any pipe dressing procedures shall be subject to approval of the Contracting Officer.

6. A deficiency greater than 1/4-inch from the specified wall thickness of pipe 30-inch or smaller in internal diameter.

7. A variation from the specified internal diameter in excess of 1 percent, or interior surfaces which have been reworked after placing of concrete. The variation in internal diameter permitted herein does not apply to gasket contact surface in gasketed joint pipe.

8. A hollow spot (identified by tapping the internal surface of the pipe), which is greater than 30-inch in length or wider than 3 times the specified wall thickness. Repair of such defective areas not exceeding these limitations may be made as specified in paragraph: "Repairs" herein.

9. Defects that indicate imperfect molding of concrete; or any surface defect indicating honeycomb or open texture (rock pockets) greater in size than area equal to a square with a side dimension of 2-1/2 times the wall thickness or deeper than two times the maximum graded aggregate size; or local deficiency of cement resulting in loosely bonded concrete, the area of which exceeds in size the limits of area described above when the defective concrete is removed. Repair of such defects not exceeding these limits may be made as specified in paragraph: "Repairs" herein.

10. Any of the following:

a. A crack having a width of 0.005 to 0.01-in throughout a continuous length of 36 inches or more.

b. A crack having a width of 0.0 to 0.03-in or more throughout a continuous length of 1 foot or more.

c. Any crack greater than 0.005-in extending through the wall of the pipe and having a length in excess of the wall thickness.

d. Any crack showing two visible lines of separation for a continuous length of 2 feet or more, or an interrupted length of 3 feet or more anywhere in evidence, both inside and outside.

e. Cracks anywhere greater than 0.03-in in width.

2.1.6 Marking and Shipping

The pipe shall be clearly marked as required by ASTM C76 in a manner acceptable to the Contracting Officer. The markings may be at either end of the pipe for the convenience of the manufacturer, but for any one size

shall always be at the same end of each pipe length. Pipe shall not be shipped until the compressive strength of the concrete has attained 4,000 psi and not before 5 days after manufacture and/or repair, whichever is the longer.

2.1.7 Pipe Sections

Pipe shall have a minimum laying length of approximately 8-ft, except for closure and other special pieces as approved by the Contracting Officer. Have available at the site sufficient pipe of various lengths to affect closure at manholes or structures that cannot be located to accommodate standard lengths. Short lengths of pipe made for closure, etc, may be used in the pipeline at the end of construction if properly spaced. The length of the incoming and outgoing concrete pipe at each structure shall not exceed 4-ft, except where the joint is cast flush with the exterior wall of the structure, where steel wall fittings are provided or where otherwise noted on the Drawings. Maximum laying length shall not exceed 16-ft, but the installation of 16-ft lengths will depend upon the ability to handle such lengths of pipe in sheeted trenches, comply with trench width requirements, maintain the integrity of the sheeting and avoid disturbance to adjacent ground. If in the opinion of the Contracting Officer the use of 16-ft lengths is impracticable, shorter lengths shall be used.

2.1.8 Length Tolerance

Each length of pipe shall be checked against the length noted on the shop drawings. Pipe more than 1-1/2-in longer than that shown on the shop drawings shall not be used on this project. Variations in length of the same pipe shall not exceed ASTM C76 requirements.

2.1.9 Joint Tolerance

During manufacturing, measuring devices shall be used to assure joint assembly is within the tolerance of ASTM C76 and this Section.

2.1.10 Concrete Inspection

The Contracting Officer shall have the right to take samples of the concrete after it has been mixed, or as it is being placed in the forms or molds and to make such inspection and tests thereof as he/she may wish.

2.1.11 Concrete Test Cylinders

At the start of the work, a set of test cylinders shall be taken each day on which pipe is manufactured for the project or more often if required. This may ultimately be reduced to one set of three specimens for every 50 cu yds of concrete placed, if the uniformity of results warrants and if approved by the Contracting Officer. At the start of the work, a relationship shall be established between ultimate strength of test cylinders stored in a standard manner as compared to cylinders steam cured with the pipe and as compared to cores taken from the corresponding finished pipe. At least five sets of tests shall be made.

2.1.12 Cores by Government

The Contracting Officer shall have the right to cut cores from such pieces of the finished pipe as he/she selects for inspection and for such tests as he/she may wish to apply. Holes left by the removal of cores shall be filled in an approved manner by and at the expense of the manufacturer.

Core drilling shall be carried out by the pipe manufacturer at his/her expense. The number of cores shall not exceed the requirements of ASTM C76.

2.1.13 Cores by Manufacturer

Test cores may be taken for every 500 linear feet of pipe manufactured, but not less than once each day on which pipe is manufactured for the project. Cores may be reduced to one set of two per week (or possibly fewer, but not less than one set for every 1,500 linear feet), if a satisfactory relationship is established between cores and cylinders made and cured in the standard manner. This relationship shall not vary by more than 10 percent more or less from the average ratio. Cores may be drilled in any manner which will provide a smooth core face. All pipe cylinders and cores shall be 4-in in diameter. Cores shall be carefully saw-trimmed and capped in a vertical position with a sulfur cap of minimum thickness, at least one day before being tested.

2.1.14 Core Testing

Core testing shall conform to Standard ASTM Methods.

2.1.15 Pipe Inspection

At the time of inspection, the pipe will be carefully examined for compliance with the appropriate ASTM standard, as specified herein, and shop drawings. All pipes shall be inspected for general appearance, dimension, "scratch-strength," blisters, cracks, roughness, soundness, etc. All pipes will be checked for soundness by being tapped and scratched at least once on every 50 sq in of pipe surface. The surface shall be dense and close-textured. Cores also shall serve as a basis for rejection of pipe, particularly if lamination or poor bond of reinforcement is apparent.

2.1.16 Joint Tolerance

The manufacturer shall use measuring devices to assure joint assembly is within tolerances of ASTM C76 and as specified herein. If, during construction, the pipes cannot be satisfactorily joined, the manufacturer shall pre-join the pipe at the plant.

2.1.17 Unsatisfactory or Damaged Pipe

Unsatisfactory or damaged pipe will be either permanently rejected or returned for minor repairs. Only that pipe actually conforming to the specifications and accepted will be listed for approval, shipment and payment. Approved pipe will be so stamped or stenciled on the inside before it is shipped. All pipe which has been damaged after delivery will be rejected and if such pipe already has been laid in the trench, it shall be acceptably repaired, if permitted, or removed and replaced, entirely at the Contractor's expense.

2.1.18 Repairs

Pits, blisters, rough spots, breakage and other imperfections may be repaired, subject to the approval of the Contracting Officer, after demonstration by the manufacturer that strong and permanent repairs result. Repairs shall be carefully inspected before final approval. Non-shrink cement mortar used for repairs shall have a minimum compressive strength of 6,000 psi at the end of 7 days and 7,000 psi at the end of 28 days, when tested in 3-in cylinders stored in the standard manner. Epoxy mortar may

be utilized for repairs subject to the approval of the Contracting Officer.

2.1.19 Curved Sections

Pipe for use on curved sections shall be fabricated by beveling one or both ends up to 5 degrees to produce the radius of curvature required. Joint deflection shall not be utilized to produce the radius of curvature required. Reinforced concrete bends shall be cast to the degree of curvature required or fabricated by cutting the pipe at the required angle and rejoining the sections. Bends may be smooth or mitered providing mitered angles do not exceed 22-1/2 degrees and bends have a radius divided by the pipe diameter greater or equal to 1.

2.1.20 PVC Liner

Reinforced concrete pipe shall be furnished with integral PVC liner in conformance with Section 09880.

2.1.21 Steel Wall Fittings

Steel wall fittings to be used in the walls of the cast-in-place structures shall be compatible with rubber and steel joints of reinforced concrete pipe where applicable.

2.2 JOINTS FOR CONCRETE PIPE

2.2.1 Joints

Joints for 48-inch concrete pipe shall be concrete and rubber tongue and groove or bell and spigot type joint conforming to ASTM C361 with provisions for using a round rubber O-Ring gasket in a recess in the spigot end of the pipe. The bevel on the bell of the pipe shall be between 1-1/2 degrees and 2-1/2 degrees. The diameters of the joint surfaces which compress the gasket shall not vary from the true diameters by more than 1/16-in.

2.2.2 Gaskets

The round rubber O-Ring gaskets shall conform to ASTM C443 except as otherwise specified herein. Two gaskets shall be submitted to the Contracting Officer for tests at least 30 days before joining any the pipe.

2.2.2.1 Gasket Testing

Specimens shall be heated in a dry oven to 150 degrees F for 6-hour duration and five specimens shall be tested by immersion, one each as follows: 2-hour immersion in petroleum ether, 72-hour immersion in saturated Hydrogen Sulfide solution, 72-hour immersion in 1 percent NaOH solution, 72-hour immersion in standard soap solution (80 percent alcohol), 72-hour immersion in 10 percent NaCl solution. The specimens shall show no detrimental change in color, texture, or feeling upon completion of the above tests. Specimens of the gaskets shall be subjected to tensile tests of approximately 100 psi before and after immersion and heating tests and shall show an elongation of at least 25 percent. Upon release from the tensile tests, each specimen shall return to its original length. The Contractor shall supply manufacturer test data and affidavits showing compliance with these requirements. Tests shall have been conducted within six months of the start of manufacture of the pipe.

2.2.2.2 Design

The gaskets shall be designed and manufactured so that the completed joint will withstand an internal water pressure in excess of 13 psi for a period of 10 minutes without showing any leakage by the gasket or displacement of it. The pipe manufacturer shall provide facilities for testing the effectiveness of the joints against leakage and one such test may be required for each 500-ft of pipe for each type of joint manufactured. Such tests shall be made by an internal or external pressure against the joint of at least 13 psi for a period of ten minutes in accordance with ASTM C443. The completed joint, when installed in place in the work, shall be capable of withstanding a groundwater pressure of 13 psi without exceeding the allowable leakage specified for the pipe testing.

2.2.3 Joint Surfaces

The ends of the pipe shall be made true to form and dimension and the bell shall be made by casting against steel forms. The manufacturer shall inspect all pipe joint surfaces for out-of-roundness and pipe ends for squareness. The manufacturer shall furnish to the Contracting officer a notarized affidavit stating all pipe meets the requirements of ASTM C76, as specified herein and the joint design.

2.2.4 PVC Liner Joints

Sealing and welding of PVC liner joints shall be in conformance with Section 09880.

PART 3 EXECUTION

3.1 LAYING CONCRETE PIPE

3.1.1 Delivery

Care shall be taken in loading, transporting and unloading to prevent injury to the pipe or fittings and the joint surfaces. Pipe or fittings shall not be dropped. All pipe or fittings shall be examined before laying and no piece shall be installed which is found to be defective.

3.1.2 Pipe Trench

As soon as the excavation is completed to the normal grade of the bottom of the trench, place screened gravel in the trench and firmly bed the pipe in this gravel to conform accurately to the lines and grades indicated on the Drawings. Screened gravel shall conform to the requirements of Section 02316. Blocking under the pipe will not be permitted.

3.1.3 Preparation

A depression shall be left in the supporting gravel at the joint to prevent contamination of the rubber gasket immediately before being forced home. Before the pipe is lowered into the trench, the spigot and bell shall be cleaned and free from dirt. Gasket and bell shall be lubricated by a vegetable lubricant which is not soluble in water, furnished by the pipe manufacturer and harmless to the rubber gasket. The pipe shall be properly aligned in the trench to avoid any possibility of contact with the side of the trench and fouling the gasket. As soon as the spigot is centered in the bell of the previously laid pipe, it shall be forced home by approved methods.

3.1.4 Backfill

As soon as the pipe is in place and before the come-along is released, backfill shall be placed as indicated on the Drawings and compacted for at least one-half the length of pipe. Not until this backfill is placed shall the come-along be released. If any motion at joints can be detected, a greater amount of backfill shall be placed before pressure is released. When pipe laying is not in progress, including lunchtime, the open ends of the pipe shall be closed by a watertight plug or other approved means.

3.1.5 Loading

Regulate the equipment and construction operations such that the loading of the pipe does not exceed the loads for which the pipe is designed and manufactured. Any pipe damaged during construction operations shall promptly and satisfactorily be repaired or replaced at the Contractor's expense.

3.2 TESTING AND CLEANING

3.2.1 Testing

Testing shall be as specified herein and as supplemented in Section 02531.

3.2.2 Cleaning

Cleaning shall be as specified in Section 02531.

3.2.3 Low Pressure Air Test

3.2.3.1 Equipment

Use equipment specifically designed and manufactured for the purpose of testing sewer pipelines using low-pressure air. Provide equipment with an air regulator valve or air safety valve so set that the internal air pressure in the pipeline cannot exceed 8 psig. The leakage test using low-pressure air shall be made on each manhole-to-manhole section of pipeline. Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be tested and shall resist internal test pressure without requiring external bracing or blocking. All air used shall pass through a single control panel.

3.2.3.2 Test

Low-pressure air shall be introduced into the sealed line until the internal air pressure reaches 4 psig greater than the maximum pressure exerted by groundwater that may be above the invert of the pipe at the time of the test. However, the internal air pressure in the sealed line shall not be allowed to exceed 8 psig. When the maximum pressure exerted by the ground water exceeds 4 psi, conduct an infiltration test as specified in Section 02531.

a. At least two minutes shall be allowed for the air pressure to stabilize in the section under test. After the stabilization period, the low-pressure air supply hose shall be quickly disconnected from the control panel. The time required in minutes for the pressure in the section under test to decrease from 3.5 to 2.5 psig (greater than the maximum pressure exerted by groundwater

that may be above the invert of the pipe) shall not be less than that shown in the Table 1 of ASTM C828.

3.2.3.3 Retest

If the pipe section does not pass the air test, either sectionalize the section tested to determine the location of the leak or perform a hydrostatic leakage test. Once the leak has been located, repair and retest.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 02 - SITE WORK

SECTION 02623

HIGH DENSITY POLYETHYLENE (HDPE) PIPE

-- End of Section Table of Contents --

SECTION 02623

HIGH DENSITY POLYETHYLENE (HDPE) PIPE

PART 1 GENERAL

1.1 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals required and install 30-inch through 48-inch high density polyethylene water pipe, fittings, appurtenances and required adapters as shown on the Drawings and as specified herein.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D1238	(2001e1) Flow Rates Thermoplastics by Extrusion Plastometer
ASTM D1248	(2002) Polyethylene Plastic Molding and Extrusion Materials
ASTM D1505	(1998 el) Density of Plastics by the Density-Gradient Technique
ASTM D2657	(1997) Heat-Joining Polyolefin Pipe and Fittings
ASTM D2837	(2001 ael) Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials
ASTM D3350	(2002a) Polyethylene Plastic Pipe Fittings materials
ASTM F714	(2001) Polyethylene (PE) Plastic Pipe (SDR-PR) Based on outside Diameter.

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C906	(1999) Large Diameter Polyethylene (PE) Pressure Pipe and Fittings for Water Distribution.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office

that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Materials; G

Within 20 days prior to delivery, provide a list of materials to be furnished, the names of the suppliers and the date of delivery of materials to the site.

SD-02 Shop Drawings; G

Drawings

Within 20 days prior to delivery, provide complete details shop drawings of all polyethylene pipe, including the location of all fittings, joints, and connections to structures, or other pipe materials.

SD-03 Product Data

Pipe Resins; G

Within 20 days prior to delivery, provide documentation for the origin of the resin to be used in the manufacturing of the pipe including the suppliers name and production plant, as well as brand name and number.

HDPE Manufacturer

Within 20 days prior to delivery, provide Manufacturer quality control manual describing implementation of quality control procedures during pipe manufacturing process.

SD-06 Test Reports

Resin Evaluation; G

Within 20 days prior to delivery, provide documentation from the resins manufacturer showing the results of the tests for resin identification.

Finished Product Evaluation; G

Within 20 days prior to delivery, provide the results of pipe measurements recorded on production sheets.

SD-07 Certificates

HDPE Pipe; G

Pipe manufacturer's certification of compliance with this Section

Resin; G
Stress Regression Testing

For each shipment of pipe a manufacturer's certification that the pipe was manufactured from the same approved resin.

SD-08 Manufacturer's Instructions

Installation

Within 20 days prior to delivery, provide Manufacturer's recommendations for handling, storing and installing pipe and fittings.

1.4 QUALITY ASSURANCE

1.4.1 HDPE Manufacturer

All high density polyethylene (HDPE) pipe and fittings shall be from a single manufacturer. All HDPE pipe to be installed under this Contract may be inspected at the factory for compliance with this section by an independent testing laboratory provided by Government. The Contractor shall require the manufacturer's cooperation in these inspections.

1.4.2 Resin Evaluation

All incoming resin shall be sampled for conformance testing against test results supplied by the resin manufacturer. Samples shall be taken from the top and bottom of each compartment from every hopper car received. The following conformance tests shall be performed on the sampler:

a. Melt Flow Index ASTM D1238

b. Density ASTM D1505

c. The results of these tests shall become part of the manufacturers permanent quality control records.

1.4.3 Finished Product Evaluation

Each length of pipe produced shall be checked by production staff for the items listed below. The results of all measurements shall be recorded on production sheets which become part of the manufacturers permanent records.

a. Pipe in process shall be checked visually, inside and out for cosmetic defects (grooves, pits, hollows, etc).

b. Pipe outside diameter shall be measured using a suitable periphery tape to ensure conformance with ASTM F714.

c. Pipe wall thickness shall be measured at 12 equally spaced location around the circumference at both ends of the pipe to ensure conformance with ASTM F714.

d. Pipe length shall be measured.

e. Pipe marking shall be examined and checked for accuracy.

f. Pipe ends shall be checked to ensure that are cut square and clean.

g. Subject inside surface to a reverse bend test to ensure the pipe is free of oxidation (brittleness).

1.4.4 Stress Regression Testing

The polyethylene pipe manufacturer shall provide certification that stress regression testing has been performed on the specific polyethylene resin being utilized in the manufacture of this product. This stress regression testing shall have been done in accordance with ASTM D2837 and the manufacturer shall provide a product supplying a minimum Hydrostatic Design Basis (HDB) of 1,600 psi as determined in accordance with ASTM D2837.

1.4.5 Pipe Inspection after Delivery

Inspection of the pipe may also be made by the Contracting Officer and representatives of SAWPA after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the specified requirements, even though pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall immediately be removed from the job.

1.4.6 Test Joint

Prior to making heat fused joints for the pipeline, one test joint shall be made and tested by a bent strap test as outlined in Chevron Chemical Co., Plexco Bulletin No. 106. A joint showing any disbondment of the fusion will not be accepted. No joints shall be made until a successful test joint has been made. All joints shall be inspected by a representative of the pipe manufacturer.

1.5 WARRANTY

The pipe material manufacturer shall provide an unconditional extended warranty for the pipe covering the cost of materials for repair or replacement plus installation manpower should the pipe fail within the warranty period. The manufacturer's extended warranty shall be for ten years after the final acceptance of the project by Government. The manufacturer shall guarantee that the pipe furnished is suitable for the purpose intended and free from defects of material and workmanship for the duration of the extended warranty. In the event the pipe fails to perform as specified, the pipe manufacturer shall promptly replace defective pipe at no additional cost to Government.

PART 2 PRODUCTS

2.1 HIGH DENSITY POLYETHYLENE (HDPE) PIPE

High Density Polyethylene (HDPE) pipe shall comply with the applicable requirements of AWWA C906 and as specified herein. The material shall be NSF listed and approved for potable water service.

2.1.1 Properties

High Density Polyethylene (HDPE) Pipe resins shall be high molecular weight, high density polyethylene with a cell classification of 345434C in accordance with ASTM D3350.

2.1.2 Pipe Size

The pipes shall have a nominal dimension of 48-in as shown on the Drawings, and shall have a pressure rating of 80 psi meeting the requirements of Standard Dimension Ratio (SDR) of 21.

2.1.3 Polyethylene Pipe

All polyethylene pipe shall meet the requirements of ASTM F714.

2.1.4 Joints

The pipe shall be joined with butt, heat fusion joints. All joints shall be made in strict compliance with the manufacturer's recommendations.

2.1.5 Pipe Lengths

Pipe shall be furnished in standard laying lengths not exceeding 50-ft.

2.1.6 Resin

All high density polyethylene pipe and fittings shall be made from the same resin and manufacturer.

2.2 PIPE IDENTIFICATION

The following shall be continuously indent printed on the pipe or spaced at intervals not exceeding 5-ft:

1. Name and/or trademark of the pipe manufacturer.

2. Nominal pipe size.

3. Dimension ratio.

4. The letters PE followed by the polyethylene grade in accordance with ASTM D1248, followed by the hydrostatic design basis in 100 of psi e.g., PE 3408-1600.

5. Manufacturing standard reference, e.g., ASTM F714.

6. A production code from which the date and place of manufacture can be determined.

PART 3 EXECUTION

3.1 INSTALLATION

High Density Polyethylene (HDPE) Pipe shall be installed in accordance with the instructions of the manufacturer, as shown on the Drawings and as specified herein. The Contractor performing the jointing shall be a distributor of the pipe material supplied. All heat fusion joints shall be done by a factory qualified joining technician as designated by the pipe manufacturer with a minimum of three years experience for the fusion equipment to be used.

3.1.1 Transporting

Care shall be taken in loading, transporting, and unloading to prevent injury to the pipe. Pipe or fitting shall not be dropped. All pipe or fitting shall be examined before installation, and no piece shall be installed which is found to be defective. Any damage to the pipe shall be repaired as directed by the Contracting Officer. If any defective pipe is discovered after it has been installed, it shall be removed and replaced

with a sound pipe in a satisfactory manner by the Contractor, at his own expense.

3.1.2 Pipe and Fittings

All pipe and fittings shall be thoroughly cleaned before installation, and shall be kept clean until they are used in the work.

3.1.3 Layout

Pipe shall be laid to lines and grade shown on the Drawings with bedding and backfill as shown on the Drawings.

3.1.4 Plugs

When laying is not in progress, including lunchtime, the open ends of the pipe shall be closed by fabricated plugs, or by other approved means. All plugs shall be OD fitting type plugs. No plugs will be allowed that require insertion of the plug into the pipe.

3.1.5 Handling and Storage

Pipe shall be stored on clean level ground to prevent undue scratching or gouging. The handling of the pipe shall be in such a manner that the pipe is not damaged by dragging it over sharp and cutting objects. The maximum allowable depth of cuts, scratches or gouges on the exterior of the pipe is 10 percent of wall thickness. The interior pipe surface shall be free of cuts, gouges or scratches.

3.1.6 Pipe Flaws

Sections of the pipe with cuts, scratches or gouges exceeding five percent of the pipe wall thickness shall be removed completely and the ends of the pipeline rejoined.

3.1.7 Pipe Cutting

When cutting pipe is required, the cutting shall be done by machine, leaving a smooth cut at right angles to the axis of the pipe.

3.1.8 Joints

The pipe shall be joined by the method of thermal butt fusion, as outlined in ASTM D2657. All joints shall be made in strict compliance with the manufacturer's recommendations.

3.2 CLEANING

At the conclusion of the work, the Contractor shall thoroughly clean all of the new pipelines by flushing with a minimum of three pipe volumes of water to remove all water, dirt, stones, or other material which may have entered during the construction period. Debris cleaned from the lines shall be removed. If, after this cleaning, obstruction remain, they shall be removed.

-- End of Section --

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DIVISION 05 - METALS

SECTION 05915

STOPLOGS

-- End of Section Table of Contents --

SECTION 05915

STOPLOGS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36/A 36M	(1997a) Carbon Structural Steel
ASTM A 193	(2000) Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Detail Drawings; G

Detail drawings shall be submitted as specified in Section 05501 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

SD-03 Product Data

Welding; G

Schedules of welding procedures for structural steel and welding processes for aluminum shall be submitted as specified in Section 05501 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

Materials

Materials orders, materials lists and materials shipping bills shall be submitted as specified in Section 05501 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

Materials Disposition Records

A system of identification which shows the disposition of specific lots of approved materials and fabricated items in the work shall be established and submitted before completion of the

contract.

SD-06 Test Reports

Tests, Inspections, and Verifications

Certified test reports for material tests shall be submitted with all materials delivered to the site.

1.3 QUALIFICATION OF WELDERS AND WELDING OPERATORS

Qualification of welders and welding operators shall conform to the requirements of Section 05501 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

1.4 DELIVERY, STORAGE AND HANDLING

Delivery, handling and storage of materials and fabricated items shall conform to the requirements specified in Section 05501 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

1.4.1 Rubber Seals

Rubber seals shall be stored in a place which permits free circulation of air, maintains a temperature of 70 degrees F or less, and prevents the rubber from being exposed to the direct rays of the sun. Rubber seals shall be kept free of oils, grease, and other materials which would deteriorate the rubber. Rubber seals shall not be distorted during handling.

PART 2 PRODUCTS

2.1 MATERIALS

Materials orders, materials lists and materials shipping bills shall conform to the requirements of Section 05501 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

2.1.1 Metals

Structural steel and other metal materials sections and standard articles shall be as shown and as specified herein and in Section 05120, STRUCTURAL STEEL AND MISCELLANEOUS METALWORK.

2.1.1.1 Structural Steel

Structural steel shall conform to ASTM A 36/A 36M.

2.1.2 Rubber Seals

Rubber seals shall conform to the requirements in Section 05120, STRUCTURAL STEEL AND MISCELLANEOUS METALWORK.

2.1.2.1 Fabrication

Rubber seals shall have a fluorocarbon film vulcanized and bonded to the sealing surface of the bulb. The film shall be 0.030 or 0.060 inch thick Huntington Abrasion Resistant Fluorocarbon Film No. 4508, or equal, and shall have the following physical properties:

Tensile strength ..... 2,000 psi (min.)

Elongation ..... 250 percent (min.)

The outside surface of the bonded film shall be flush with the surface of the rubber seal and shall be free of adhering or bonded rubber. Strips and corner seals shall be molded in lengths suitable for obtaining the finish lengths shown and with sufficient excess length to provide test specimens for testing the adequacy of the adhesion bond between the film and bulb of the seal. At one end of each strip or corner seal to be tested, the fluorocarbon film shall be masked during bonding to prevent a bond for a length sufficient to hold the film securely during testing.

2.2 MANUFACTURED UNITS

Bolts, nuts, washers, screws and other manufactured units shall conform to the requirements specified and in Section 05501 METALWORK FABRICATION, MACHINE WORK, AND MISCELLANEOUS PROVISIONS.

2.2.1 Stainless Steel Bolts

Stainless steel bolts shall conform to ASTM A 193 Grade B6 unless noted otherwise.

2.2.2 Screws

Screws shall be of the type indicated.

2.3 FABRICATION

2.3.1 Detail Drawings

Detail drawings of stoplogs and appurtenant shop fabricated items, including fabrication drawings, shop assembly drawings, delivery drawings, and field installation drawings, shall conform to the requirements specified and in Section 05501 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

2.3.1.1 Fabrication Drawings

Fabrication drawings shall show complete details of materials, tolerances, connections, and proposed welding sequences which clearly differentiate shop welds and field welds.

2.3.1.2 Shop Assembly Drawings

Shop assembly drawings shall provide details for connecting the adjoining fabricated components in the shop to assure satisfactory field installation.

2.3.1.3 Delivery Drawings

Delivery drawings shall provide descriptions of methods of delivering components to the site, including details for supporting fabricated components during shipping to prevent distortion or other damages.

2.3.1.4 Field Installation Drawings

Field installation drawings shall provide a detailed description of the

field installation procedures. The description shall include the location and method of support of installation and handling equipment; provisions to be taken to protect concrete and other work during installation; method of maintaining components in correct alignment; and methods for installing appurtenant items.

2.3.2 Structural Fabrication

Structural fabrication shall conform to the requirements specified and in Section 05501 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

2.3.3 Welding

Welding shall conform to the requirements specified in Section 05501 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

2.3.4 Bolted Connections

Bolted connections shall conform to the requirements specified in Section 05501 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

2.3.5 Machine Work

Machine work shall conform to the requirements specified in Section 05501 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

2.3.6 Miscellaneous Provisions

Miscellaneous provisions for fabrication shall conform to the requirements specified and in Section 05501 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

2.3.7 Fabrications

2.3.7.1 Stoplogs

Stoplogs shall be fabricated of structural steel conforming to ASTM A 36/A 36M.

2.3.7.2 Stoplog Guides

Stoplog guides shall be fabricated of structural steel conforming to ASTM A 36/A 36M.

2.3.7.3 Miscellaneous Embedded Metals

Corner protection angles, frames, base plates, and other embedded metal items required for complete installation shall conform to the details shown.

2.3.8 Seal Assemblies

Seal assemblies shall consist of rubber seals, stainless steel retainer and spacer bars, and fasteners. Rubber seals shall be continuous over the full length. Seals shall be accurately fitted and drilled for proper installation. Bolt holes shall be drilled in the rubber seals by using prepared templates or the retainer bars as templates. Splices in seals shall be fully molded, develop a minimum tensile strength of 50 percent of the unspliced seal, and occur only at locations shown. All vulcanizing of splices shall be done in the shop. The vulcanized splices between molded

corners and straight lengths shall be located as close to the corners as practicable. Splices shall be on a 45 degree bevel related to the "thickness" of the seal. The surfaces of finished splices shall be smooth and free of irregularities. Stainless steel retainer bars shall be field-spliced only where shown and machine-finished after splicing.

2.4 TESTS, INSPECTIONS, AND VERIFICATIONS

Tests, inspections, and verifications for materials shall conform to the requirements specified in Section 05501 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

PART 3 EXECUTION

3.1 INSTALLATION

Installation shall conform to the requirements specified and in Section 05501 METALWORK FABRICATION, MACHINE WORK, AND MISCELLANEOUS PROVISIONS.

3.1.1 Embedded Metals

Corner protection angles, frames, base plates, and other embedded metal items required for complete installation shall be accurately installed to the alignment and grade required to ensure accurate fitting and matching of components. Embedded metals shall be given a primer coat of the required paint on all surfaces prior to installation in concrete forms. Anchors for embedded metals shall be installed as shown. Items requiring two concrete pours for installation shall be attached to the embedded anchors after the initial pour, adjusted to the proper alignment, and concreted in place with the second pour.

3.1.2 Seal Assemblies

Rubber seal assemblies shall be installed after the embedded metal components have been concreted in place and the gate installation, including painting, completed. Rubber seals shall be fastened securely to metal retainers.

3.1.3 Painting

Stoplogs and appurtenances except machined surfaces, corrosion-resistant surfaces, surfaces of anchorages embedded in concrete, rubber seals, and other specified surfaces shall be painted as specified in Section 09940 PAINTING - HYDRAULIC STRUCTURES AND APPURTENANT WORKS.

3.2 PROTECTION OF FINISHED WORK

Protection of finished work shall conform to the requirements specified in Section 05501 METALWORK FABRICATION, MACHINE WORK, AND MISCELLANEOUS PROVISIONS.

3.3 ACCEPTANCE TRIAL OPERATION

After completion of installation, the Contracting Officer will examine the stoplog installation for final acceptance. The individual components of the stoplog installation will be examined first to determine whether or not the workmanship conforms to the specification requirements. The Contractor will be required to place the stoplogs in the guides a sufficient number of times to demonstrate that the stoplogs fit properly and seat uniformly.

Required repairs or replacements to correct defects, shall be made at no cost to the Government. The trial operation shall be repeated after defects are corrected.

-- End of Section --

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DIVISION 09 - FINISHES

SECTION 09880

PVC LINERS FOR CONCRETE PIPE AND STRUCTURES

-- End of Section Table of Contents --

SECTION 09880

PVC LINERS FOR CONCRETE PIPE AND STRUCTURES

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 412	(1998; Rev. A) Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension

1.2 LOCATION OF APPLICABILITY

This specification shall be applied to materials, installation, and testing of polyvinyl chloride (PVC) liners, where called for , in reinforced concrete pipe, precast concrete manholes, and cast-in-place concrete structures.

All work for and in connection with the installation of the lining in concrete pipe, and the field sealing and welding of joints, shall be done in strict conformity with all applicable specifications, instructions, and recommendations of the lining manufacturer.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

PVC Liner; G

Show orientation of liner installation in pipeline. Not necessary if shown in other submitted literature.

SD-03 Product Data

PVC Liner; G

Submit manufactures test data, and literature of the PVC liner to confirm information indicated in the specifications, but not shown in the manufactures catalog brochures; including but not limited to tensile strength, elongation at break, shore durometer,

Type D (with respect to initial test results), and weight change following elongation test.

Show material properties, thicknesses, chemical resistivity, adhesives, solvents, and activators.

Transverse Welding Strip; G

SD-04 Samples

Weld Specimen; G

SD-07 Certificates

PVC Liner; G

Certificate stating that the PVC liner to be used meets the criteria outlined in these specifications and that the manufacturer of the lining has successfully used the lining in sewage conditions recognized as corrosive or otherwise detrimental to concrete.

SD-08 Manufacturer's Instructions

PVC Liner; G

Submit manufactures installation instructions. Show how pipeline and manholes will be lined. Show returns, corners, joints, and coverage. Show location and type of field welds.

SD-09 Manufacturer's Field Reports

PVC Liner; G

Submit installation inspection reports for all field applied PVC liners to the satisfaction of the Contracting Officer. Material inspection specimens taken from sheets and strips at any time prior to final acceptance of the work, when tested as specified, shall meet the requirements set forth herein. Inspection shall be performed by a manufacturer's representative, or other competent person familiar with the manufactures requirements for product installation. Proper inspection is the contractors responsibility.

PART 2 PRODUCTS

2.1 COMPOSITION

The material used in the liner, welding strips, and other accessory items, shall be a combination of poly vinyl chloride resin, pigments and plasticizers, specially compounded to remain flexible. Poly vinyl chloride resin shall constitute not less than 99 percent, by weight, of the resin used in the formulation. Copolymer resins will not be permitted. Linear Low Density Polyethylene (LLDPE) may also be submitted for use; if approved by the Contracting Officer.

2.2 PHYSICAL PROPERTIES

a. All plastic liner plate sheets, welding strips and other accessory items, shall have the following physical properties when tested at

77 degree F± 5 degrees.

Property	Initial	(Par. 2.4)
Tensile Strength	2,200 psi min.	2,100 psi min.
Elongation at Break	200% min.	200% min.
Shore Durometer, Type D (w.r.t. initial test results)	1-sec, 50-60 10-sec, 35-50	±5 ±5
Weight Change	_	1.5%

b. Tensile specimens shall be prepared and tested in accordance with ASTM D 412 using Die B. Weight change specimens shall be 1 inch by 3 inch samples. Specimens for testing of initial physical properties may be taken from liner plate sheet and welding strip at any time prior to final acceptance of the work.

c. Liner plate locking extensions embedded in concrete shall withstand a test pull of at least 100 pounds per linear inch, applied perpendicularly to the concrete surface for a period of one minute, without rupture of the locking extensions or withdrawal from embedment. This test shall be made at a temperature of 70- 80 degrees F inclusive.

d. All plastic liner plate sheets, including locking extensions, all joint, corner and welding strips shall be free of cracks, cleavages or other defects adversely affecting the protective characteristics of the material. The engineer may authorize the repair of such defects by approved methods.

e. The lining shall have good impact resistance, shall be flexible and shall have an elongation sufficient to bridge up to 1/4 inch settling cracks, which may occur in the pipe or in the joint after installation without damage to the lining.

f. The lining shall be repairable at any time during the life of the pipe or structure.

g. Liner locking extensions embedded in concrete shall withstand a test pull of at least 100 pounds per linear inch, applied perpendicularly to the concrete surface for a period of one minute, without rupture of the locking extensions or withdrawal from embedment. This test shall be made at a temperature between 70 degrees F to 80 degrees F, inclusive.

h. The liner must be continuous and free of pinholes both across the joints and in the liner itself. Plastic liner sheets, including locking extensions and all joint, corner, and welding strips, shall be free of cracks, cleavages, or other defects adversely affecting the protective characteristics of the material.

2.3 CHEMICAL RESISTANCE

Chemical resistance tests shall be used for pre-qualification and when material formulations are changed.

After conditioning to constant weight at 110 degree F, tensile specimens and weight change specimens shall be exposed to the following solutions for a period of 112 days at 77 degree F±5 degrees.

At 28 day intervals, tensile specimens and weight change specimens shall be removed from each of the chemical solutions and tested in accordance with paragraph 2.2. b. If any specimen fails to meet the 112 day requirements before completion of the 112-day exposure, the material shall be rejected.

Chemical Solution	Concentration
Sulfuric Acid	20%*
Sodium hydroxide	5%
Ammonium hydroxide	5%*
Nitric acid	1%*
Ferric chloride	1%
Soap	0.1%
Detergent (linear alkyl benzyl sulfonate or LAS)	0.1%
Bacteriological	BOD not less than 700 ppm

*Volumetric percentages of concentrated C.P. grade reagents.

2.4 BASIC SHEET DIMENSIONS

a. Liner sheets shall be a minimum of 0.065 inch in thickness. Locking extensions (T-shaped) of the same material as that of the liner shall be integrally extruded with the sheet. Locking extensions shall be approximately 2 1/2 inches apart and shall be at least 0.375 inch high.

b. Sheets shall have a nominal width of 48 inches and a length of no more than 24 feet except that longer lengths may be supplied on special order. Lengths specified shall include a tolerance at a ratio of ±1/4 inches for each 100 inches.

c. Special sized, factory pre-welded and tested sheets shall be available on special order.

2.5 PIPE-SIZE SHEETS AND ACCESSORIES

a. Pipe linings shall be supplied as pipe-size sheets, fabricated by shop-welding the basic-size sheets together. Shop welds shall be made by lapping sheets a minimum of ½ inch and applying heat and pressure to the lap to produce a continuous welded joint. Tensile strength measure across shop-welded joints in accordance with ASTM D 412 shall be at least 2000 psi.

b. If required, strap channels shall be 1 inch wide maximum of 3/16 inch remains.

c. Sheets also can be supplied in prefabricated, pipe-size tubular-shaped sheets, ready to lower onto the inner pipe forms. These normally do not require the use of strap channels.

d. Welding strips shall be approximately 1 inch wide with a minimum width of 7/8 inch. The edges of weld strips shall be beveled in the manufacturing process. Thickness of weld strip shall be a normal 1/8 inch.

e. Joint strips for pipe shall be 4 inches wide with a minimum width of 3 1/2 inches. Thickness of joint strips shall be a nominal of 3/32 inch.

f. Prior to preparing the sheets for shipment, they shall be tested for pinholes using an electrical spark tester set between 18,000 and 22,000 volts. Any holes shall be repaired and retested.

2.6 FLAPS

Transverse flaps may be provided at the ends of sheets for pipe. Locking extensions shall be removed from flaps so that a maximum of 1/32 inch of the base of the locking extension is left on the sheet. **Overlap shall be in the direction of flow.**

2.7 ADHESIVES AND CLEANERS

2.7.1 Adhesives

Adhesives that will deleteriously affect the liner or strip in any way shall not be applied to the liner or to any of the liner strips. Flammable adhesives and solvents shall not be used for nay purpose in connection with plastic liner with locking extensions.

2.7.2 Cleaning Agents

Cleaning agents for use with plastic liner with locking extensions shall be a water soluble, nonflammable product not detrimental to the plastic liner.

2.8 FACTORY TESTING

The liner shall be shop tested for holes with a spark tester set to provide form 18,000 to 22,000 volts. Prior to shipment from the manufacturer's plant, sheets having holes shall be shop-repaired an retested. Repairs shall be made by welders qualified as specified in Part 3, EXECUTION. The Contracting Officer may test samples at the point of manufacture during production of sheet and strip material.

PART 3 EXECUTION

3.1 QUALIFICATION OF INSTALLERS

3.1.1 Applicators

The application of plastic liner to forms and other surfaces shall be considered as highly specialized work, and personnel performing this type of work shall be trained in methods of installation.

3.1.2 Welders

Each welder shall pre-qualify by successfully passing a welding test before doing any welding. Pre-qualification may be required at any time deemed necessary by the Contracting Officer. All test welds shall be made in the presence of the Contracting Officer and shall consist of the following:

a. Two pieces of liner, at least 15 inches long and 9 inches wide, shall be lapped 1 1/2 inches and held in a vertical position.

b. A welding strip shall be positioned over the edge of the lap and welded to both pieces of liner. Each end of the welding strip shall extend at least 2 inches beyond the liner to provide tabs.

c. The weld specimen shall be submitted to the Contracting Officer and will be tested as follows:

1. Each welding strip tab, tested separately, shall be subjected to a 10-pound pull normal to the face of the liner with the liner secured firmly in place. There shall be no separation between the strip and liner when the welding tables are submitted to the test pulls.

2. Three test specimens shall be cut from the welded sample and tested in tension across the welds. If none of these specimens fail when tested as specified in Part 2, Paragraph 2.5.a, the weld will be considered as satisfactory in tension.

3. If one of the specimens fails to pass the tension test, a retest will be permitted. The retest shall consist of testing three additional specimen cut form the original weld sample. If all three of the retest specimens pass the test, the weld will be considered satisfactory.

d. A disqualified welder may submit a new welding sample after receiving sufficient off-the-job training to warrant reexamination.

3.2 GENERAL

a. Installation of the lining, including preheating of sheets in cold weather and the welding of all joints, shall be done in accordance with the recommendations of the liner manufacturer.

b. Coverage of the lining shall not be less than the minimum shown on the plans. The interior of all pipe shall be lined with a minimum of 330 degrees of coverage. The non-lined portion of the pipe shall be centered about the flow line of the pipe.

c. The lining shall be installed with the locking extensions running parallel with the longitudinal axis of the pipe.

d. The lining shall be held snugly in place against inner forms.

e. Locking extensions shall terminate not more than 1 1/2 inches from the end of the inside surface of the pipe section. Joint flaps when used shall extend approximately 4 inches beyond the end of the inside surface.

f. Concrete poured against lining shall be vibrated, spaded or compacted in a careful manner so as to protect the lining and produce a dense, homogenous concrete, securely anchoring the locking extensions into the concrete.

g. In removing forms, care should be taken to protect the lining from damage. Sharp instruments shall not be used to pry forms from lined surfaces. When forms are removed, any nails that remain in the lining shall be pulled, without tearing the lining, and the resulting holes clearly marked.

h. All nail and tie holes and all cut, torn and seriously abraded areas in the lining shall be patched. Patches made entirely with welding strip shall be fused to the liner over the entire patch area. Larger patches may consist of smooth liner sheet applied over the damaged area with adhesive. All edges must be covered with welding strip fused to the patch and the sound lining adjoining the damaged area.

i. Hot joint compounds, such as coal tar, shall not be poured or applied to the lining.

j. The contractor shall take all necessary measures to prevent damage to installed lining from equipment and materials used in or taken through the work.

3.3 APPLICATION TO CONCRETE PIPE - SPECIAL REQUIREMENTS

a. The lining shall be set flush with the inner edges of the bell or spigot end of a pipe section and **shall extend to approximately 4 inches beyond the opposite end.**

b. Wherever concrete pipe or cast-in-place structures protected with lining, join structures not so lined (such as brick structures, concrete pipe or cast-in-place structures with clay lining or clay pipe), the lining shall be extended over and around the end of the pipe and back into the structure for not less than 4 inches. This protecting cap may be molded or fabricated from the lining material but need not be locked into the pipe.

c. Where a pipe lateral (not of plastic lined concrete) is installed through lined concrete pipe, the seal between the lined portion and the lateral shall be made by the method prescribed for cast-in-place structures under Paragraph 3.5.b.

d. Lined concrete pipe may be cured by standard curing methods.

e. Care shall be exercised in handling, transporting and placing lined pipe to prevent damage to the lining. No interior hooks or slings shall be used in lifting pipe. All handling operations shall be done with an exterior sling or with a suitable fork lift.

f. **(Deleted)**

g. No pipe with damaged lining will be accepted until the damage has been repaired to the satisfaction of the Contracting Officer.

3.4 FIELD JOINTS IN LINING FOR CONCRETE PIPE

a. The joint between sections of lined pipe shall be prepared in the following manner: If required, the inside joint shall be filled and carefully pointed with cement mortar in such a manner that the mortar shall not, at any point, extend into the pipe beyond the straight line connecting the surfaces of the adjacent pipe sections. Pipe joints must be dry before lining joints are made.

b. All mortar and other foreign materials shall be removed from lining surfaces adjacent to the pipe joint, leaving them clean and dry.

c. Field joints in the lining at pipe joints **shall be**:

Type P-2: The joint shall be made with a joint flap with locking extensions removed per Paragraph 2.6 and extending approximately 4 inches beyond the pipe end. The joint flap shall overlap the lining in the adjacent pipe section a minimum of 1/2 inch and be heat-sealed in place prior to welding. The field joint shall be completed by welding the flap to the lining of the adjacent pipe using 1 inch weld strip. Care shall be taken to protect the flap from damage. Excessive tension and distortion in bending back the flap to expose the pipe during laying and joint mortaring shall be avoided. At temperatures below 50 degree F, heating of the liner may be required to avoid damage.

d. The joint flap or strip on beveled pipe shall be trimmed to a width (measured from the end of the spigot) of approximately 4 inches for the entire circumferential length of the lining.

e. All welding of joints is to be in strict conformance with the specifications and instructions of the lining manufacture. Welding shall fuse both sheets and weld strip together to provide a continuous joint equal in corrosion resistance and impermeability to the liner plate. Hot air welding tools shall provide effluent air to the sheets to be joined at a temperature between 500 and 600 degrees F. Welding tools shall be held approximately 1/2 inch from and moved back and forth over the junction of the two materials to be joined. The welding tool shall be moved slowly enough as the weld progresses to cause a small bead of molten material to be visible along both edges and in front of the weld strip.

f. **(Deleted)**

3.5 APPLICATION TO CAST-IN-PLACE CONCRETE STRUCTURES - SPECIAL REQUIREMENTS

a. Linear sheets shall be closely fitted and properly secured to the inner forms. Sheets shall be cut to fit curved and warped surfaces using a minimum number of separate pieces.

b. Unless otherwise shown on the plans, the lining shall be returned at least 3 inches at the surfaces of contact between the concrete structure and items not of concrete (including manhole frames, gate guides, clay pipe or brick manholes and clay or cast iron pipes). The same procedure shall be followed at joints where the type of protective lining is changed or the new work is built to join existing unlined concrete. At each return, the returned liner shall be sealed to the item in contact with the plastic-lined concrete using the adhesive system recommended by the liner manufacturer. If the liner cannot be sealed with this adhesive because of the joint at the return being too wide or rough or because of safety regulations, the joint space shall be densely caulked with lead wool or other approved caulking material to a depth of 2 inches and finished with a minimum of 1 inch of an approved corrosion resistant material.

3.6 JOINTS IN LINING FOR CAST-IN-PLACE CONCRETE STRUCTURES

a. Lining at joints shall be free of all mortar and other foreign material and shall be clean and dry before joints are made.

b. Field joints in the lining shall be of the following described types, used as prescribed:

Type C-1: The joint shall be made with a separate 4 inch joint strip and two welding strips. The 4 inch joint strip shall be centered over the joint, heat-sealed to the liner then welded along each edge to adjacent sheets with a 1 inch wide welding strip. The width of the space between adjacent sheets shall not exceed 2 inches. The 4 inch joint strip shall lap over each sheet a minimum of 1/2 inch. It may be used at any transverse or longitudinal joint.

Type C-2: The joint shall be made by lapping sheets not less than 1/2 inch. One 1 inch welding strip is required. The upstream sheet shall overlap the one downstream. The lap shall be heat-sealed into place prior to welding on the 1 inch welding strip.

Type C-3: The joint shall be made by applying 2 inch waterproof tape or 1 inch wide welding strip on the back of the maximum 1/4 inch gap butt joint or by some other method approved by the engineer to prevent wet concrete from getting under the sheet. After the forms have been stripped, a 1 inch welding strip shall be applied over the face of the sheet.

c. All welding is to be in strict conformance with the specifications of the lining manufacturer and Paragraph 3.4.e.

3.7 TESTING AND REPAIRING DAMAGED SURFACES

a. After the pipe is installed in the trench, all surfaces covered with lining, including welds, shall be tested with an approved electrical holiday detector (Tinker & Rasor Model No. AP-W with power pack) with the instrument set between 18,00 and 22,00 volts. All welds shall be physically tested by a nondestructive probing method. All patches over holes, or repairs to the liner wherever damage has occurred, shall be accomplished in accordance with Paragraph 3.2.h.

b. Each transverse welding strip which extends to a lower edge of the liner shall be tested and approved by the Contracting Officer. The welding strips shall extend 2 inches below the liner to provide a tab. A 10-pound pull will be applied to each tab. The force will be applied normal to the face of the structure by means of a spring balance. Liner adjoining the welding strip will be held against the concrete during application of the force. The 10-pound pull will be maintained if a weld failure develops, until no further separation occurs. Defective welds will be retested after repairs have been made. Tabs shall be trimmed away neatly by the installer of the liner after the welding strip has passed inspection. Inspection shall be made within 2 days after the joint has been completed in order to prevent tearing the projecting weld strip and consequently damage to the liner from equipment and materials used in or taken through the work.

3.8 CLEAN UP

Before acceptance, the liner shall be cleaned to the satisfaction of the

Contracting Officer.

-- End of Section --

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DIVISION 13 - SPECIAL CONSTRUCTION

SECTION 13120

DIGITAL PHOTO DOCUMENTATION

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SECTION 13120

DIGITAL PHOTO DOCUMENTATION

PART 1 GENERAL

1.1 CONTRACTOR PHOTOS

The Contractor shall take regular photos of the Project as indicated in Part 3, Subpart 3.1. These photos, used in conjunction with the approved Project Schedule shall be used to measure the progress of the work, to aid in evaluating time extensions, and to provide the basis of all progress payments.

1.2 BASIS FOR PAYMENT

The digital photos and the schedule shall be the basis for measuring Contractor progress. Lack of digital photos and an approved, updated schedule shall result in an inability of the owner's representative to evaluate Contractor progress for the purposes of payment. Failure of the Contractor to provide all information, as specified below, shall result in the disapproval of the entire Project Schedule submission and the inability of the owner's representative to evaluate Contractor progress for payment purposes.

1.3 CONTRACTOR'S RESPONSIBILITY

The Contractor is responsible for visually documenting the entire project using a digital camera and a secure digital photo management system similar to the LYNX Digital Photo Management System. The Contractor shall designate an authorized representative who shall:

a. Take the digital photos.

b. Download them into a secure digital photo management system.

c. Add captions, full descriptions and keywords to each photo.

d. Link each photo to the project's schedule by attaching the appropriate activity id to each photo.

e. Transfer a copy of all photos and their related notes, keywords, captions, activity id's to the owner's representative on a weekly basis.

1.3.1 Contractor Shall Supply

a. A single user master digital photo management system on the jobsite. This master system shall include the hardware and software necessary to operate the' digital photo management system. The digital photo management system may be operated on the contractor's jobsite computer providing the jobsite computer meets the minimum hardware requirements of the digital photo

management system and it has adequate hard disk space available. Adequate hard disk space will be 500 megabytes of space reserved for the digital photo management system software and the digital photos.

b. Maintenance and support for the digital photo management software for the duration of the project.

c. **Eight (8) digital cameras, one of which writes directly to a CD**.

d. A digital camcorder.

e. 4 copies of the digital photo management system viewer software to be utilized by the owner's representative, architect, engineer, etc.

The digital **cameras, the camcorder,** and the master digital photo management software shall be turned over to the owner at the end of the project.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Digital Camera
Digital Camcorder
Photo Management System

Eight (8) copies of product brochures of the digital camera and the secure digital photo management system

PART 2 PRODUCTS

2.1 DIGITAL CAMERA

Seven (7) of the digital cameras shall be **Sony DSC- P-9 Cybershot** or equal and shall meet the following minimum specifications:

a. Imager: 1/1.8" 4.0 MegaPixel effective

b. Recording Media: Memory Stick® Media

c. Zoom: 3X Optical/2X Digital/6X Total

d. 35MM Equivalency: 39~117mm

e. Focal Length: 8 - 24mm

f. Aperture: f2.8 - 5.6

g. Focus: 3 Area Multi-Point AF, 5 Step Manual Preset

h. Minimum Focus Distance: 3.9" (10 cm) Macro Mode

i. Shutter Speed: Auto, 1/30 - 1/2000 sec, Twilight 2 sec - 1/2000

j. Manual Exposure: ±2.0 EV, 1/3 EV Steps

k. Flash Modes Auto/Forced On/Forced Off, Red-Eye Reduction On/Off

l. Color LCD: 1.5" 123K Pixels Low Temperature Polysilicon TFT

m. Flash Effective Range: 1.3 - 12.5 ft (0.4 - 3.8m)

n. ISO: Auto, 100, 200, 400

o. Scene Modes: Twilight, Twilight Portrait, Landscape

p. Video Output: NTSC/PAL Selectable

r. MPEG Movie Modes: MPEG HQX (320 x 240)

One digital camera shall be Sony MVC-CD400 4.0 MP CD Mavica or equal and shall meet the following minimum specifications:

a. Stores images directly on 156 MD CD-R/RAW media

b. Multi-point auto focus

c. Image Sizes: Still: 2272x1704, 2272(3:2), 1600x1200, 1280x960, 640x480, MPEG: 320x240 and 160x120, ClipMotion GIF: 160x120 and 80x72

d. Recording Formats: Still: JPEG, TIFF, GIF, Movie: MPEG EX (160x120 or 320x240 at 8fps length limited only by available storage media - 45 mins on 64MB), MPEG HQ (160x120 or 320x240 @ 16fps preset lengths of 5, 10 15sec)

e. A/D Conversion: 14-bit DXP

f. 35MM Equivalency: 34-102mm

g. Focus: Contrast Detect w/AF illuminator light, Autofocus 19.7" to infinity, Macro AF 1.6" minimum, 13-step Manual focus

h. ISO: Auto, 100, 200, 400

i. Exposure Metering: Center-weighted Averaging or Spot

j. Shutter Priority Range: 8 sec to 1/1000 sec in 40 steps

k. Aperture Priority Range: F2.0-8.0 in 13 steps

l. Manual Exposure: Yes with EV indicator

m. Flash Modes: Auto, Forced, Redeye, Off

n. Flash Level Adjustment: Auto, High, Low

o. Flash Range: 1 to 9.8 feet (0.3m to 3.0m)

p. External Flash: Optional HVL-F1000 via ACC port and flash shoe

q. Color LCD: 1.8-inch 123,200 pixels (560x220) TFT w/backlight

r. MPEG 6X Cue/Review: Yes, EX or HQ

s. Storage Supplied: 16MB Memory Stick, can use any capacity Memory Stick

t. Connections: Video, USB, AC power, ACC flash port

u. Battery: InfoLithium NP-FM50 7.2v 8.5Wh (1180mAH) w/AC-L10 charger & AC supply

2.2 DIGITAL CAMCORDER

The digital camcorder shall be Sony DCR-PC101 MiniDV Handycam® Camcorder or equal and shall meet the following minimum specifications:

a. Imaging Device: 1/4.7" 1,070K Gross Pixels.

b. Video Actual: 690K Pixels.

c. Still Actual: 1,000K Pixels.

d. Aperture range: F1.8- 2.

e. Optical Zoom: 10X; Digital Zoom: 120X.

f. Focal Distance: 3.7-37mm.

g. 35mm Conversion: 50- 500mm (Camera Mode); 42- 420mm (Memory Mode).

h. Filter Diameter: 30mm

i. Focusing: Full Range Auto/Manual.

j. Minimum Illumination: 7 Lux (0 Lux with NightShot® Infrared System)

k. Shutter Speeds: 1/4-1/4000 (AE Mode)

l. NightShot Infrared System: Super NightShot, Color Slow Shutter

m. Viewfinder: Color (180k Pixels)

n. Accessory Shoe: Intelligent

o. Memory Mode: 1152 x 864, 640 x 480

p. Video Input/Output: Special and S-Video

q. Audio Input/Output: Stereo

r. i.LINK® DV Interface (IEEE1394): 4-Pin

s. Mic Input: Stereo

t. Power Consumption: VF/LCD/VF+LCD 3.3W/4.0W/4.3W

u. OS Compatibility: Microsoft® Windows® 98SE, 2000, Me, XP;

v. Portable Printer Capable

w. MPEG Movie EX Mode: 320 x 240, 160 x 112

x. USB Terminal/USBStreaming: 320 x 240 (up to 30 frames/sec)

2.3 SECURE DIGITAL PHOTO MANAGEMENT SYSTEM

The computer software system utilized by the Contractor to document the Project with digital photos shall be capable of providing all of the requirements of this specification. The photos shall be downloaded by and stored in the LYNX Digital Photo Management System (800-873-0700) or approved equal. The digital photo management system shall:

a. Be a commercially available product that has been on the market for at least one year.

b. Download the camera directly into a high-speed database.

c. Keep an unchangeable log of each download, and document the exact date and time of the download.

d. Automatically compress the photos to an average of approximately 30k per photo.

e. Secure the photos as soon as they are downloaded so that they cannot be modified.

f. Provide a mechanism for verifying the integrity of the photos each time they are viewed to ensure that they haven't been modified.

g. Provide visual indicators that the photos are secure.

h. Automatically store the date and time with each photo where it cannot be modified.

i. Automatically identify each photo with the serial number of the system that downloaded it, the download number, the photo number from the roll, and the person's name that took the photo. This information must be protected so that it can't be modified.

j. Allow a caption of up to 30 characters to be attached to each photo. This caption shall appear automatically in the photo browser when the mouse pointer passes over the thumbnail of the photo.

k. Allow a permanent description of up to 5,000 characters to be placed on each photo. Once the photo is filed this is permanent.

l. Provide a file management system that allows and unlimited number of photos to be archived and retrieved easily. The system must be capable of automatically splitting its image database into multiple files that can be relocated by the system to removable media if desired (zip drives, read-write optical drives, etc.).

m. Automatically store the photos in reverse date and time order.

n. Allow the photos to be retrieved by date range instantly.

o. Allow the photos to be located by keywords.

p. Include built-in file transfer capabilities that will allow photos to be transferred easily from system to system using built-in modem software, floppy disk, Internet, etc. This file transfer system shall have the ability to automatically select all new photos from the database, place a copy of these photos in a secure transfer packet along with their notes, keywords, etc., and send this secure packet to other systems.

q. Include the ability to link the digital photos directly to the project's schedule (Primavera P3, SureTrak or Microsoft Project), and view all of the photos for a given activity instantly directly from the schedule.

r. Include the ability to share the photos and their descriptions with parties that don't have a digital photo management system by creating diskettes with photos and their text descriptions. A royalty free viewer shall be placed on each of these diskettes that will allow the receiving party to view the photos and their descriptions.

PART 3 EXECUTION

3.1 PHOTO REQUIREMENTS

The Contractor shall document the Project by taking the following photos:

a. Each Friday the Contractor shall take at least one photo of each item listed on the schedule that is a) in progress or b) supposed to be in progress.

b. Each Friday one photo shall be taken from the same 16 locations around the jobsite. These locations will be determined at the beginning of the job by the owners representative. They shall be identified in the keywords field as directed by the owner's representative. For example, one of the photos may be taken each week from the north property line and it would be identified Nl in the keywords field, WI would identify the photo taken from the west property line, etc. This will allow the project to be viewed from that point instantly by calling up all photos with the keyword NI, WI, etc.

c. Each day photos shall be taken of the large items of equipment as they are delivered to the job site (chillers, generators, etc.)

d. Once a week at least one photo shall be taken on any item that is considered to be a delay by the Contractor or Owner. The keyword DELAY shall be attached to these photos and a description of the delay shall be typed in the permanent description field.

e. Immediately prior to the submission of the requisition each month, one photo shall be taken of each work activity and stored material line item in the requisition that is being requested. These photos shall be identified with a caption that is the same as the requisition's description, and the keyword shall be REQxxx where xxx is the line number from the requisition.

f. Photos shall be taken immediately of all problem areas.

g. Where possible, photos shall be taken of all items that are included in a Request for Information (RFI). These photos shall be identified in the keyword field of the photo as RFIxxx where xxx is the RFI number.

h. Other miscellaneous photos shall be taken of other items as directed by the owner's representative (up to 50 photos per week).

3.2 TRANSFERRING PHOTOS

A packet transfer of all the new Project photos shall be sent to the owner's representative each week by one of the following methods as required:

a. Floppy diskette (1.44 meg - Windows 95 format)

b. Internet e-mail attachment.

c. Direct modem connection.

d. CD-ROM.

Packets may be sent on a more frequent basis if requested by the owner's representative.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 15 - MECHANICAL

SECTION 15100

VALVES

-- End of Section Table of Contents --

SECTION 15100

VALVES

PART 1 GENERAL

1.1 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals required and install complete and ready for operation and test all valves as shown on the Drawings and as specified herein. The equipment shall include, but not be limited to, the following. However all items specified herein may not be included in this project.

1. Valve Actuators - General
2. Knife Gate Valves

1.2 RELATED WORK

Pipeline appurtenances are included in Section 15120 and include the following:

1. Unions
2. Flanged Joints
3. Plugs and Caps
4. Miscellaneous Adaptors
5. Flexible Connectors

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI B16.1	Cast Iron Pipe Flanges and Flanged Fittings Classes 25, 125 and 250

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C504	Rubber-Sealed Butterfly Valves

MANUFACTURER'S STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

MSS-SP-61	Pressure Testing of Steel Valves
MSS SP-81	Stainless Steel, Bonnetless, Flanged, Knife Gate Valves

National Electrical Manufacturers Association (NEMA)

Underwriters Laboratories (UL)

Factory Mutual (FM)

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

System Description; G

1. Certified drawings showing all important details of construction and dimensions.

2. Descriptive literature, bulletins and/or catalogs of the equipment.

3. The total weight of each item.

4. A complete bill of materials.

5. Additional submittal data, where noted with individual pieces of equipment.

SD-06 Test Reports

Factory Testing; G

Provide certified hydrostatic test data, per manufacturers standard procedure or MSS-SP-61 for all valves.

SD-07 Certificates

Certifications; G

For each valve specified to be manufactured, tested and/or installed in accordance with AWWA and other standards, submit an affidavit of compliance with the appropriate standards, including certified results of required tests and certification of proper installation.

SD-08 Manufacturer's Instructions

Valves and Appurtenances

Manufacturer's Installation and Application Data.

SD-10 Operation and Maintenance Data

Maintenance

Operating and maintenance data for knife gate valves.

1.5 QUALITY ASSURANCE

1.5.1 Qualifications

Valves and appurtenances shall be products of well established firms who are fully experienced, minimum 10 years, reputable and qualified in the manufacture of the particular equipment to be furnished.

The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with this Section as applicable.

All units of the same type shall be the product of one manufacturer.

1.5.2 Certifications

The Contractor shall furnish a manufacturer's affidavit of compliance with Standards referred to herein. Refer to PART 3 for testing required for certain items in addition to that required by referenced standards.

1.5.3 Inspection of Units

Inspection of the units may also be made by the Contracting Officer or other representative of the Government after delivery. The equipment shall be subject to rejection at any due to failure to meet any of the specified requirements, even though submittal data may have been accepted previously. Equipment rejected after delivery shall be marked for identification and shall be removed from the job site at once.

1.6 SYSTEM DESCRIPTION

All of the equipment and materials specified herein is intended to be standard for use in controlling the flow of wastewater, sludges, air and chemicals, raw, filtered and finished water as noted on the Drawings.

1.6.1 Valves, Appurtenances and Miscellaneous Items

Valves, appurtenances and miscellaneous items shall be installed as shown on the Drawings and as specified, so as to form complete workable systems.

1.7 DELIVERY, STORAGE AND HANDLING

1.7.1 Packing and Shipping

Care shall be taken in loading, transporting and unloading to prevent injury to the valves, appurtenances, or coatings. Equipment shall not be dropped. All valves and appurtenances shall be examined before installation and no piece shall be installed which is found to be defective. Any damage to the coatings shall be repaired as acceptable to the Contracting Officer.

Prior to shipping, the ends of all valves shall be acceptably covered to prevent entry of foreign material. Covers shall remain in place until after installation and connecting piping is completed.

a. All valves 3-in and larger shall be shipped and stored on site

until time of use with wood or plywood covers on each valve end.

b. Rising stems and exposed stem valves shall be coated with a protective oil film which shall be maintained until the valve is installed and put into use.

c. Any corrosion in evidence at the time of acceptance by the Owner shall be removed, or the valve shall be removed and replaced.

1.7.2 Storage and Protection

Special care shall be taken to prevent plastic and similar brittle items from being directly exposed to the sun, or exposed to extremes in temperature, to prevent deformation. See the individual piping sections and manufacturer's information for further requirements.

1.8 MAINTENANCE

1.8.1 Tools

Provide all special tools required for normal maintenance. Tools shall be packaged in a steel case, clearly and indelibly marked on the exterior to indicate equipment for which tools are intended.

1.8.2 Spare and Replacement Parts

Provide to the Contracting Officer a list of all spare and replacement parts with individual prices and location where they are available.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT - GENERAL

2.1.1 Manufacturer

The use of a manufacturer's name and/or model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

2.1.2 Sizes

Valves and appurtenances shall be of the size shown on the Drawings or as noted and as far as possible equipment of the same type shall be identical and from one manufacturer.

2.1.3 Marking

Valves and appurtenances shall have the name of the maker, nominal size, flow directional arrows, working pressure for which they are designed and standard referenced, cast in raised letters or indelibly marked upon some appropriate part of the body.

2.1.4 Working Pressure

Unless otherwise noted, valves shall have a minimum working pressure of 150 psi.

2.1.5 Special Adaptors

Provide all special adaptors as required to ensure compatibility between valves, appurtenances and adjacent pipe.

2.1.6 Durability

Valves and actuators located outdoors but not within a building; within maximum 2-ft above liquid; in vaults; or where otherwise noted shall be especially designed for submerged service where water may completely submerge the valve and operator. All other units shall be as a minimum weather tight.

2.2 VALVE ACTUATORS - GENERAL

2.2.1 Valve Actuators

The valve manufacturer shall supply and integrally, rigidly mount all actuators, including any type of manual on valves at the factory. The valves and their individual actuators shall be shipped as a unit.

2.2.2 Manual Actuator

Unless otherwise noted, valves shall be manually actuated.

2.2.3 Operation

All actuators shall be capable of moving the valve from the full open to full close position and in reverse and holding the valve at any position part way between full open or closed.

2.2.4 Markings

Each operating device shall have cast on it the word "OPEN" or "CLOSE" and an arrow indicating the direction of operation.

2.2.5 Stem Guides

Stem guides shall be of the adjustable wall bracket type, bronze bushed, with maximum spacing of 10-ft as manufactured by Clow; Rodney Hunt or equal. Extended operating nuts and/or stems shall have universal joints and pin couplings, if longer than 10-ft and a rating of at least five times the maximum operating torque. Stem adaptors shall be provided.

2.2.6 Appurtenances

Where required by the installation, or as specified, provide the following: extended stem; floor stand and handwheel; position indicator and etched or cast arrow to show direction of rotation to open the valve; resilient, moisture-resistant seal around stem penetration of slab.

2.2.7 Gear Actuators

Unless otherwise noted, gear actuators shall be provided for the following:

1. All valves of larger than 8-in nominal diameter.

2. Gear actuators shall be of the worm or helical gear type with output shaft perpendicular to valve shaft, having a removable hand wheel mounted on the output shaft. Unless noted they shall conform to AWWA C504, but except with butterfly valves, need not

be certified.

3. Actuators shall be capable of being removed from the valve without dismantling the valve or removing the valve from the line.

4. Gearing shall be machine-cut steel designed for smooth operation. Bearings shall be permanently lubricated, with bronze bearing bushings provided to take all thrusts and seals and to contain lubricants. Housings shall be sealed to exclude moisture and dirt, allow the reduction mechanisms to operate in lubricant and be of the same material as the valve body.

5. Manual operator input effort to the handwheel shall be a maximum of 40 ft-lbs for operating the valve from full open to full close, under any conditions. Gear actuators shall indicate valve position and have adjustable stops. Maximum handwheel size shall be 24-in diameter.

2.2.8 Markings

All position indication and direction of opening arrows shall be embossed, stamped, engraved, etched or raised decals.

2.2.9 Position Indicators

Unless otherwise noted, all valves larger than 3-in nominal diameter shall be provided with position indicators at the point of operation.

2.3 KNIFE GATE VALVES

Knife gate valves shall be metal seated, rated at 60 psig cold working pressure (CWP) with a pressure-retaining bonnet that fully encloses the gate. Valves shall be suitable for buried service, with an extended rising stem and a separate non-rising operator that shall be designed for installation below grade in a cast concrete vault. The operator shall be designed so that no portion of the valve stem or operator projects above the bottom of the vault cover at any time.

The valve stem extension shall be fully enclosed, with the packing gland extending into the operator vault so that it is accessible from inside the vault. Elevations of the valve centerline and the top of the vault are shown on the contract drawings.

Valves shall be as manufactured by HILTON VALVE, INC. of Redmond, WA, or approved equal.

2.3.1 Materials

2.3.1.1 Body & Bonnet

All wetted parts of the body and bonnet shall be 316 SS, including fasteners. Exterior flanges and stiffeners shall be cast or fabricated carbon steel. The 316 SS body cladding and face rings shall be fully welded to the carbon steel body - "floating" body liners are not acceptable.

2.3.1.2 Gate

The gate shall be 316 SS, suitable for the service conditions, and shall be ground and polished to a minimum surface finish of 32 micro-inch/inch R.M.S.

2.3.1.3 Seat

The metal seat shall be 316 SS, integral with the valve body. The seat shall be machined smooth to provide the required shutoff, and shall include Stellite #6 hardfacing and solid Molybdenum permanent lubrication to prevent galling.

2.3.1.4 Stem

The stem shall be 316 SS. To facilitate shipping and installation the stem shall be supplied in two (2) segments, joined with a bolted 316 SS coupling.

2.3.1.5 Stem Extension Casing

The stem extension casing shall be 316 SS, of suitable strength to resist bending. The casing shall be supplied in two (2) segments, connected with a flanged joint. One segment shall be welded or bolted to the top of the bonnet.

2.3.1.6 Stem Bushings

Bronze stem bushings shall be provided inside the stem extension casing, located so that L/r for the stem is less than 200.

2.3.1.7 Packing

The packing shall be Teflon-impregnated synthetic fiber, without included asbestos. The packing shall be replaceable without disassembling the valve or removing the valve from the pipeline.

2.3.2 Manual Operator

2.3.2.1 Operator

A non-rising operator shall be provided to raise and lower the rising valve stem. The operator shall be suitable for installation below grade within the operator vault and shall be designed so that no portion of the valve stem or operator projects above the bottom of the vault cover at any time.

2.3.2.2 Lifting Stems

The dual lifting stems shall be 303 SS or 304 SS with ACME threads. Stem nuts shall be bronze.

2.3.2.3 Gearing

Gearing shall be provided so that the valve can be operated with a 2" square opening nut with a maximum input of 40 ft-lb. The top of the operating nut shall be located approximately 2" below the bottom of the vault cover and shall be operable through a small access hole in the main vault cover. The direction of rotation shall be clearly marked.

2.3.2.4 Position Indicator

A geared position indicator shall be provided, visible through the access hole while the valve is being operated with the 2" operating nut. The position indicator shall be graduated and shall show continuous valve position between full closed and full open.

2.3.2.5 Gear Operators

Gear operators shall be fully enclosed and permanently lubricated, with a sealed housing to prevent contamination. Gearing shall be machine-cut steel designed for smooth operation.

2.3.3 Construction Details

2.3.3.1 Flanges

Flanges shall be raised face. The gasket surface shall be 304 SS and shall be fully machined with a spiral serrated finish. Flange drilling shall match ANSI B16.1, Class 125. All flange bolt holes shall be threaded.

2.3.3.2 Lubrication System

A lubrication system shall be provided for lubricating the stem and stem bushings. A lubrication point shall be provided at each stem bushing, and each lubrication point shall be connected with 316 SS piping to a grease fitting located within the operator vault.

2.3.4 Surface Preparation and Shop Coatings

Knife gate valves shall be coated with a shop applied fusion bond epoxy, 3-M Company Scotchkote 206N or 134, or approved equal.

2.3.5 Factory Inspection, Testing and Correction of Deficiencies

Factory inspection, testing and correction of deficiencies shall be done in accordance with the referenced standards and as noted herein.

2.3.5.1 Factory Testing

Factory testing shall be in accordance with MSS SP-81, as follows:

1. Shell Test: The valve body and bonnet shall be hydrostatically pressure tested at 1.5 times the rated working pressure with no visible leakage allowed (leakage through the packing or valve seat shall not be cause for rejection).

2. Gate Test: The valve shall be hydrostatically pressure tested at 1.1 times the rated working pressure with no visible leakage through the gate material allowed.

3. Seat Test: The valve shall be hydrostatically pressure tested at 40 psig differential pressure in the direction of closure. Maximum permissible leakage shall be 40 cc/min./inch of diameter.

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

3.1.1 Valves and Appurtenances

Valves and appurtenances shall be installed per the manufacturer's instructions in the locations shown, true to alignment and rigidly supported. Any damage to the above items shall be repaired to the satisfaction of the Contracting Officer before they are installed.

3.1.2 Brackets, Operators and Appurtenances

Install all brackets, extension rods, guides, the various types of operators and appurtenances as shown on the Drawings, or otherwise required. Before setting these items, check all Drawings and figures which have a direct bearing on their location. The Contractor shall be responsible for the proper location of valves and appurtenances during the construction of the work.

3.1.3 Defective Materials

All materials shall be carefully inspected for defects in construction and materials. All debris and foreign material shall be cleaned out of openings, etc. All valve flange covers shall remain in place until connected piping is in place. All operating mechanisms shall be operated to check their proper functioning and all nuts and bolts checked for tightness. Valves and other equipment which do not operate easily, or are otherwise defective, shall be repaired or replaced at no additional cost to the Government.

3.1.4 Installation Standards

Where installation is covered by a referenced standard, installation shall be in accordance with that standard, except as herein modified, and the Contractor shall certify such. Also note additional requirements in other parts of this Section.

3.1.5 Joints

Unless otherwise noted, joints for valves and appurtenances shall be made up utilizing the same procedures as specified under the applicable type connecting pipe joint and all valves and other items shall be installed in the proper position as recommended by the manufacturer. Contractor shall be responsible for verifying manufacturers' torquing requirements for all valves.

3.2 INSTALLATION OF MANUAL OPERATIONAL DEVICES

3.2.1 Operational Devices

Unless otherwise noted, all operational devices shall be installed with the units of the factory, as shown on the Drawings or as acceptable to the Contracting Officer to allow accessibility to operate and maintain the item and to prevent interference with other piping, valves and appurtenances.

3.2.2 Boxes and Stem Guides

Floor boxes, valve boxes, extension stems and low floor stands shall be installed vertically centered over the operating nut, with couplings as required and the elevation of the box top shall be adjusted to conform with the elevation of the finished floor surface or grade at the completion of the Contract. Boxes and stem guides shall be adequately supported during concrete pouring to maintain vertical alignment.

3.3 INSPECTION, TESTING AND CORRECTION OF DEFICIENCIES

3.3.1 Testing Precautions

Take care not to over pressure valves or appurtenances during pipe testing. If any unit proves to be defective, it shall be replaced or repaired to the satisfaction of the Contracting Officer.

3.3.2 Functional Test

Prior to plant startup, all items shall be inspected for proper alignment, quite operation, proper connection and satisfactory performance. All units shall be operated continuously while connected to the attached piping for at least 8 hours, without vibration, jamming, leakage, or overheating and perform the specified function.

3.3.3 Field Testing Valves and Appurtenances

The various pipelines in which the valves and appurtenances are to be installed are specified to be field tested. During these tests any defective valve or appurtenance shall be adjusted, removed and replaced, or otherwise made acceptable to the Contracting Officer.

3.3.4 Operational Tests

Various regulating valves, strainers, or other appurtenances shall be tested to demonstrate their conformance with the specified operational capabilities and any deficiencies shall be corrected or the device replaced or otherwise made acceptable to the Contracting Officer.

3.4 CLEANING

All items (including valve interiors) shall be cleaned prior to installation, testing and final acceptance.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 15 - MECHANICAL

SECTION 15120

PIPING SPECIALTIES

-- End of Section Table of Contents --

SECTION 15120

PIPING SPECIALTIES

PART 1 GENERAL

1.1 SCOPE OF WORK

This Section specifies the basic administrative and testing requirements for piping. The items shall include the following:

1. Flanged Joints
2. Plugs and Caps
3. Flexible Connectors
    a. Sleeve Couplings

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A36	(2001) Carbon Structural Steel
ASTM A307	(2000) Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
ASTM A325	(2002) Strength Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI B1.1	Unified Inch Screw Threads (UN and UNR Thread Form)
ANSI B18.2	Square and Hex Bolts and Screws Inch Series Including Hex Cap Screws and Lag Screws

AMERICAN SOCIETY OF MECHANICAL CONTRACTING OFFICERS (ASME)

AMERICAN WELDING SOCIETY (AWS)

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C219	(2001) Bolted, Sleeve-Type Couplings for Plain-End Pipe

Underwriters Laboratories (UL)

Factory Mutual (FM)

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Sleeve Couplings; G

Submit manufacturer's data for sleeve couplings.

SD-07 Certificates

Manufacturer's Certification; G

Submit manufacturer's certifications that materials meet minimum requirements as specified.

1.4 QUALITY ASSURANCE

The materials, installation and testing shall be inspected for compliance with the contract requirements.

1.4.1 New Materials

All materials shall be new and unused.

1.4.2 Piping Installations

Install piping appurtenances to meet requirements of local codes.

1.4.3 Certifications

Provide manufacturer's certification that materials meet or exceed minimum requirements as specified. Reference to standards such as ASTM and ANSI shall apply to those versions in effect at the time of bid opening.

1.4.4 Connections

Coordinate dimensions and drilling of flanges with flanges for valves, pumps and other equipment to be installed in piping systems. Bolt holes in flanges to straddle vertical centerline.

1.4.5 Reason for Rejection

Reject materials contaminated with gasoline, lubricating oil, liquid or gaseous fuel, aromatic compounds, paint solvent, paint thinner and acid solder.

1.4.6 Pipe-joint Compound

Pipe-joint compound, for pipe carrying flammable or toxic gas, must bear approval of UL or FM.

1.4.7 Design Pressure

Unless otherwise specified, pressures referred to in all piping sections are expressed in pounds per square inch, gauge, above atmospheric pressure, psig; all temperatures are expressed in degrees Fahrenheit (F).

1.5 DELIVERY, STORAGE AND HANDLING

During loading, transportation and unloading, take care to prevent damage. Carefully load and unload each pipe under control at all times. Place skids or blocks under each pipe in the shop and securely wedge pipe during transportation to ensure no injury to pipe and lining.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Specific piping materials and appurtenances are specified in the respective Piping or System Sections. The use of a manufacturers' name and/or model number is for the purpose of establishing the standard of quality and general configuration desired.

2.1.1 Equipment Size

Equipment shall be of the size shown on the Drawings or as noted and as far as possible equipment of the same type shall be identical and from one manufacturer.

2.1.2 Marking

Equipment shall have the name of the maker, nominal size, flow directional arrows (if applicable), working pressure for which they are designed and standard referenced specifications cast in raised letters or indelibly marked upon some appropriate part of the body.

2.1.3 Minimum Working Pressure

Unless otherwise noted, items shall have a minimum working pressure of 150 psi or be of the same working pressure as the pipe they connect to, whichever is higher and suitable for the pressures noted where they are installed.

2.2 FLANGED JOINTS

For non-submerged applications, bolts and nuts shall be Grade B, ASTM A307, except where otherwise specified within the applicable Piping Sections. For submerged applications, bolts and nuts shall be Type 316 stainless steel. Bolt number and size same as flange standard; studs - same quality as machine bolts; 1/8-in thick rubber gaskets with cloth insertions.

2.3 PLUGS AND CAPS

Provide standard plug or cap as required for testing; plugs, caps suitable for permanent service.

2.3.1 Work in Progress

Plug or cap or otherwise cover all piping work in progress, using caps furnished by the pipe supplier, or other acceptable caps or covers. Work

in progress shall be covered at the end of each work day.

2.3.2 Bolt-Hole Caps

Provide plastic bolt-hole insert caps for all flush-mounted bolting, including flush-mounted flanges and flush-mounted exterior mechanical joints.

2.4 FLEXIBLE CONNECTORS

2.4.1 Sleeve Couplings

Provide plain end type ends to be joined by sleeve couplings as stipulated in AWWA C219.

1) Join welds on ends by couplings without pipe stops. Grind flush to permit slipping coupling in at least one direction to clear pipe joint.

2) Outside diameter and out-of-round tolerances shall be within limits specified by coupling manufacturer.

3) Provide lugs in accordance with ASTM A36.

4) Provide hardened steel washers in accordance with ASTM A325.

5) Plastic plugs shall be fitted in coupling to protect bolt holes.

6) Nuts and bolts:

a. Provide bolts and bolt-studs in accordance with ASTM A307 and ANSI B1.1 with hexagonal or square heads, coarse thread fit, threaded full length with ends chamfered or rounded.

b. Project ends 1/4 inch beyond surface of nuts.

c. Hexagonal nuts with dimensions in accordance with ANSI B18.2 and coarse threads in accordance with ANSI B1.1.

2.4.1.1 Middle Ring

Middle ring of each mechanical coupling shall have a thickness at least equal to that specified for size of pipe on which coupling is to be used and shall not be less than 10 inches long for pipe 30-inch and larger and not less than 7 inches long for pipe under 30-inch in diameter.

a. Omit pipe stop from inner surface of middle rings of couplings in all cases to permit removal of valves, flowmeters and other installed equipment.

2.4.1.2 Clean and Prime

Clean and shop prime with manufacturer's standard rust inhibitive primer.

2.4.1.3 Gasket

Furnish gaskets of a composition suitable for exposure to the fluid service.

2.4.1.4 Pipe Type

Unless otherwise specified with the individual type of pipe, sleeve couplings shall be Victaulic Depend-O-Lok (unrestrained) or F x F (self-restrained); ITT (formerly Smith Blair) Style 411; Dresser Style 38, similar models by Baker or equal, with the pipe stop removed.

2.4.2 Flanged Adaptors

2.4.2.1 Flanged Adaptor for Grooved or Shouldered End Pipe

Flanged adaptor connections for grooved or shouldered end pipe compatible with split couplings at fittings, valves and equipment shall be VIC-Flange Style 341 (for ductile iron pipe) and VIC Flange Style 741/743 (for steel and stainless steel pipe) as manufactured by the Victaulic Company of America, equal by Depend-O-Lok F x F FAC by Victaulic Depend-O-Lok, Inc. or equal.

2.4.2.2 Flanged Adaptor for Plain End Pipe

Flanged adaptor connections for plain end pipe at fittings, valves, and equipment flanges shall be Dresser Style 127 or 128, equal by ITT (formerly Smith-Blair); Depend-O-Lok F x E FAC by Victaulic Depend-O-Lok or equal.

2.4.2.3 Stainless Steel

No ferrous metals shall be permitted to contact stainless steel pipe.

PART 3 EXECUTION

3.1 GENERAL

All dirt, scale, weld splatter, water and other foreign matter shall be removed from the inside and outside of all pipe and sub-assemblies prior to installing.

3.2 PIPE JOINTS AND CONNECTIONS

All pipe joints and connections to equipment shall be made in such a manner as to produce a minimum of strain at the joint. Use anti-sieze compound on all pipe bolts. Piping runs shall be installed completed up the last joint which shall remain open until such time as the temperature of the piping, throughout its length is between 59 and 63 degrees F.

3.3 INSTALLATION

Install piping in a neat manner with lines straight and parallel or at right angles to walls or column lines and with risers plumb. Run piping so as to avoid ductwork or passing over electrical panels or cabinets, and/or interference with other lines. All work shall be accomplished using recognized methods and procedures of pipe fabrication and in accordance with the latest revision of applicable ANSI Standards, ASME Codes and Pipe Fabrication Institute Standards.

1. Use full length of pipe except where cut lengths are necessary. Do not spring or deform piping to make up joints. All equipment connections shall be released before start-up.

2. Pipe shall be cut square, not upset, undersize or out of round. Ends shall be carefully reamed and cleaned before being installed. Bending of pipe is not permitted. Use fittings for all changes in

direction.

3. Do not use bushings except where specifically approved by the Contracting Officer.

4. Verify the locations and elevations of any existing piping and manholes before proceeding with work on any system. Any discrepancies between the information shown on the Drawings and the actual conditions found in the field shall be reported at once to the Contracting Officer.

5. Where lines of lower service rating tie into services or equipment of higher service rating the isolation valve between the two shall conform to the higher rating.

6. Mitering of pipe to form elbow is not permitted.

7. All piping interiors shall be thoroughly cleaned after installation and kept clean by approved temporary closures on all openings until the system is put in service.

8. End caps on pre-cleaned pipe shall not be removed until immediately before assembly. All open ends shall be capped immediately after completion of installation.

3.4 INSTALLATION OF SLEEVE COUPLINGS

Unless otherwise required by the manufacturer's instructions, prior to installation of sleeve couplings, the pipe ends shall be cleaned thoroughly for a distance of at least 12 inches. Soapy water may be used as a gasket lubricant. A follower and gasket, in that order, shall be slipped over each pipe to a distance of about 6 inches from the end, the middle ring shall be placed on the already installed pipe and shall be inserted into the middle ring flair and brought to proper position in relation to the pipe already installed. The gaskets and followers shall then be pressed evenly and firmly into the middle ring flares.

-- End of Section --

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