AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. *(If applicable)*
0002	2002 March 21		DACW09-02-B-0002

6. ISSUED BY CODE

U.S. ARMY ENGINEER DISTRICT, Los Angeles
P.O. Box 532711
Los Angeles, California 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

(√)	9A. AMENDMENT OF SOLICITATION NO.
X	DACW09-02-B-0002
	9B. DATED *(SEE ITEM 11)* 2002 April 18 (Bid Opening)
	10A. MODIFICATION OF CONTRACTS/ORDER NO.
	10B. DATED *(SEE ITEM 13)*

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[X] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers [X] 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 _____ 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.)*

F-1 CHANNEL, HUALAPAI WAY TO BELTWAY, LAS VEGAS WASH AND TRIBUTARIES (TROPICANA AND FLAMINGO WASHES), CLARK COUNTY, NEVADA

The North American Industry Classification System (NAICS) Code 23499, All Other Heavy Construction, Except Dredging and Surface Cleanup Activities, $27.5 M average annual gross revenue for the last three (3) fiscal years, is revised from $27.5 M to $28.5 M.

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

F-1 CHANNEL, HUALAPAI WAY TO BELTWAY, LAS VEGAS WASH AND TRIBUTARIES (TROPICANA AND FLAMINGO WASHES), CLARK COUNTY, NEVADA (Continued)

BLOCK 14 – Continued

REPLACE the following Specification Sections in the Original Solicitation with the enclosed Specification Sections for clarification purposes:

Section 00010
Section 00850
Section 01200
Section 01270
Section 01321
Section 01330
Section 01355
Section 01451
Section 02300
Section 02316
Section 02630
Section 02710
Section 02722
Section 02741
Section 02748
Section 02821
Section 03200
Section 05500
Section 09900

ADD the following enclosed Plans/Drawings for clarification purposes:

File No.	Sheet No.	Drawing Title
196/851	G1 of G5	PLAN OF EXPLORATION
196/852	G2 of G5	PLAN OF EXPLORATION
196/853	G3 of G5	SOIL CLASSIFICATION, LEGEND AND GENERAL NOTES
196/854	G4 of G5	LOGS OF EXPLORATION
196/855	G5 of G5	LOGS OF EXPLORATION

REMOVE the following Specification Sections from the Original Solicitation for clarification purposes:

Section 02510
Section 02531

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Section 00010	Solicitation, Offer and Award (SF1442)	SF1442 Front & Back
	And Bidding Schedule and Notes	00010-1 thru 00010-6
Section 00100	Instructions, Conditions, and Notice to Bidders	00100-1 thru 00100-11
Section 00600	Representations & Certifications	00600-1 thru 00600-14
Section 00700	Contract Clauses	00700-1 thru 00700-82
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DIVISION 00 - DOCUMENTS

SECTION 00010

BID SCHEDULE

PART 1 GENERAL

1.1 Base Bid
1.2 Optional Bid Items at Hualapai Way

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used

-- End of Document Table of Contents --

SECTION 00010

BID SCHEDULE

PART 1 GENERAL

1.1 **Base Bid**

Item	Description	Quantity	Unit	Unit Price	Amount
0001	Traffic Control	1	Job	LS	_____.__
0002	Diversion and Control of Water	1	Job	LS	_____.__
0003	Construction Water	1	Job	LS	_____.__
0004	Clear Site and Remove Obstructions	1	Job	LS	_____.__
0005	Ladder Systems	1	Job	LS	_____.__
0006	Channel Station Marking	1	Job	LS	_____.__
0007	Confluence Structure #1	1	Job	LS	_____.__
0008	Confluence Structure #2	1	Job	LS	_____.__
0009	Access Ramp #1	1	Job	LS	_____.__
0010	Access Ramp #2	1	Job	LS	_____.__
0011	RCB near Beltway (4.000 m x 3.660 m)	1	Job	LS	_____.__
0012	RCB Fort Apache Lateral (3.660 m x 2.440 m)	1	Job	LS	_____.__
0013	RCB at Fort Apache (5.000 m x 3.000 m)	1	Job	LS	_____.__
0014	RCB at Grand Canyon Drive (5.000 m x 3.000 m)	1	Job	LS	_____.__
0015	Side Drain Connection, Sta. 14+51.017	1	Job	LS	_____.__
0016	Side Drain Connection, Sta. 20+88.197	1	Job	LS	_____.__
0017	Side Drain Connection, Sta. 29+05.435	1	Job	LS	_____.__
0018	Side Drain Connection, Sta. 29+08.310	1	Job	LS	_____.__
0019	Side Drain Connection, Sta. 29+11.186	1	Job	LS	_____.__

Item	Description	Quantity	Unit	Unit Price	Amount
0020	Stilling Well	1	Job	LS	_____.__
0021	Excavation, Channel	98,030	m^3	_____.__	_____.__
0022	Compacted Fill, Channel	34,700	m^3	_____.__	_____.__
0023	Compacted Fill, Roadway	2,500	m^3	_____.__	_____.__
0024	Excess Material Disposal	54,480	m^3	_____.__	_____.__
0025	Reinforced Concrete Pipe 0.914 m Dia.	58.8	m	_____.__	_____.__
0026	Reinforced Concrete Pipe 1.219 m Dia.	4.8	m	_____.__	_____.__
0027	Reinforced Concrete Pipe 1.372 m Dia.	19.6	m	_____.__	_____.__
0028	Aggregate Base Course	1,817	t	_____.__	_____.__
0029	Asphalt Concrete Pavement	1,105	t	_____.__	_____.__
0030	Chain Link Fencing	3,850	m	_____.__	_____.__
0031	Swing Gate	11	Ea	_____.__	_____.__
0032	Post and Cable Railing	4,750	m	_____.__	_____.__
0033	Concrete, Invert	6,440	m^3	_____.__	_____.__
0034	Concrete, Wall	6,050	m^3	_____.__	_____.__
0035	Pre-Emergent Herbicide/Dust Pallative	2	HA	_____.__	_____.__

1.2 **Optional Bid Items at Hualapai Way**

Item	Description	Quantity	Unit	Unit Price	Amount
0036	F-1 RCB at Hualapai Way (4.000 m x 3.000 m)	1	Job	LS _____.__	
0037	F-2 RCB at Hualapai Way (5.000m x 3.000 m)	1	Job	LS _____.__	
0038	Side Drain Connection, Sta. 37+13.926	1	Job	LS _____.__	
0039	Reinforced Concrete Pipe 1.676 m Dia.	19.4	m	_____.__	_____.__

TOTAL ESTIMATED AMOUNT $_____.____

Basis of Bid shall be the entire work complete in accordance with the drawings and specifications for Base Bid Items, but not including the work indicated or specified to be provided under any Option Item.

Option may be exercised at the time of award or within 90 calendar days after award by the Contracting Officer. A firm fixed bid price is required for each option. No provision is made for economic price adjustment.

NOTE: 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.

If a bid or modification to a bid based on unit prices is submitted which provides for a lump sum adjustment to the total estimated cost, the application of the lump sum adjustment to each unit price in the SUPPLIES OR SERVICES AND PRICES/COSTS must be stated. If it is not stated, the bidder agrees that the lump sum adjustment shall be applied on a pro rate basis to every unit price in the SUPPLIES OR SERVICES AND PRICES/COSTS.

Amounts and prices shall be indicated in either figures or words, not both.

Bids shall be submitted on all items of the SUPPLIES OR SERVICES AND PRICES/COSTS.

Abbreviations:

m	=	meter
m^3	=	cubic meter
t	=	metric ton (1000 kilograms)
ea	=	each
LS	=	lump sum
HA	=	hectare

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

-- End of Section --

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. 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.

4. 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.

5. 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.

6. 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.

7. 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.

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

9. 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 00800.

10. 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.

11. 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.

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

13. 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.

14. At the formal bid opening for this solicitation, all hand carried bids submitted prior to 12:45 p.m. on the bid opening date will be accepted in Room 1035 by available personnel. For the time period 12:45p.m. to 1:00 p.m., bids must be submitted to Room 1035(bid opening room), to the bid-opening officer only. Bids will not be accepted by any other personnel or at any other location. No bid will be accepted after 1:00 p.m. The official bid opening time will be called by the Bid Opening Officer.

15. 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).

16. Bidders are to submit prices on all line items in the Base Bid (0001 through 0035). In addition, bidders must submit prices on all line items in the Optional Bid Items (0036 through 0040). The Government contemplates award of one contract to the responsive, responsible bidder who submits the lowest bid for the Base Bid and Optional Bid Items. Any bidder who submits a bid without all line items for both Base Bid and Optional Bid Items filled out comprehensively and correctly 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

General Decision Number NV020005

General Decision Number NV020005
Superseded General Decision No. NV010005
State: **Nevada**
Construction Type:
HEAVY
HIGHWAY
County(ies):

CARSON CITY	EUREKA	NYE
CHURCHILL	HUMBOLDT	PERSHING
CLARK	LANDER	STOREY
DOUGLAS	LINCOLN	WASHOE
ELKO	LYON	WHITE PINE
ESMERALDA	MINERAL	

HEAVY AND HIGHWAY CONSTRUCTION PROJECTS (Except construction projects at the **NEVADA** TEST SITE and TONOPAH TEST RANGE) (and Excluding Water Well Drilling)

Modification Number	Publication Date
0	03/01/2002

COUNTY(ies):

CARSON CITY	EUREKA	NYE
CHURCHILL	HUMBOLDT	PERSHING
CLARK	LANDER	STOREY
DOUGLAS	LINCOLN	WASHOE
ELKO	LYON	WHITE PINE
ESMERALDA	MINERAL	

CARP0034L 07/01/1998

	Rates	Fringes
CARSON CITY, CHURCHILL, DOUGLAS, ELKO, EUREKA, HUMBOLDT, LANDER, LYON, MINERAL, PERSHING, STOREY, WASHOE AND WHITE PINE COUNTIES		
DIVER STANDBY	27.65	12.425
DIVER WET	38.90	12.425
DIVER TENDER	27.65	12.425
PILE DRIVERS:		
(Bridge, Warf & Dock Builders)	25.65	12.425

CARP0971E 07/01/2001

	Rates	Fringes
CHURCHILL, DOUGLAS, ELKO, EUREKA, HUMBOLDT, LANDER, LYON, MINERAL, PERSHING, STOREY, WASHOE, AND WHITE PINE.		
CARPENTERS	24.95	5.75

CARP1780A 07/01/1999

	Rates	Fringes
CLARK, ESMERALDA, LINCOLN AND NYE COUNTIES		
CARPENTERS:		
30 Mile radius around Las Vegas (Measured from the intersection of Maryland Parkway and Charleston Blvd.)	27.18	7.65
30 to 50 Mile radius around Las Vegas (same as above)	28.68	7.65
Over 50 mile Mile radius around Las Vegas (same as above)	30.43	7.65

Laughlin Area	29.18	7.65

ELEC0357F 12/01/2001

	Rates	Fringes
CLARK, LINCOLN, AND NYE (South of the Mt. Diablo Base Line) COUNTIES		
ELECTRICIANS	28.55	10.21+3%

ELEC0357G 07/01/1997

	Rates	Fringes
CLARK, LINCOLN, AND NYE COUNTIES		
LINE CONSTRUCTION WORKERS:		
Area bound by a 30 mile radius from the intersection of Main Street and Fremont Street in Las Vegas (Free Area)		
Groundman	17.98	5.95+3%
Line Equipment Operators	21.86	5.95+3%
Lineman	24.45	5.95+3%
Area between a 30 mile radius and 60 mile radius from Main and Fremont Streets		
Groundman	18.98	5.95+3%
Line Equipment Operators	22.86	5.95+3%
Lineman	25.45	5.95+3%
Area Over 60 mile radius from Main and Fremont Streets		
Groundman	20.98	5.95+3%
Line Equipment Operators	24.86	5.95+3%
Lineman	27.45	5.95+3%

ELEC0401F 12/01/2001

	Rates	Fringes
CHURCHILL, DOUGLAS, ELKO, ESMERALDA, EUREKA, HUMBOLDT, LANDER, LYON, MINERAL, PERSHING, STOREY, WASHOE, AND WHITE PINE COUNTYS.		
ELECTRICIANS:		
ELECTRICAINS	26.69	7.10+3%
CABLE SPLICER	29.36	7.10+3%

ELEC0401G 02/01/1993

	Rates	Fringes
CHURCHILL, DOUGLAS, ELKO, ESMERALDA, EUREKA, LANDER, LYON, MINERAL, PERSHING, STOREY, WASHOE, AND WHITE PINES COUNTYS.		
LINE CONSTRUCTION:		
Lineman	21.74	5.34+3-3/4%
Cable Splicer	23.91	5.34+3-3/4%
Equipment Operator	19.57	5.34+3-3/4%
Groundman	14.13	5.34+3-3/4%

ENGI0012H 08/01/1999

	Rates	Fringes
HYDRAULIC SUCTION AND CLAMSHELL DREDGES		
Leverman	34.20	8.00
Deck Captain	31.30	8.00
Dozer	30.73	8.00
Watch Engineer, Welder and		

Deckmate	30.62	8.00
Winchman (Stern Winch) (on dredge)	30.07	8.00
Deckhand (can operate anchor scow under direction of mate), Bargeman	29.53	8.00
Barge mate	30.14	8.00

ENGI0012J 07/01/2000

	Rates	Fringes
CLARK, ESMERALDA LINCOLN AND NYE COUNTIES		
POWER EQUIPMENT OPERATORS:		
Group 1	28.54	8.30
Group 2	29.49	8.30
Group 3	29.78	8.30
Group 4	30.67	8.30
Group 5	31.77	8.30
Group 6	30.89	8.30
Group 7	31.99	8.30
Group 8	31.00	8.30
Group 9	32.10	8.30
Group 10	31.12	8.30
Group 11	32.22	8.30
Group 12	31.29	8.30
Group 13	31.39	8.30
Group 14	31.42	8.30
Group 15	31.50	8.30
Group 16	31.62	8.30
Group 17	31.79	8.30
Group 18	31.89	8.30
Group 19	32.00	8.30
Group 20	32.12	8.30
Group 21	32.29	8.30
Group 22	32.39	8.30
Group 23	32.50	8.30
Group 24	32.62	8.30
CRANES, PILEDRIVING & HOISTING EQUIPMENT		
Group 1	29.29	8.30
Group 2	30.24	8.30
Group 3	30.53	8.30
Group 4	30.67	8.30
Group 5	30.89	8.30
Group 6	31.00	8.30
Group 7	31.12	8.30
Group 8	31.29	8.30
Group 9	31.46	8.30
Group 10	32.46	8.30
Group 11	33.96	8.30
Group 12	34.46	8.30
Group 13	35.46	8.30
TUNNEL GROUP:		
Group 1	30.74	8.30
Group 2	31.03	8.30
Group 3	31.17	8.30
Group 4	31.39	8.30
Group 5	31.50	8.30
Group 6	31.62	8.30

Group 7 31.79 8.30
From the City Hall of Las Vegas
20 Miles to 40 Miles - add $1.50 per hour to wage rates
40 Miles to 60 Miles - add $2.50 per hour to wage rates
Over 60 Miles - add $3.00 per hour to wage rates
POWER EQUIPMENT OPERATOR CLASSIFICATIONS:
GROUP 1: Bargeman, brakeman, compressor operator (when more than five (5) 900 CFM or larger units, additional operator required), ditch witch, with seat or similar type equipment, elevator operator - inside, engineer oiler, generator operator, generator, pump or compressor plant operator, pump operator, signalman, switchman
GROUP 2: Asphalt - rubber plant operator, concrete mixer operator - skip type, conveyor operator, fireman, hydrostatic pump operator, oiler crusher (asphalt or concrete plant), skiploader (when wheel type up to 3/4 yd. without attachment), soils field technician, tar pot fireman, temporary heating plant operator, trenching machine oiler, nurse tank operator.
GROUP 3: Asphalt - rubber blend operator, equipment greaser (rack), ford ferguson (with dragtype attachments), helicopter radioman (ground), power concrete curing machine operator, power concrete saw operator, power - driven jumbo form setter operator, 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 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, hydra-hammer-aero stomper, power sweeper operator, roller operator (compacting), screed operator (asphalt or concrete), trenching machine operator (up to 6ft.), concrete cleaning decontamination machine operator, power concrete curing machine operator,
GROUP 5: Equipment Greaser (Grease Truck)
GROUP 6: Asphalt plant engineer, batch plant operator, bit sharpener, concrete joint machine operator (canal and similar type), concrete planer operator, deck engine operator, derrickman (oilfield type), drilling machine operator, bucket or auger types (Caldwell 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, hydrographic seeder machine operator (straw, pump 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 type), 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

GROUP 7: Asphalt or concrete spreading operator (tamping or finishing), asphalt paving machine operator (Barber Greene or similar type - 1 screedman required), Asphalt -rubber distributor 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 (Caldwell 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, kalamazoo ballast 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), pneumatic concrete placing machine operator (Hackley-Presswell or similar type), pumpcrete 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, skipload operator (crawler and wheel type over 1-1/2 yds. up to and including 6-1/2 yds.), 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 bending machine operator, trenching machine operator (over 6 ft. depth capacity, oiler required)

GROUP 8: Heavy duty repairman

GROUP 9: Drilling machine operator, bucket or auger types (Caldwell 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, 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), rubber-tired earth-moving equipment operator (multiple engine, Euclid, Caterpillar and similar over 25 yds. and up to 50 yds.), tower crane repair person, tractor loader operator (crawler and wheel type over 6-1/2 yds.), Woods mixer operator (and similar pugmill equipment)

GROUP 10: Dynamic compactor LDC350 (or similar types

GROUP 11: Auto grader operator, automatic slip form operator, drilling machine operator, bucket or auger types (Caldwell, auger 20 CA or similar types - Watson auger 6000 or similar types - drilling depth of 175' maximum), hoe ram or similar with compressor, mass excavator operator, 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 12: Rubber-tired earth-moving equipment operator operating equipment with push-pull system (single engine, up to and including 25 yds. struck)

GROUP 13: Canal liner operator, canal trimmer operator, remote-control earth-moving equipment operator, wheel excavator operator

GROUP 14: 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 15: 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 16: 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 17: 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 18: 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, including 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 19: 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 20: 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 21: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single

engine, up to and including 25 yds. struck)
GROUP 22: 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 23: 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 24: Concrete pump operator - truck mounted (oiler required when boom over 105' or 36 meters), 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 (under 5 tons capacity)
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: Stinger crane (Austin-Western or similar type); Tugger hoist operator (1 drum)
GROUP 6: Bridge crane operator; Cretor crane operator; Fork lift operator (over 5 tons); Hoist operator (Chicago boom and similar type); Lift mobile operator; Lift slab machine operator (Vagtborg and similar types); Material hoist operator; 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, Guyderrick or similar type (up to and including 25 ton capacity); Shovel, backhoe, dragline, clamshell operator (over 7 cu. yds. mrc)
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; Tower crane operator
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)
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 motorman (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); Welder - general

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 - welder combination

GROUP 7: Tunnel mole boring machine operator

ENGI9993D 07/01/2000

	Rates	Fringes
CHURCHILL, DOUGLAS, ELKO, EUREKA, HUMBOLDT, LANDER, LYON, MINERAL, PERSHING, STOREY, WASHOE, WHITE PINE AND CARSON CITY		
POWER EQUIPMENT OPERATORS (Except Piledriving and Steel Erection)		
AREA 1:		
Group 1a	25.33	8.21
Group 2	25.86	8.21
Group 3	26.13	8.21
Group 4	26.87	8.21
Group 5	27.17	8.21
Group 6	27.34	8.21
Group 7	27.59	8.21
Group 8	28.18	8.21
Group 9	28.50	8.21
Group 10	28.85	8.21
Group 10a	29.04	8.21

Group 11	29.28	8.21
Group 11a	30.92	8.21
Group 11b	31.73	8.21
PILEDRIVING		
AREA 1:		
Group 1	37.32	8.21
Group 1a	31.38	8.21
Group 1b	29.46	8.21
Group 2	35.80	8.21
Group 2a	31.17	8.21
Group 2b	29.26	8.21
Group 3	34.35	8.21
Group 3a	30.95	8.21
GROUP 3b	29.03	8.21
Group 4	32.84	8.21
Group 5	31.73	8.21
Group 6	30.62	8.21
Group 7	29.66	8.21
Group 8	27.80	8.21
STEEL ERECTION		
AREA 1:		
Group 1	37.87	8.21
Group 1a	31.70	8.21
Group 1b	29.74	8.21
Group 2	36.36	8.21
Group 2a	31.45	8.21
Group 2b	29.53	8.21
Group 3	35.12	8.21
Group 3a	31.23	8.21
Group 3b	29.31	8.21
Group 3c	34.76	8.21
Group 4	33.39	8.21
Group 5	32.29	8.21

POWER EQUIPMENT OPERATOR CLASSIFICATIONS
CHURCHILL, DOUGLAS, ELKO, EUREKA, HUMBOLDT, LANDER, LYON, MINERAL, PERSHING, STOREY, WASHOE, WHITE PINE, CARSON CITY
(EXCLUDING PILEDRIVING AND STEEL ERECTION)

GROUP 1a: Oiler; Partsman (heavy duty repair shop partsroom when needed).

GROUP 2: Compressor; Material Loader and/or Conveyor (handling building materials); Pump Operator

GROUP 3: Bobcat or similar loader (1/4 cu. yd. or less); Concrete Curing Machines (streets, highways, airports, canals); Conveyor belt operator(tunnel); Forklift (under 20 ft.); Engineer Generating plant (500 K.W.); Mixer box operator (concrete plant); Motorman; Rotomist Operator; Screedman (except asphaltic or concrete paving); Oiler (truck crane)

GROUP 4: Concrete mixer, skip type; Dinky; Forklift (20' and over) or Lumber stacker; Ross Carrier; Skip Loader (under 1 cu. yd); Tie Spacer.

GROUP 5: Concrete mixer (over 1 cu. yd); concrete pumps or pumpcrete guns; Elevator and material Hoist (1 drum); Groundman for Asphalt Milling and similar.

GROUP 6: Auger type drilling equipment up to and including 30 ft. depth digging capacity m.r.c.; Boom Truck or Dual Purpose "A" Frame Truck; B.L.H. Lima road pactor or similar; Chip box spreader (flaherty type or similar); Concrete batch plant (wet or

dry); Concrete saws (highways, streets, airports, canals); Locomotive (over 30 tons); Lubrication and service engineer (mobile & grease rack); Maginnis international full slab vibrator (airports, highways, canals, warehouses); Mechanical finishers (concrete)(clary, Johnson, Bidwell Bridge Deck or similar types); Mechanical Burn, Curb and/or Curb and Gutter Machine (concrete or asphalt); Pavement breaker, truck mounted, with compressor combination; Pavement breaker or tamper (with or without compressor (combination); Power Jumbo (setting slip-forms, etc. in tunnels); Roller (except asphalt); Self-propelled tape machine; Self-propelled compactor (single engine); Self-propelled power sweeper; slip form pump (power-driven by hydraulic, electric, air, gas, etc. lifting device for concrete forms); Small Rubber-tired Tractors; Snooper Crane, Paxton-Mitchell or similar; Stationary Pipe Wrapping, Cleaning and Bending Machine Operator

GROUP 7: Auger type drilling equipment over 30 ft. depth digging capacity m.r.c.; Compressor (over 2); Concrete conveyor or concrete pump, truck equipment mounted (boom length to apply); Concrete conveyor, building site; Drilling and boring Machinery, vertical and horizontal (not to apply to waterliners, wagon drills or jackhammers); Crusher Plant Engineer; Generators; Kolman Loader; Material Hoist (2 or more drums); Mechanical finishers or spreader machine (asphalt, Barber-Greene and similar); (Screedman required); Mine or shaft hoist; Pipe bending machines (pipelines only); Pipe cleaning machines (tractor propelled and supported); Pipe wrapping machines (tractor propelled and supported); Portable crushing and screening plants; Post driller and/or driver; Pumps (over 2); Roller operator (asphalt); Screedman (except asphaltic or concrete paving; Screedman (Barber-Green and similar)(Aspaltic or concrete paving); Self-propelled boom-type lifting device (center amount) (on 10 ton capacity or less); Slusher; Soil tester (certified); Soils and material tester; Surface heater and planer; Trenching machine (maxiumum digging capacity 3 feet depth); Truck type loader; Welding machines (gasoline or diesel.

GROUP 8: Asphalt plant Engineer; Asphalt milling machine; Cast-in-place pipe laying machine; Combination slusher and motor op.; Concrete batch plant (multiple units); Dozer Operator; Drill doctor; Elevating grader; Gradesetter, Grade checker; Grooving and grinding machine (highway); Heavy duty repairman and/or welder; Ken-seal; Loader (up to and including 2 1/2 cu. yds.); Mechanical trench shield; Mixermobile; Push cats; Road oil mixing machine (wood-mixer and other similar pugmill equipment); Rubber-tired earth-moving equipment (up to and including 35 cu. yds."struck" M.R.C. Euclid, T-pulls, DW's 10, 20, 21, and similar); Self-propelled compactor with dozer; Hyster 450 or cat 825 or similar; Sheepfoot; Small tractor (with boom); Soil stabilizer (P & H or equal); Timber skidder (rubber-tired and/or similar equipment); Tractor-drawn scraper; Tractor; Tractor-mounted compressor drill combination; Trenching machine (over 3 feet depth); Tri-batch paver; Tunnel badger or tunnel boring machine; Tunnel mole boring machine; Vermeer T-600b rock cutter.

GROUP 9: Chicago boom; Combination backhoe and loader (up to and including 3/8 yard); Combination mixer and compressor (gunite); Lull hi-lift (20 feet or over); Mucking machine; Sub-grader

(gurries or other types); Tractor (with boom) (D6 or larger); Track-laying-type earthmoving machine (single engine with tandem scrapers).
GROUP 10: Boom-type backfillng machine; Bridge crane; Carylift or similar; Chemical grouting machine; Derricks (two (2) Group 10 operators required when swing engine remote from hoist); Derrick barges (except excavation work); Euclid loader and similar types; Heavy-Duty rotary drill rigs; Lift-slab (vagtborg and similar types); Loader (over 2 1/2 cu yds. up to and including 4 cu. yds); Locomotive (over 100 tons) (single or multiple units); Multiple-Engine earth-moving machines (euclid, dozers, etc.); Pre-stress wire-wrapping machine; Rubber-tried scraper, self-loading; Single-engine scraper (over 35 cu. yds); Shuttle car (reclaim station); Train loading station; Trenching machine multi-engine with sloping attachment (jefco or similar); Vacuum cooling plant; Whirley crane (up to and including 25 tons).
GROUP 10a: Backhoe (up to and including 1 cu. yd hydraulic); Backhoe (up to and including 1 cu. yd. cable); CMI dual lane auto -grader SP30 or similar; Cranes (not over twenty five (25) tons (hammerhead and gantry); Finish Blade; Gradalls (up to and in-cluding 1 cu. yd); Motor patrol; Power shovels, Clamshells, Draglines, Cranes (up to and including 1 cu. yd.); Rubber-tried scraper, self-loading (twin-engine); Self-propelled boom-type lifting device (center mount) (over 10 tons up to and including 25 tons).
GROUP 11: Automatic asphalt or concrete slip-form paver; Automatic railroad car dumper; Canal trimmer; Cary lift, campbell or similar; Cranes (over 25 tons); Euclid loader when controled from the pullcat; Highline cableway operator; Loader (over 4 cu yds. up to and including 12 cu. yds.); Multi-Engine earthmoving equipment (up to and including 75 cu. yds. "struck M.R.C); Multi ple Engine Scrapers (when used to push pull); Power shovels, Clam-shells, Draglines, Backhoes, Gradealls (over 1 cu. yd. and up to and including 7 cu. yds. M.R.C.); Self-propelled Boom type lifting device (over 25 tons M.R.C.); Self-propelled Compactor (with multiplepropulsion power units); Single-engine rubber-tried earthmoving machine (with tandem scraper); Slip-form paver (concrete or asphalt)(one (1) Operator and two (2) screedman); Tandem cats and scrapers; Tower crane mobile (including rail-mounted); Truck-mounted hydraulic crane when remote-control equipped (over 10 tons up to and including 25 tons); Universal Liebher and tower cranes (and similar types)(in the erection, dismantling and moving of equipment there shall be an additional operating engineer at group 8 rates); Wheel excavator (up to and including 750 cu. yds. per hour); Whirley cranes (over 25 tons).
GROUP 11a: Band wagons (in conjuction with wheel excavators); Operator of helicopter (when used in construction work); Loaders (over 12 cu. yds.); Multi-engine earthmoving equimpent (over 75 cu. yds. "struck" M.R.C.); Power shovels, Clamshells, Draglines, Backhoes and Gradalls (over 7 cu. yds. M.R.C.); Remote-controlled Earthmoving equipment; Wheel excavator (over 750 cu. yds. per hour)(two (2) Group 11A operators required).
GROUP 11b: Holland loader or similar or loader (over 18 cu. yds)

PILEDRIVING CLASSIFICATIONS

GROUP 1: Derrick barge pedestal mounted over 100 tons; Clam-shells over 7 cu. yds.; Self propelled boom type lifting device over 100 tons; Truck crane or crawler, land or barge mounted over

100 tons;
GROUP 1a: Truck crane oiler.
GROUP 1b: Oiler
GROUP 2: Derrick barge pedestal mounted 45 tons up to and including 100 tons; Clamshells up to and including 7 cu. yds; Self propelled boom type lifting device over 45 tons; Truck crane or crawler, land or barge mounted over 45 tons up to and including 100 tons.
GROUP 2a: Truck crane oiler.
GROUP 2b: Oiler
GROUP 3: Derrick barge pedestal mounted under 45 tons; self propelled boom type lifting device 45 tons and under; Skid/Scow Piledriver, any tonnage; (any assistance required shall be by an employee covered by this agreement); Truck crane or crawler, land or barge mounted 45 tons and under.
GROUP 3a: Truck Crane oiler
GROUP 3b: Oiler
GROUP 4: Forklift, 10 tons and over
GROUP 5: No current classification.
GROUP 6: Deck engineer
GROUP 7: No current classification
GROUP 8: Deckhand, Fireman

STEEL ERECTORS AND FABRICATORS

GROUP 1: Cranes, over 100 tons; Derrick over 100 tons, Self-propelled boom type lifting devices over 100 tons.
GROUP 1a: Truck crane oiler.
GROUP 1b: Oiler
GROUP 2: Cranes, over 45 tons up to and including 100 tons; Derrick 100 tons and under, Self-propelled boom type lifting device, over 45 tons; Tower Crane.
GROUP 2a: Truck crane oiler.
GROUP 2b: Oiler
GROUP 3: Cranes, 45 tons and under; Self propelled boom type lifting device, 45 tons and under
GROUP 3a: Truck crane oiler
GROUP 3b: Hydraulic
GROUP 3c: Oiler
GROUP 4: Chicago boom; Forklift, 10 tons and over; Heavy Duty Repairman/Welder.
GROUP 5: Boom cat

AREA DEFININITIONS AND PAY RATES

AREA 1:
ALL AREA FALLING WITHIN 50 ROAD MILES OF EITHER THE CARSON CITY COURTHOUSE OR THE WASHOE COUNTY COURHOUSE SHALL BE CONSIDERED FREE AREA.
AREA 2:
ALL WORK FALLING BETWEEN 50 AND 150 ROAD MILES OF THE WASHOE COUNTY COURTHOUSE SHALL BE COMPUTED AT AN ADDITIONAL $1.50 PER HOUR ABOVE THE BASE RATE.
AREA 3:
ALL WORK FALLING BETWEEN 150 AND 300 ROAD MILES OF THE WASHOE COUNTY COURTHOUSE SHALL BE COMPUTED AT AN ADDITIONAL $2.00 PER HOUR ABOVE THE BASE RATE.
AREA 4:
ANY WORK PERFORMED IN EXCESS OF 300 ROAD MILES OF THE WASHOE COURTHOUSE SHALL BE COMPUTED AT AN ADDITIONAL $3.00 PER HOUR ABOVE THE BASE RATE.

ENGI9993K 07/01/1997

	Rates	Fringes
CHURCHILL, DOUGLAS, ELKO, EUREKA, HUMBOLDT, LANDER, LYON, MINERAL, PERSHING, STOREY, WASHOE, WHITE PINE AND CARSON CITY		
HYDRAULIC SUCTION & CLAMSHELL & DIPPER DREDGE		
GROUP 1:		
Area 1	31.04	11.89
Area 2	33.04	11.89
GROUP 2:		
Area 1	26.08	11.89
Area 2	28.08	11.89
GROUP 3:		
Area 1	24.96	11.89
Area 2	26.96	11.89

DREDGING CLASSIFICATIONS

GROUP 1:
Day Mate (Captain); Leverman/Operator

GROUP 2:
Booster Pump Operator, Deck Engineer, Deck Mate, Dredge Dozer; Dredge Tender; Heavy Duty Repairman; Watch Engineer; Winchman

GROUP 3:
Bargeman; Deckhand; Fireman; Leveehand; Oiler

AREA DEFININITIONS

AREA 1:
ALL AREA FALLING WITHIN 50 ROAD MILES OF EITHER THE CARSON CITY COURTHOUSE OR THE WASHOE COUNTY COURHOUSE SHALL BE CONSIDERED FREE AREA.

AREA 2:
ALL WORK FALLING BETWEEN 50 AND 150 ROAD MILES OF THE WASHOE COUNTY COURTHOUSE.

AREA 3:
ALL WORK FALLING BETWEEN 150 AND 300 ROAD MILES OF THE WASHOE COUNTY COURTHOUSE.

AREA 4:
ANY WORK PERFORMED IN EXCESS OF 300 ROAD MILES OF THE WASHOE COURTHOUSE.

IRON0027J 07/01/2001

	Rates	Fringes
ELKO, EUREKA, AND WHITE PINE COUNTIES		
IRON WORKERS:		
Fence Erectors: Machinery Movers		
Ornamental: Reinforcing. Rigger		
Structural	25.19	14.575

IRON0155B 07/01/2001

	Rates	Fringes
CHURCHILL, CLARK, DOUGLAS, ESMERALDA, HUMBOLDT, LANDER, LINCOLN, LYON, MINERAL, NYE, PERSHING, STOREY, WASHOE, AND WHITE PINE COUNTIES		
IRONWORKERS:		
STRUCTURAL, ORNAMENTAL AND REINFORCING	26.08	14.575
FENCE ERECTORS (Excluding Clark County)	25.19	14.575

LABO0169F 10/01/2001

	Rates	Fringes
CHURCHILL, DOUGLAS, ELKO, EUREKA, HUMBOLDT, LANDER, LYON, MINERAL, PERSHING, STOREY, WASHOE, WHITE PINE, CARSON CITY		
Group 1	19.15	5.12
Group 1-A	16.28	5.12
Group 2	19.25	5.12
Group 3	19.40	5.12
Group 4	19.65	5.12
Group 5	19.95	5.12
Group 6	19.95	5.12
Group 7	19.65	5.12
Group 8	19.30	5.12
Group 9	13.99	5.12

From the Washoe County Courthouse
50 Miles to 150 Miles - add $1.50 per hour to wage rates
150 Miles to 300 Miles - $2.00 per hour to wage rates
Over 300 Miles - add $3.00 per hour to wage rates

CLASSIFICATIONS

GROUP 1: All cleanup work of debris, grounds and building including windows and tile; dump or spotter (other than asphalt); general laborers; limber, brushloader and piler
GROUP 1-A: Flagmen
GROUP 2: Choker setter or rigger (clearing work only); Pittsburgh chipper and similar type brush shredders; concrete worker (wet or dry) all concrete work not listed in Group 3; crusher or grizzle tender; Guinea chaser (stake); panel forms (wood or metal) handling, cleaning and stripping of; loading and unloading of all rods and materials for reinforcing concrete; railroad track (builders); sloper; semi-skilled wrecker (salvaging of building materials other than those listed in Group 3).
GROUP 3: Asphalt workers (ironers, shoveler, cutting machine); buggymobile; chainsaw, faller, logloader and bucker; compactor (all types); concrete mixer, under 1/2 yd.; concrete pan work (breadpan type) (handling, cleaning, stripping); concrete saw, chipping, grinding, sanding, vibrator; cribbing, shoring, lagging, trench jacking, hand-guided lagging hammer; curbing or divider machine; curb setter (precast or cut); Ditching machine (hand-guided); driller's tender, chuck tender; form raiser, slip forms; grouting of concrete walls, windows and door jams; headerboard; jackhammer, pavement breaker, air spade; mastic worker (wet or dry); pipe wrapper, kettle, pot, and workers applying asphalt, Creosote and similar type materials; all power tools (air, gas or electric); post driver; riprap stonepaver and rock slinger, including placing of sack concrete, wet or dry; roto tiller; rigging and signaling in connection with laborers work, sandblaster, pot men; vibrascreed; skilled wrecker (removing and salvaging of sash windows, doors, plumbing and electrical; fixtures)
GROUP 4: Burning and welding in connection with laborers' work; joy drill model TWM-2A, gardener denver model DN 143 and similar type drills; track drillers, diamond core drillers, wagon drillers, mechanical drillers on multiple units; high scalers; concrete pump; heavy duty vibrator with stinger 5" diameter or over; pipelayer, caulker and bander; pipelayer - waterline,

sewerline, gasline, conduit; asphalt rakers
GROUP 5: Blaster and powder, all work of loading, placing and blasting of all powder and explosive of any type, regardless of method used used for such loading and placing; asbestos removal; lead abatement, hazardous waste and material removal.
GROUP 6: Nozzlemen, Rodman
GROUP 7: Gunmen, Materialmen
GROUP 8: Reboundmen
GROUP 9: Landscaper

LABO0872D 07/01/2000

	Rates	Fringes
CLARK, ESMERALDA, AND LINCOLN COUNTIES; NYE COUNTY (South half, including Highway #6)		
LABORERS:		
Group 1	21.58	7.46
Group 2	21.74	7.46
Group 3	21.84	7.46
Group 4	21.93	7.46
Group 5	22.02	7.46
Group 6	21.84	7.46
Group 7	18.53	7.46

30 - 50 Miles From City Hall, Las Vegas $1.50 above the base rate.

50 - 70 Miles From City Hall, Las Vegas $2.50 above the base rate.

Over 70 Miles From City Hall, Las Vegas $3.00 above the base rate.

Laughlin Area $2.25 above the base rate.

LABORER CLASSIFICATIONS

Group 1: Dry Packing of concrete and filling of form-bolt holes; fine grader, highway and street paving, airport runaways and similar type heavy construction; gas and oil pipeline laborer; guinea chaser; laborer, general; construction or demolition laborer; packing rod steel and pans; laborers; temporary water lines (portable type); landscape gardener and nursery worker (must have knowledge of plant materials and how to plant them lay out plant arrangements to-follow the landscape plan); tarman and mortarman; kettleman; potman and worker applying asphalt lay-kold creosote, lime and similar type materials ("applying" means applying, dipping, brushing or handling of such materials

for pipe wrapping and waterproofing); underground laborer, including caisson bellowers; window cleaner; scafford erector - (excludes tenders); fence erector - chain link; mortarless, barrier wall and/or retaining walls; mechanical stabilized earth wall; landscape decorative rock installer - ponds, water fall etc.; material handler - (incidental to trade).

Group 2: Asphalt raker, ironer, spreader, Luteman, buggymobile man; cement dumper (on 1 yard or larger mixers and handling bulk cement); cesspool digger and installer; chucktender (except tunnels); concrete core cutter; concrete curer, impervious

membrane and oiler of all materials; concrete saw, excluding tractor type, cutting, scoring old or new concrete; gas and oil pipeline wrapper, pot tender and form; making and caulking of all non metallic pipe joints; operators and tenders of pneumatic and electric tools, vibrating machines, hand-propelled trenching machines, impact wrench, multiplate and similar mechanical tools not separately classified herein; operator of cement grinding machine; riprap stonepaver; roto-scraper; sandblaster (pot tender); scaler; septic tank digger and installer; tank scaler and cleaner; tree climber, faller, chain saw operator, pittsburgh chipper and similar type brush shredders

Group 3: Cutting torch operator; gas and oil pipeline wrapper; gas and oil pipeline laborer, certified; jackhammer and/or pavement breaker, laying of all non-metallic pipe, including landscape sprinklers, sewerpipe, drain pipe, and underground tile; mudcutter; concrete vibrator, all sizes; rock slinger; scaler (using Bos'n chair or safety belt or power tools); forklift (incidental to trade) a journeyman shall hold OSHA certification at time of referral.
Group 4: Cribber or shorer, lagging, sheeting, trenching bracing hand guided lagging hammer; head rock slinger; powder - blaster, 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; sandblaster (nozzle operator); steel headerboard

Group 5: Driller (core, diamond or wagon); joy driller model TW-M-2a, Gardener-Denver Model DH 143 and similar type drills (in accordance with memorandum of understanding between laborers and operating engineers dated Miami, Florida, February 3, 1954); Gas and oil pipeline fusion; gas and oil pipeline wrappers, 6" pipe and over-

Group 6: Environmental specialist (asbestos abatement, lead abatement, Hazardous waste abatement, petro-chemical abate ment, radiation remediation.

Group 7: Flag and Signal Person

LABO0872I 07/01/1999

	Rates	Fringes
CLARK, ESMERALDA, AND LINCOLN COUNTIES; NYE COUNTY (South half, including Highway #6)		
LABORERS:		
MINER AND BULLGANG		
Group 1	23.07	7.48
Group 2	22.57	7.48
Group 3	22.32	7.48
Group 4	22.93	7.48
Group 5	22.57	7.48

30 - 50 Miles From City Hall, Las Vegas $1.50 above the base

rate.

50 - 70 Miles From City Hall, Las Vegas $2.50 above the base rate.

Over 70 Miles From City Hall, Las Vegas $3.00 above the base rate.

Laughlin Area $2.25 above the base rate.

CLASSIFICATIONS

Group 1: Shaft, Raise, Stope Miner

Group 2: Miner - Tunnel (Hardrock)

Group 3: BullGang, Mucker, Trackman

Group 4: Miner - Welder

Group 5: Pipe Jacking, Micro-Tunneling, Tunnel Boring Machine

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PAIN0159F 07/01/2001

	Rates	Fringes
CLARK, ESMERALDA, LINCOLN AND NYE COUNTIES		
PAINTERS:		
Brush, Roller, Paperhangers, Spray, Sandblasters, Pot Tender, Nozzleman, Tapers, Marbleizing, Metal Leafing Sign Painters, Acid Staining, Graining and Buffing	25.62	7.34
Structural Steel Paint and Sandblasting, Buffing Steel	26.02	7.34
Special Coating	25.62	7.34
Steeplejack	27.42	7.34

PAIN0567E 10/01/2001

	Rates	Fringes
CARSON CITY, CHURCHILL, DOUGLAS, ELKO, EUREKA, HUMBOLDT, LANDER, LYON, MINERAL, PERSHING, STOREY, WASHOE AND WHITE PINE COUNTIES		
PAINTERS:		
Brush and Roller	20.53	5.06
Spray; Paperhangers; and Sandblaster; Special Coatings Application - Brush	21.03	5.06
Structural Steel (not to include stairways, tube steel, Q-decks & trust joints worked off powered lift in enclosed building); Steeplejack Brush/		

Spray over 40 feet with open space below; Special Coatings Application - Spray	21.53	5.06
Special Coatings Application - Spray Steel	21.78	5.06
Drywall Taper	22.08	5.06
Steeplejack - Taper, over 40 ft. with open space	23.58	5.06

PLAS0241G 10/01/1997

	Rates	Fringes
CHURCHILL, DOUGLAS, ELKO, ESMERALDA, EUREKA, HUMBOLDT, LANDER, LYON, MINERAL, PERSHING, STOREY, WASHOE, AND WHITE PINE COUNTIES		
CEMENT MASONS		
Cement Masons	17.02	7.10
Mastic. magesite and all composition masons	17.27	7.10

PLAS0797G 07/01/2001

	Rates	Fringes
CLARK, ESMERALDA, LINCOLN AND NYE COUNTIES		
CEMENT MASONS:		
0 to 30 Miles from City Hall in Las Vegas	25.88	6.95
30 to 50 Miles from City Hall in Las Vegas	27.38	6.95
50 to 70 Miles from City Hall in Las Vegas	28.38	6.95
Over 70 Miles from City Hall in Las Vegas	29.38	6.95

PLUM0350G 08/01/2001

	Rates	Fringes
CHURCHILL, DOUGLAS, ELKO, EUREKA, HUMBOLDT, LANDER, LYON, MINERAL, PERSHING, STOREY, WASHOE, WHITE PINE, CARSON CITY COUNTIES, and NYE COUNTY (North of Hwy. #6 including the City of Tonopah)		
PLUMBERS & PIPEFITTERS	28.15	6.25

PLUM0525G 06/01/2001

	Rates	Fringes
CLARK, ESMERALDA AND LINCOLN, COUNTIES; NYE COUNTY (South of Hwy. #6 including the City of Tonopah)		
PLUMBERS & PIPEFITTERS	30.01	10.61

	Rates	Fringes
ROOF0162D 03/01/1999		
ROOFERS	17.78	3.17
SHEE0026C 07/01/2001		
CHURCHILL, DOUGLAS, ELKO, EUREKA, HUMBOLDT, LANDER, LYON, MINERAL, PERSHING, STOREY, WASHOE, CARSON CITY AND NYE COUNTY (North of the First Standard Parallel Line north of the 38th Parallel)		
SHEET METAL WORKERS	25.83	8.77
SHEE0088H 07/01/2001		
CLARK, ESMERALDA, AND LINCOLN COUNTIES; NYE COUNTY (South of the First Standard Parallel Line north of the 38th Parallel); WHITE PINE COUNTY		
SHEET METAL WORKERS	32.22	8.58
TEAM0533A 01/01/1998		
REMAINING COUNTIES AND NYE COUNTY (North of and including highwAY #6)		
TRUCK DRIVERS		
All dump trucks (Single or multiple dump units including Semi's and Double and Transfer units:		
Under 4 yards (water level) 4 yards and under 8 yards (water level)	16.62	7.40
3 yards & under 18 yards (water level)	16.84	7.40
3 yards & under 25 yards (water level)	17.05	7.40
25 yards & under 60 yards (water level)	17.64	7.40
60 yards & under 75 yards (water level)	19.08	7.40
75 yards & under 100 yards (water level)	19.82	7.40

100 yards & over (water level)	20.50	7.40
150 yards & under 250 yards	22.50	7.40
250 yards & under 350 yards	25.50	7.40
Over 350 yards	27.00	7.40

(Men regularly employed underground on tunnel work shall be paid forty-five ($.45) cents per hour for such work, provided that such employment underground on tunnel work continues for one (1) or more hours)

Bulk cement spreader (with or without Auger) Use dump truck scales.

Bootman (a bootman when employed on such equipment shall receive the rate specified for the classification of road oil trucks or bootman).

Transit Mix, Manufactures Rating:

Under 8 yards	17.05	7.40
8 yards & including 12 yards	17.16	7.40
Over 12 yards	17.38	7.40

Transit Mix with boom shall receive $.12-1/2 cents per hour above the appropriate yardage classification rate of pay when such boom is used.

Water Trucks:

Up to 2,500 gallons	16.84	7.40
2,500 gallons & over	17.05	7.40

Jetting truck (use appropriate water truck rate.

DW20's and 21's and other similar cat type, Terra cobra, Le Tourneau pulls, Tournerocker, Euclid and similar type equipment when pulling Aqua/pak, Water tank trailers and fuel and/or

Grease Tank trailer or other miscellaneous trailers (except as definded under dump trucks.	17.33	7.40
Heavy Duty Transport (High bed)	17.22	7.40
Heavy Duty Transport (Gooseneck Low Bed)	17.22	7.40
Tiltbed or Flatbed Pull Trailers	17.22	7.40
Bootman, combination bootman and road oiler	17.11	7.40
Flat Rack (2 or 3 axle unit)	14.94	7.40
Bus and Manhaul drivers:		
Up to 18,000 lbs. (single unit)	16.67	7.40
18,000 lbs & over (single unit)	16.78	7.40
Helicopter Pilot (when trans-porting men or materials)	30.66	7.40
Industrial Lift truck (use appropriate flat rack rate (mechanical tailgate)		
Lift Jitneys & Fork Lift	16.89	7.40
Winch Truck & "A" Frame Drivers:		
Under 18,000 lbs.	16.78	7.40
18,000 lbs. & over	16.89	7.40
Warehouse Spotters	16.23	7.40
Teamsters Warehouse Clerk	16.84	7.40
Tire Repairman	16.55	7.40
Truck Repairman	17.05	7.40
Pick-up Truck & Pilot Cars (Job Site)	14.74	7.40
Pick-up Truck & Pilot Car (over the road)	16.73	7.40
Truck Oil and Greaser	16.78	7.40
Fuel Truck Driver	16.78	7.40
Fuel Man & Fuel Island Man	16.78	7.40
When on grease and fuel truck,		

an Engineer Oil and Teamster
Oil, work interchangeable
servicing trucks and other
equipment, The wage rate shall
be identical.

AREA 1: All that area falling within fifty (50) road miles of
either the Carson City or Washoe County Courthouse shall be
considerer a free area.

AREA 2: All work falling between fifty (50) and (150) road miles
of the Washoe County Courthouse shall be computed at and
additional $1.50 per hour.

AREA 3: All work falling between one hundred and fifty (150)
and three hundred (300) road miles of the Washoe County
Courthouse shall be computed at additional $2.00 per hour.

AREA 4: Any work performed in excess of three hundred (300)
road miles of the Washoe County Courthouse shall be computed
at $3.00 per hour.

TEAM0631A 07/01/1999

	Rates	Fringes
CLARK, ESMERALDA, LINCOLN COUNTIES AND NYE COUNTY (South of and excluding Highway #6)		
TRUCK DRIVERS:		
GROUP 1:	21.35	7.12
GROUP 2:	21.46	7.12
GROUP 3:	21.67	7.12
GROUP 4:	21.85	7.12
GROUP 5:	22.00	7.12
GROUP 6:	22.35	7.12

30 - 50 Miles from City Hall, Las Vegas $1.00 above the base
rate.
50 - 70 Miles from City Hall, Las Vegas $2.00 above the base
rate.
70 - 80 Miles from City Hall, Las Vegas $3.00 above the base
rate.
Over 80 Miles from City Hall, Las Vegas $3.50 above the base
rate.
Laughlin and Mesquite Areas, $3.00 above the base rate.

Group 1: Dump trucks (less than 12 yards water level); trucks
(legal payload capacity less than 15 tons); water and fuel
trucks (under 2500 gallons); pickups; service; drivers of busses
(on jobsite used for transportation of up to 25 passengers);
teamster equipment (highest rate for dual craft operation);

working flat rack driver.

Group 2: Dump trucks (12 yards but less than 16 yards water level); trucks (legal payload capacity between 15 and 20 tons); transit mix trucks (under 3 yds.; dumpcrete trucks (less than 6-1/2 yds. water level); gas and oil pipeline working truck drivers; including winch truck and all sizes of trucks; water and fuel truck drivers (2,500 gallon to 4,000 gallon); truck greaser; drivers of busses (on jobsite used for transportation of more than twenty-five (25) passengers); warehouse clerk.

Group 3: Dump trucks (16 yds. up to and including 22 yds. water level); driver of trucks (legal payload cap. 20 tons but less than 30 tons); dumpster trucks; drivers of transit-mix trucks (3 yds. but less than 6 yds.); dumpcrete trucks (6-1/2 yds. water level and over); fork lift driver; ross carrier driver; highway water and fuel drivers (4,000 gallons but less than 6,000 gallons); stock room clerk; tireman.

Group 4: Transit-mix trucks (6 yds. or more); dump trucks (over 22 yds. water level); trucks (legal payload capacity 30 tons and over); fuel and water trucks (6,000 gallons and over).

Group 5: Drivers of trucks and trailers in combination (seven axles or more).

Group 6: All offroad equipment; truck repairmen and drivers of road oil spreader trucks; D.W. 10 and D.W. 20 euclid-type equipment, letourneau pulls, terra cobras and similar types of equipment; also PB and similar-type trucks when performing work within Teamsters' jurisidiction, regardless of types of attachment inlcuding power unit pulling off highway belly dumps in tandem.

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)(v)).

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

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01200

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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.

ASME INTERNATIONAL (ASME)

ASME B18.2.1	(1996) Square and Hex Bolts and Screws (Inch Series)
ASME B18.2.2	(1987; R 1993) Square and Hex Nuts (Inch Series)

COMMERCIAL ITEM DESCRIPTIONS (CID)

CID A-A-2246	(Rev B) Paint, Latex
CID A-A-2336	(Rev A) Primer Coating (Alkyd, Exterior Wood, White and Tints)

DEPARTMENT OF COMMERCE (DOC)

DOC PS 1	(1996) Voluntary Product Standard - Construction and Industrial Plywood

ENGINEERING MANUALS (EM)

COE EM 385-1-1	(1996) Safety and Health Requirements Manual

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST PS 20	(1994; Addenda Jan. 1997) American Softwood Lumbar Standards

1.2 PROJECT FACILITIES

The Contractor shall construct and/or erect the following project facilities as soon as possible and not less than 15 calendar days after notice to proceed.

1.2.1 Construction Signs

The signs shall include the following:

a. Project Signs: One Project Sign at location designated by the Contracting Officer.

b. Warning Signs: Facing approaching traffic on all haul roads crossing under overhead power transmission lines.

c. Hard Hat Signs: Ten hard hat signs at locations directed.

1.2.2 Bulletin Board

Bulletin board shall be erected at the Contractor's office.

1.2.3 Sanitary Facilities

Suitable sanitary facilities shall be provided and maintained by the Contractor.

PART 2 PRODUCTS

2.1 CONSTRUCTION SIGNS

2.1.1 Materials

2.1.1.1 Lumber

NIST PS 20, and shall be seasoned Douglas Fir, S4S, Grade D or better except that posts, braces and spacers shall be construction Grade (WCLB).

2.1.1.2 Plywood

DOC PS 1, grade A-C, Group 1, exterior type.

2.1.1.3 Bolts, Nuts and Nails

Bolts shall conform to ASME B18.2.1, nuts shall conform to ASME B18.2.2, and nails shall conform to commercially available supplies.

2.1.1.4 Paints and Oils

Paints shall conform to CID A-A-2336 for primer and CID A-A-2246 for finish paint and lettering.

PART 3 EXECUTION

3.1 CONSTRUCTION OF SIGNS

3.1.1 Project and Hard Hat Signs

Constructed as detailed in Figures 1,2,3 and Safety Signs. Decals signs will be furnished by the Contracting Officer.

3.1.2 Warning Signs

Constructed of plywood not less than 13 mm thick and shall be securely bolted to the supports with the bottom of the sign face 1 m above the ground. The sign face shall be 0.60 m x 1.20 m, all letters shall be 100 mm in height, and the wording shall be: "WARNING: OVERHEAD TRANSMISSION LINES."

3.2 PAINTING SIGNS

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.

3.3 PROJECT ENGINEER'S OFFICE EQUIPMENT

Contractor shall provide computer software (3.5" floppy disc size) to the Contracting Officer for the type of scheduling system to be used and quantity/fill programs for tracking or estimating bid quantities during construction. Scheduling software must be capable of downloading completely to the COE Standard Data Exchange Format. The Contractor shall utilize a hand held radio system for communication between the Contractor's quality control representative and the Government's quality assurance representative. Radio equipment for the Government's use shall include a hand held radio, two batteries and one charger. The Contractor shall provide Government personnel with the following equipment for the duration of the contract: 1 Cellular telephone with voice mail, 2 nickel cadmium batteries, 1 desk top charger, 1 travel charger, and 400 minutes of air time per month or portion thereof.

3.4 BULLETIN BOARD

A weatherproof bulletin board, approximately 915 mm wide and 760 mm 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.

3.5 MAINTENANCE AND DISPOSAL OF PROJECT FACILITIES

The Contractor shall maintain the project facilities in good condition throughout the life of the project. Upon completion of work under this contract, the facilities covered under this section will remain the property of the Contractor and shall be removed from the site at his expense.

3.6 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.

3.7 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 notifications 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 CONTRACT CLAUSES of the contract.

3.8 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 such 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.

3.9 PUBLIC UTILITIES, NOTICES, AND RESTRICTIONS

3.9.1 General

The approximate location of all railroads, pipelines, 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.

3.9.2 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.

3.9.3 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.

3.9.4 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.

3.9.5 Notices

3.9.5.1 Utilities To be Relocated or Protected

Unless otherwise specified, 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 7 days prior to the start of work in the vicinity of their respective utilities.

3.9.5.2 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 existing bench mark or right-of-way marker.

3.9.5.3 ENVIRONMENTAL ASSESSMENT REQUIREMENT

In order to satisfy the Environmental Assessment for this project, the Contracting Officer is required to have a qualified biologist on site at all times while clearing and grubbing operations are in progress. The Contractor shall notify the Contracting Officer 14 calendar days prior to the start of clearing and grubbing activities so that a biological monitor shall be required to walk immediately in front of the Contractors' clearing and grubbing equipment to survey for the threatened desert tortoise and state protected and BLM sensitive Gila monster. For scheduling purposes, the Contractor shall coordinate and complete all clearing and grubbing activities within one four-workday period.

3.9.5.4 Spill Reporting

The Contractor shall notify the Contracting Officer immediately after any spill, 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 procedure.

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

3.9.6 Restrictions

3.9.6.1 Other Agency Representatives

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

3.9.6.2 Traffic Control Plan

The Contractor shall develop a Traffic Control Plan and obtain an approval from the Clark County Department of Public Works prior to construction. The plan shall include details of truck haul routes.

3.9.6.3 Existing Roads

The construction schedule shall be prepared giving full consideration to maintaining traffic on existing roads. Additional work on the existing roads may be performed by others during the life of this contract.

3.9.6.4 Access and Haul Roads

Access and haul roads shall be proposed so that use of existing residential streets are minimized.

3.9.6.5 Public and Private Roads

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 road will 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.

3.9.6.6 Maintenance of Roads

All haul and access roads, within the construction area, including the borrow areas, shall be maintained to provide vehicular access for the Government's vehicles and the Contractor's vehicles and equipment. Road maintenance shall include rock/mud slides, washouts, and any incident which would restrict vehicular/equipment access. Prior to any alterations of any road alignment, the Contractor shall receive an approval from the Contracting Officer. Road maintenance and alterations shall be performed by the Contractor at no additional cost to the Government.

3.9.6.7 Traffic Safety

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 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.

3.9.6.8 Rock and Gravel

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

3.9.6.9 Cooperation with Others

The Contractor shall coordinate his activities and cooperate with other contractors as to not delay or interfere with their work.

3.9.7 Working Hours

The Contractor shall restrict all construction activities to the following schedule:

Monday thru Friday 6:30 a.m. to 7 p.m.
Saturday 8 a.m. to 7 p.m.

No work will be permitted on Sundays or Federal Holidays without the prior written approval from the Contracting Officer.

Disposal area(s) and haul route(s) utilized by the Contractor may require restricted hauling hours. The Contractor is notified that hauling or disposal activities may be restricted to normal business hours (7 a.m. to 4 p.m. in the event that such operations are considered to be disruptive to existing neighborhood safety and noise conditions. In the event that such a situation develops, the Contracting Officer shall notify the Contractor of restrictive hauling and/or disposal times. The Contractor shall develop their schedule for construction so that restrictive hauling times can be absorbed without extending the overall contract completion period.

3.9.8 Construction Water

The Contractor shall be responsible for obtaining water for construction purposes. The Contractor shall be responsible for obtaining approvals from the Las Vegas Valley Water District (LVVWD) and for coordination with other projects in the area.

3.9.9 Identification of Vehicles

All the Contractor's vehicles shall display suitable permanent identification.

3.9.10 Construction Method Observation

Any construction method, plant, or piece of equipment used on this contract shall not be considered proprietary, and can be inspected or photographed at any time by the Government, regulatory agencies, or any group approved by the Government.

3.9.11 Contractor's Equipment

The planned method of transportation and operation of cranes and other heavy equipment to be used in the performance of this contract shall be

submitted for approval by the Contracting Officer. The plan shall include the type, size, loadings of equipment, the proposed transportation routes, and work areas to be used on the project.

3.10 PUBLIC SAFETY

Attention is directed 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 a hazard 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.

3.11 OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA) STANDARDS

The OCCUPATIONAL SAFETY and HEALTH ACT (OSHA) STANDARDS for CONSTRUCTION (Title 29, Code of Federal Regulations Part 1926 as revised from time to time) and the Corps of Engineers "Safety and Health Requirements Manual", COE EM 385-1-1, are both applicable to this contract. The most stringent requirement of the two standards will be applicable.

3.11.1 Accident Reporting

In accordance with COE EM 385-1-1, the Contractor shall submit a written summary of worker's compensation claims which have been filled 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".

3.12 PERMITS

3.12.1 General

Reference is made to the article of the contract entitled "Permits and Responsibilities", which obligates the Contractor to obtain all required licenses and permits.

3.12.2 Air Pollution Permit (APP)

The Contractor shall obtain an APP from the Clark County Health Department.

A copy of the permit shall be submitted to the Contracting Officer. For further information, contact Ms. Cynthia Mikes at telephone number (702) 383-1276.

3.12.3 National Pollutant Discharge Elimination System (NPDES) Permit

The Contractor shall obtain a NPDES permit from the United States Environmental Protection Agency (USEPA) under the Nation Wide Permit (NWP) program, which requires that a Storm Water Pollution Prevention Plan (SWPPP) shall be prepared and maintained on-site throughout the construction period. A copy of the plan shall be submitted to the Contracting Officer. In accordance with the NWP, a minimum of two (2) days prior to the start of construction activities, the Contractor shall submit a Notice of Intent (NOI) with fees to the Nevada Division of USEPA. The NOI shall be submitted on the standard EPA Form 3510-6 (8-92), and copies shall be provided to the Contracting Officer. For further information, contact Mr. Robb Saunders at telephone number (775) 687-4670.

3.13 CONTRACTOR SAFETY PERSONNEL REQUIREMENT

3.13.1 General

Full-time, on-site, safety coverage by Contractors shall be required at all times during 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. 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. The Safety and Health person shall be assigned no other duties.

3.13.2 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 (2) years, no time being credited to these two (2) years unless at least fifty (50) percent of the time each year was devoted to safety and occupational health; 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 lease one (1) year, no time being credited to this one (1) year experience unless at least fifty (50) percent of the time was devoted to safety and occupational health; 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 (3) years, no time being credited to these three (3) years unless at least fifth (5) percent of the time each year was devoted to safety and occupational health; or

d. In lieu of a degree, shall have been engaged in safety and

occupational health for at least five (5) years, no time being credited to these five (5) years unless at least fifty (50) percent of the time each year was devoted to safety and occupational health.

e. First aid work is not creditable experience.

3.13.3 Qualification 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 and currently 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.

3.13.4 Names and Duties

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 to immediately correct the unsafe or unhealthful conditions.

3.14 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. 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. 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 workshop of 1 to 2 days duration would be held periodically throughout the duration of the contract as agreed to by the Contractor and Government.

3.15 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER (ER 415-1-15, 31 OCT 89)

a. This provision specifies the procedure for determination of time extensions for unusually severe weather in accordance with the CONTRACT CLAUSE: DEFAULT (FIXED PRICE CONSTRUCTION). In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:

(1) The weather experienced at the project site during the contract period must be found to be unusually severe, that is,

more severe than the adverse weather anticipated for the project location during any given month.

(2) The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the Contractor.

b. The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

MONTHLY ANTICIPATED ADVERSE WEATHER DAYS
Work Days Based on five (5) Day Work Week

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
6	2	2	1	1	0	2	2	1	1	1	3

c. Upon acknowledgment of the Notice to Proceed (NTP) and continuing throughout the contract, the Contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day. The number of actual adverse weather days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in subparagraph b, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the CONTRACT CLAUSE: DEFAULT (FIXED PRICE CONSTRUCTION).

3.16 REQUIRED INSURANCE

The Contractor shall procure and obtain during the entire period of his performance under this contract the following minimum insurance:

a. General Public Liability insurance for bodily injury and property damage with minimum limits of $1,000,000 combined single limit per occurrence and $1,000,000 annual aggregate for bodily injury to or death, personal injury and property damage.

b. Automobile Liability insurance for bodily injury and property damage with minimum limits of $1,000,000 combined single limit for each occurrence and $1,000,000 annual aggregate.

c. Either Workman's Compensation or Employer's Liability insurance with a minimum limit of $1,000,000.

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. County of Clark, a political

subdivision of the state of Nevada, Clark County Regional Flood Control District, and Montgomery Watson shall be named as additional insured parties and all policies issued in performance of work under this contract.

The Contractor does hereby agree to indemnify, defend, and save harmless Clark County, Clark County Regional Flood Control District, U.S. Army Corps of Engineers and Montgomery Watson from loss, damage, liability, costs, or expense to the proportionate extent caused by the Contractor, his employees, agents, or consultants and/or consultants arising out of its performance of this contract, including, but not limited to the negligent acts, errors, omissions, or intentional misconduct of the Contractor, its employees, agents or consultants and/or subconsultants in connection with this contract.

Contractor further does hereby agree, as a precaution to the performance of any work under this contract and as a precaution to any obligation of Clark County to make any payment under this contract, to provide Clark County with a certificate and/or a certificate issued by the State Industrial Insurance System (SIIS) in accordance with Nevada Revised Statute 616.280.

Contractor agrees to maintain required workers compensation throughout the entire term of the contract. If Contractor does not maintain coverage throughout the entire term of the contract, Contractor agrees that Owner may, at any time the coverage is not maintained by Contractor, order the Contractor to stop work, assess liquidated damages as defined herein, suspend the contract, or terminate the contract. For each six month period this contract is in effect, Contractor agrees, prior to the expiration of the six month period, make another written request to SIIS for the provisions of a certificate and notice of lapse in or nonpayment of coverage. If Contractor does not make the request or does not provide the certificate before the expiration of the six month period, Contractor agrees that owner may order the Contractor to stop work, suspend the contract or terminate the contract.

3.17 SPECIAL CONSTRUCTION REQUIREMENTS

The Contractor shall restrict his operation and adapt his construction schedule to accommodate the following:

3.17.1 Project Limits

The Contractor's work, employee parking, operations, staging, equipment assembly and maintenance, and other on-site activities shall be restricted to actual areas of construction within the Project Limits. The Project Limits of the F-1 Channel, Hualapai Way to Beltway, are indicated on the drawings, and constitute the maximum limits of the construction area available for Contractor's operations. The Project Limits are generally defined by the Right-of-Way (R/W) and adjoining Temporary Construction Easements (TCE) as shown on the plans, unless designated otherwise (either in the plans, in these Specifications or by the Contracting Officer).

The Contractor shall be solely responsible for obtaining agreements with and acquisition from adjacent land owners, when additional land or access points are required to supplement the Contractor's operations or staging needs. No appurtenances or other public access facilities (either temporary or permanent) shall be constructed beyond the Project Limits.

3.17.2 Existing Roads

3.17.2.1 Beltway (South Bound Frontage Road), Fort Apache, Grand Canyon Drive, Hualapai Way

The Contractor shall maintain public access along South Bound Frontage Road, Fort Apache, Grand Canyon Drive and Hualapai Way at all times during this contract. Signs and reflective barriers are to be used as required to allow safe passage.

3.17.3 Coordination with Other Contractors

3.17.3.1 North and South of F-1 Channel, Hualapai Way to Beltway, and Sienna Community

The Contractor is advised that communities North and South of the F-1 Channel, Hualapai Way to Beltway and the Sienna Community are currently under construction. Work to be performed under that contract consists of construction of golf course, subdivision, related utilities and connector roads.

3.17.4 Runoff F-1 Channel, Hualapai Way to Beltway

The work areas for both the channel and basin will occur in areas that are subject to flowing waters as a result of rainfall. In addition, the channel work area is subject to flowing waters as a result of irrigation runoff and other construction related activities (new development). The F-1 Channel, Hualapai Way to Beltway Contractor is advised that it is their responsibility to protect their work from these probable events. In addition to these and other coordination issues discussed herein, see also specification Section 02100 "Diversion and Control of Water". See also paragraph National Pollution Discharge Elimination System (NPDES) Permit.

3.17.4.1 Runoff Side Drains

The F-1 Channel, Hualapai Way to Beltway Contractor shall anticipate storm (and nuisance) runoff coordination from side drains and at side drain locations along the F-1 Channel, Hualapai Way to Beltway. Some side drains and laterals are active while others will become active during the life of the F-1 Channel, Hualapai Way to Beltway project. The F-1 Channel, Hualapai Way to Beltway Contractor shall conduct construction activities with full coordination of these runoff waters and shall safely allow them to pass without inundating other areas of adjacent development. Drainage from side drains, laterals and all future side drain locations shall not be interrupted.Text

3.17.5 Hualapai Way, Grand Canyon Drive and Fort Apache Road Construction Access for Others

The Hualapai Way, Grand Canyon Drive and Fort Apache Road Crossings are required to have continuous construction access for others across the F-1 Channel, Hualapai Way to Beltway Channel alignment. The F-1 Channel, Hualapai Way to Beltway Contractor shall be required to construct the Hualapai Way, Grand Canyon Drive and Fort Apache Road Reinforced Concrete Boxes in two phases and ensure that the access is reconfigured during both phases so that traffic activities other than the F-1 Channel, Hualapai Way to Beltway project are not interrupted. Improvements for the permanent Hualapai Way, Grand Canyon Drive and Fort Apache Roads perpendicular to the F-1 Channel, Hualapai Way to Beltway, are anticipated to commence (by others) during the life of this contract. Any detours utilized by the F-1 Channel, Hualapai Way to Beltway Contractor shall provide means of passage

through the Channel work area that include equivalent road surface requirements (for instance asphalt paving if applicable).

3.17.6 Excess Material

Excess material originating from the construction of the F-1 Channel, Hualapai Way to Beltway project shall be disposed in the Russel Road Disposal Site. The F-1 Channel, Hualapai Way to Beltway Contractor is advised that Russell Road, the Beltway, and the roads next to the Russell Road disposal site are all currently active and open streets to the Public. Haul routes shall be coordinated through the development of traffic control plans submitted to and approved by Clark County Department of Public Works.

3.17.7 Existing Gas Lines

Existing natural gas lines owned by Southwest Gas Corporation located in Hualapai Way and Grand Canyon Drive are in conflict with the F-1 Channel alignment and are required to be relocated. The existing polyethylene gas lines shall be relocated by Southwest Gas after the F-1 Channel Contractor has completed rough excavation at each area. The F-1 Channel Contractor shall temporarily support the existing gas lines during excavation and until Southwest gas has completed their relocation. In developing their construction schedule, the F-1 Channel Contractor shall allow Southwest Gas two weeks after completion of rough excavation to complete the required relocations. Advance notice of proposed scheduling for relocation work shall be provided by the F-1 Channel Contractor to Southwest Gas so that relocation activities may be completed within the desired time period.

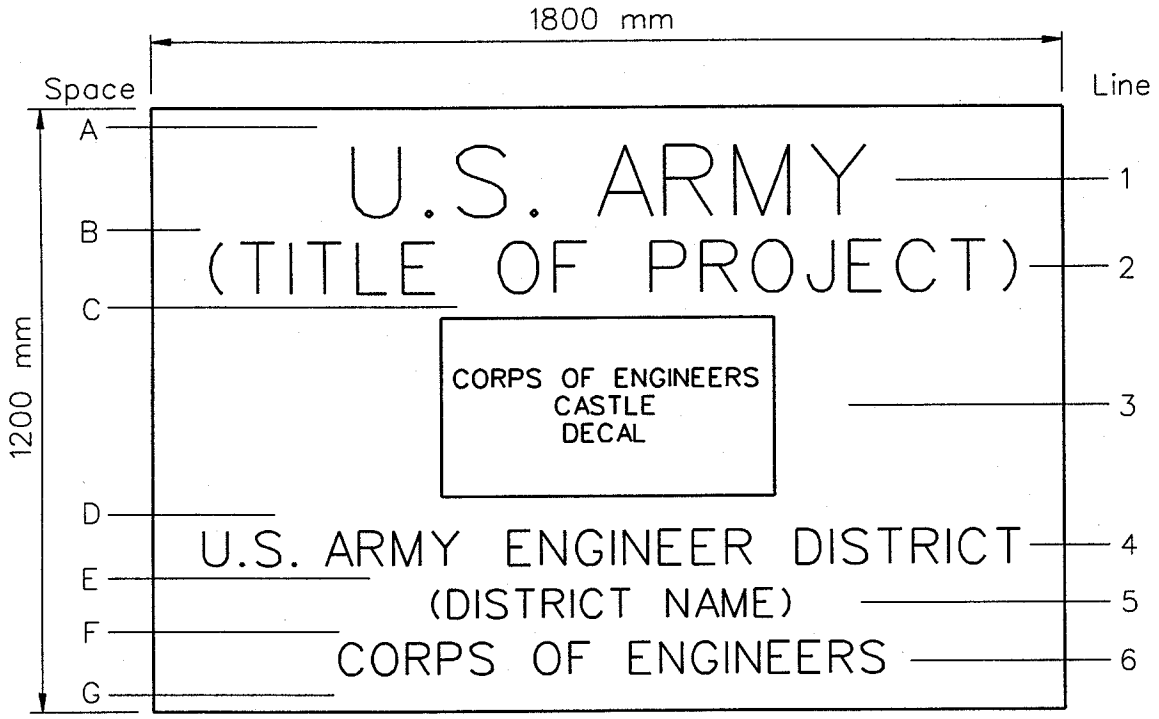
3.17.8 Coordination for Utilities

During the life of the F-1 Channel contract, the F-1 Channel Contractor shall anticipate numerous coordination issues with utility owners at various locations along the F-1 Channel alignment. New utilities are required to support this rapidly developing area. Sprint, Nevada Power, Southwest Gas, Las Vegas Valley Water District, Cox Cable and the Clark County Sanitation District are among the utilities anticipated to be improved or added through this area. The F-1 Channel Contractor shall coordinate all F-1 Channel work with utility companies desiring access to the F-1 Channel ROW or TCE limits identified on the contract drawings. The F-1 Channel Contractor shall permit any utility or its delegated representative to enter into and use F-1 Channel ROW or TCE areas to complete utility work. The F-1 Channel ROW and TCE areas are not intended to be restricted for the sole use of the F-1 Channel Contractor.

3.17.9 Coordination with Planned Sewer Lines

Two new sewer lines are planned along the F-1 Channel and installation is anticipated to commence by 01 April 2002. These sewer lines cross under and run parallel to the F-1 Channel in areas between Station 18+00 and Station 14+80. The F-1 Channel Contractor shall plan and coordinate their construction activities accordingly to allow the installation of these two separate lines by others. The F-1 Channel work shall not damage or interrupt service to these sewers once completed. Manholes installed for these sewers shall be adjusted in elevation by the F-1 Channel Contractor to match finish grade elevations to include new concrete collars per Standard Clark County Drawings.

-- End of Section --



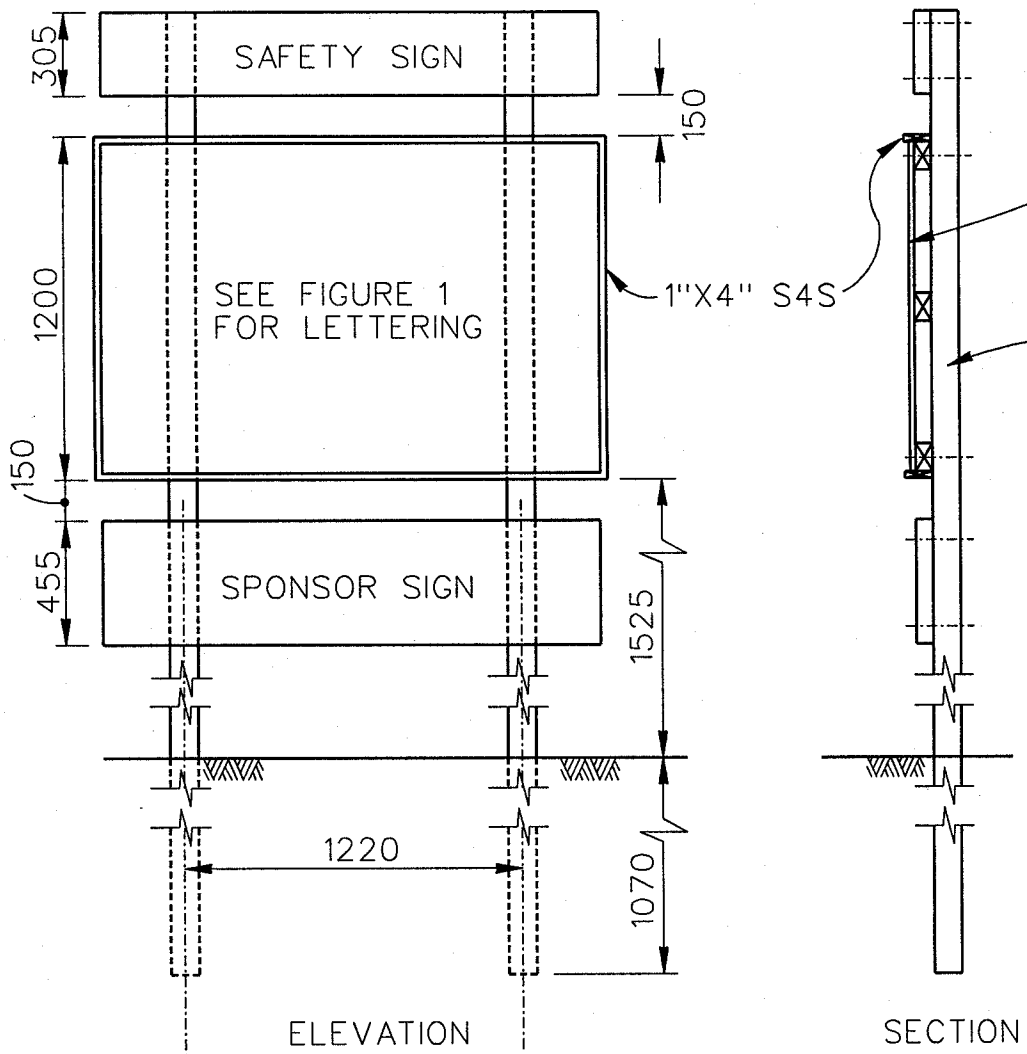
Space	Height	Line	Description	Letter Height	Stroke
A	75				
		1	U.S. ARMY	140	22
B	50				
		2	PROJECT NOMENCLATURE	100	16
C	50				
		3	CORPS OF ENGINEERS CASTLE (DECAL)	345	
D	70				
		4	U.S. ARMY ENGINEER DISTRICT	70	9
E	50				
		5	DISTRICT NAME	60	6
F	50				
		6	CORPS OF ENGINEERS	65	9
G	75				

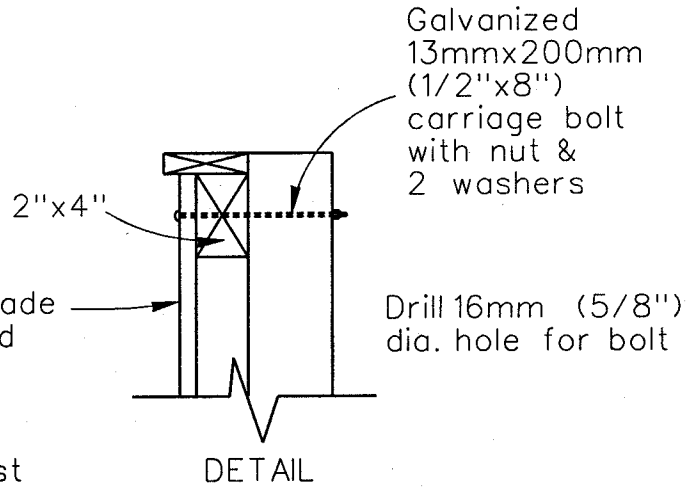
Letter Color -- Black

PROJECT SIGN
(Army-Civil Works)

Figure 1
October 1996

All units are in millimeters.





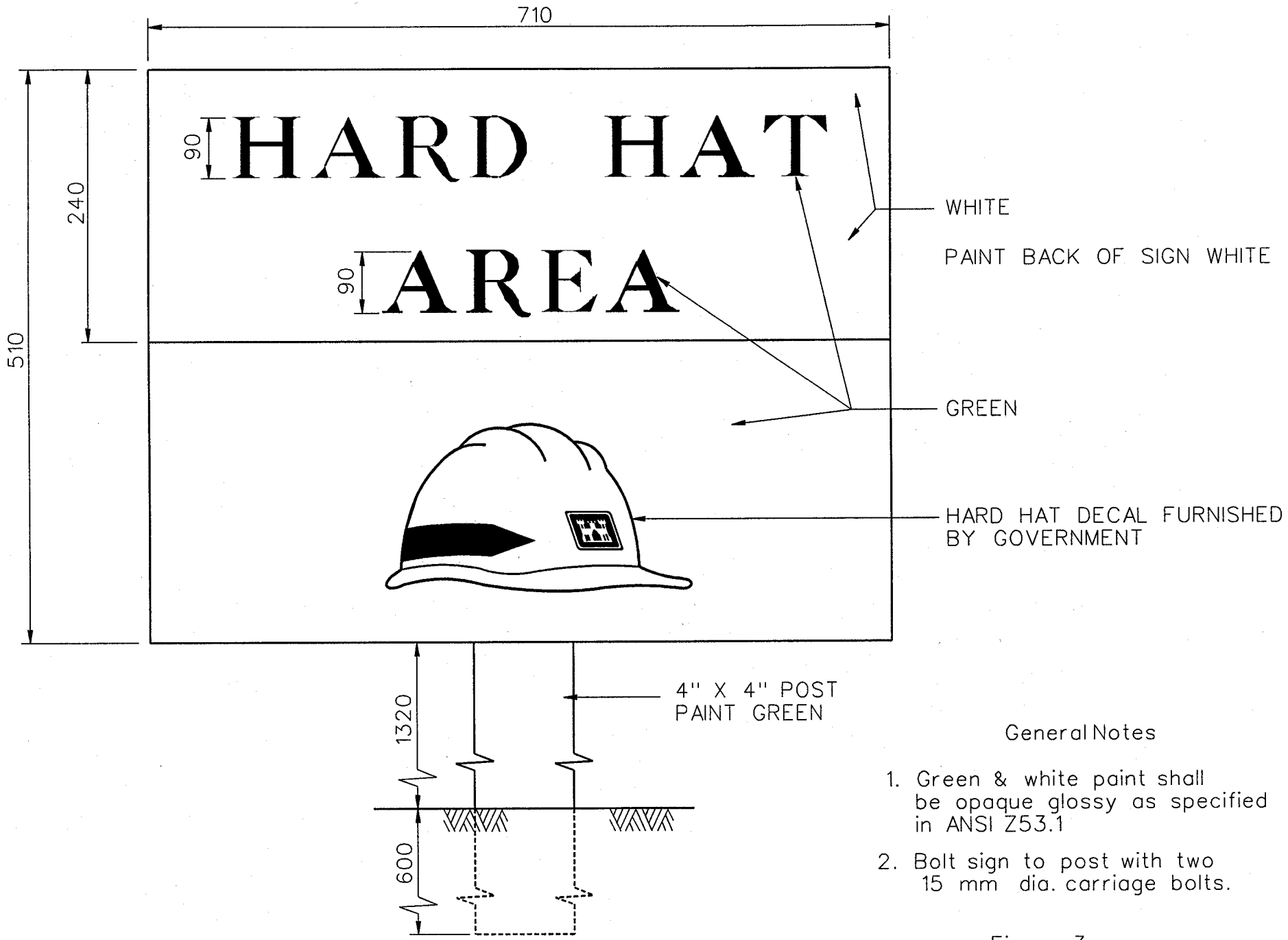
General Notes

1. Lumber to be cut & formed accurately.
2. Secure 1"x4" & plywood with 6d finish nails at not less than 305mm(12") O.C.
3. All exposed nails to be set & holes filled with putty.
4. Sign to be set in good solid ground & backfill carefully tamped into place.
5. Where necessary, posts shall be braced to provide a solid installation.

SIGN DETAILS

Figure 2
October 1996

All units are in millimeters unless otherwise indicated.



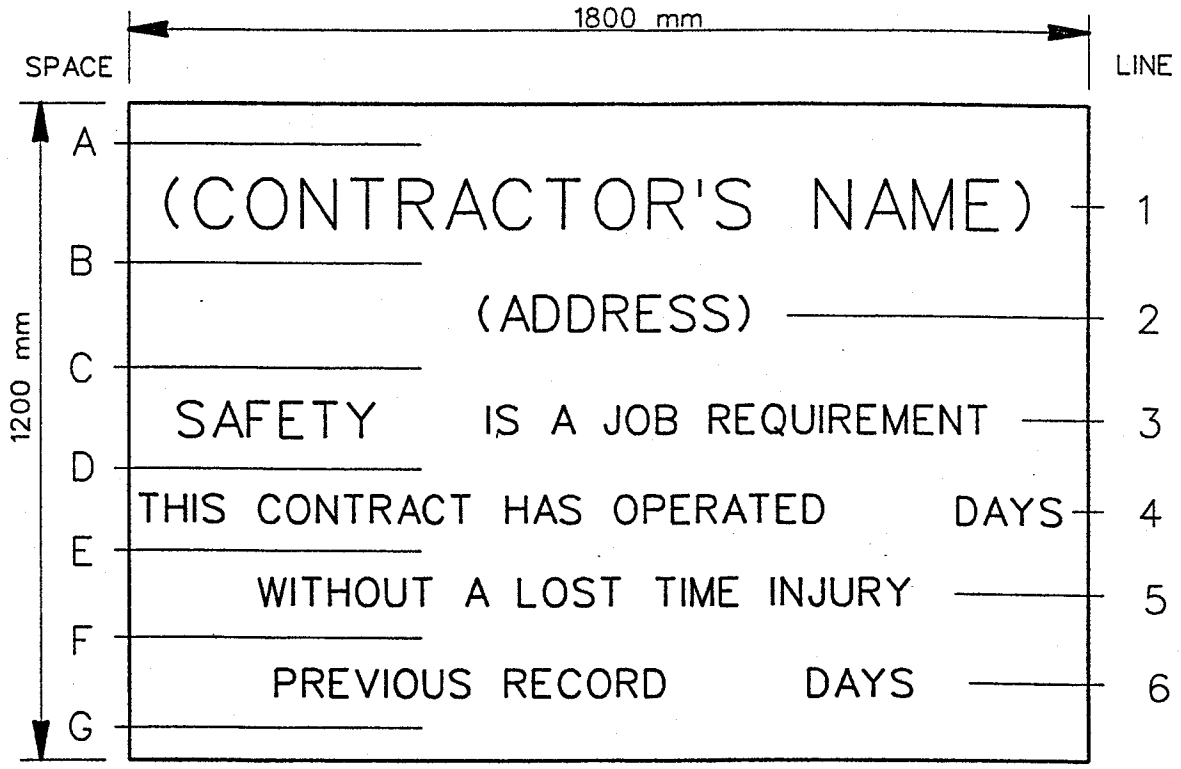
General Notes

1. Green & white paint shall be opaque glossy as specified in ANSI Z53.1
2. Bolt sign to post with two 15 mm dia. carriage bolts.

All units are in millimeters unless otherwise indicated.

Figure 3
October 1996

CORPS OF ENGINEERS U.S. ARMY



SPACE	HEIGHT	LINE	DESCRIPTION	LETTER HEIGHT
A	125			
		1	CONTRATOR'S NAME	125
B	75			
		2	ADDRESS	75
C	150			
		3	SAFETY IS A JOB REQUIREMENT	115 & 75
D	75			
		4	ALL LETTERING	75
E	75			
		5	ALL LETTERING	75
F	75			
		6	ALL LETTERING	75
G	125			

Notes

Lettering shall be black No. 27038 standard 595.
Sign shall be installed in the same manner as the Project Sign.

SAFETY SIGN
STANDARD DETAIL

All units are in millimeters.

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SECTION 01270

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 REFERENCES - NOT USED

1.2 LUMP SUM PAYMENT ITEMS

Payment items for the work of this contract for which contract lump sum payments will be made are listed in the BIDDING SCHEDULE and described below. All costs for items of work, which are not specifically mentioned to be included in a particular lump sum or unit price payment item, shall be included in the listed lump sum item most closely associated with the work involved. The lump sum price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for which separate payment is not otherwise provided.

1.2.1 Traffic Control (Bid Item 0001)

Payment for Traffic Control will be made at the applicable contract price, which payment shall constitute full compensation for traffic control including but not limited to earthwork and grading for construction and removal of temporary roadways; providing safety barriers; providing traffic warning and control signs and flagmen as required.

1.2.2 Diversion and Control of Water (Bid Item 0002)

Payment for Diversion and Control of Water will be made at the applicable contract price, which payment shall constitute full compensation for control of storm water runoff to prevent adverse impacts to the project or downstream properties.

1.2.3 Construction Water (Bid Item 0003)

Payment for Construction Water will be made at the applicable contract price, which payment shall constitute full compensation for furnishing water for construction and dust control including cost of permits, cost of water taps or hydrants, applicable earthwork, design and installation of temporary water pipeline and storage tanks, maintaining and repairing the water supply system and all incidentals, complete.

1.2.4 Clear Site and Remove Obstructions (Bid Item 0004)

Payment for Clear Site and Remove Obstructions will be made at the applicable contract price, which payment shall constitute full compensation for clearing debris and grubbing areas of excavation, fill, or other approved areas necessary for the Contractor's operations within the limits of the designated temporary construction easement, the protection of existing facilities to remain in place. This work shall include removal of designated riprap and fence. This work shall not include clearing and removal of trash and the smoothing of piles on the North side of the F-1

Channel in the Right-Of-Way between Station 28+15.550 and Station 24+02.805, which is covered in Bid Item XXXXXXX. Unnecessary clearing will not be permitted. This work shall include disposal off-site of all existing debris such as old pavement, tree trimmings, trash, etc. This work shall also include the protection in place, or restoration, of existing facilities that are to remain in place.

1.2.5 Ladder Systems (Bid Item 0005)

Payment for Ladder Systems will be made at the applicable contract lump sum price for installation of all channel access ladders. The contract price for ladder system shall be considered full payment for fabrication, assembly fittings, finishing, paint and marking, installation of ladder steps, and all equipment, labor and fittings.

1.2.6 Channel Station Marking (Bid Item 0006)

Payment for Channel Station Marking will be made at the applicable contract lump sum price, which shall be considered full payment for preparation, paint and marking, equipment and labor.

1.2.7 Confluence Structures (Bid Item 0007 - 0008)

Payment for Confluence Structure #1 and Confluence Structure #2, including the confluence and transition structures, will be made at the applicable contract lump sum price, which payment shall constitute full compensation for each confluence and transition structure, for the reach of the channel and confluence structure specified, including furnishing and placing reinforcing steel; furnishing, placing, finishing and curing concrete; excluding excavation and compacted fill that is included in separate bid items for Excavation, Channel, and Compacted Fill, Channel; complete as shown on the drawings. Confluence Structure #1 shall be from F-1 Channel Station 19+76.492 to Station 20+68.005 and will include the portion of the Fort Apache Lateral from Fort Apache Lateral Station 10+00.000 to Station 10+06.476. Confluence Structure #2 shall be from F-1 Channel Station 34+05.060 to Station 35+61.625 and will include the portion of the F-2 Channel from F-2 Channel Station 10+00.000 to Station 10+32.058.

1.2.8 Access Ramps (Bid Items 0009 - 0010)

Payment for each Access Ramp #1 and Access Ramp #2 will be made at the applicable contract lump sum price for the reach of channel and ramp specified, which payment shall constitute full compensation for each access ramp, including main channel at ramp, furnishing and placing reinforcing steel; Furnishing, placing, finishing and curing concrete; Furnishing, placing and finishing pipe access gate; excluding excavation and compacted fill that is included in separate bid items for Excavation, Channel, and Compacted Fill, Channel; complete as shown on the drawings. Access Ramp #1 shall be from Station 19+13.665 to Station 19+76.492 on the F-1 Channel. Access Ramp #2 shall be from Station 10+95.934 to Station 11+46.953 on the F-2 Channel.

1.2.9 Reinforced Concrete Boxes (RCB) (Bid Items 0011 - 0014)

Payment for RCB will be made at the applicable contract lump sum price for the size and reach of box specified, which payment shall constitute full compensation for RCB and headwalls including earthwork, complete, including: furnishing and placing reinforcing steel; furnishing and placing, finishing and curing concrete, headwalls; and all incidentals,

complete as shown on the drawings except for post and cable railing, chain link fencing, and gates. RCB near Beltway shall be 4.000 m x 3.660 m from Station 14+26.483 to Station 14+64.278. RCB Lateral at Fort Apache shall be 3.660 m x 2.440 m from Station 10+06.476 to Station 10+54.100. RCB at Fort Apache shall be 5.000 x 3.000 from Station 20+61.529 to Station 21+23.810. RCB at Grand Canyon shall be 5.000 x 3.000 from Station 28+87.660 to Station 29+48.140.

1.2.10 Side Drain Connections (Bid Items 0015 - 0019)

Payment for Side Drain Connections will be made at the applicable contract lump sum price for each structure and connection at the station specified and shown on the plans, which payment shall constitute full compensation for structure and RCP connection to the channel wall, complete, including: excavation and compacted fill and backfill; furnishing and placing reinforcing steel; furnishing and placing, finishing and curing concrete, and all incidentals, complete as shown on the drawings, inclusive within the construction joints shown on the plans and drawings.

1.2.11 Stilling Well (Bid Item 0020)

Payment for Stilling Well will be made at the applicable contract price, which payment shall constitute full compensation for the stilling well, complete, including excavation and compacted backfill; furnishing and placing reinforcing steel; staff gauge; manhole, access door, shelf, furnishing PVC coated-rigid steel inlet pipes with slurry backfill; connection to existing and/or new concrete channel walls, including sawcuts and dowels; furnishing, placing, finishing, and curing concrete for, cutoff, walls, slabs, and sills as shown on the drawings; and all incidentals.

1.3 UNIT PRICE PAYMENT ITEMS

Payment items for the work of this contract on which the contract unit price payments will be made are listed in the BIDDING SCHEDULE and described below. The unit price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for each of the unit price items.

1.3.1 Excavation, Channel (Bid Item 0021)

1.3.1.1 Measurement

A survey of the site shall be made prior to commencement of work, and all measurements will be based on this survey without regard to any changes in the site that may be made between the excavation lines and grades indicated on the drawings or staked in the field and the ground surfaces as indicated by the above mentioned survey. Measurement shall be based on difference between surveyed original grade and the grade and slope of the theoretical cross sections indicated on the drawings. The actual slopes as excavated may be greater or less than those indicated or staked, depending on the materials excavated and methods used in performing the work, but such alterations shall not change the measurement for payment from the original lines as specified herein. The quantity of directed excavation necessary for the removal of unsatisfactory foundation material as specified shall be included in the measurement of the excavation where the unsatisfactory

soils are encountered. Quantities will be computed in cubic meters by the average end area method and the planimeter will be considered a precise instrument for measurement of plotted cross sections. The Contractor has the option of using computer methods for quantity estimations, but all computer methods of quantity estimations shall be approved by the Contracting Officer. All excavation outside of excavation lines shown on the drawings will be considered as being for convenience of the Contractor.

1.3.1.2 Payment

Payment for Excavation, Channel will be made at the applicable contract price for excavation per cubic meter, which payment shall constitute full compensation for excavation for the channel, roads and other areas as indicated on the drawings including shoring, blasting, rock removal, and cemented alluvium excavation; shaping and trimming of areas to receive concrete; crushing or otherwise processing, loading, stockpiling, hauling, and placing suitable materials for compacted fill and backfill; loading, stockpiling, hauling, stockpiling of excess satisfactory excavated materials having no particle larger than 0.2 meters in size at disposal site indicated on the drawings; Payment will not be included for excavation (including shoring) outside the excavation limits indicated on the drawings or staked in the field, and other earthwork requirements for which separate payments are provided.

1.3.1.3 Subgrade or Foundation Preparation

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

1.3.1.4 Unsatisfactory Soils

No separate payment will be made for the excavation and disposal of unsatisfactory soils. When such excavation is directed, payment will be made based on the contract unit prices for Excavation, Channel and Compacted Fill.

1.3.1.5 Trenches

No separate payment will be made for the excavation and disposal of pipe trenches. All costs therefore shall be included in the applicable contract prices for the items to which the work applies.

1.3.1.6 Shoring

No separate payment will be made for shoring. The Contractor shall be responsible for method of construction and the use of shoring, stable slope cuts, or other trench safety requirements.

1.3.2 Fills (Bid Items 0022 - 0023)

1.3.2.1 Measurement

Measurement for fills will be made between the 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 meters by the average end area method and the planimeter will be considered a precise instrument for measuring plotted cross sections. The Contractor has the option of using computer methods of quantity estimation, but all

computer methods of quantity estimation shall be approved by the Contracting Officer.

1.3.2.2 Payment for Compacted Fill, Channel

Payment for Compacted Fill, Channel, will be made at the applicable contract unit price per cubic meter, which payment shall constitute full compensation for shaping, grading, and compacting the fill, complete. Payment will not be included for fills outside the fill limits indicated on the drawings or staked in the field, and other fill requirements for which separate payments are provided.

1.3.2.3 Payment for Compacted Fill, Roadways

Payment for Compacted Fill, Roadways, will be made at the applicable contract unit price per cubic meter, which payment shall constitute full compensation for shaping, grading, and compacting the fill, complete. Payment will not be included for fills outside the fill limits indicated on the drawings or staked in the field, and other fill requirements for which separate payments are provided.

1.3.2.4 Trenches

No separate payment will be made for backfilling pipe including bedding material, selected granular material, or initial backfill material. All costs in connection therewith shall be included in the contract prices for items to which the work applies.

1.3.2.5 Backfill About Structures

No separate payment will be made for backfill about structures. All such costs shall be included in the applicable contract prices for items to which the work applies.

1.3.2.6 Subgrade Preparation

No separate payment will be made for subgrade preparation for areas of fill, and all costs in connection therewith shall be included in the contract prices.

1.3.3 Excess Material Disposal (Bid Item 0024)

1.3.3.1 Measurement

Measurement for Excess Material Disposal shall be equal to the accepted quantity of excavation less the accepted amounts for compacted fill, channel, and roadway. Satisfactory excavated materials shall be used, to the extent possible for construction of fills, embankments, subgrades, shoulders, bedding, and similar purposes. Excess materials, not utilized as compacted fill, shall be disposed of in the designated disposal site as indicated on the drawings.

1.3.3.2 Payment

Payment for Excess Material Disposal shall be at the contract unit price per cubic meter, which payment shall constitute full compensation for haul and placement at the designated disposal site as indicated on the drawings.

1.3.4 Reinforced Concrete Pipe (Bid Items 0025 - 0027)

1.3.4.1 Measurement

Provide reinforced concrete piping as shown on the drawings. The Work shall consist of a complete installation. All excavation, bedding material, backfill, compaction of bedding and backfill, caps and marker posts, and all other trenching related work shall be included. Any trench excavation greater than 1.524 meters deep (vertical wall) shall be braced in accordance with Section 02316. The pipe shall be measured along the flow line. Laying the pipe to line and grade, grouting in the joints and all other piping installation work shall also be included except side drain connection paid under a separate bid item. All labor, equipment, and material costs shall be included in the price per meter for each size and class of RCP.

1.3.4.2 Payment

Payment for Reinforced Concrete Pipe will be made at the applicable contract unit price per linear meter, which payment shall constitute full compensation for the installation, including excavation, bedding and backfill materials and placement, laying the pipe, mortaring the joints, compaction of bedding and backfill materials under, around, and over the pipe, caps and marker posts, complete and in place. Side drain connection is paid under a separate bid item.

1.3.5 Aggregate Base Course(Bid Item 0028)

1.3.5.1 Measurement

Measurement of the base course will be by the metric tonne (1,000 kilograms) of aggregate base course placed within the lines and grades indicated on the drawings.

1.3.5.2 Payment

Payment for Aggregate Base Course will be made at the applicable contract unit price per metric tonne, which payment shall constitute full compensation for work required for installation of aggregate base course, furnishing, placing, and compacting the aggregate base course, complete, including subgrade preparation.

1.3.6 Asphalt Concrete Pavement (Bid Item 0029)

1.3.6.1 Measurement

Measurement for Asphalt Concrete Pavement will be by the metric tonne (1,000 kilograms) of asphalt concrete pavement placed within the lines and grades as indicated on the drawings.

1.3.6.2 Payment

Payment for Asphalt Concrete Pavement will be made at the applicable contract price which payment shall constitute full compensation for asphalt concrete pavement in place, complete including tack coat, prime coat and appurtenant work except for aggregate base course. No payment will be made for excessive thickness.

1.3.7 Chain Link Fencing and Swing Gate(Bid Items 0030 TO 0031)

1.3.7.1 Measurement

Measurement of Chain Link Fencing that is provided will be by the linear meter of chain link fencing constructed as shown on the drawings. Gates shall be measured for each type and size acceptably installed.

1.3.7.2 Payment for Chain Link Fencing

Payment for Chain Link Fencing will be made at the applicable contract unit price per linear meter of fabric specified, which payment shall constitute full compensation for chain link fencing, including posts with caps, rail, chain link fabric, stretcher bars, tension bands, wire ties, truss wire, sleeves, grout, and all incidentals, complete as shown on the drawings.

1.3.7.3 Payment for Swing Gate

Payment for Swing Gate will be made at the applicable contract price, per each, for chain link double swing gates, which payment shall constitute full compensation for obtaining and installing gates complete, as shown on the drawings.

1.3.8 Post and Cable Railing (Bid Item 0032)

1.3.8.1 Measurement

Measurement of Post and Cable Railing will be by the linear meter, measured from end to end, of railing installed as shown on the drawings.

1.3.8.2 Payment

Payment for Post and Cable Railing will be made at the applicable contract unit price per linear meter, which payment shall constitute full compensation for railing, including posts, cable, safety chain gates, galvanized appurtenances, fabrication, grout or dry pack, and all incidentals, complete.

1.3.9 Reinforced Concrete (Bid Items 0033 - 0034)

1.3.9.1 Measurement

Measurement of concrete will be made on the basis of the actual volume, in cubic meters, of concrete within the pay lines of the channel slab, and channel walls, as shown 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 structures. No deductions will be made for rounded or beveled edges or space occupied by metalwork, nor voids or embedded items which are either less than 0.15 cubic meter in volume or one-tenth of square meter in cross section. Concrete wasted or used for the convenience of the Contractor will not be included in measurement for payment.

1.3.9.2 Payment

Payment for the concrete items will be made at the applicable contract prices for the various items of the schedule, which payments shall constitute full compensation for labor, reinforcing steel, forming, finishing, curing, cutoff walls that are apart of channel construction, joint sealant complete, and for all equipment and tools to complete the concrete work. Embedded items (such as weepholes) shall be included in the

cost of the concrete except when other payment is specifically provided. No payment will be made for concrete, as such, which is placed in structures for which payment is made on a lump sum basis.

1.3.9.3 Channel, Invert

Payment for the Channel, Invert will be made at the applicable contract unit price per cubic meter, which payment shall constitute full compensation for all concrete (including all necessry items described in Paragraph 1.3.9.2 above) placed for the channel invert slab, keys, and starter walls, complete.

1.3.9.4 Channel, Wall

Payment for the Channel, Wall will be made at the applicable contract unit price per cubic meter, which payment shall constitute full compensation for all concrete (including all necessary items described in Paragraph 1.3.9.2 above) placed above the starter walls in the vertical walls of the channel, and cast-in-place boxes, complete.

1.3.10 Pre-Emergent Herbicide/Pigmented Dust Palliative/Soil Stabilizer (Bid Item 0035)

1.3.10.1 Measurement

Measurement of Pre-Emergent Herbicide/Dust Palliative will be made on the basis of the actual area in hectares surfaces treated with dust palliative or as directed.

1.3.10.2 Payment

Payment for Pre-Emergent Herbicide/Dust Palliative will be at the applicable contract price, which payment shall constitute full compensation including grading, scarifying furnishing materials, processing, and application, complete in place.

1.4 OPTIONAL BID ITEMS

Construction of reinforced concrete boxes for the F-1 and F-2 Hualapai Way roadway crossings and other facilities in Hualapai Way are optional construction that may or may not be awarded.

1.4.1 Reinforced Concrete Box (RCB) (Bid Items 0036 - 0037)

Payment for F-1 RCB and F-2 RCB at Hualapai Way will be made at the applicable contract lump sum price for the size and reach of box specified, which payment shall constitute full compensation for RCB and headwalls including earthwork, complete, including: furnishing and placing reinforcing steel; furnishing and placing, finishing and curing concrete, headwalls; and all incidentals, complete as shown on the drawings except for post and cable railing, chain link fencing, and gates. F-1 RCB at Hualapai Way shall be 4.000 m x 3.000 m from Station 36+80.049 to Station 37+52.022. F-2 RCB at Hualapai Way shall be 5.000 m x 3.000 m from Station 11+61.850 to Station 12+29.550.

1.4.2 Side Drain Connection, Sta. 37+13.926 (Bid Item 0038)

Payment for Side Drain Connection, Sta. 37+13.926 will be made at the applicable contract lump sum price for the structure and connection at the

station specified and shown on the plans, which payment shall constitute full compensation for structure and RCP connection to the channel wall, complete, including: furnishing and placing reinforcing steel; furnishing and placing, finishing and curing concrete, and all incidentals, complete as shown on the drawings, inclusive within the construction joints shown on the plans and drawings.

1.4.3 Reinforced Concrete Pipe 1.676 m Dia. (Bid Item 0039)

1.4.3.1 Measurement

Provide reinforced concrete piping as shown on the drawings. The Work shall consist of a complete installation. All excavation, bedding material, backfill, compaction of bedding and backfill, caps and marker posts, and all other trenching related work shall be included. Any trench excavation greater than 1.524 meters deep (vertical wall) shall be braced in accordance with Section 02316. The pipe shall be measured along the flow line. Laying the pipe to line and grade, grouting in the joints and all other piping installation work shall also be included except side drain connection paid under a separate bid item. All labor, equipment, and material costs shall be included in the price per meter for each size and class of RCP.

1.4.3.2 Payment

Payment for Reinforced Concrete Pipe 1.676 m Dia. will be made at the applicable contract unit price per linear meter, which payment shall constitute full compensation for the installation, including excavation, bedding and backfill materials and placement, laying the pipe, mortaring the joints, compaction of bedding and backfill materials under, around, and over the pipe, caps and marker posts, complete and in place. Side drain connection paid under a separate bid item.

1.4.4 Steel Sleeve (Bid Items 0040)

1.4.4.1 Measurement

The Contractor shall provide steel sleeve as shown on the drawings. The work shall consist of a complete installation including caps and marker posts. All excavation, bedding material, backfill, compaction of bedding and backfill, and all other trenching related work shall be included. Any trench excavation greater than 1.524 meters deep (vertical wall) shall be braced in accordance with Section 02316. The pipe sleeve shall be measured along the flow line. Laying the pipe sleeve to line and grade and all other installation work shall also be included. All labor, equipment, and material costs shall be included in the price per linear meter of steel pipe sleeve.

1.4.4.2 Payment

Payment for Steel Sleeve will be made at the applicable contract unit price per linear meter, which payment shall constitute full compensation for the installation of sleeve, caps, and marker posts, involving excavation, bedding and backfill materials and placement, laying the sleeve, compaction of bedding and backfill materials under, around, and over the sleeve, complete and in place.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

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SECTION 01321

NETWORK ANALYSIS SCHEDULES (NAS)

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SECTION 01321

NETWORK ANALYSIS SCHEDULES (NAS)

PART 1 GENERAL

1.1 DESCRIPTION

Prepare a progress chart pursuant to the clause entitled "FAR 52.236-15, Schedules for Construction Contracts" of the Contract Clauses that shall consist of a network analysis system. The network analysis system shall consist of the network analysis schedule (diagram), mathematical analysis, and associated reports. The scheduling of construction shall be the responsibility of the Contractor. Submission of progress and revision data will be used to measure work progress, aid to evaluate time extensions, and provide basis of all progress payments. The Critical Path Method (CPM) of network calculation shall be used to generate the project schedule and will utilize the Precedence Diagram technique to satisfy both time and cost applications. All progress payment amounts will be derived from and tied to the cost-loaded schedule activities.

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 "RE" designates that the Resident Office will review the submittal for the Government. Submit the following in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Qualifications; G, RE.

Standard Activity Coding Dictionary

Schedule Development Session Scheduler/Planner; G, RE.

Network Analysis Schedule; G, RE.

Accepted Network Analysis Schedule; G, RE.

SD-07 Certificates

Monthly Network Analysis Updates; G, RE.

SD-11 Closeout Submittals

As-Built Schedule; G, RE.

1.3 SCHEDULE ACCEPTANCE

Review comments made by the Government on the Contractor's construction schedule will not relieve the Contractor from compliance with requirements of the Contract Documents. The Contractor is responsible for scheduling,

sequencing, and prosecuting the Work to comply with the requirements of the Contract Documents. Government acceptance extends only to the activities of the contractor's schedule that the Government has been assigned responsibility for and agrees it is responsible. The Government will also review for contract imposed schedule constraints and conformance, and cost loading of the CPM activities. Comments offered on other parts of the schedule which the Contractor is assigned responsibility are offered as a courtesy and are not conditions of government acceptance; but are for the general conformance with established industry schedule concepts.

1.3.1 Schedule Acceptance Prior to Start of Work

The Accepted Network described in the paragraph entitled "Accepted Network Analysis Schedule" must be submitted and accepted by the government before the contractor will be allowed to start work.

1.3.2 Acceptance

a. When the Accepted Network Analysis Schedule is submitted and accepted by the Contracting Officer, it will be considered the "Baseline CPM Schedule". The Baseline CPM Schedule will then be used by the Contractor for planning, organizing, and directing the work; reporting progress; and requesting payment for work accomplished. The schedule will be updated monthly by the Contractor and submitted monthly with the progress pay request to reflect the current status of the work. The submittal and acceptance of the Accepted Network Analysis Schedule and accurate updated schedules accompanying the pay requests are both conditions precedent to processing pay requests. Only bonds will be paid prior to acceptance of the Accepted Network Analysis Schedule.

b. Submittal of the Network, and subsequent schedule updates, will be understood to be the Contractor's representation that the submitted schedule meets all of the requirements of the Contract Documents, accurately reflects the work accomplished, and that Work will be executed in the sequence indicated on the submitted schedule.

1.4 SOFTWARE

The scheduling software that will be utilized by the government on this project is Primavera Project Planner (P3) by Primavera Systems, Inc. If the contractor chooses to use an equally capable program, the contractor shall convert all data into Primavera Machine Readable Format (Lotus, D-Base, Excel, etc.) prior to submission of all schedule inputs, included but not limited to the initial schedule, monthly updates, and changes to the schedule. It is the responsibility of the Contractor to ensure all data elements and logic required by this specification are kept intact during the conversion to Primavera. If scheduling software other than Primavera is being used, provide a licensed copy of the Contractor's scheduling software and data. The software will be the most current version available and will be compatible with all MS-Windows operating systems (e.g., Win NT, Win 95, etc.). The scheduling software package shall contain all user manuals normally provided by the software distributor. If the Contractor upgrades their software during the course of the contract, the upgrade shall also be provided to the Contracting Officer. The software will remain the property of the government.

1.4.1 Computer Hardware

The Contractor shall provide and maintain a personal computer (PC) capable of running the network analysis software specified herein. The Contractor shall also provide a printer and plotter with necessary cables. The PC will remain the property of the Contractor.

1.4.2 Software Training

If software other than Primavera is used by the Contractor, provide schedule software training for two Government personnel. A firm accredited by the scheduling software manufacturer, as their authorized trainer shall conduct the training. The training shall last a minimum of 24 hours per individual. Provide course material the training firm normally distributes at their software classes. Provide all necessary materials and equipment to conduct the training. The Contractor shall provide training within 10 working days after notification to the Contractor, by the Contracting Officer. Unless agreed to by the Contracting Officer, the training site shall be at the Contracting Office.

1.5 QUALIFICATIONS

The Contractor shall designate a Scheduler that will be responsible for the development, preparation, and maintenance of an accurate, computerized Network Analysis Schedule. The Scheduler shall have previously developed, created and maintained at least 2 previous computerized schedules of similar size and complexity of this contract. A resume outlining the qualifications of the scheduler shall be submitted for acceptance to the Contracting Officer. If at a later date, the Contracting Officer considers the Contractor's Scheduler to be incompetent or objectionable, the Contractor will propose a new Scheduler, meeting the qualification requirements. Payments will not be processed until an acceptable Scheduler is provided.

1.6 NETWORK SYSTEM FORMAT

The system shall consist of time scaled logic diagrams accompanying mathematical analyses and specified reports.

1.6.1 Diagrams

Show the order and interdependence of activities and the sequence in which the work is to be accomplished as planned. The basic concept of a network analysis diagram will be followed to show how the start of a given activity is dependent on the completion of preceding activities and how its completion restricts or restrains the start of following activities. Diagrams shall be organized by Work Phase and sorted by Early Start Date and will show a continuous flow from left to right with no logic (relationship lines) from right to left. With the exception of the Project Start and Project Completion milestone activities, no activities will be open-ended; each activity will have predecessor and successor ties. The diagram shall clearly show the activities of the critical path. No onsite construction activity shall have duration in excess of 20 working days. Once an activity exists on the schedule it may not be deleted and must remain in the logic. No more than 20 percent of the activities may be critical or near critical. Critical will be defined as having zero days of Total Float. "Near critical" will be defined as having Total Float in the range of 1 to 14 days. Show the following information on the diagrams for each activity:

a. Activity/Event Number

b. Activity Description

c. Original Duration in work days

d. Actual Duration in Work Days

e. Early Start Date

f. Early Finish Date

g. Total Float (or Slack)

h. Responsibility Code

Provide network diagrams on ANSI E sheets. Updated diagrams shall show the date of the latest revision.

1.6.2 Quantity and Numbering of Activities

Numbering shall be assigned so that, in general, predecessor activity numbers are smaller numerically than the successor activity numbers. Skip numbering shall be used on the network to allow insertion of additional activities for contract modifications and logic changes. The minimum number of construction activities in the final network diagram shall be 20. Types of activities included in the schedule are specified below.

1.6.2.1 Procurement Activities

Tasks related to the procurement of material or equipment shall be included as separate activities in the project schedule. Examples of procurement activities include, but are not limited to: Material/equipment submittal preparation, submittal and approval of material/equipment; delivery of O&M manuals; material/equipment fabrication and delivery, delivery of extra parts, extra stock, special tools, notification of Government Furnished Material/Equipment delivery requirement, etc. As a minimum, separate procurement activities will be provided for every specification section. If the Contractor intends on using Just-In-Time (JIT) delivery methods, the schedule will show each JIT delivery with relationship tie to the Construction Activity specifically for the JIT delivery. Material and equipment for which payment will be requested in advance of installation shall be cost-loaded with the procurement costs. All activities within a procurement process/cycle will have a unique identifier in the activity code to show their relationships and will extend to the related construction activities (i.e., Work Category).

If the Government's action on any submittal is "Disapproved" or "Revise and Resubmit", a new series of Procurement Activities will be inserted into the schedule. Predecessor for the new submittal preparation activity will be the original approval activity and the successor of the new approval activity will be the fabrication/deliver activity for the equipment or material.

1.6.2.2 Government Activities

Government and other agency activities that could impact progress shall be clearly identified. Government activities include, but are not limited to;

Government approved submittal reviews, Government conducted inspections/tests, utility outages, Notice(s) to Proceed and delivery of Government Furnished Material/Equipment. Show activities indicating Government furnished materials and equipment utilizing delivery dates indicated in "FAR 52.245-2, Government Property (Fixed-Price Contracts)." Government activities will be driven by calendars that reflect Saturdays, Sundays and all Federal Holidays as non-work days.

1.6.2.3 Construction Activities

Construction activities shall include, but are not limited to: Tasks related to mobilization/demobilization; the installation of temporary or permanent work by tradesman; testing and inspections of installed work by technicians, inspectors or engineers; start-up and testing of equipment; commissioning of building and related systems; scheduling of specified manufacture's representatives; final clean-up; training to be provided; and administrative tasks necessary to start, proceed with, accomplish or finalize the contract. Contractor activities will be driven by calendars that reflect Saturdays, Sundays and all Federal Holidays as non-work days.

1.6.2.4 Anticipated Weather Delays

Schedule activity duration(s) shall be formulated with allowance for normal adverse weather conditions. Any activity duration which could be impacted by normally anticipated adverse weather (precipitation, high or low temperature, wind, etc.), due to the time period which the Contractor has scheduled the work, shall include an adjustment to include the anticipated weather delay. The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

MONTHLY ANTICIPATED ADVERSE WEATHER DAYS
Work Days Based on five (5) Day Work Week

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
6	2	2	1	1	0	2	2	1	1	1	3

The number of anticipated adverse weather delays allocated to an activity will be reflected in the activity's calendar. A lost workday, due to weather conditions, is defined as a day in which the contractor's workforce cannot work 50 percent or more of the day. The Contractor shall immediately notify the Contracting Officer when a lost day has occurred due to weather and will record on the Daily Reports, the occurrence of adverse weather and resultant impact to the normally scheduled work. If the number of actual adverse weather delay days exceeds the number of days anticipated, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days and issue a modification in accordance with the contract clauses.

1.6.2.5 Activity Properties

Schedule activities will have the following properties:

a. Standard Activity Coding Dictionary: The Contractor shall submit a coding scheme for Schedule Activity Numbers that shall be used

throughout the project. The coding scheme submitted shall list the values for each activity code category and translate those values into project specific designations. Code length shall not exceed 10 characters. Once accepted, the coding scheme will be used for the duration of the project.

b. Activity Description: Each activity shall have a narrative description consisting of a Verb or work function (e.g.; form, pour, excavate), an Object (e.g.; slab, footing, underfloor plumbing), and Area (e.g.; 3rd floor, northeast quadrant, basement).

c. Work Category: All Activities shall be identified in the project schedule according to the work category which best describes the activity. Examples of work categories are procurement, government, and construction activities that are all related to a single Definable Feature of Work. Activities shall not be contained in more than one Work Category.

d. Area Code: All activities shall be identified in the project schedule by the Area Code in which the activity occurs. Activities shall not be contained in more than one Area Code. Area is defined as a distinct separation in construction, such as a story of construction, separate structure, usage or function difference, utility distribution systems, etc.

e. Responsibility Code: All activities in the project schedule shall be identified with the party responsible to perform the task. Responsibility includes, but is not limited to; the prime contractor, subcontracting firm, or Government agency performing a given task. Activities shall not belong to more than one responsible party. The responsible party for each activity shall be identified by a responsibility code. For example, a responsibility code value, "ELEC", may be identified as "Electrical Subcontractor."

f. CSI Code: All activities in the project schedule shall be identified with its respective 5-digit Specification Section number. Activities shall not belong to more than one Section number. If an activity does not have an applicable CSI Code, (such as "Mobilize"), the code will be "00000".

g. Drawing Code: All activities in the project schedule shall be identified with its respective project drawing code. The drawing code is the Sheet Number on the primary project drawing which indicates the work to be performed. Activities shall not belong to more than one Drawing Code. Examples of Drawing Codes are "C-10", "C.10" or "C10". The code system will allow organizing all activities by drawing code in alpha and numeric order. If an activity does not have an applicable Drawing Code, (such as "Mobilize"), the code will be "00000".

h. Modification Code: The Modification Code shall identify activities that are modified or added by contract modification. Activities shall not belong to more than one Modification Code. The Government will assign the modification number, which will be shown on the SF 30. Use a shortened version of the modification number for the code (e.g.; A00010 = 010).

i. Request for Equitable Adjustment (REA) or Claim Code: Activities that are modified or added, as a result of a Contractor's REA or Claim shall be identified by a code generated by the Contractor. Activities shall not belong to more than one REA or Claim Code.

j. The Three Phases of Control (Preparatory, Initial, and Follow-up): For each Definable Feature of Work identified in the Contractor's Quality Control Plan, include an activity for the Preparatory Phase. The Initial Phase and Follow-up Phase will be represented by the Construction Activities in the schedule.

k. Project Milestone Dates: Dates shall be shown on the diagram for the start of the project, any contract required interim start and completion dates, contract completion date and other significant milestones.

l. Scheduled Project Duration: The schedule duration shall extend from notice-to-proceed to the contract completion date.

m. Project Start Date Milestones: The schedule shall start no earlier than the contract award date and the project duration (Day 1) will start on the Notice-to-Proceed (NTP) date. The Contractor shall include as the first activity in the schedule, an activity named "Contract Award" and another activity on the NTP date named "Start Project". Both activities will be zero duration, with constrained start dates equal to the contract award and NTP dates.

n. Constraint of Last Activity Milestone: The Contractor shall include as the last activity in the project schedule, an activity named "End Project". The "End Project" activity shall be zero duration with a mandatory finish constraint equal to the contract completion date for the project. Calculation of project updates shall be such that if the finish of the last activity falls after the contract completion date, then the float calculation shall reflect negative float on the critical path.

o. Early Project Completion: In the event the Contractor's project schedule shows completion of the project prior to the contract completion date, the Contractor shall include an activity named "Contractor Early Completion". The activity shall be a zero duration milestone with an unconstrained date representing the Contractor's Early Completion date.

p. Substantial Completion: If the contractor elects to include an activity for Substantial Completion, then it is agreed that Substantial Completion will be the point in time that the Government considers the project is complete and ready for its intended use. The activity will be named "Substantial Completion". The activity shall be a zero duration milestone with an unconstrained date representing the Contractor's Substantial Completion date.

q. Activity/Event Constraints: Date/time constraint(s), other than those required by the contract, will not be allowed unless accepted by the Contracting Officer.

r. Leads and Lags: Leads or lags will not be used when the creation of an activity will perform the same function (e.g., concrete cure time). Lag durations contained in the project schedule shall not

have a negative value. The use of any lead or lag will be explained in the Narrative Report.

s. Default Progress Data Disallowed: Actual Start and Finish dates shall not be automatically updated by default mechanisms that may be included in the CPM scheduling software system. Actual Start and Actual Finish dates on the CPM schedule shall match the dates provided from Contractor Quality Control and Production Reports. These reports will be the sole basis for updating the schedule. Work activities will be updated by actual work progression rather than being cash flow driven. The updating of the percent complete and the remaining duration of any activity shall be independent functions; program features that calculate one of these parameters from the other shall be disabled. Out-of-Sequence progress (if applicable) shall be handled through Retained Logic, not the Default Option of Progress Override. Actual labor and equipment hours used on activities will be derived from the daily reports.

1.6.3 Mathematical Analysis

The network diagram mathematical analysis shall include a tabulation of each activity shown on the detailed network diagrams. Provide the following information as a minimum for each activity:

a. Activity/Event number

b. Activity/Event description

c. Estimated duration of activities (by work days)

d. Earliest start date (by calendar date)

e. Earliest finish date (by calendar date)

f. Actual start date (by calendar date)

g. Actual finish date (by calendar date)

h. Latest start date (by calendar date)

i. Latest finish date (by calendar date)

j. Total float or slack

k. Material/Equipment costs will be assigned to their respective Procurement Activities (i.e., the delivery activity). Costs for installation of the material/equipment (labor, construction equipment, and temporary materials) will be assigned to their respective Construction Activities. The value of inspection/testing activities will not be less than 10 percent of the total costs for Procurement and Construction Activities. Evenly disperse overhead and profit to each activity over the duration of the project.

l. Responsibility code (including prime contractor, subcontractors, suppliers, Government, or other party responsible for accomplishment of an activity.)

m. Area Code

n. Manpower required (crew size)

o. Percentage of activity duration completed

p. Contractor's earnings based on accepted work-in-place.

The program or means used in making the mathematical computation shall be capable of compiling the total value of completed and partially completed activities. The program shall also be capable of accepting revised completion dates as modified by approved time extensions and recompilation of tabulation dates/costs and float accordingly. The total of all cost loaded activities; including costs for material and equipment delivered for installation on the project, and manpower and construction equipment loaded construction activities, shall total to 100 percent of the value of the contract.

1.6.4 Required Reports

The following reports will be made available in the schedule submittals and in each updated schedule submission provided on disk by the Contractor:

a. By the preceding event number from lowest to highest and then in the order of the following activity number (Activity Identification Report) showing the current status of all activities.

b. By the amount of total float, from lowest to highest and then in order of activity number (Total Float or Slack Report) showing all incomplete activities.

c. By latest allowable start dates and then in order of activity numbers (Late Start Report).

d. Earned Value Report listing all activities having a budget amount and cost. A compilation of total earnings on the project from the notice to proceed to the most recent monthly progress payment request and the difference between the previous request amount and the current payment request amount. Sort report first by resource and then by activity.

e. By earliest allowable start dates and then in order of activity number (Early Start Report).

f. By tasks scheduled to start and finish by the end of the next pay period (30-Day Look Ahead).

g. With each updated schedule submission, provide a computer generated Log Report using a recognized schedule comparison software listing all changes made between the previous schedule and current updated schedule. Identify the name of the previous schedule and name of the current schedule being compared. This report will as a minimum show changes for: Added & Deleted Activities, Original Durations, Remaining Durations, Activity Percent Complete, Total Float (or Slack), Free Float, Calendars, Descriptions, Constraints (added, deleted or changed), Actual Starts/Finishes, Added/Deleted Resources, Resource Quantities, Costs, Resource Percents, Added/Deleted Relations, Changed Relation Lags, Changed Driving Relations, and Changed Critical

Status.

h. By the activity number from lowest to highest, showing preceding and succeeding activity numbers for each activity (Predecessor/Successor Report), and showing the current status of each activity.

1.7 SUBMISSION AND ACCEPTANCE

1.7.1 Preliminary Meeting

At the Pre-Construction Conference, the Contracting Officer, Contractor and major subcontractors shall participate in a preliminary meeting to discuss the proposed schedule and requirements of this section prior to submission of the network. The definition of a "major subcontractor" is one that exceeds 5 percent of the contract value.

1.7.2 Schedule Development Session:

Prior to the submission of the Network Analysis Schedule, the Contractor shall conduct a Schedule Development Session. The Schedule Development Session shall include procurement of on site services of an expert scheduler/planner for not less than a 5 day period. The Contractor's choice of Schedule Development Session scheduler/planner is subject to the acceptance of the Contracting Officer. The scheduler/planner shall facilitate the session on site and shall be fluent in the English language. The scheduler/planner shall have at least 10 years experience developing construction project schedules with scheduling software programs that the contractor intends to use. Unless agreed to by the Contracting Officer, the session shall be conducted at the Office of the Contracting Officer. The Contractor is responsible for providing the necessary equipment for the session which, as a minimum, includes a personal computer (PC), a computer display projector to facilitate group viewing, and a printing device. During the session the facilitator shall provide all necessary training to participants and shall lead the development of the project's schedule. As a minimum, the scheduler/planner shall facilitate development of activity coding and work breakdown structures; establishment of procurement, government, and construction activities; activity relationship; resourcing; budgeted costs; and reports to be used during the project. Members of the Contracting Officer's staff will attend the session as well as members of the designer of record, local sponsor, major subcontractors (those which exceed 5 percent of the contract value), and the Contractor's home and field project management staff. All costs associated with the Schedule Development Session are to be borne by the Construction Contractor.

1.7.3 Network Analysis Schedule

Submit the complete network system, consisting of the network mathematical analysis and network diagrams, within 40 calendar days after contract award. Submit three copies of the diagrams described in the paragraph entitled "Diagrams", the required reports listed in the paragraph entitled "Required Reports ", and the analysis described in the paragraph entitled "Mathematical Analysis". As part of this submittal, provide the Project Name format (and Project Group Name if used) that will be used by the Contractor to identify initial schedule submittals, updates, fragnets, changes, etc. Include 1 copy of the Network Analysis Schedule on 3.5" disk(s) formatted to hold 1.44 MB of data.

1.7.4 Review and Evaluation

After the Government's review, the Contractor shall meet with the Contracting Officer to discuss the review and evaluation of the NAS submittal. Revisions necessary as a result of this review shall be resubmitted for acceptance within 10 calendar days after the meeting.

1.7.5 Accepted Network Analysis Schedule

Once review comments are resolved and the network has been accepted by the Contracting Officer, the Contractor shall within 5 calendar days furnish:

a. Two copies of the network diagrams

b. Two copies of the required reports listed in paragraph entitled "Required Reports"

c. Two copies of the "Mathematical Analysis".

d. Two copies of the Cash Flow Report indicating the cash flow based upon both the early and late start schedules.

e. Two copies of each major subcontractor's statement certifying their concurrence with the Contractor's Accepted Network Analysis Schedule. Each certifying statement will be made on the subcontractor's letterhead.

f. Two sets of data disks containing the project schedule shall be provided for the initial submission and every periodic project update. Data shall be submitted on 3.5: disk(s), formatted to hold 1.44 MB of data. A permanent exterior label shall be affixed to each disk submitted. The label shall indicate the type of schedule (Preliminary, NAS Submittal, Accepted, Update, Recovery, or Change), full contract number, Project Name used to identify project in scheduling software, contract name & location, data status date, diskette number with total number of diskettes in set, software name and version used to run the schedule, and the name and telephone number of person responsible for the schedule.

For major revisions, updates or changes to the network diagrams, once accepted by the Contracting Officer, the Contractor shall submit these same diagrams and reports.

1.7.6 Monthly Network Analysis Updates

At monthly intervals the Contractor, Government representatives and major subcontractors will meet to jointly update the project schedule and agree on percentage of payment for each activity progressed during the update period. The purpose of the meeting is to determine progress payment amounts for each activity, allow all parties to evaluate project status at the data date, provide a complete and accurate update of procurement and construction progress, create an historical record of the project and establish prediction of completion date(s) based upon current status. The Contractor is responsible to gather all supporting documentation propose the update data for the schedule and record the meeting minutes. All progress payment amounts will be derived from and tied to the cost-loaded schedule activities. Submit at monthly intervals a report of the actual construction progress by updating the required reports, the time scaled logic diagram, and mathematical analysis. Meeting to update the schedule and the submission of an error free, acceptable updated schedule to the

Government is a condition precedent to the processing of the Contractor's pay request. As a minimum, the following actions will be accomplished during the meeting:

a. Identify activities started and completed during the previous period and enter the Actual Start and Actual Finish dates.

b. Show estimated duration (in workdays) to complete each activity started but not completed (remaining duration).

c. Indicate percentage of cost payable for each activity.

d. Reflect changes in the network diagram. All changes (i.e., duration changes, logic changes, new logic, conformed change orders, new activities, changes due to Conformed Modifications, changes in work sequence, etc.) shall be recorded and a note added to the activity log field. The log shall include as a minimum, the date and reason for the change, and description of the change.

e. Submit two copies of a Narrative Report describing: 1) Progress made in each area of the project; 2) Changes in the following; activities, original durations, logic interdependencies, milestones, planned sequence of operations, critical path, and resource and loading; 3) Pending items and status thereof, including permits, change orders, and time extensions; 4) Status of Contract Completion Date and interim milestones; 5) Current and anticipated delays (describe cause of the delay and corrective action(s)); and 6) Description of current and future schedule problem areas. Each entry in the narrative report will cite the respective Activity ID and Activity Description.

f. Submit two copies of the required reports listed in paragraph entitled "Required Reports".

g. Submit two copies of the Update Meeting minutes.

1.7.7 As-Built Schedule

As a condition precedent to the release of retention, the last update of the schedule submitted shall be identified by the Contractor as the "As-Built Schedule". The As Built shall reflect the exact manner in which the project was actually constructed (including actual start and finish dates, activities, sequences, and logic) and shall be certified by the Contractor's Project Manager and Construction Scheduler as being a true reflection of the way the project was actually constructed. If more than one person filled the position(s) during the course of the project, each person will provide certification for the period of time they were responsible.

1.8 CONTRACT MODIFICATION

When a contract modification to the work is required, submit proposed revisions to the network with a fragmentary network and a cost proposal for each proposed change. All modifications shall be incorporated into the network analysis system as separately identifiable activities broken down and inserted appropriately on the first update following issuance of a directive to proceed with the change. Submit one copy of the Total Float Report, Log Report and a copy of the proposed Time Impact Analysis on disk, with the cost proposal. Unless the Contracting Officer requests otherwise,

only conformed contract modification fragmentary networks will be added into the subsequent monthly updates. All revisions to the current baseline schedule activities that are necessary to further refine the schedule so that the changed work activities can be logically tied to the schedule shall be made. Financial data shall not be incorporated into the schedule until the contract modification is signed by the Contracting Officer.

1.8.1 Time Impact Analysis:

Time Impact Analysis shall be used by the Contracting Officer in determining if a time extension or reduction to the contract milestone date(s) is justified. The Contractor shall provide a Time Impact Analysis to the Contracting Officer for any proposed contract change or as support for a Value Engineering Proposal, Claim or Request for Equitable Adjustment by the Contractor.

a. The Contractor shall submit a Time Impact Analysis (TIA) illustrating the influence of each change or delay on the Contract Completion Date or milestones. Unless the Contracting Officer requests an interim update to the schedule, the current monthly updated schedule accepted by the government shall be used to display the impacts of the change. Unless requested by the Contracting Officer, no other non-conformed changes will be incorporated into the schedule being used to justify the change impact.

b. Each TIA shall include a Fragmentary Network (fragnet) demonstrating how the Contractor proposes to incorporate the impact into the Project Schedule. A fragnet is defined as the sequence of new activities and/or activity revisions, logic relationships and resource changes that are proposed to be added to the existing schedule to demonstrate the influence of impacts to the schedule. The fragnet shall identify the predecessors to the new activities and demonstrate the impacts to successor activities. Include a narrative report describing the effects of new activities and relationships to interim and contract completion dates, with each TIA.

c. Following the Contractor's receipt of a contract modification on a Standard Form 30 signed by the Government; all changes in the fragnet used to determine impacts, shall be incorporated into the schedule. Changes will occur during the next monthly schedule update meeting.

1.8.2 No Reservation-Of-Rights

All direct costs, indirect costs, and time extensions will be negotiated and made full, equitable and final at the time of modification issuance.

1.9 CHANGES TO THE NETWORK ANALYSIS SCHEDULE

If changes in the method of operating and scheduling are desired, the Contracting Officer shall be notified in writing stating the reasons for the change. If the Contracting Officer considers these changes to be of a major nature, the Contractor may be required to revise and submit for acceptance, without additional cost to the Government, the network diagrams and required sorts. A change may be considered of a major nature if the estimated time required or actually used for an activity or the network logic is varied from the original plan to a degree that there is a

reasonable doubt as to the effect on the contract completion date(s). Changes that affect activities with adequate float time shall be considered a major change when their cumulative effect could extend the contract completion date.

1.10 FLOAT

Use of float suppression techniques, such as; preferential sequencing (arranging critical path through activities more susceptible to government caused delay), special lead/lag logic restraints, zero total or free float constraints, extended activity times, or imposing constraint dates other than as required by the contract, shall be cause for rejection of the project schedule or its updates. The use of Resource Leveling (or similar software features) used for the purpose of artificially adjusting activity durations to consume float and influence the critical path is expressly prohibited.

1.10.1 Definitions of Float or Slack

Free Float is the length of time the start of an activity can be delayed without delaying the start of a successor activity. Total Float is the length of time along a given network path that the actual start and finish of activity(s) can be delayed without delaying the project completion date. Project Float is the length of time between the Contractor's Early Completion (or Substantial Completion) and the Contract Completion Date.

1.10.2 Ownership of Float

Float available in the schedule, at any time shall not be considered for the exclusive use of either the Government or the Contractor. During the course of contract execution, any float generated due to the efficiencies of either party is not for the sole use of the party generating the float; rather it is a shared commodity to be reasonably used by either party. Efficiencies gained as a result of favorable weather within a calendar month, where the number of days of normally anticipated weather is less than expected, will also contribute to the reserve of float. A schedule showing work completing in less time than the Contract time, and accepted by the Government, will be considered to have Project Float. Project Float will be a resource available to both the Government and the Contractor. No time extensions will be granted nor delay damages paid unless a delay occurs which impacts the Project's critical path, consumes all available float or contingency time, and extends the work beyond the Contract Completion Date.

1.10.3 Negative Float

Negative float will not be a basis for requesting time extensions. Any extension of time will be addressed in accordance with the Paragraph "Time Extensions". Scheduled completion date(s) that extend beyond the contract completion date(s) (evidenced by negative float) may be used in computations for assessment of payment withholdings. The use of this computation is not to be construed as a means of acceleration.

1.11 TIME EXTENSIONS

Extension of time for performance required under the clauses entitled "Changes," "Differing Site Conditions," "Default (Fixed-Price Construction)" or "Suspension of Work" will be granted only to the extent that equitable time adjustments for the activity or activities affected

exceed the total float or slack along the network paths involved at the time Notice to Proceed was issued for the change. The Contractor acknowledges and agrees that delays in activities which, according to the network analysis schedule, does not in fact actually affect any milestone completion dates or the contract completion date shown on the CPM network at the time of delay, will not be a basis for a contract extension. Submit time extension requests with a Time Impact Analysis and three copies of the Total Float (or Slack) Report, Narrative Report and Log Report.

1.12 MONTHLY COORDINATION MEETING

In conjunction with receipt of the Monthly Network Update submission, a coordination meeting will be held each month in the Contracting Officer's conference room to discuss the report. The Contractor shall make a presentation of the previously submitted and current Monthly Network Update to the Contracting Officer so as to provide an overview of the project's schedule and provide an opportunity to discuss items of coordination.

1.13 BIWEEKLY WORK SCHEDULE

To provide a more detailed day-to-day planning of upcoming work, the Contractor shall prepare and issue detailed work plans that coordinate with and supplement the above defined network analysis. The work plans shall be keyed to the CPM activity numbers and shall be submitted each week and shall show the projects activities that will occur during the following two-week interval. Additionally, the critical path activities are to be identified on the Biweekly Work Plan. The detail work plans are to be bar chart type schedules prepared by the Contractor in sufficient detail to define the work to be accomplished, the crews, construction tools and equipment to be used during the current and next two-week interval. The bar charts shall be formatted to allow reproduction on 8 1/2 by 11 sheets. Three copies of the bar chart schedules shall be delivered to the Contracting Officer not less than 3 work hours prior to the start of the weekly coordination meeting.

1.14 CORRESPONDENCE AND TEST REPORTS

All correspondence (e.g., letters, Requests for Information (RFIs), e-mails, meeting minutes, Production and QC Daily Reports, material delivery tickets, photographs, etc.) shall reference the Schedule Activity Number(s) that are being addressed. All test reports (e.g., concrete, soil compaction, weld, pressure, etc.) shall reference the Schedule Activity Number(s) that are being addressed.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

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SECTION 01330

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SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

1.1.1 Government-Furnished Information

Submittal register database and submittal management program will be delivered to the contractor, by contracting officer on 3 1/2 inch disk. Register will have the following fields completed, to the extent that will be required by the Government during subsequent usage.

Column (c): Lists specification section in which submittal is required.

Column (d): Lists each submittal description (SD No. and type, e.g. SD-04 Drawings) required in each specification section.

Column (e): Lists one principal paragraph in specification section where a material or product is specified. This listing is only to facilitate locating submitted requirements. Do not consider entries in column (e) as limiting project requirements.

Column (f): Indicate approving authority for each submittal. A "G" indicates approval by contracting officer; a blank indicates approval by QC manager.

The database and submittal management program will be extractable from the disk furnished to contractor, for operation on contractor's IBM compatible personal computer with 640kb RAM,a hard drive,and 3 1/2 inch high density floppy disk drive.

1.2 DEFINITIONS

1.2.1 Submittal

Shop drawings, product data, samples, and administrative submittals presented for review and approval. Contract Clauses "FAR 52.236-5, Material and Workmanship," paragraph (b) and "FAR 52.236-21, Specifications and Drawings for Construction," paragraphs (d), (e), and (f) apply to all "submittals."

1.2.2 Types of Submittals

All submittals are classified as indicated in paragraph "Submittal Descriptions (SD)". Submittals also are grouped as follows:

a. Shop drawings: As used in this section, drawings, schedules, diagrams, and other data prepared specifically for this contract, by contractor or through contractor by way of subcontractor, manufacturer, supplier, distributor, or other lower tier contractor, to illustrate portion of work.

b. Product data: Preprinted material such as illustrations, standard schedules, performance charts, instructions, brochures, diagrams, manufacturer's descriptive literature, catalog data, and other data to illustrate portion of work, but not prepared exclusively for this contract.

c. Samples: Physical examples of products, materials, equipment, assemblies, or workmanship that are physically identical to portion of work, illustrating portion of work or establishing standards for evaluating appearance of finished work or both.

d. Administrative submittals: Data presented for reviews and approval to ensure that administrative requirements of project are adequately met but not to ensure directly that work is in accordance with design concept and in compliance with contract documents.

1.3 SUBMITTAL IDENTIFICATION (SD)

Submittals required are identified by SD numbers and titles as follows:

SD-01 Preconstruction Submittals

Certificates of insurance.
Surety bonds.
List of proposed subcontractors.
List of proposed products.
Construction Progress Schedule.
Submittal schedule.
Schedule of values.
Health and safety plan.
Work plan.
Quality control plan.
Environmental protection plan.

SD-02 Shop Drawings

Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work.

Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the contractor for integrating the product or system into the project.

Drawings prepared by or for the contractor to show how multiple systems and interdisciplinary work will be coordinated.

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials or equipment for some portion of the work.

Samples of warranty language when the contract requires extended product warranties.

SD-04 Samples

Physical examples of materials, equipment or workmanship that

illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged.

Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project.

Field samples and mock-ups constructed on the project site establish standards by which the ensuring work can be judged. Includes assemblies or portions of assemblies which are to be incorporated into the project and those which will be removed at conclusion of the work.

SD-05 Design Data

Calculations, mix designs, analyses or other data pertaining to a part of work.

SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. (Testing must have been within three years of date of contract award for the project.)

Report which includes findings of a test required to be performed by the contractor on an actual portion of the work or prototype prepared for the project before shipment to job site.

Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports

Daily checklists

Final acceptance test and operational test procedure

SD-07 Certificates

Statements signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

Document required of Contractor, or of a supplier, installer or subcontractor through Contractor, the purpose of which is to further quality of orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel qualifications.

Confined space entry permits.

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and Material Safety Data sheets concerning impedances, hazards and safety precautions.

SD-11 Closeout Submittals

Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

As-built drawings.

Special warranties.

Posted operating instructions.

Training plan.

1.3.1 Approving Authority

Person authorized to approve submittal.

1.3.2 Work

As used in this section, on- and off-site construction required by contract documents, including labor necessary to produce construction and materials, products, equipment, and systems incorporated or to be incorporated in such construction.

1.4 SUBMITTALS

Submit the following in accordance with the requirements of this section.

SD-01 Preconstruction Submittals

Submittal register; G

1.5 USE OF SUBMITTAL REGISTER DATABASE

Prepare and maintain submittal register, as the work progresses. Use electronic submittal register program furnished by the Government or any other format. Do not change data which is output in columns (c), (d), (e), and (f) as delivered by government; retain data which is output in columns (a), (g), (h), and (i) as approved.

1.5.1 Submittal Register

Submit submittal register as an electronic database, using submittals management program furnished to contractor. Submit with quality control plan and project schedule required by Section 01451, "CONTRACTOR QUALITY CONTROL" and Section 01321, "Network Analysis Schedules." Do not change data in columns (c), (d), (e), and (f) as delivered by the government. Verify that all submittals required for project are listed and add missing submittals. Complete the following on the register database:

Column (a) Activity Number: Activity number from the project schedule.

Column (g) Contractor Submit Date: Scheduled date for approving authority to receive submittals.

Column (h) Contractor Approval Date: Date contractor needs approval of submittal.

Column (i) Contractor Material: Date that contractor needs material

delivered to contractor control.

1.5.2 Contractor Use of Submittal Register

Update the following fields in the government-furnished submittal register program or equivalent fields in program utilized by contractor.

Column (b) Transmittal Number: Contractor assigned list of consecutive numbers.

Column (j) Action Code (k): Date of action used to record contractor's review when forwarding submittals to QC.

Column (l) List date of submittal transmission.

Column (q) List date approval received.

1.5.3 Approving Authority Use of Submittal Register

Update the following fields in the government-furnished submittal register program or equivalent fields in program utilized by contractor.

Column (b).

Column (l) List date of submittal receipt.

Column (m) through (p).

Column (q) List date returned to contractor.

1.5.4 Contractor Action Code and Action Code

Entries used will be as follows (others may be prescribed by Transmittal Form):

NR - Not Received

AN - Approved as noted

A - Approved

RR - Disapproved, Revise, and Resubmit

1.5.5 Copies Delivered to the Government

Deliver one copy of submitted register updated by contractor to government with each invoice request. Deliver in electronic format, unless a paper copy is requested by contracting officer.

1.6 PROCEDURES FOR SUBMITTALS

1.6.1 Reviewing, Certifying, Approving Authority

QC organization shall be responsible for reviewing and certifying that submittals are in compliance with contract requirements. Approving authority on submittals is QC manager unless otherwise specified for specific submittal. At each "Submittal" paragraph in individual specification sections, a notation "G," following a submittal item, indicates contracting officer is approving authority for that submittal

item.

1.6.2 Constraints

a. Submittals listed or specified in this contract shall conform to provisions of this section, unless explicitly stated otherwise.

b. Submittals shall be complete for each definable feature of work; components of definable feature interrelated as a system shall be submitted at same time.

c. When acceptability of a submittal is dependent on conditions, items, or materials included in separate subsequent submittals, submittal will be returned without review.

d. Approval of a separate material, product, or component does not imply approval of assembly in which item functions.

1.6.3 Scheduling

a. Coordinate scheduling, sequencing, preparing and processing of submittals with performance of work so that work will not be delayed by submittal processing. Allow for potential requirements to resubmit.

b. Except as specified otherwise, allow review period, beginning with receipt by approving authority, that includes at least 15 working days for submittals for QC manager approval and 20 working days for submittals for contracting officer approval. Period of review for submittals with contracting officer approval begins when Government receives submittal from QC organization. Period of review for each resubmittal is the same as for initial submittal.

1.6.4 Variations

Variations from contract requirements require Government approval pursuant to contract Clause entitled "FAR 52.236-21, Specifications and Drawings for Construction" and will be considered where advantageous to government.

1.6.4.1 Considering Variations

Discussion with contracting officer prior to submission, will help ensure functional and quality requirements are met and minimize rejections and resubmittals. When contemplating a variation which results in lower cost, consider submission of the variation as a Value Engineering Change Proposal (VECP).

1.6.4.2 Proposing Variations

When proposing variation, deliver written request to the contracting officer, with documentation of the nature and features of the variation and why the variation is desirable and beneficial to government. If lower cost is a benefit, also include an estimate of the cost saving. In addition to documentation required for variation, include the submittals required for the item. Clearly mark the proposed variation in all documentation.

1.6.4.3 Warranting That Variations Are Compatible

When delivering a variation for approval, contractor warrants that this

contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of work.

1.6.4.4 Review Schedule Is Modified

In addition to normal submittal review period, a period of 10 working days will be allowed for consideration by the Government of submittals with variations.

1.6.5 Contractor's Responsibilities

a. Determine and verify field measurements, materials, field construction criteria; review each submittal; and check and coordinate each submittal with requirements of the work and contract documents.

b. Transmit submittals to QC organization in accordance with schedule on approved Submittal Register, and to prevent delays in the work, delays to government, or delays to separate contractors.

c. Advise contracting officer of variation, as required by paragraph entitled "Variations."

d. Correct and resubmit submittal as directed by approving authority. When resubmitting disapproved transmittals or transmittals noted for resubmittal, the contractor shall provide copy of that previously submitted transmittal including all reviewer comments for use by approving authority. Direct specific attention in writing or on resubmitted submittal, to revisions not requested by approving authority on previous submissions.

e. Furnish additional copies of submittal when requested by contracting officer, to a limit of 20 copies per submittal.

f. Complete work which must be accomplished as basis of a submittal in time to allow submittal to occur as scheduled.

g. Ensure no work has begun until submittals for that work have been returned as "approved," or "approved as noted", except to the extent that a portion of work must be accomplished as basis of submittal.

1.6.6 QC Organization Responsibilities

a. Note date on which submittal was received from contractor on each submittal.

b. Review each submittal; and check and coordinate each submittal with requirements of work and contract documents.

c. Review submittals for conformance with project design concepts and compliance with contract documents.

d. Act on submittals, determining appropriate action based on QC organization's review of submittal.

(1) When QC manager is approving authority, take appropriate action on submittal from the possible actions defined in paragraph entitled, "Actions Possible."

(2) When contracting officer is approving authority or when variation has been proposed, forward submittal to Government with certifying statement or return submittal marked "not reviewed" or "revise and resubmit" as appropriate. The QC organization's review of submittal determines appropriate action.

e. Ensure that material is clearly legible.

f. Stamp each sheet of each submittal with QC certifying statement or approving statement, except that data submitted in bound volume or on one sheet printed on two sides may be stamped on the front of the first sheet only.

(1) When approving authority is contracting officer, QC organization will certify submittals forwarded to contracting officer with the following certifying statement:

"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with contract Number , is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is submitted for Government approval.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Certified by QC manager _____, Date _____"
(Signature)

(2) When approving authority is QC manager, QC manager will use the following approval statement when returning submittals to contractor as "Approved" or "Approved as Noted."

"I hereby certify that the (material) (equipment) (article) shown and marked in this submittal and proposed to be incorporated with contract Number , is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is _____ approved for use.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Approved by QC manager _____, Date _____"
(Signature)

g. Sign certifying statement or approval statement. The person signing certifying statements shall be QC organization member designated in the approved QC plan. The signatures shall be in original ink. Stamped signatures are not acceptable.

h. Update submittal register database as submittal actions occur and maintain the submittal register at project site until final acceptance of all work by contracting officer.

i. Retain a copy of approved submittals at project site, including contractor's copy of approved samples.

1.6.7 Government's Responsibilities

When approving authority is contracting Officer, the Government will:

a. Note date on which submittal was received from QC manager, on each submittal for which the contracting officer is approving authority.

b. Review submittals for approval within scheduling period specified and only for conformance with project design concepts and compliance with contract documents.

c. Identify returned submittals with one of the actions defined in paragraph entitled "Actions Possible" and with markings appropriate for action indicated.

1.6.8 Actions Possible

Submittals will be returned with one of the following notations:

a. Submittals marked "not reviewed" will indicate submittal has been previously reviewed and approved, is not required , does not have evidence of being reviewed and approved by contractor, or is not complete. A submittal marked "not reviewed" will be returned with an explanation of the reason it is not reviewed. Resubmit submittals returned for lack of review by contractor or for being incomplete, with appropriate action, coordination, or change.

b. Submittals marked "approved" "approved as submitted" authorize contractor to proceed with work covered.

c. Submittals marked "approved as noted" or "approval except as noted; resubmission not required" authorize contractor to proceed with work as noted provided contractor takes no exception to the notations.

d. Submittals marked "revise and resubmit" or "disapproved" indicate submittal is incomplete or does not comply with design concept or requirements of the contract documents and shall be resubmitted with appropriate changes. No work shall proceed for this item until resubmittal is approved.

1.7 FORMAT OF SUBMITTALS

1.7.1 Transmittal Form

Transmit each submittal, except sample installations and sample panels, to office of approving authority. Transmit submittals with transmittal form prescribed by contracting officer and standard for project. The transmittal form shall identify contractor, indicate date of submittal, and include information prescribed by transmittal form and required in paragraph entitled "Identifying Submittals." Process transmittal forms to record actions regarding sample panels and sample installations.

1.7.2 Identifying Submittals

Identify submittals, except sample panel and sample installation, with the following information permanently adhered to or noted on each separate component of each submittal and noted on transmittal form. Mark each copy of each submittal identically, with the following:

a. Project title and location.

b. Construction contract number.

c. Section number of the specification section by which submittal is required.

d. Submittal description (SD) number of each component of submittal.

e. When a resubmission, add alphabetic suffix on submittal description, for example, SD-10A, to indicate resubmission.

f. Name, address, and telephone number of subcontractor, supplier, manufacturer and any other second tier contractor associated with submittal.

g. Product identification and location in project.

1.7.3 Format for Product Data

a. Present product data submittals for each section as a complete, bound volume. Include table of contents, listing page and catalog item numbers for product data.

b. Indicate, by prominent notation, each product which is being submitted; indicate specification section number and paragraph number to which it pertains.

c. Supplement product data with material prepared for project to satisfy submittal requirements for which product data does not exist. Identify this material as developed specifically for project.

d. Provide product data in metric dimensions. Where product data are included in preprinted catalogues with inch-pound units only, submit metric dimensions on separate sheet.

1.7.4 Format for Shop Drawings

a. Shop drawings shall not be less than A4 (297 by 210 mm) nor more than AO (1189 by 841 mm).

b. Present A4 (297 by 210 mm) sized shop drawings as part of the bound volume for submittals required by section. Present larger drawings in sets.

c. Include on each drawing the drawing title, number, date, and revision numbers and dates, in addition to information required in paragraph entitled "Identifying Submittals."

d. Dimension drawings, except diagrams and schematic drawings; prepare drawings demonstrating interface with other trades to scale. Shop drawing dimensions shall be the same unit of measure as indicated on the contract drawings. Identify materials and products for work shown.

1.7.5 Format of Samples

a. Furnish samples in sizes below, unless otherwise specified or

unless the manufacturer has prepackaged samples of approximately same size as specified:

(1) Sample of Equipment or Device: Full size.

(2) Sample of Materials Less Than 50 by 75 mm: Built up to A4 (297 by 210 mm).

(3) Sample of Materials Exceeding A4 (297 by 210 mm): Cut down to A4 (297 by 210 mm) and adequate to indicate color, texture, and material variations.

(4) Sample of Linear Devices or Materials: 250 mm length or length to be supplied, if less than 250 mm. Examples of linear devices or materials are conduit and handrails.

(5) Sample of Non-Solid Materials: 750 ml. Examples of non-solid materials are sand and paint.

(6) Color Selection Samples: 50 by 100 mm.

(7) Sample Panel: 1200 by 1200 mm.

(8) Sample Installation: 10 square meters.

b. Samples Showing Range of Variation: Where variations are unavoidable due to nature of the materials, submit sets of samples of not less than three units showing extremes and middle of range.

c. Reusable Samples: Incorporate returned samples into work only if so specified or indicated. Incorporated samples shall be in undamaged condition at time of use.

d. Recording of Sample Installation: Note and preserve the notation of area constituting sample installation but remove notation at final clean up of project.

e. When color, texture or pattern is specified by naming a particular manufacturer and style, include one sample of that manufacturer and style, for comparison.

1.7.6 Format of Administrative Submittals

a. When submittal includes a document which is to be used in project or become part of project record, other than as a submittal, do not apply contractor's approval stamp to document, but to a separate sheet accompanying document.

b. Provide all dimensions in administrative submittals in metric. Where data are included in preprinted material with inch-pound units only, submit metric dimensions on separate sheet.

1.8 QUANTITY OF SUBMITTALS

1.8.1 Number of Copies of Product Data

a. Submit six copies of submittals of product data requiring review and approval only by QC organization and seven copies of product data requiring review and approval by contracting officer.

1.8.2 Number of Copies of Shop Drawings

Submit shop drawings in compliance with quantity requirements specified for product data.

1.8.3 Number of Samples

a. Submit two samples, or two sets of samples showing range of variation, of each required item. One approved sample or set of samples will be retained by approving authority and one will be returned to contractor.

b. Submit one sample panel. Include components listed in technical section or as directed.

c. Submit one sample installation, where directed.

d. Submit one sample of non-solid materials.

1.8.4 Number of Copies of Administrative Submittals

a. Unless otherwise specified, submit administrative submittals compliance with quantity requirements specified for product data.

1.9 FORWARDING SUBMITTALS

1.9.1 Samples Required of the Contractor

Submit samples to Contracting Officer.

1.9.2 Shop Drawings, Product Data, and O&M Data

As soon as practicable after award of contract, and before procurement of fabrication, submit, except as specified otherwise, to the Contracting Officer the shop drawings, product data and O&M Data required in the technical sections of this specification. The Architect-Engineer for this project will review and provide surveillance for the Contracting Officer to determine if Contractor-approved submittals comply with the contract requirements, and will review and approve for the Contracting Officer those submittals not permitted to be Contractor approved to determine if submittals comply with the contract requirements. One copy of the transmittal form for submittals shall be forwarded to the Resident Officer in Charge of Construction

1.10 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.10.1 Government Approved

Government approval is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," they are considered to be "shop drawings."

1.10.2 Information Only

All submittals not requiring Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.

1.11 APPROVED SUBMITTALS

The Contracting Officer's approval of submittals shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Contractor Quality Control (CQC) requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work. After submittals have been approved by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.12 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the Contracting Officer and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice in accordance with the Contract Clause "Changes" shall be given promptly to the Contracting Officer.

1.13 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

1.14 GENERAL

The Contractor shall make submittals as required by the specifications. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same as those used in the contract drawings. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Prior to submittal, all items shall be checked and approved by the Contractor's Quality Control (CQC) System Manager and each item shall be stamped, signed, and dated by the CQC System Manager indicating action taken. Proposed deviations from the contract requirements shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Submittals requiring Government approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby. Samples remaining upon completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

1.15 SUBMITTAL REGISTER

At the end of this section is a submittal register showing items of

equipment and materials for which submittals are required by the specifications; this list may not be all inclusive and additional submittals may be required. The Contractor shall maintain a submittal register for the project.

1.16 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 30 calendar days exclusive of mailing time) shall be allowed and shown on the register for review and approval. No delay damages or time extensions will be allowed for time lost in late submittals.

1.17 TRANSMITTAL FORM (ENG FORM 4025)

The sample transmittal form (ENG Form 4025) attached to this section shall be used for submitting both Government approved and information only submittals in accordance with the instructions on the reverse side of the form. These forms are included in the RMS-QC software that the Contractor is required to use for this contract. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care shall be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

1.18 SUBMITTAL PROCEDURES

Submittals shall be made as follows:

1.18.1 Procedures

The Contractor shall complete ENG Form 4025, "Transmittal of Shop Drawings, Equipment Data, Material Samples, or Manufacturer's Certificate of Compliance" with each set of shop drawings, certificates, equipment data of samples submitted. A blank ENG Form 4025 will be furnished by the Contracting Officer on request. Six (6) copies of each submittal will be required.

1.18.2 Deviations

For submittals which include proposed deviations requested by the Contractor, the column "variation" of ENG Form 4025 shall be checked. The Contractor shall set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

1.19 CONTROL OF SUBMITTALS

The Contractor shall carefully control his procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

1.20 GOVERNMENT APPROVED SUBMITTALS

Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being so

stamped and dated. Four copies of the submittal will be retained by the Contracting Officer and two copies of the submittal will be returned to the Contractor.

1.21 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

1.22 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets contract requirements shall be similar to the following:

CONTRACTOR (Firm Name)   _____ Approved _____ Approved with corrections as noted on submittal data and/or attached sheets(s).   SIGNATURE: _____ TITLE: _____ DATE: _____

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION

F-1 Channel, Hualapai Way to Beltway

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	CLASSIFICATION	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY						REMARKS
					GOVT OR A/E REVWR	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)
		01321	SD-01 Preconstruction Submittals														
			Qualifications	1.5	G												
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			Excavation Plan	3.1.1	G												
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SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION

F-1 Channel, Hualapai Way to Beltway

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		02300	SD-02 Shop Drawings															
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F-1 Channel, Hualapai Way to Beltway

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F-1 Channel, Hualapai Way to Beltway

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					MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
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		09900	Application instructions																
			Mixing																
			Manufacturer's Material Safety	1.6.2															
			Data Sheets																

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE *(Read instructions on the reverse side prior to initiating this form)*	DATE	TRANSMITTAL NO.

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS *(This section will be initiated by the contractor)*

TO:	FROM:	CONTRACT NO.	CHECK ONE: ☐ THIS IS A NEW TRANSMITTAL ☐ THIS IS A RESUBMITTAL OF TRANSMITTAL _____
SPECIFICATION SEC. NO. *(Cover only one section with each transmittal)*	PROJECT TITLE AND LOCATION		CHECK ONE: THIS TRANSMITTAL IS FOR ☐ FIO ☐ GOV'T. APPROVAL

ITEM NO. *a.*	DESCRIPTION OF ITEM SUBMITTED *(Type size, model number/etc.)*	MFG OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO. *(See instruction no. 8) c.*	NO. OF COPIES *d.*	CONTRACT REFERENCE DOCUMENT		FOR CONTRACTOR USE CODE *g.*	VARIATION *(See instruction No. 6) h.*	FOR CE USE CODE *i.*
				SPEC. PARA. NO. *e.*	DRAWING SHEET NO. *f.*			

REMARKS

I certify that the above submitted items have been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as other wise stated.

_____

NAME AND SIGNATURE OF CONTRACTOR

SECTION II - APPROVAL ACTION

ENCLOSURES RETURNED *(List by Item No.)*	NAME, TITLE AND SIGNATURE OF APPROVING AUTHORITY	DATE

INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required number of copies.

2. Each transmittal shall be numbered consecutively in the space provided for "Transmittal No.". This number, in addition to the contract number, will form a serial number for identifying each submittal. For new submittals or resubmittals mark the appropriate box; on resubmittals, insert transmittal number of last submission as well as the new submittal number.

3. The "Item No." will be the same "Item No." as indicated on ENG FORM 4288-R for each entry on this form.

4. Submittals requiring expeditious handling will be submitted on a separate form.

5. Separate transmittal form will be used for submittals under separate sections of the specifications.

6. A check shall be placed in the "Variation" column when a submittal is not in accordance with the plans and specifications--also, a written statement to that effect shall be included in the space provided for "Remarks".

7. Form is self-transmittal, letter of transmittal is not required.

8. When a sample of material or Manufacturer's Certificate of Compliance is transmitted, indicate "Sample" or "Certificate" in column c, Section I.

9. U.S. Army Corps of Engineers approving authority will assign action codes as indicated below in space provided in Section I, column I to each item submitted. In addition they will ensure enclosures are indicated and attached to the form prior to return to the contractor. The Contractor will assign action codes as indicated below in Section I, column g, to each item submitted.

THE FOLLOWING ACTION CODES ARE GIVEN TO ITEMS SUBMITTED

A	--	Approved as submitted.	E	--	Disapproved (See attached).
B	--	Approved, except as noted on drawings.	F	--	Receipt acknowledged.
C	--	Approved, except as noted on drawings. Refer to attached sheet resubmission required.	FX	--	Receipt acknowledged, does not comply as noted with contract requirements.
D	--	Will be returned by separate correspondence.	G	--	Other *(Specify)*

10. Approval of items does not relieve the contractor from complying with all the requirements of the contract plans and specifications.

(Reverse of ENG Form 4025-R)

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SECTION 01355

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SECTION 01355

ENVIRONMENTAL 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.

CODE OF FEDERAL REGULATIONS (CFR)

33 CFR 328	Definitions
40 CFR 68	Chemical Accident Prevention Provisions
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 279	Standards for the Management of Used Oil
40 CFR 302	Designation, Reportable Quantities, and Notification
40 CFR 355	Emergency Planning and Notification
49 CFR 171 - 178	Hazardous Materials Regulations

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE EM 385-1-1	(1996) Safety and Health Requirements Manual

US ARMY CORPS OF ENGINEERS TECHNICAL REPORT

WETLAND MANUAL	Corps of Engineers Wetlands Delineation Manual Technical Report Y-87-1

1.2 DEFINITIONS

1.2.1 Environmental Pollution and Damage

Environmental pollution and damage is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally and/or historically.

1.2.2 Environmental Protection

Environmental protection is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes

management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2.3 Contractor Generated Hazardous Waste

Contractor generated hazardous waste means materials that, if abandoned or disposed of, may meet the definition of a hazardous waste. These waste streams would typically consist of material brought on site by the Contractor to execute work, but are not fully consumed during the course of construction. Examples include, but are not limited to, excess paint thinners (i.e. methyl ethyl ketone, toluene etc.), waste thinners,excess paints, excess solvents, waste solvents, and excess pesticides, and contaminated pesticide equipment rinse water.

1.2.4 Land Application for Discharge Water

The term "Land Application" for discharge water implies that the Contractor shall discharge water at a rate which allows the water to percolate into the soil. No sheeting action, soil erosion, discharge into storm sewers, discharge into defined drainage areas, or discharge into the "waters of the United States" shall occur. Land Application shall be in compliance with all applicable Federal, State, and local laws and regulations.

1.2.5 Surface Discharge

The term "Surface Discharge" implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers,creeks, and/or "waters of the United States" and would require a permit to discharge water from the governing agency.

1.2.6 Waters of the United States

All waters which are under the jurisdiction of the Clean Water Act, as defined in 33 CFR 328.

1.2.7 Wetlands

Wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, and bogs. Official determination of whether or not an area is classified as a wetland must be done in accordance with WETLAND MANUAL.

1.3 GENERAL REQUIREMENTS

The Contractor shall minimize environmental pollution and damage that may occur as the result of construction operations. The environmental resources within the project boundaries and those affected outside the limits of permanent work shall be protected during the entire duration of this contract. The Contractor shall comply with all applicable environmental Federal, State, and local laws and regulations. The Contractor shall be responsible for any delays resulting from failure to comply with environmental laws and regulations.

1.4 SUBCONTRACTORS

The Contractor shall ensure compliance with this section by subcontractors.

1.5 PAYMENT

No separate payment will be made for work covered under this section. The Contractor shall be responsible for payment of fees associated with environmental permits, application, and/or notices obtained by the Contractor. All costs associated with this section shall be included in the contract price. The Contractor shall be responsible for payment of all fines/fees for violation or non-compliance with Federal, State, Regional and local laws and regulations.

1.6 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 "RE" designates that the Resident Office will review the submittal for the Government. Submit the following in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Environmental Protection Plan; G, RE.

1.7 Environmental Protection Plan

Prior to commencing construction activities or delivery of materials to the site, the Contractor shall submit an Environmental Protection Plan for review and approval by the Contracting Officer. The purpose of the Environmental Protection Plan is to present a comprehensive overview of known or potential environmental issues which the Contractor must address during construction. Issues of concern shall be defined within the Environmental Protection Plan as outlined in this section. The Contractor shall address each topic at a level of detail commensurate with the environmental issue and required construction task(s). Topics or issues which are not identified in this section, but which the Contractor considers necessary, shall be identified and discussed after those items formally identified in this section. Prior to submittal of the Environmental Protection Plan, the Contractor shall meet with the Contracting Officer for the purpose of discussing the implementation of the initial Environmental Protection Plan; possible subsequent additions and revisions to the plan including any reporting requirements; and methods for administration of the Contractor's Environmental Plans. The Environmental Protection Plan shall be current and maintained onsite by the Contractor.

1.7.1 Compliance

No requirement in this Section shall be construed as relieving the Contractor of any applicable Federal, State, and local environmental protection laws and regulations. During Construction, the Contractor shall be responsible for identifying, implementing, and submitting for approval any additional requirements to be included in the Environmental Protection Plan.

1.7.2 Contents

The environmental protection plan shall include, but shall not be limited

to, the following:

a. Name(s) of person(s) within the Contractor's organization who is(are) responsible for ensuring adherence to the Environmental Protection Plan.

b. Name(s) and qualifications of person(s) responsible for manifesting hazardous waste to be removed from the site, if applicable.

c. Name(s) and qualifications of person(s) responsible for training the Contractor's environmental protection personnel.

d. Description of the Contractor's environmental protection personnel training program.

e. An erosion and sediment control plan which identifies the type and location of the erosion and sediment controls to be provided. The plan shall include monitoring and reporting requirements to assure that the control measures are in compliance with the erosion and sediment control plan, Federal, State, and local laws and regulations. A Storm Water Pollution Prevention Plan (SWPPP) may be substituted for this plan.

f. Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on the site.

g. Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plan shall include measures to minimize the amount of mud transported onto paved public roads by vehicles or runoff.

h. Work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas including methods for protection of features to be preserved within authorized work areas.

i. Drawing showing the location of borrow areas.

j. The Spill Control plan shall include the procedures, instructions, and reports to be used in the event of an unforeseen spill of a substance regulated by 40 CFR 68, 40 CFR 302, 40 CFR 355, and/or regulated under State or Local laws and regulations. The Spill Control Plan supplements the requirements of COE EM 385-1-1. This plan shall include as a minimum:

1. The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation. This individual shall immediately notify the Contracting Officer and the local Fire Department in addition to the legally required Federal, State, and local reporting channels (including the National Response Center 1-800-424-8802) if a reportable quantity is released to the environment. The plan shall contain a list of the required reporting channels and telephone numbers.

2. The name and qualifications of the individual who will be responsible for implementing and supervising the containment and cleanup.

3. Training requirements for Contractor's personnel and methods of accomplishing the training.

4. A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.

5. The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material-placement equipment available in case of an unforeseen spill emergency.

6. The methods and procedures to be used for expeditious contaminant cleanup.

k. A non-hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris. The plan shall include schedules for disposal. The Contractor shall identify any subcontractors responsible for the transportation and disposal of solid waste. Licenses or permits shall be submitted for solid waste disposal sites that are not a commercial operating facility. Evidence of the disposal facility's acceptance of the solid waste shall be attached to this plan during the construction. The Contractor shall attach a copy of each of the Non-hazardous Solid Waste Diversion Reports to the disposal plan. The report shall be submitted on the first working day after the first quarter that non-hazardous solid waste has been disposed and/or diverted and shall be for the previous quarter (e.g. the first working day of January, April, July, and October). The report shall indicate the total amount of waste generated and total amount of waste diverted in cubic meters or tons along with the percent that was diverted.

l. A recycling and solid waste minimization plan with a list of measures to reduce consumption of energy and natural resources. The plan shall detail the Contractor's actions to comply with and to participate in Federal, State, Regional, and local government sponsored recycling programs to reduce the volume of solid waste at the source.

m. An air pollution control plan detailing provisions to assure that dust, debris, materials, trash, etc., do not become air borne and travel off the project site.

n. A contaminant prevention plan that: identifies potentially hazardous substances to be used on the job site; identifies the intended actions to prevent introduction of such materials into the air, water, or ground; and details provisions for compliance with Federal, State, and local laws and regulations for storage and handling of these materials. In accordance with COE EM 385-1-1, a copy of the Material Safety Data Sheets (MSDS) and the maximum quantity of each hazardous material to be on site at any given time shall be included in the contaminant prevention plan. As new hazardous materials are brought on site or removed from the site,

the plan shall be updated.

o. A waste water management plan that identifies the methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines. If a settling/retention pond is required, the plan shall include the design of the pond including drawings, removal plan, and testing requirements for possible pollutants. If land application will be the method of disposal for the waste water, the plan shall include a sketch showing the location for land application along with a description of the pretreatment methods to be implemented. If surface discharge will be the method of disposal, a copy of the permit and associated documents shall be included as an attachment prior to discharging the waste water. If disposal is to a sanitary sewer, the plan shall include documentation that the Waste Water Treatment Plant Operator has approved the flow rate, volume, and type of discharge.

p. A historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on the project site: and/or identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in the area are discovered during construction. The plan shall include methods to assure the protection of known or discovered resources and shall identify lines of communication between Contractor personnel and the Contracting Officer.

1.7.3 Appendix

Copies of all environmental permits, permit application packages, approvals to construct, notifications, certifications, reports, and termination documents shall be attached,as an appendix, to the Environmental Protection Plan.

1.8 PROTECTION FEATURES

Prior to starting any onsite construction activities, the Contractor and the Contracting Officer shall make a joint survey after which the Contractor shall prepare a brief report indicating on a layout plan the areas where native plants will be salvaged. All plant materials to be salvaged shall be identified and clearly marked. Vegetation outside of the project area shall be identified for protection.

1.9 SPECIAL ENVIRONMENTAL REQUIREMENTS

The Contractor shall comply with the stipulation of the BLM right-of-way grant and the special environmental requirements included at the end of this section.

1.10 ENVIRONMENTAL ASSESSMENT OF CONTRACT DEVIATIONS

Any deviations, requested by the Contractor, from the drawings,plans and specifications which may have an environmental impact will be subject to approval by the Contracting Officer and may require an extended review,

processing, and approval time. The Contracting Officer reserves the right to disapprove alternate methods, even if they are more cost effective, if the Contracting Officer determines that the proposed alternate method will have an adverse environmental impact.

1.11 NOTIFICATION

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with Federal, State or local environmental laws or regulations, permits, and other elements of the Contractor's Environmental Protection plan. The Contractor shall, after receipt of such notice, inform the Contracting Officer of the proposed corrective action and take such action when approved by the Contracting Officer. The Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted or equitable adjustments allowed to the Contractor for any such suspensions. This is in addition to any other actions the Contracting Officer may take under the contract, or in accordance with the Federal Acquisition Regulation or Federal Law.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 ENVIRONMENTAL PERMITS AND COMMITMENTS

This paragraph supplements the Contractor's responsibility under the contract clause "PERMITS AND RESPONSIBILITIES" to the extent that the Government has obtained environmental permits. The Contractor shall comply with the terms and conditions of the attached list of environmental commitments at the end of this section.

The Contractor shall be responsible for obtaining and complying with all environmental permits and commitments required by Federal, State, Regional, and local environmental laws and regulations.

3.2 LAND RESOURCES

The Contractor shall confine all activities to areas defined by the drawings and specifications. Prior to the beginning of any construction, the Contractor shall identify any land resources to be preserved within the work area. Except in areas indicated on the drawings or specified to be cleared, the Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without approval. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. The Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs. Stone, soil, or other materials displaced into uncleared areas shall be removed by the Contractor.

3.2.1 Work Area Limits

Prior to commencing construction activities, the Contractor shall mark the areas that need not be disturbed under this contract. Cactus Yucca, shrubs, grasses, land forms and other landscape features outside the construction area shall be preserved. Isolated areas within the general work area which are not to be disturbed shall be marked or fenced. Monuments and markers shall be protected before construction operations

commence. Where construction operations are to be conducted during darkness, any markers shall be visible in the dark. The Contractor's personnel shall be knowledgeable of the purpose for marking and/or protecting particular objects.

3.2.2 Landscape

Trees, shrubs, vines, grasses, land forms and other landscape features indicated and defined on the drawings to be preserved shall be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques. The Contractor shall restore landscape features damaged or destroyed during construction operations outside the limits of the approved work area.

3.2.3 Erosion and Sediment Controls

The Contractor shall be responsible for providing erosion and sediment control measures in accordance with Federal, State, and local laws and regulations. The erosion and sediment controls selected and maintained by the Contractor shall be such that water quality standards are not violated as a result of the Contractor's construction activities. The area of bare soil exposed at any one time by construction operations should be kept to a minimum. The Contractor shall construct or install temporary and permanent erosion and sediment control best management practices (BMPs) as specified in Section 01356 STORM WATER POLLUTION PREVENTION MEASURES. BMPs may include, but not be limited to, vegetation cover, stream bank stabilization, slope stabilization, silt fences, construction of terraces, interceptor channels, sediment traps, inlet and outfall protection, diversion channels, and sedimentation basins. The Contractor's best management practices shall also be in accordance with the National Pollutant Discharge Elimination System (NPDES) Storm Water Pollution Prevention Plan (SWPPP) which may be reviewed at the Environmental Office. Any temporary measures shall be removed after the area has been stabilized.

3.2.4 Unprotected Erodible Soils

Earthwork brought to final grade shall be finished as indicated. Side slopes and back slopes shall be protected as soon as practicable upon completion of rough grading. All earthwork shall be planned and conducted to minimize the duration of exposure of unprotected soils. Except in cases where the constructed feature obscures borrow areas, quarries, and waste material areas, these areas shall not initially be totally cleared. Clearing of such areas shall progress in reasonably sized increments as needed to use the developed areas as approved by the Contracting Officer.

3.2.5 Disturbed Areas

The Contractor shall effectively prevent erosion and control sedimentation through approved methods including, but not limited to, the following:

a. Retardation and control of runoff. Runoff from the construction site or from storms shall be controlled, retarded, and diverted to protected drainage courses by means of diversion ditches, benches, berms, and by any measures required by area wide plans under the Clean Water Act.

3.2.6 Contractor Facilities and Work Areas

The Contractor's field offices, staging areas, stockpile storage, and

temporary buildings shall be placed in areas designated on the drawings or as directed by the Contracting Officer. Temporary movement or relocation of Contractor facilities shall be made only when approved. Erosion and sediment controls shall be provided for on-site borrow and spoil areas to prevent sediment from entering nearby waters. Temporary excavation and embankments for plant and/or work areas shall be controlled to protect adjacent areas.

3.3 WATER RESOURCES

The Contractor shall monitor construction activities to prevent pollution of surface and ground waters. Toxic or hazardous chemicals shall not be applied to soil or vegetation unless otherwise indicated. All water areas affected by construction activities shall be monitored by the Contractor. For construction activities immediately adjacent to impaired surface waters, the Contractor shall be capable of quantifying sediment or pollutant loading to that surface water when required by State or Federally issued Clean Water Act permits.

3.4 AIR RESOURCES

Equipment operation and activities or processes performed by the Contractor in accomplishing the specified construction shall be in accordance with the State's rules and all Federal emission and performance laws and standards. The Contractor shall obtain and comply with Air Quality Permits. Ambient Air Quality Standards set by the Environmental Protection Agency shall be maintained. Monitoring of air quality shall be the Contractor's responsibility. All air areas affected by the construction activities shall be monitored by the Contractor. Monitoring results will be periodically reviewed by the Government to ensure compliance.

Special management techniques as set out below shall be implemented to control air pollution by the construction activities. These techniques supplement the requirements of Federal, State, and local laws and regulations; and the safety requirements under this Contract. If any of the following techniques conflict with the requirements of Federal, State, or local laws or regulations, or safety requirements under this contract, then those requirements shall be followed in lieu of the following.

3.4.1 Particulates

Dust particles; aerosols and gaseous by-products from construction activities; and processing and preparation of materials, such as from asphaltic batch plants; shall be controlled at all times, including weekends, holidays and hours when work is not in progress. The Contractor shall maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates which would cause the Federal, State, and local air pollution standards to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, baghouse, scrubbers, electrostatic precipitators or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp at all times. The Contractor must have sufficient, competent equipment available to accomplish these tasks. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs. The Contractor shall comply with all State and local visibility regulations.

3.4.2 Odors

Odors from construction activities shall be controlled at all times. The odors shall not cause a health hazard and shall be in compliance with State regulations and/or local ordinances.

3.4.3 Sound Intrusions

The Contractor shall keep construction activities under surveillance and control to minimize environment damage by noise.

3.4.4 Burning

Burning shall be prohibited on the Government premises.

3.5 CHEMICAL MATERIALS MANAGEMENT AND WASTE DISPOSAL

Disposal of wastes shall be as directed below, unless otherwise specified in other sections and/or shown on the drawings.

3.5.1 Solid Wastes

Solid wastes (excluding clearing debris) shall be placed in containers which are emptied on a regular schedule. Handling, storage, and disposal shall be conducted to prevent contamination. Segregation measures shall be employed so that no hazardous or toxic waste will become co-mingled with solid waste. The Contractor shall transport solid waste off site and dispose of it in compliance with Federal, State, and local requirements for solid waste disposal.

3.5.2 Chemicals and Chemical Wastes

Chemicals shall be dispensed ensuring no spillage to the ground or water. Periodic inspections of dispensing areas to identify leakage and initiate corrective action shall be performed and documented. This documentation will be periodically reviewed by the Government. Chemical waste shall be collected in corrosion resistant, compatible containers. Collection drums shall be monitored and removed to a staging or storage area when contents are within 150 mm of the top. Wastes shall be classified, managed, stored, and disposed of in accordance with Federal, State, and local laws and regulations.

3.5.3 Contractor Generated Hazardous Wastes/Excess Hazardous Materials

Hazardous wastes are defined in 40 CFR 261, or are as defined by applicable State and local regulations. The Contractor shall take sufficient measures to prevent spillage of hazardous and toxic materials during dispensing. The Contractor shall segregate hazardous waste from other materials and wastes, shall protect it from the weather by placing it in a safe covered location, and shall take precautionary measures such as berming or other appropriate measures against accidental spillage. The Contractor shall be responsible for storage, describing, packaging, labeling, marking, and placarding of hazardous waste and hazardous material in accordance with 49 CFR 171 - 178, State, and local laws and regulations. The Contractor shall transport Contractor generated hazardous waste off Government property within 60 days in accordance with the Environmental Protection Agency and the Department of Transportation laws and regulations. The Contractor shall dispose of hazardous waste in compliance with Federal, State and local laws and regulations. Spills of hazardous or

toxic materials shall be immediately reported to the Contracting Officer. Cleanup and cleanup costs due to spills shall be the Contractor's responsibility.

3.5.4 Fuel and Lubricants

Storage, fueling and lubrication of equipment and motor vehicles shall be conducted in a manner that affords the maximum protection against spill and evaporation. Fuel, lubricants and oil shall be managed and stored in accordance with all Federal, State, Regional, and local laws and regulations. Used lubricants and used oil to be discarded shall be stored in marked corrosion-resistant containers and recycled or disposed in accordance with 40 CFR 279, State, and local laws and regulations.

3.5.5 Waste Water

Disposal of waste water shall be as specified below.

a. Waste water from construction activities, such as onsite material processing, concrete curing, foundation and concrete clean-up, water used in concrete trucks, forms, etc. shall not be allowed to enter water ways or to be discharged prior to being treated to remove pollutants. The Contractor shall dispose of the construction related waste water in accordance with all Federal, State, Regional and Local laws and regulations.

3.6 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

If during excavation or other construction activities any previously unidentified or unanticipated historical, archaeological, and cultural resources are discovered or found, all activities that may damage or alter such resources shall be temporarily suspended. Resources covered by this paragraph include but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rock or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, the Contractor shall immediately notify the Contracting Officer so that the appropriate authorities may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. The Contractor shall cease all activities that may result in impact to or the destruction of these resources. The Contractor shall secure the area and prevent employees or other persons from trespassing on, removing, or otherwise disturbing such resources.

3.7 BIOLOGICAL RESOURCES

3.7.1 Threatened and Endangered Species Protection

If during construction activities any threatened or endangered species (particularly the Desert Tortoise) are observed in or near the construction area, such observations shall be reported immediately to the Contracting Officer so that the appropriate authorities may be notified and a determination made as to what special disposition should be made. The Contractor shall strictly adhere to the relevant articles of the following Table 01355-1 found at the end of this section. In no circumstances shall any employee directly handle any tortoise unless it is in imminent danger. The Contractor shall cease all activities that may result in an impact to or the destruction of these resources. The Contractor shall prevent his employees from trespassing on private property, removing, or otherwise

disturbing any threatened or endangered species.

Based on the Nevada Division of Wildlife's (NDOW) February 23, 2001 comments on the January 2001 DSEA (Draft Supplemental Environment Assessment) for the R-4 Detention Basin and Haul Road Alignment, the Corps has agreed to incorporate protocols to protect the Gila monster into its program to protect the desert tortoise in future projects such as this F-1 Channel, Hualapai Way to Beltway. Separate surveys for the Gila monster are not required. The biological monitor (for the desert tortoise) shall also be trained to recognize the Gila monster and to handle this species according to NDOW protocol. The Gila monster is not federally listed as Threatened or Endangered, but it is classified as a State of Nevada Protected Reptile and a BLM Sensitive Species. If during the preconstruction biological surveys or construction monitoring (for desert tortoise), a Gila monster is discovered, the NDOW will be notified. If the NDOW is not available, the biologist shall photograph the Gila monster, document its location, capture, and release the Gila monster out of harm's way, using precautions to avoid being bitten.

3.7.2 Protection of Biological Resources

The Contractor shall keep construction activities under surveillance, management, and control to minimize interference with, disturbance to, and damage of, native vegetation, fish, and wildlife. The Contractor shall minimize interference with, disturbance to, and damage of wildlife. Species that require specific attention along with measures for their protection shall be listed by the Contractor prior to beginning of construction operations.

3.8 PREVIOUSLY USED EQUIPMENT

The Contractor shall clean all previously used construction equipment prior to bringing it onto the project site. The Contractor shall ensure that the equipment is free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds. The Contractor shall consult with the USDA jurisdictional office for additional cleaning requirements.

3.9 MAINTENANCE OF POLLUTION FACILITIES

The Contractor shall maintain permanent and temporary pollution control facilities and devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

3.10 TRAINING OF CONTRACTOR PERSONNEL

The Contractor's personnel shall be trained in all phases of environmental protection and pollution control. The Contractor shall conduct environmental protection/pollution control meetings for all Contractor personnel prior to commencing construction activities. Additional meetings shall be conducted for new personnel and when site conditions change. The training and meeting agenda shall include: methods of detecting and avoiding pollution; familiarization with statutory and contractual pollution standards; installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of archaeological sites, artifacts, wetlands, and endangered species and their habitat that are known to be in the area.

3.11 POST CONSTRUCTION CLEANUP

The Contractor shall clean up all areas used for construction in accordance with Contract Clause: "Cleaning Up". The Contractor shall, unless otherwise instructed in writing by the Contracting Officer, obliterate all signs of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. The disturbed area shall be graded, filled and the entire area seeded unless otherwise indicated.

-- End of Section --

Table 01355-1

ENVIRONMENTAL COMMITMENTS

Significant Impact	EIS Ref.	Federal Enviro nmental	Mitigation Commitment	Implementa tion
Impacts to desert tortoise	Para 2.03	NEPA, Endan- gered Species Act	Payment of a Compensation Fee of $550 per acre of permanent disturbance and $220 per acre of tempo- rary disturbance (40 percent of the assessment for permanent disturbance). This assessment would re- sult in a compensation of $401,340 for permanent disturbance and $47,214 for temporary disturbance for a total of $448,554.	Prior to the initi- ation of construc- tion. Paid by Corps of Engineers.
Impacts to desert tortoise during pre construction and construc- tion	Para 2.03	NEPA, Endan- gered Species Act	The Corps will designate an individual as a contact representative who will be responsible for overseeing compliance with protective stipulations for the desert tortoise and coordination with the FWS.	Concurrent with pre con- struction and con- struction activities causing
			Any biologist supervising pre-construction and construction activity and/or moving tortoises or their eggs shall be a qualified tortoise biologist trained in the handling procedures specified in the Appendix A to the Biological Opinion (BO) issued by the FWS (Appendix D).	Concurrent with pre con- struction and con- struction activities

			Prior to start of pre-construction and construction activities in any areas occupied by the desert tortoise, or in which tortoise habitat is found, all employees who will work in such areas will be informed, through an education program, developed by the Corps, of the occurrence of the desert tortoise in the project area, and of the Threatened status of the species. They will be advised of the definition of "take", of the potential for impacts to the tortoise, and of the potential penalties (up to $25,000 in fines and 6 months in prison) for taking a threatened species. They will also be informed of the mitigation measures to which the Corps has committed and the terms and conditions included in the Biological Opinion.	Concurrent with pre construction and construction activities causing impacts.
			The contents of the education program would be coordinated with the FWS prior to its implementation. The program will also be presented to all supervisory and maintenance personnel associated with activities in tortoise habitat, and private landowners, if any, who will be responsible for maintenance of facilities on their properties. All such persons will sign a statement indicating that they have completed the education program and understand fully its provisions and the specific measures, terms, and conditions included in the EIS and Biological Opinion.	Concurrent with pre construction and construction activities causing impacts.

			Within 60 days prior to initial brushing, grubbing, grading, or other construction activity, a thorough survey of the construction site, including areas outside the facility boundaries likely to be disturbed by construction activities, will be conducted by the qualified Biologist. All tortoises, including any eggs found, will be removed form the site no more than 60 days prior to the onset of construction. Alternatively, removal efforts may occur in concert with surveys of project areas if performed no more than 60 days prior to the onset of construction.	Concurrent with pre construction and construction activities causing impacts.
			Each burrow, whether showing evidence of activity of not, will be 1) either examined using a fiberoptiscope and, if a tortoise is present, excavated by hand to remove the tortoise, or (2 excavated by hand to remove any tortoise or eggs that may be present. Burrows or dens of other species that could be used by tortoises also will be treated in the same manner. Tortoises found in these areas shall be handled and moved out of the construction zone according to the protocol provided in Appendix A to the Biological Opinion. All burrows will be excavated under the supervision of the Biologist. Only the Biologist shall handle tortoises or tortoise eggs.	Concurrent with pre construction and construction activities causing impacts.
			Tortoises removed from the wild will be relocated as specified under the section on measures to minimize mortality of desert tortoises during transportation, handling, and care following removal from project sites, below.	Concurrent with construction activities causing impacts.

			The Construction right-of-way for all primary channels and the lateral collector channel system will be inspected for tortoises and their burrows not more than one working day prior to any surface disturbing activities. The inspection will be conducted by a qualified tortoise biologist and will provide 100 percent coverage of the right-of-way. The area will be surveyed three times unless no tortoises are found on the second pass.	Concurrent with construction activities causing impacts.
			Tortoises found on all channel and lateral collector sites will be moved off the construction site for a distance of 300 to 1,000 feet and placed in the shade of a shrub, in a natural unoccupied burrow similar to the hibernaculum in which it was found, or in an artificially constructed burrow following the protocol provided in Appendix A to the Biological Assessment. Tortoises will not be placed on land not under the ownership of the Bureau of Land Management or the Flood Control District without the written permission of the landowner. If such permission is not obtained, the tortoise would be handled under the procedures outlined above.	Concurrent with construction activities causing impacts.

			Tortoises showing symptoms of Upper Respiratory Tract Disease will be left in the wild. To minimize the risk of spreading the Upper Respiratory Tract Disease, each tortoise will be handled with a separate pair of disposable gloves. All materials used to handle or contain tortoises will be used once and then discarded or sterilized. Cardboard boxes used to hold tortoises will be purchased new, used once, and then discarded. Tortoises will be purposefully moved only by qualified tortoise biologists, solely for the purpose of moving them out of harm's way. If a suitable location is not found, tortoises will be disposed of as specified under the subparagraph on measures to minimize mortality of desert tortoises during transportation, handling, and care following removal from project sites, below.	Concurrent with con-struction activities causing impacts.
			All vehicle traffic during construction will be restricted to existing roadways and to areas that have been cleared of tortoises. Speed limits in undeveloped areas containing tortoise habitat will not exceed 10 miles per hour from March 1 to November 15 of any year, except in emergency situations involving human health and safety. Information will be provided to construction crews and other workers regarding areas where vehicular traffic is not allowed. The ground beneath any vehicle parked in areas occupied by the desert tortoise will be carefully searched for tortoises before the vehicle is moved. If a tortoise is found beneath a vehicle, then the Biologist will move it according to the protocol specified in Appendix A to the Biological Opinion.	Concurrent with con-struction activities causing impacts.

			The Corps or the local sponsor, as appropriate, will deliver all tortoises that are to be removed permanently from the wild to Dewey Animal Care, Inc., in Las Vegas, Nevada. The Corps or the local sponsor will bear the cost incurred by Dewey Animal Care, Inc., of caring for and marking the tortoises. The time and date of collection, Biological Opinion number, and collector's name will be marked by the Corps or the local sponsor on each individual box containing a desert tortoise. The Corps or local sponsor will contact the tortoise transfer facility in writing at least 10 days in advance that tortoises are to be collected and delivered to the facility. The Corps will notify the local sponsor of this requirement.	Concurrent with construction activities causing impacts.
			The Corps is responsible for ensuring that the following provisions are implemented: 1) All tortoises delivered from the transfer facility will be permaneltly and humanely marked as provided under the Short-term Habitat Conservaton Plan for the Desert Tortoise. 2) Handling of tortoises by Dewey Animal Care, Inc., will be consistent with conditions authorized under Fish and Wildlife 10(a)(1)(B) Permit #756260.	Concurrent with construction activities causing impacts.
			The Corps and/or its designee will implement a litter control program during construction that will include the use of covered, raven-proof trash receptacles, removal of trash from the construction site to the trash receptacles following the close of each work day, and proper disposal of trash in a designated solid waste disposal facility at the end of each work week.	Concurrent with construction activities causing impacts.

Impacts to desert tortoise during operation and mainatenance	Para 2.03	NEPA, Endan-gered Species Act	Prior to maintenance activities at any facility in tortoise habitat, a qualified Biologist will conduct a thorough survey of the facility not more than 1 day prior to initiation of the work and flag all tortoise burrows found within the area in which maintenance activities will take place. If the maintenance is to occur between November 1 and March 15, burrows shall either be completely avoided, or the burrows dug out and hibernating tortoises moved as specified in Appendix A of the Biological Opinion. If the maintenance is to occur between March 15 and November 1, a Biologist shall accompany the maintenance crew and move all tortoises to safety that would be affected by the activity as specified in Appendix A of the Biological Opinion.	Subsequent to project completion (operation and main-tenance).
			Herbicides shall not be used in or adjacent to any facilities located in areas occupied by the desert tortoise unless approved in writing by the FWS.	Subsequent to project completion (operation and main-tenance).
			Maintenance crews that locate a tortoise that is trapped in any flood control facility will im-mediately notify a person designated by the local sponsor to handle such situations. The tortoise will be moved by a person trained in tortoise handling procedures. If a live tortoise is in imminent danger of harm within a facility, a maintenance crew member may move the tortoise out of harms way using methods provided in the training program.	Subsequent to project completion (operation and main-tenance).

Temporary impacts to the desert tortoise and other vegetation and wildlife	Para 2.03	NEPA, Endangered Species Act	The Corps will develop and implement a revegetation program for temporarily disturbed sites west of Durango Road in areas adjacent to tortoise habitat. The Corps also will monitor the effects of revegetation for ten years after revegetation. Revegetation and monitoring plans will be developed by the Corps and coordinated with the FWS prior to initiation of construction.	Upon completion of construction.
Temporary construction impacts	Paras 4.07a, and 4.11	NEPA	Planting of native species in disturbed areas for erosion control.	Upon completion of construction.

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01451

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SECTION 01451

CONTRACTOR QUALITY CONTROL

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 3740	(2001) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E 329	(2000b) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.2 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices or lump-sum prices contained in the Bidding Schedule.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause titled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence. The project manager will be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the contract. The project manager in this context shall be responsible for the overall construction activities at the site, including quality and production. The project manager shall maintain a physical presence at the site at all times, except as otherwise acceptable to the Contracting Officer, and shall be responsible for all construction and construction related activities at the site.

3.2 QUALITY CONTROL PLAN

The Contractor shall furnish for review by the Government, not later than 10 days after receipt of notice to proceed, the Contractor Quality Control

(CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. The Government will consider an interim plan for the first 30 days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

3.2.1 Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents:

a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to the project manager.

b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.

c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the Government.

d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01330 SUBMITTAL PROCEDURES.

e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities will be approved by the Contracting Officer.)

f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.

h. Reporting procedures, including proposed reporting formats.

i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section. This list will be agreed upon during the coordination meeting.

3.2.2 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.3 Notification of Changes

After acceptance of the CQC Plan, the Contractor shall notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and prior to acceptance by the Government of the CQC Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 10 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 Personnel Requirements

The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure safety and contract compliance. The Safety and Health Manager shall receive direction and authority from the CQC System Manager and shall serve as a member of the CQC staff. Personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly will also be included as part of the CQC organization. The Contractor's CQC staff shall maintain a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure contract compliance. The CQC staff shall be subject to acceptance by the Contracting Officer. The Contractor

shall provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Complete records of all letters, material submittals, show drawing submittals, schedules and all other project documentation shall be promptly furnished to the CQC organization by the Contractor. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a graduate engineer, a graduate of construction management, or construction person with a minimum of 5 years construction experience on construction similar to this contract. This CQC System Manager shall be on the site at all times during construction and shall be employed by the prime Contractor. The CQC System Manager shall be assigned no other duties. An alternate for the CQC System Manager shall be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager.

3.4.3 CQC Personnel

In addition to CQC personnel specified elsewhere in the contract, the Contractor shall provide as part of the CQC organization specialized personnel to assist the CQC System Manager for the following areas: civil, structural, materials technician. These individuals may be employees of the prime or subcontractor; be responsible to the CQC System Manager; be physically present at the construction site during work on their areas of responsibility; have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan.

Experience Matrix

	Area	Qualifications
a.	Civil	Graduate Civil Engineer with 2 years experience in the type of work being performed on this project or technician with 5 yrs related experience
b.	Structural	Graduate Structural Engineer with 2 yrs experience or person with 5 yrs related experience
c.	Concrete, Pavements and Soils	Materials Technician with 2 yrs experience for the appropriate area

3.4.4 Additional Requirement

In addition to the above experience and education requirements the CQC

System Manager shall have completed the course entitled "Construction Quality Management For Contractors".

3.4.5 Organizational Changes

The Contractor shall maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

3.5 SUBMITTALS AND DELIVERABLES

Submittals, if needed, shall be made as specified in Section 01330 SUBMITTAL PROCEDURES. The CQC organization shall be responsible for certifying that all submittals and deliverables are in compliance with the contract requirements.

3.6 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control shall be conducted by the CQC System Manager for each definable feature of work as follows:

3.6.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

a. A review of each paragraph of applicable specifications, reference codes, and standards. A copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field shall be made available by the Contractor at the preparatory inspection. These copies shall be maintained in the field and available for use by Government personnel until final acceptance of the work.

b. A review of the contract drawings.

c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.

d. Review of provisions that have been made to provide required control inspection and testing.

e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.

f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

g. A review of the appropriate activity hazard analysis to assure safety requirements are met.

h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.

i. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.

j. Discussion of the initial control phase.

k. The Government shall be notified at least 48 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

a. A check of work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.

b. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.

c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

d. Resolve all differences.

e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.

f. The Government shall be notified at least 48 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.

g. The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the

deficient work. The Contractor shall not build upon nor conceal non-conforming work.

3.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, onsite production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

3.7 TESTS

3.7.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers certified testing laboratory or establish a certified testing laboratory at the project site. The Contractor shall perform the following activities and record and provide the following data:

a. Verify that testing procedures comply with contract requirements.

b. Verify that facilities and testing equipment are available and comply with testing standards.

c. Check test instrument calibration data against certified standards.

d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

e. Results of all tests taken, both passing and failing tests, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test shall be given. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility shall be provided directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.7.2 Testing Laboratories

3.7.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of $500.00 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3 Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials shall be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to a Quality Assurance Laboratory, at an address to be determined.

Coordination for each specific test, exact delivery location, and dates will be made through the Area Office.

3.8 COMPLETION INSPECTION

3.8.1 Punch-Out Inspection

Near the end of the work, or any increment of the work established by a time stated in the Special Clause, "Commencement, Prosecution, and Completion of Work", or by the specifications, the CQC Manager shall conduct an inspection of the work. A punch list of items which do not conform to the approved drawings and specifications shall be prepared and included in the CQC documentation, as required by paragraph DOCUMENTATION. The list of deficiencies shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

3.8.2 Pre-Final Inspection

The Government will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection with the customer can be scheduled. Any items noted on the Pre-Final inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the

superintendent or other primary management person, and the Contracting Officer's Representative shall be in attendance at the final acceptance inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups, and major commands may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice shall be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

3.9 DOCUMENTATION

The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

a. Contractor/subcontractor and their area of responsibility.

b. Operating plant/equipment with hours worked, idle, or down for repair.

c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.

d. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase shall be identified (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action.

e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.

f. Submittals and deliverables reviewed, with contract reference, by whom, and action taken.

g. Offsite surveillance activities, including actions taken.

h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

i. Instructions given/received and conflicts in plans and/or specifications.

j. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and

deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within 12 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every 7 days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.10 SAMPLE FORMS

Sample forms enclosed at the end of this section.

3.11 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

-- End of Section --

FIGURE 1
SAMPLE SPREADSHEET

SEVEN OAKS DAM, DAM AND APPURTENANCES
SAN BERNARDINO COUNTY, CALIFORNIA

ITEM #	DESCRIPTION	TOTALS AMOUNT	%	FED BE069	%	O.C. NON-FED FW090	%
1.	MOB & DEMOB	$1,000,000.00	94,1797	$941,797.00	5.1044	$51,044.00	0.4092
2.	DIV & CONTROL WA	$2,000,000.00	94,1797	$1,883,594.00	5.1044	$102,088.00	0.4092
3.	CLEAR SITE	$1,000,000.00	94,1797	$941,797.00	5.1044	$51,044.00	0.4092
4.	SCALING	$2,000,000.00	94,1797	$1,883,594.00	5.1044	$102,088.00	0.4092
5.	EXC, FOUND ALLU	$5,000,000.00	94,1797	$4,708,985.00	5.1044	$255,220.00	0.4092
6.	EXC, FOUND ROCK	$5,000,000.00	94,1797	$4,708,985.00	5.1044	$255,220.00	0.4092
					%	NON-FED VW090	%
7.	PROTECT-IN-PLACE	$1,000,000.00			87.6999	$876,999.00	7.0306
8.	RELOCATE NEWPO	$2,000,000.00			87.6999	$1,753,998.00	7.0306

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SECTION 02300

EARTHWORK

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.

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE EM 385-1-1	(1996) Safety and Health Requirements Manual

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 422	(1963; R 1998) Particle-Size Analysis of Soils
ASTM D 1556	(2000) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(2000) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu. m.))
ASTM D 2216	(1998) Laboratory Determination of Water (Moisture) Content of Soil and Rock
ASTM D 2487	(2000) 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 4914	(1994) Density of Soil and Rock in Place by the Sand Replacement Method in a Test Pit.
ASTM D 5030	(1994) Density of Soil and Rock in Place by the Water Replacement Method in a Test Pit.

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

Excavation Plan; G, RE.

The Contractor shall submit his excavation plan to the Contracting Officer in conformance with paragraph EXCAVATION PLAN

Haul Route Plan; G, RE.

The Contractor shall submit a haul route plan for removal of required excavated materials and for placing required fill materials.

SD-02 Shop Drawings

Shop Drawings; G, RE.

The contractor shall submit for approval shop drawings showing the proposed method of bracing which he intends to use to protect existing property.

Explosive Storage Locations; G, RE.

The contractor shall submit to the Contracting Officer drawings showing the location, access to and type of construction of the proposed storage magazine for explosives, and cap house.

SD-05 Design Data

Blast Data.

The Contractor shall submit Pre- and Post-Blast Reports which shall contain all of the pertinent data on the location by station, ground surface elevation in the area of the blast; diameter, spacing, depth, over-depth, pattern and inclination of blast holes; the type, strength, amount, distribution and powder factor for the explosives to be used and actually used per hole and per blast; the sequence and pattern of delays, and description and purpose of special methods.

SD-06 Test Reports

Field Density Tests; G, RE.

Treating of Compacted Fill Materials; G, RE.

Copies of all laboratory and field test reports shall be submitted to the Contracting Officer within 24 hours of the completion of the tests.

1.3 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.

PART 2 PRODUCTS

2.1 PRE-EMERGENT HERBICIDE PRODUCT

Soil surfaces requiring treatment with pre-emergent herbicide shall be treated with a mixture of SURFLAN herbicide or approved equal applied at 0.16 liters per hectare and GALLERY herbicide or approved equal applied at

0.01 liters per hectare.

2.2 PIGMENTED DUST PALLIATIVE/SOIL STABILIZER PRODUCT

The dust palliative/soil stabilizer shall be a mixture of plaster and natural fiber mulch. The cellulose fiber mulch shall be produced from grinding clean whole wood chips, or fiber produced from ground newsprint with a labeled ash content not to exceed 7 percent. The plaster shall consist of naturally occurring high purity processed gypsum and aditives. The gypsum shall be produced from a mined or quarried source. The gypsum shall be processed to be composed of crushed dry calcium sulfate hemihydrate having a purity of not less than 88 percent. The Contractor shall add a color pigment to the dust palliative/soil stabilizer slurry at the time of application. Apply color pigment to match existing soil color at the site, at the application rate recommended by the manufacturer. Color can be matched using the "Davis Colors" chart by Soil-Tech, Las, Vegas, Nevada, or equal. The gypsum and additives shall be furnished either in bags or bulk and be accompanied by bills of lading and shipping invoices. The shipping invoices for the gypsum shall state the gypsum's purity content, dry weight, and source of manufacture. Processed gypsum that has become partially air set, lumpy, or caked shall not be used. The plaster/cellulose fiber mulch shall be applied at a rate of 6.75 tonnes of plaster mixed with 2.242 tonnes of fiber per hectare.

PART 3 EXECUTION

3.1 EXCAVATION, GENERAL

Excavation shall consist of the removal of every type of material encountered in the designated areas or from areas directed. The material to be removed may include but is not limited to hardpan, silt, sand, gravel, cobbles and boulders, cemented silt/sand/gravel/cobbles/boulders with various degrees of cementation, caliche, asphalt, vegetation, trash, and other debris. Slope lines indicated on the drawings for temporary cuts do not necessarily represent the actual slopes to which the excavation must be made to safely perform the work. Unforeseen conditions may dictate that the temporary cut slope shall be made to the actual slope to which the work can be safely performed. Measurement and payment for excavation will be made in accordance with Section 01270. Excavation for permanent cuts shall be made to the slope lines indicated. Excavation will likely require ripping or other rock-excavation techniques, which may include blasting, and shall be performed in a manner which will not impair the subgrade. Use of heavy tractors equipped with a ripper tooth, hoe-rams, and hydraulic or pneumatic rock breaker could be necessary to excavate highly cemented soils. Rock or cemented material from required excavation to be used in compacted fills and backfills shall be crushed or otherwise reduced in size to meet gradation requirements prior to placement or stockpiling. Except as otherwise specified, the finish surface of subgrades shall be smooth and shall not vary more than 25 mm from indicated grade, except at areas to receive concrete where finished surfaces of subgrade shall not vary more than 12.5 mm from indicated grade. Excess excavated materials shall be hauled and stockpiled in the disposal site per the lines and grades shown on the drawings. Excess excavated materials including rocks and cemented soils shall be processed/crashed or otherwise reduced in sizes not exceeding 75 mm, prior to hauling and placing in the primary disposal site. Prior to commencing excavation, the Contractor shall submit his Excavation Plan to the Contracting Officer. All subgrade excavations will be inspected by the Contracting Officer prior to placement of any fill materials.

3.1.1 Excavation Plan

Prior to commencing excavation, the Contractor shall submit his plan for excavation to the Contracting Officer for acceptance. The plan must show all proposed locations of excavation operations utilizing methods involving blasting, headache balling, hoe ramming, or other techniques as may be applicable. In addition, the plan must include the results of a pre-excavation survey, a detailed blasting plan (if applicable) performed by a certified blasting consultant, and a seismic monitoring plan. The excavation plan shall be updated and resubmitted to the Contracting Officer any time the Contractor proposes altering his methods. The Contractor's methods for excavation are solely his responsibility. Approval of the excavation plan by the Contracting Officer will in no way limit the Contractor's liability regarding property damaged by this operations, nor will it alter the Contractor's sole responsibility for the safety of his operations. The Contractor shall be responsible for all damage caused by his excavation operations and be responsible for answering all complaints. The Contractor shall provide the Contracting Officer with 30 days advance warning of the use of excavation techniques which may lead to property damage to allow for review of the proposed techniques, to confirm general compliance with these specifications, and to allow monitoring of the excavations methods.

3.2 EXCAVATION, BLASTING

Any method used to excavate the structure or channel using explosives shall be subject to the approval by the Contracting Officer.

3.2.1 General Requirements

The drilling and blasting program and methods shall be the minimum necessary to break up the rock and/or caliche/cemented alluvium into bulldozer-manageable sized pieces for removal. Only the minimum strength explosive that will accomplish the fracturing will be allowed. If multiple charges are deemed necessary, they will be sequenced to produce good breakage of the rock or caliche/cemented alluvium and reduce airblast (sonic impacts) and ground vibrations to minimal levels. In the design of the blasting pattern, no blastholes will be permitted within 60 meters of an active tortoise or Gila Monster burrow. A qualified desert tortoise ecologist is required to be present during all blasting operations to ensure that there are no occupied burrows and/or to remove tortoises or Gila Monsters from the surface or burrows within the 60 meter limit. The desert tortoise ecologist will provide a short report with field notes to the Contracting Officer. The desert tortoise ecologist will be provided by the Contractor as his own expense. Additional restrictions may be imposed during the hibernation period (15 November through 15 March) to protect hibernating tortoises, if necessary and directed by the Contracting Officer. The Contractor shall strictly comply with all State and local regulations regarding construction blasting (e.g., Uniform Standard Specifications for Public Works Construction Off-Site Improvements, Clark County Area, Nevada, Third Edition, subsections 107.10, 203.03.03, and 208.03.01, and Engineer Manual (EM) 1110-2-3800, including all notice and reporting requirements). Under no circumstances shall blasting be performed within 30 meters of concrete that has been placed less than seven days. Blasting within 30 meters of concrete older than seven days will be permitted only if approved by the Contracting Officer.

3.2.2 Blasting

Prior to drilling for each blast, unless waived by the Contracting Officer, the Contractor shall submit a Pre-Blast plan on an approved form, which includes the pertinent data on the location by station, ground surface elevation in the area of the blast; diameter, spacing, depth, overdepth, pattern and inclination of blast holes; the type, strength, amount, distribution and powder factor for the explosives used per hole and per blast; the sequence and pattern of delays, and description and purpose of special methods. The loading of holes shall be done in the presence of a Government inspector. Acceptance by the Contracting Officer of the Pre-Blast plan will not relieve the Contractor of his sole responsibility to produce satisfactory results as set forth in these specifications. Drilling and blasting shall be done only to the depth, amount, and at such locations, with explosives of such quantity, distribution and density that will not produce unsafe or damaged rock and/or caliche/cemented alluvium surfaces or damage beyond the prescribed excavation limits. When a drilling and blasting program results in damage to the excavation, or to natural or man-made features, or is injurious to wildlife and habitat, the Contractor will be required to devise and employ methods which will prevent such damage. The revision may include special methods such as presplit and zone blasting, shallow lifts, reduction in size of individual blasts, small diameter blast holes, closely spaced blast holes, reduction of explosives, greater distribution of explosives by use of decking and primacord or variation in density of explosives.

3.2.2.1 Blasting and Utility Lines

Blasting will not be permitted close to existing utility lines. Contractor shall use other rock excavation techniques, and deploy all means necessary to break-out and remove layers of highly cemented soils nearby the utility lines. Contractor shall coordinate with utility owners prior to excavation and blasting in the vicinity of utility lines.

3.2.3 Overshooting

The Contractor shall use controlled blasting techniques so as not to overshoot. All possible care shall be exercised in drilling and blasting operations to prevent formation of discontinuities and to minimize over-break and blast damage of adjacent unexcavated ground and structures. Any material outside the authorized limits which may be shattered or loosened because of blasting shall be removed and/or re-compacted by the Contractor at his expense. Shattered or loosened material below the bottom limits of the required excavation shall be uniformly distributed and compacted or otherwise disposed of in a manner satisfactory to the Contracting Officer. The Contractor shall discontinue any method of blasting which leads to overshooting or is dangerous to the public, destructive of natural or man-made features, or is injurious to wildlife and habitat.

3.2.4 Pre-excavation Survey

The Contractor shall perform a pre-excavation survey which shall include as a minimum; detailed examination of adjacent structures, including video taping and installation of crack monitoring tape along existing structural cracks. Also included shall be a seismic survey performed by a certified seismic survey firm to determine limiting charge weights, distances to structures, ect. for all areas where blasting is proposed and limiting ball weights, height of drop, etc., for all areas where headache balls and/or hoe ram techniques are proposed.

3.2.4.1 Vibration Monitoring

During construction, the Contractor shall hire a certified seismic survey firm to perform a seismic monitoring program to determine the effects of any blasting, headache ball or hoe ram use, or any other specialized excavation technique. Particle velocities measured at an existing structure or 300 meters, which ever is closest, shall not exceed statutory limits or per second (whether the result of blasting or other excavation technique). In addition to these requirements, the Contractor shall provide suitable vibration monitoring equipment to measure and record ground motions at the 60 meter distance.

3.2.5 Notifications

The Contractor shall notify each property owner and public utility company having structures or facilities in proximity to the site of the work of his intention to use explosives. Such notice shall be given sufficiently in advance to enable the companies to take such steps as they may deem necessary to protect their property from injury. Any blasting adjacent to or crossing existing utilities shall be fully coordinated with the owner of the effected utility to include hole spacing, loading and vibration.

3.2.6 Qualifications

During blasting operations, the Contractor shall have on site, and in immediate charge of the blasting, a licensed blaster acceptable to the Contracting Officer who has had no less than 3 years of experience in controlled blasting and rock excavation operations. Powder handlers shall have had no less than one year continuous experience in preparation and loading of powder charges.

3.2.7 Post-Blast Reports

In addition to the reporting requirements required above, a separate Post-Blast Report of each blast shall be prepared and furnished to the Contracting Officer on an approved form. The report shall indicate the location of the blast by specific stationing, ground surface elevation, depth of round, pounds of explosives used by type and grade, total number of loaded holes, total pounds per delay, quantity and kind of explosive in each hole, maximum measured blast vibration, and all other blast information directed by the Contracting Officer. Original or legible copies of the report shall be provided to the Contracting Officer within 24 hours of the blast event.

3.2.8 Explosives

3.2.8.1 Safety

The contractor shall fully comply with Section 29, Blasting, COE EM 385-1-1 and any Local or State Laws and Regulations applicable to the proposed Blasting Plan.

3.2.8.2 Storage

The Contractor shall submit to the Contracting Officer, for approval, drawings showing the location, access to and type of construction of the proposed storage magazine for explosives, and cap house. The explosives storage magazine and other facilities may be located on project lands if a

satisfactory location can be found and is approved by the Contracting Officer. The Contractor shall maintain the explosive storage area at his own expense. The explosives storage magazine shall be securely locked when not in use.

3.3 PRESERVATION OF PROPERTY

All excavation operations shall be conducted in such a manner that concrete structures, embankments, utilities, or other facilities and improvements which are to remain in place permanently will not be subjected to settlement or horizontal movement. The Contractor shall furnish and install sheet piling, cribbing, bulkheads, shores, or whatever means may be necessary to adequately support material carrying such improvements or to support the improvements themselves and shall maintain such means in position until they are no longer needed. Temporary sheet piling, cribbing, bulkheads, shores or other protective means shall remain the property of the Contractor and when no longer needed shall be removed from the site. The Contractor shall submit for approval shop drawings showing proposed method of bracing which he intends to use. All shoring and bracing shall be designed so that it is effective to the bottom of the excavation, and shall be based upon calculation of pressures exerted by (and the condition and nature of) the materials to be retained, including surcharge imparted to the side of the trench by equipment and stored materials. Removal of shoring shall be performed in such manner as not to disturb or damage the finished concrete or other facility.

3.4 EXCAVATION FOR STRUCTURES

Excavation within the vicinity of existing structures, utilities, roads, and drainage pipes to remain in place shall be performed in a manner to prevent damage to the structure. Earth banks and facilities to remain in place shall be supported as necessary during excavation. Potential for damage resulting from severe vibration may limit the Contractor's operations or choice of equipment. In general, unless otherwise shown or specified, the actual side slopes shall be in accordance with COE EM 385-1-1.

3.5 EXCAVATION CHANNEL

Channel excavation consists of the removal of all materials within the lines and grades indicated.

3.6 REMOVAL OF UNSATISFACTORY SOILS

The removal of soils or materials which are unsatisfactory for the foundation of the channel, or structures may be required in certain areas. Unsatisfactory soils or materials include but are not limited to those materials containing roots and other organic matter, trash, debris and materials classified in ASTM D 2487, as Pt, OH, OL, CH, MH, and materials too wet to support construction equipment. Channel subgrade materials that cannot be brought to 95% compaction after scarification, shall be removed. The Contractor will be required to excavate any such areas to the depth directed and backfill the removal areas with compacted fill conforming to the requirements of Paragraph GENERAL REQUIREMENTS FOR COMPACTED FILLS AND COMPACTED BACKFILLS.

3.7 DISPOSITION AND DISPOSAL OF EXCAVATED MATERIALS

Excavated materials suitable for required fills shall be placed in temporary stockpiles or used directly in the work. Excess excavated

satisfactory natural ground and surface material and soils not utilized as part of the construction shall be hauled and stockpiled in the designated disposal site. Materials and soils to be placed in the designated disposal site shall be free from trash, dumped debris and demolition products, and shall consist of no materials and soils suspected of having characteristics of hazardous and/or toxic waste materials characterized as unsatisfactory soil and material including trash, dumped debris and demolition products. Materials and soils suspected of having characteristics of hazardous and/or toxic waste materials characterized as unsatisfactory soil including trash, dumped debris and demolition products and unstable soils shall become the property of the Contractor and shall be removed from the project site in accordance with requirements Section 01355 ENVIRONMENTAL PROTECTION and Section 01200 GENERAL REQUIREMENTS. No excavated material or waste of any kind shall be removed beyond the project limits under this contract without the express written authority of the Contracting Officer. Prior to placing material, the approved stockpile area(s) and designated disposal site shall be cleared of trash and vegetation. Vegetation shall be removed by grading the existing ground surface to a depth of 150 mm. Any stockpiles shall be placed in a manner to preclude ponding of water. The designated disposal site shall be graded and filled as per plan(s). Natural ground and surface soils and materials thus excavated and removed will then be designated as either:

i. Materials to be salvaged, or
ii. Scrap and unsatisfactory materials and soils and unstable materials and soils to be treated as specified above and in Section 02230 CLEAR SITE AND REMOVE OBSTRUCTIONS.

3.7.1 Hauled Excavated Material

The Contractor shall have a routing plan for haul within the project limits, including removal of required excavated materials and placing fill materials. The haul route plan shall be submitted to the Contracting Officer for approval. Haul routes for transport of the excess excavated material shown on the drawing sheets are approximate. The Contractor will be responsible for obtaining all permits and licenses necessary to haul material off-site. The Contractor will provide to the Contracting Officer three copies of the proposed street haul route plan for transport of all excess excavated material.

3.8 OVERCUT

Except as otherwise specified or specifically ordered in writing, any overcut or excavation beyond the lines and grades indicated in the plans (or as directed) shall be backfilled with compacted fill conforming to the Paragraph GENERAL REQUIREMENTS FOR COMPACTED FILLS AND COMPACTED BACKFILLS, or concrete conforming to the Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS. The Contractor shall expect to overbuild and trim back the compacted fill required to backfill overcuts made at trapezoidal channel sections. All excavating, backfilling, compacting of backfill, and concreting occasioned thereby shall be by the Contractor at no additional cost to the Government. Any overcut under existing or newly constructed channels and structures shall be backfilled with concrete.

3.9 COMPACTION EQUIPMENT

Compaction shall be accomplished by tamping roller, rubber tired roller vibratory compactor or mechanical tampers. All equipment, tools, and machines shall be maintained in satisfactory working condition at all

times. Compaction equipment shall be suitable for consistently producing uniform soil densities.

3.10 GENERAL REQUIREMENTS FOR COMPACTED FILLS AND COMPACTED BACKFILLS

3.10.1 Control

Moisture-density relations shall be established by the Contractor. The soil used for each maximum density test shall be classified in accordance with ASTM D 2487 and shall include a particle size analysis in accordance with ASTM D 422. At least one five point maximum density test shall be made for every 10 field density tests. Field density test shall be performed by the Contractor at the frequency established in paragraph Field Control, and in such locations to insure that the specified density is being obtained. Moisture-density relations and field densities shall be reported on approved forms. One copy of density data less dry weight determinations shall be provided on the day each test is taken. The completed test reports shall be provided with the Contractor Quality Control Report on the work day following the test.

3.10.1.1 Laboratory Control

Moisture-density relations shall be established by the Contractor. One moisture-density relation shall be made for each classification, blend or change in classification of soil materials encountered. Approval of moisture-density relations shall be obtained prior to the compacting of any material in the work. The moisture-density relations shall be determined in a laboratory in accordance with ASTM D 1557.

a. The desired amount of mixing water will be added for each compaction test specimen, mixed well, and the mixture will be placed in a container with an airtight cover and allowed to cure for 24 hours. A shorter curing time may be allowed where tests show that shortening the curing time will not affect the results.

3.10.1.2 Field Control

Field in-place density shall be determined in accordance with ASTM D 1556. The field moisture content shall be determined in accordance with ASTM D 2216. Determination of in-place densities using the nuclear method ASTM D 2922 may be used to supplement the sand cone density tests ASTM D 1556. When ASTM D 2922 is used, the calibration curves shall be checked and adjusted using only the sand cone method as described in ASTM D 1556. When material contain considerable amount of rock or coarse gravel in-place density test method ASTM D 4914 or ASTM D 5030 shall be used. At least one adjacent sand cone test shall be performed for every five nuclear density tests performed. If field density tests determined by the nuclear method vary by more than 0.1 kilonewtons per cubic meter from comparison sand-cone tests, and are consistently high or low, adjustment of the calibration curve is necessary.

a. In-Place Densities

One test per 750 cubic meters, for the first 7,500 cubic meters of material and one test for each 1,500 cubic meters thereafter, or fraction thereof, shall be made of each lift of fill or backfill areas compacted by other than hand-operated machines. At least one test shall be made in each 600 mm layer of compacted fill or backfill processed as a unit and not less than one test shall be made in each

area. One test per 300 cubic meters, or fraction thereof, shall be made of each lift of fill or backfill areas compacted by hand-operated machines. The contractor CQC shall maintain a log of all tests, which will, updated and submitted to the contracting officer on a weekly basis. The test log shall include: Test number (if retest shall include retest number), date, feature of work, station and offset, weight of wet soil, weight of dry soil, percent of compaction, optimum moisture content, maximum dry unit weight, soil classification, in-place density test methods either sand-cone or nuclear densimeter.

3.10.2 Settling of Fills or Backfills with Water

Settling of fills or backfills with water will not be permitted.

3.10.3 Fill Material

Fill material shall be obtained from the required excavation. Materials considered unsatisfactory for use as compacted fill include but are not limited to those materials containing roots and other organic matter, trash, debris, chunks or clumps of cemented material, and shall contain no stone whose greatest dimension is more than 3/4 the lift thickness. The Contractor shall expect to break-down, crush or otherwise process required excavation for use as fill material due to the cementation of in-situ soils. Materials classified in ASTM D 2487 as MH, CH, Pt, OH, and OL are also considered unsatisfactory for use as compacted fill. Material for compacted fill behind concrete structures shall contain less than 30 percent by weight passing the 75 mm sieve and shall contain no particle larger than 75 mm.

3.10.4 Placement

Fill material shall not be placed against concrete which has not been in place at least 14 days or until the concrete has attained a strength of 17.2 megapascals when tested in accordance with the Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS. Fill shall not be placed over covered channels (roof decks) until the concrete has obtained 70% of the contract required design strength. Heavy equipment shall not be operated over pipes and buried structures until at least 600 mm of fill material have been placed and compacted over them. Material from the top of the pipe or buried structure to 600 mm above pipe or buried structure shall be compacted by mechanical tampers or other equipment approved by the Contracting Officer. Compacted fill shall be placed with suitable equipment in horizontal layers which before compaction, shall not exceed 300 mm in depth for rubber-tired or vibratory rollers, 200 mm in depth for tamping rollers, 100 mmin depth when mechanical tampers are used. The Contractor may vary the layer thickness within these limits for most efficient operations. Material containing stones shall be placed in a manner to prevent the stones from striking the concrete structures and to prevent the formation of voids.

3.10.5 Moisture Content

Material shall have a uniform moisture content while being placed and compacted. Water shall be added at the source, if required, or by sprinkling each layer of material during placement. Uniform distribution of moisture shall be obtained by disking, harrowing, or otherwise manipulating the soil during and after time water is added. Material containing an excess of moisture shall be manipulated with suitable

implements to facilitate maximum aeration and shall be permitted to dry to the proper consistency before being compacted. Fill shall have a maximum moisture content of not more than 2 percent above optimum and a minimum moisture content of not less than 2 percent below optimum.

3.10.6 Compaction

No layer of fill shall be compacted before the practicable uniform moisture content has been obtained. Scarified areas shall be compacted as specified for the fill placed thereon. Rollers will not be permitted to operate within 300 mm of channel or structure walls or over buried structures until the compacted fill over the top of the structures has reached a depth of 600 mm. Compaction equipment shall be so operated that structures are not damaged nor overstressed during compaction operations. Mechanical tampers shall be used for compaction of fill material adjacent to structures where rolling equipment is impracticable for use in compaction.

3.11 COMPACTED FILL, CHANNEL

3.11.1 Invert

3.11.1.1 Preparation for Placing

The foundation for the compacted fill to be placed and compacted fill at the channel shall be cleared of all existing obstructions, vegetation and debris. Any trash or debris shall be removed in accordance with Section 02230 CLEAR SITE AND REMOVE OBSTRUCTIONS. Unsatisfactory or unstable (too wet) material and soils not meeting the requirements for fill material shall be removed where directed. The existing surfaces for the compacted fill at the channel site shall be scarified to a depth of 150 mm and proofrolled by four passes of the compaction equipment. The subgrade for the channel shall be prepared in accordance with paragraph SUBGRADE PREPARATION.

3.11.1.2 Compaction

Each layer of the material shall be compacted to not less than 95 percent of maximum density, per ASTM D 1557.

3.11.2 Behind Channel Walls

3.11.2.1 Limitations on Equipment

The gross weight of any piece of equipment, or the combined weight of any combinations of equipment coupled together, used to place, moisten and/or compact fill behind channel walls and up to 600 mm above the top of covered sections shall not exceed 16,000 kilograms, including dynamic forces produced by vibratory equipment. Equipment used to compact the fill behind the channel walls shall be of such size as to be capable of operating in the area between the cut slope and the channel wall. Compaction equipment will not be required to operate at elevations lower than 600 mm above the top of wall footings. This equipment shall be of such size as to be capable of operating in the area between the cut slope and the channel wall at any point 600 mm above the top of the heel of wall footings.

3.11.2.2 Construction Balance

Fills behind wall on one side of the channel shall not exceed by more than 1.5 meters the high of the fill behind the opposite channel wall at any

time during construction.

3.11.2.3 Compaction

Each layer of fill behind channel walls, shall be compacted to not less than 90 percent of maximum density, per ASTM D 1557. The top 300 mm of the maintenance road fill adjacent to the channel wall shall be compacted to not less than 95 percent of maximum density per ASTM D 1557.

3.11.2.4 Trimming

The top of fill adjacent to channel walls shall be trimmed to the lines indicated on the drawings with a tolerance of plus or minus 25 mm. Any material loosened by trimming shall be recompacted and the area moistened and compacted with one pass of a smooth-wheeled roller. Tolerances shall apply after rolling. Fill slopes shall be trimmed to a uniform alignment at the top of the berm and reasonably uniform slope at or outside the lines shown on the drawings.

3.11.2.5 Backfill Against Plywood at Ends of Pipe and Sewer Stubs

Plywood shall be braced or otherwise held flush against the end of the pipe during backfilling. The Contractor shall make sure the plywood is of sufficient size to adequately cover the pipe or sewer stub opening. The Contractor shall attach blocks or shims to roughly fit the inside diameter of the pipe to assure that the plywood is not displaced during backfilling.

3.11.3 Compacted Fill Over Covered Channel

3.11.3.1 General

No fill material shall be placed over the top of the covered channel until all voids at the sides of the covered channel have been filled as described below, and until all caved material has been compacted to the specified density to the top of the roof slab.

3.11.3.2 Material

Materials for filling voids shall be clean sand, free of trash, organic materials, debris, and with 100 percent passing the 4.75 mm sieve and not more than 10 percent passing the 150 mm sieve.

3.11.3.3 Placement

The first layer of fill over the concrete box section shall be 300 mm in thickness and shall be compacted with a rubber-tired or vibratory roller having a maximum weight if 9,000 kilograms. The remainder of the fill shall be deposited in 150 mm layers and compacted with rubber-tired or vibratory rollers, or other approved equipment with a maximum weight of 9,000 kilograms until the structure has a cover of at least 600 mm. The remainder of the compacted fill shall be placed as specified in paragraph COMPACTED FILL, CHANNEL of this section.

3.11.3.4 Contractors Option

If the Contractor elects to leave the inside forms and shoring in place, permission will be granted to place fill material 48 hours after concrete has been placed.

3.11.3.5 Compaction

Each layer of fill on top of the covered channel shall be compacted to not less than 95 percent of maximum density, per ASTM D 1557. Compacted Fill under streets and maintenance roads shall be compacted per paragraph COMPACTED FILL, ROADWAY.

3.11.4 Compacted Fill, Roadway

3.11.4.1 Compaction

Fill shall be compacted to not less than 95 percent of maximum density per ASTM D 1557 for the width of all traveled ways plus 1 meter on each side thereof.

3.11.4.2 Trimming

All street and maintenance road shoulders and side slopes shall be trimmed to the lines indicated on the drawings with a tolerance of plus or minus 25 millimeters. Any material loosened by trimming shall be recompacted and the area moistened and compacted with one pass of a smooth-wheeled roller. Tolerances shall apply after rolling. Fill slopes shall be trimmed to a reasonably uniform slope at or outside the lines shown on the drawings.

3.12 BACKFILL

3.12.1 Structural Backfill

3.12.1.1 Location

Backfill shall consist of all fill against and/or around structures.

3.12.1.2 Material

Backfill material shall be obtained from the required excavation as approved by the Contracting Officer. In general, the best material available will be designated as backfill and fill about structures. Backfill may consist of sand, gravelly sand, and silty sands. Organic material, silt, clay, broken concrete or pavement, boulders and other unsatisfactory material shall not be used. Backfill for structures shall not contain any stones larger than 75 mm.

3.12.1.3 Placing

Backfill material shall not be placed against concrete which has not been in place at least 14 days or until the concrete has attained a strength of 17.2 megapascals when tested in accordance with Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS.

3.12.1.4 Compaction

Compaction shall be not less than 95 percent of maximum density, per ASTM D 1557 unless noted or shown otherwise.

3.13 SUBGRADE PREPARATION

3.13.1 Subgrade for Channel

Subgrade preparation for channel shall include subgrade preparation for

areas to receive concrete, aggregate base course and/or bituminous paving for streets, access roads, maintenance roads, turnarounds, and invert access ramps. All trash and debris shall be removed in accordance with Section 02230 CLEAR SITE AND REMOVE OBSTRUCTIONS. After the channel has been excavated to rough grade, the entire channel invert, invert access ramp, and other area indicated above shall be scarified to a depth of 0.15 meters, moisture conditioned and proofrolled by 4 passes of the compaction equipment and trimmed to a uniform grade and smoothed with a steel-wheeled roller to make the subgrade ready to receive concrete. If the subgrade is disturbed by the Contractor's operations or is overexcavated, or is soft or yielding, the subgrade shall be restored to grade and compacted to a density of 95 percent of maximum density, per ASTM D 1557. The finished surface of the subgrade shall not be more than 13 mm above the indicated grade at any point when tested with a 3 meters straightedge.

3.14 FINISHING

3.14.1 EARTHWORK FINISHING

Prior to the application of the pre-emergent herbicide and dust palliative/soil stabilizer, all exposed earthen slopes and surfaces shall be finished to the grades shown on the drawings or as directed by the Engineer, including the removal of all existing vegetation and the filling and smoothing of erosional features and surface irregularities. The exposed finished surfaces shall then be scarified to a depth of 150 mm, compacted, and groomed to produce a smooth surface with all particles greater than 75 mm in diameter removed.

3.14.2 PRE-EMERGENT HERBICIDE

All exposed and disturbed surface areas in the project area not covered by concrete or asphalt and prepared as described in paragraph EARTHWORK FINISHING shall be treated with a pre-emergent herbicide with the concentrations stated in paragraph PRE-EMERGENT HERBICIDE PRODUCT to discourage the growth of weeds and other vegetation. The pre-emergent herbicide shall be watered in per the manufacturer's recommendations and is to be applied prior to application of the pigmented dust palliative/soil stabilizer in paragraph PIGMENTED DUST PALLIATIVE/SOIL STABILIZER.

3.14.3 PIGMENTED DUST PALLIATIVE/SOIL STABILIZER

All exposed excavation and fill surfaces and disturbed surface areas in the project area not covered by concrete or asphalt and treated as per paragraph PRE-EMERGENT HERBICIDE shall be treated with a pigmented dust palliative/soil stabilizer for soil stabilization and dust control with the concentrations stated in paragraph PIGMENTED DUST PALLIATIVE/SOIL STABILIZER PRODUCT after construction is completed. The pigmented dust palliative/soil stabilizer shall be watered in per the manufacturer's recommendations.

The plaster/cellulose fiber mulch stabilizer shall formulate a protective crust like barrier within 4 to 8 hours after application. Application of the plaster/cellulose fiber mulch stabilizer will not be permitted when weather conditions are unsuitable for concrete placement in accordance with Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE FOR CIVIL WORKS.

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DIVISION 02 - SITE WORK

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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 D 1556	(2000) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(2000) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.))
ASTM D 2487	(2000) 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	(1988; R1996el) 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 "RE" designates that the Resident Office will review the submittal for the Government. Submit the following in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-06 Test Reports

Field Density Tests; G, RE.

Testing of Backfill Materials; G, RE.

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 comprise any materials classified by ASTM D 2487 as CL, GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SC, SM, SW, SP.

2.1.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials also include man-made fills, trash, refuse, or backfills from previous construction. Unsatisfactory material also includes material classified as satisfactory which contains root and other organic matter, frozen material, and stones larger than 75 mm,. The Contracting Officer shall be notified of any contaminated materials.

2.1.3 Unstable Material

Unstable material shall consist of materials too wet to properly support the utility pipe, conduit, or appurtenant structure.

2.1.4 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 0.075 mm mesh sieve and no less than 95 percent by weight passing the 25 mm sieve. The maximum allowable aggregate size shall be 25 mm, or the maximum size recommended by the pipe manufacturer, whichever is smaller.

2.1.5 Initial Backfill Material

Initial backfill shall consist of select granular material or satisfactory materials free from rocks 25 mm, or larger in any dimension or free from rocks of such size as 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 600 mm. Excavated material not required or not satisfactory for backfill shall be removed from the site. Grading shall be done as may be necessary to prevent surface water from flowing into the excavation, and any water accumulating 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 Requirements

The trench shall be excavated as recommended by the manufacturer of the pipe to be installed. Trench walls below the top of the pipe shall be sloped, or made vertical, and of such width as recommended in the manufacturer's installation manual. Where no manufacturer's installation manual is available, trench walls shall be made vertical. Trench walls more than 1.5 meters high shall be shored, cut back to a stable slope, or provided with equivalent means of protection for employees who may be exposed to moving ground or cave in. Trench walls which are cut back shall be excavated to at least the angle of repose of the soil. Special attention shall be given to slopes which may be adversely affected by weather or moisture content. The trench width below the top of pipe shall not exceed 600 mm plus pipe outside diameter (O.D.) for pipes of less than 600 mm inside diameter and shall not exceed 900 mm plus pipe outside diameter for sizes larger than 600 mm inside diameter. Where recommended trench widths are exceeded, redesign, stronger pipe, or special installation procedures shall be utilized by the Contractor. The cost of redesign, stronger pipe, or special installation procedures shall be borne by the Contractor without any additional cost to the Government.

3.1.1.1 Bottom Preparation

The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing. Stones of 25 mm or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing.

3.1.1.2 Removal of Unyielding Material

Where overdepth is not indicated and unyielding material is encountered in the bottom of the trench, such material shall be removed 100 mm below the required grade and replaced with suitable materials as provided in paragraph BACKFILLING AND COMPACTION.

3.1.1.3 Removal of Unstable Material

Where unstable material is encountered in the bottom of the trench, such material shall be removed to the depth directed and replaced to the proper grade with select granular material as provided in paragraph BACKFILLING AND COMPACTION. When removal of unstable material is required due to the Contractor's fault or neglect in performing the work, the resulting material shall be excavated and replaced by the Contractor without additional cost to the Government.

3.1.1.4 Excavation for Appurtenances

Excavation for manholes, catch-basins, inlets, or similar structures 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. Rock shall be cleaned of loose debris and cut to a firm surface either level, stepped, or serrated, as shown or as directed. Loose disintegrated rock and thin strata shall be removed. Removal of unstable material shall be as specified above. When concrete is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation. Excavation to the final grade level shall not be made until just before the concrete is to be placed.

3.1.2 Stockpiles

Stockpiles of satisfactory materials shall be placed and graded as specified. Stockpiles shall be kept in a neat and well drained condition, giving due consideration to drainage at all times. The ground surface at stockpile locations shall be cleared, grubbed, and sealed by rubber-tired equipment, excavated satisfactory and unsatisfactory materials shall be separately stockpiled. Stockpiles of satisfactory materials shall be protected from contamination which may destroy the quality and fitness of the stockpiled material. If the Contractor fails to protect the stockpiles, and any material becomes unsatisfactory, such material shall be removed and replaced with satisfactory material from approved sources at no additional cost to the Government. Locations of stockpiles of satisfactory materials shall be subject to prior approval of the Contracting Officer.

3.2 BACKFILLING AND COMPACTION

Backfill material shall consist of satisfactory material, select granular material, or initial backfill material as required. Backfill shall be placed in layers not exceeding 150 mm loose thickness for compaction by hand operated machine compactors, and 200 mm loose thickness for other than hand operated machines, unless otherwise specified. Each layer shall be compacted to at least 95 percent maximum density.

3.2.1 Trench Backfill

Trenches shall be backfilled to existing grade.

3.2.1.1 Replacement of Unyielding Material

Unyielding material removed from the bottom of the trench shall be replaced with select granular material or initial backfill material.

3.2.1.2 Replacement of Unstable Material

Unstable material removed from the bottom of the trench or excavation shall be replaced with select granular material placed in layers not exceeding 150 mm loose thickness.

3.2.1.3 Bedding and Initial Backfill

Bedding shall be of the type and thickness shown. Initial backfill material shall be placed and compacted with approved tampers to a height of at least one foot above the utility pipe or conduit. The backfill shall be brought up evenly on both sides of the pipe for the full length of the pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe.

3.2.1.4 Final Backfill

The remainder of the trench, except for special materials for roadways, shall be filled with satisfactory material. Backfill material shall be placed and compacted to 95 percent maximum density. Water flooding or jetting methods of compaction will not be permitted.

3.2.2 Backfill for Appurtenances

After the manhole, catchbasin, inlet, or similar structure has been constructed and the concrete has been allowed to cure for 7 days, backfill

shall be placed in such a manner that the structure will not be damaged by the shock of falling earth. The backfill material shall be deposited and compacted as specified for final backfill, and shall be brought up evenly on all sides of the structure to prevent eccentric loading and excessive stress.

3.3 TESTING

Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Government.

3.3.1 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.

3.3.2 Testing of Backfill Materials

Classification of backfill materials shall be determined in accordance with ASTM D 2487 and the moisture-density relations of soils shall be determined in accordance with ASTM D 1557. A minimum of one soil classification and one moisture-density relation test shall be performed on each different type of material used for bedding and backfill.

3.3.3 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 50 meters of installation shall be performed. One moisture density relationship shall be determined for every 1,500 cubic meters of material used. Field in-place density shall be determined in accordance with ASTM D 1556 or ASTM D 2922. When ASTM D 2922 is used, 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.

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SECTION 02630

STORM-DRAINAGE SYSTEM

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 ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 198	(1994) Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 76M	(1997) Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe (Metric)
ASTM C 443	(1994) Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
ASTM C 655	(1995a) Reinforced Concrete D-Load Culvert, Storm Drain, and Sewer Pipe

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 "RE" designates that the Resident Office will review the submittal for the Government. Submit the following in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-07 Certificates

Pipeline Testing; G, RE.

Hydrostatic Test on Watertight Joints; G, RE.

Certified copies of test reports demonstrating conformance to applicable pipe specifications, before pipe is installed.

SD-08 Manufacturer's Instructions

Placing Pipe; G, RE.

Printed copies of the manufacturer's recommendations for installation procedures of the material being placed, prior to installation.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Delivery and Storage

Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. Materials shall not be stored directly on the ground. The inside of pipes and fittings shall be kept free of dirt and debris.

1.3.2 Handling

Materials shall be handled in a manner that ensures delivery to the trench in sound, undamaged condition. Pipe shall be carried to the trench, not dragged.

PART 2 PRODUCTS

2.1 PIPE FOR CULVERTS AND STORM DRAINS

Pipe for culverts and storm drains shall be of the sizes indicated and shall conform to the requirements specified.

2.1.1 Reinforced Concrete Pipe Laterals

ASTM C 76M, Class III, or ASTM C 655 with D-Load of 1,350 pounds per linear foot of pipe diameter to produce a 0.01 inch crack.

2.2 HYDROSTATIC TEST ON WATERTIGHT JOINTS

2.2.1 Concrete

A hydrostatic test shall be made on the watertight joint types as proposed. Only one sample joint of each type needs testing; however, if the sample joint fails because of faulty design or workmanship, an additional sample joint may be tested. During the test period, gaskets or other jointing material shall be protected from extreme temperatures which might adversely affect the performance of such materials. Performance requirements for joints in reinforced and nonreinforced concrete pipe shall conform to AASHTO M 198 or ASTM C 443.

PART 3 EXECUTION

3.1 EXCAVATION FOR PIPE AND DRAINAGE STRUCTURES

Excavation of trenches, and for appurtenances and backfilling for culverts and storm drains, shall be in accordance with the applicable portions of Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS and the requirements specified below.

3.1.1 Trenching

The width of trenches at any point below the top of the pipe shall be not greater than required to permit satisfactory jointing and thorough tamping of the bedding material under and around the pipe.

3.1.2 Removal of Rock

Rock in either ledge or boulder formation shall be replaced with suitable materials to provide a compacted earth cushion having a thickness between

unremoved rock and the pipe of at least 150 mm.

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

Bedding for all RCP pipe shall be a Type II aggregate base, meeting the requirements of Section 02722 AGGREGATE BASE COURSE. The bedding gradation shall be in accordance with Section 02722, 2.1.2. The bedding surface for the pipe shall be placed with a thickness of 150 mm below the pipe and extend up to the springline of the pipe.

The bedding shall be brought up evenly on both sies of pipe for the full length of pipe. The bedding shall be thoroughly compacted with mechanical tampers or rammers.

3.3 BACKFILLING

3.3.1 Backfilling Pipe in Trenches

After the pipe has been properly bedded, backfill shall be placed, including selected granular material, or initial backfill material in accordance with Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

3.3.2 Backfilling Pipe in Fill Sections

For pipe placed in fill sections, backfill material shall be uniformly spread in layers longitudinally on both sides of the pipe, not exceeding 150 mm 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 610 mm 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 4 m, whichever is less. After the backfill has reached at least 610 mm above the top of the pipe, the remainder of the compacted fill shall be placed and thoroughly compacted in layers not exceeding 300 mm.

3.4 PLACING REINFORCED CONCRETE PIPE

Each pipe section shall be thoroughly examined before being laid; defective or damaged pipe shall not be used. Pipelines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Pipe shall not be laid in water, and pipe shall not be laid when trench conditions or weather are unsuitable for such work. Diversions of drainage or dewatering of trenches during construction shall be provided as necessary.

The Contractor shall determine his source of supply of sand for use in

mortar a sufficient time in advance of pipe laying operations to permit sampling and testing before use, and no mortar shall be used until the sand has been approved by the Engineer. Pipe sections shall be checked for alignment and grade at the time of joining the sections. If an adjustment in alignment or grade is necessary after making the joint, additional mortar shall be firmly pressed into the joint.

The interior of the pipe shall be kept free of dirt, excess mortar, and other foreign material as the pipe laying progresses, and left clean at the completion of the work. Any pipe which is not in true alignment or which shows any undue settlement after laying, or is damaged, shall be taken up and relaid at the Contractor's expense. The first section of pipe to be laid shall be firmly placed to the designated line and grade with the groove upstream. Laying shall proceed upgrade with tongue ends of tongue-and-groove pipe pointing in the direction of the flow. Abutting ends of the sections of pipe to be jointed shall than be cleared and wetted, after which joining mortar shall be firmly placed into the lower half of the groove end of the previously laid section. Joining mortar shall be firmly placed on the top half of the tongue end of the section to be jointed which shall then be inserted truly and snugly into the groove end of the section previously laid so as to completely fill the joint. The interior joint shall them be either brushed or pointed and all surplus mortar removed from the pipe. The external space between the ends of the jointed pipe shall be firmly filled from the outside with laying mortar. When pipe with self-centering joints and without and inside pointing recess is furnished, the inside shoulder of the groove end of section shall first be lightly plastered or buttered with joining mortar after which the pipe ends shall be firmly fitted together in such a way that the tongue end of each section fits snugly into the groove end of the preceding section in order to center the joint and form a true flow line. The inside joints shall be troweled or brushed smooth and excess mortar removed from the pipe. The outside joint recesses shall then be filled with mortar, after which backfilling shall be performed as specified. When pipe is furnished with self-centering joints with both inside and outside pointing recesses, the pipe shall be firmly fitted together in such a way that the tongue end of each section fits snugly into the groove end of each preceding section in order to center the joint and to form a true flow line, after which the inside joint recess shall be firmly filled with pointing mortar and then troweled or brushed smooth and excess mortar removed from the pipe, after which backfilling shall be performed as specified. Backfill of the pipe trench may be completed while the joint mortar is still plastic. Should the joint mortar become set before the backfill is placed, backfilling of the trench shall be commenced within sixteen (16) hours of joining the pipe sections. When the pipe is not backfilled while the mortar is plastic, the mortar shall be cured in accordance with the water, curing compound, form, or waterproof membrane method. Free water shall not be allowed to come in contact with the pipeline until the mortar in the joints has set at least twenty-four (24) hours.

Storm drain stubouts shall be capped and location identified with a marker post as shown on the plans.

3.5 TESTING REQUIREMENTS (BACKFILLING)

All testing requirements shall be in accordance with Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

3.6 MOVEMENT OF CONSTRUCTION MACHINERY

When compacting by rolling or operating heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Movement of construction machinery over a storm drain at any stage of construction shall be at the Contractor's risk. Any damaged pipe shall be repaired or replaced.

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SECTION 02710

SUBDRAINAGE SYSTEMS - WEEPHOLE 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 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 D 75	(1987; R 1997) Sampling Aggregates
ASTM D 4632	(1991; R 1997) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4833	(2000) Index Puncture Resistance of Geotextiles, Geomembranes and Related Products

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 "RE" designates that the Resident Office will review the submittal for the Government. Submit the following in accordance with Section 01330, "SUBMITTAL PROCEDURES:

SD-04 Samples

Filter Fabric.

Specimens identified to indicate the manufacturer, type of material, size and quantity of material, and shipment or lot represented. Each sample of filter fabric shall be a piece not less than 0.15 m x 0.15 m.

PART 2 PRODUCTS

2.1 DRAIN MATERIAL

Drain material shall be durable, hard, tough, and free from adherent coatings. The material shall not contain corrosive agents, organic matter, or soft, friable, thin or elongated particles in quantities considered deleterious by the Contracting Officer. Drain material shall consist of gravel, crushed stone, or processed crushed concrete, and shall show a loss

in weight of not more than 50 percent when tested in accordance with ASTM C 131, and shall be reasonably well graded within the following limits:

Sieve Size (millimeters)	Percent by Weight Passing
25	100
19	90 - 100
9.5	20 - 55
4.75	0 - 10
0.15	0 - 4
0.075	0 - 2

2.2 FILTER FABRIC

Filter fabric shall be a nonwoven needle punch pervious sheet of plastic yarn. The filter fabric shall provide an apparent opening size no finer than the No. 100 sieve and no coarser than the No. 50 sieve. The filter fabric shall have a minimum tensile strength of 700 newtons in any principal direction when tested in accordance with ASTM D 4632 grab test method using 25.4 millimeter square jaws and a 0.3 meter per minute constant rate of traverse. The filter fabric shall have a 15 percent minimum breaking elongation in any principal direction when tested in accordance with ASTM D 4632. The filter fabric shall have a 250 newtons minimum puncture strength when tested in accordance with ASTM D 4833. The filter fabric shall have no seams.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Drain Material

Drain material shall be placed as shown on the drawings.

3.1.2 Filter Fabric

Filter fabric shall be installed per manufacturer's recommendations. The Contractor shall use all means necessary to protect the fabric before, during and after installation. Many fabrics are subject to degradation from ultra-violet rays. Materials which, in the judgment of the Contracting Officer, are not being handled in accordance with the manufacturer's recommendation shall be rejected. Rejected materials shall be removed from the job site. Filter fabric shall be applied on a prepared surface as shown on the plans. End and longitudinal joint overlapping widths shall be a minimum of 610 millimeters.

3.2 TESTS

3.2.1 Drain Material

3.2.1.1 Points

Points on the individual grading curves obtained from representative samples of the drain material, not only shall lie between the boundary limits as defined by smooth curves drawn through the tabulated grading limits plotted on a mechanical-analysis diagram, but also shall exhibit no abrupt changes in slope denoting skip grading, scalping of certain sizes, or other irregularities which would be detrimental to the proper

functioning of the drain and filter

3.2.1.2 Sampling and Testing

Sampling and testing of the drain material shall be performed by the Contractor to determine compliance of the installed materials with specified requirements in conformance with ASTM C 131, ASTM C 136, and ASTM D 75. Sampling and testing of the filter materials shall be performed by the Contractor to determine compliance of the installed materials with specified requirements in conformance with ASTM C 136. Sampling and testing shall be performed at regular intervals with at least three tests being made for the drain materials. The location of after placement tests shall be as directed.

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3.8 DISPOSAL OF UNSATISFACTORY MATERIALS

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SECTION 02722

AGGREGATE BASE COURSE

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 117	(1995) Materials Finer Than 75 micrometer (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 127	(1988; R 1993el) Specific Gravity and Absorption of Course Aggregate
ASTM C 128	(1997) Specific Gravity and Absorption of Fine 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 D 75	(1987; R 1997) Sampling Aggregates
ASTM D 422	(1963; R 1998) Particle-Size Analysis of Soils
ASTM D 1556	(2000) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(2000) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.))
ASTM D 2487	(2000) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 4318	(2000) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM E 11	(1995) Wire-Cloth Sieves for Testing Purposes

STATE OF NEVADA DEPARTMENT OF TRANSPORTATION (NDOT) MATERIALS

TESTING DIVISION

NDOT T230	(Rev C) Method of Test For Determining the Percent of Fractured Faces

1.2 DEFINITIONS

For the purposes of this specification, the following definitions apply.

1.2.1 Aggregate Base Course

Aggregate base course (ABC) is well graded, durable aggregate uniformly moistened and mechanically stabilized by compaction.

1.2.2 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 "RE" designates that the Resident Office will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Plant, Equipment, and Tools.

List of proposed equipment to be used in performance of construction work, including descriptive data.

Waybills and Delivery Tickets; G, RE.

Copies of waybills and delivery tickets during the progress of the work. Before the final statement is allowed, the Contractor shall file certified waybills and certified delivery tickets for all aggregates actually used.

SD-06 Test Reports

Sampling and testing; G, RE.

Field Density Tests; G, RE.

Calibration curves and related test results prior to using the device or equipment being calibrated. Copies of field test results within 24 hours after the tests are performed. Certified copies of test results for approval not less than 30 days before material is required for the work.

1.4 SAMPLING AND TESTING

Sampling and testing shall be the responsibility of the Contractor. Sampling and testing shall be performed by a testing laboratory approved in accordance with Section 01451 CONTRACTOR QUALITY CONTROL. Work requiring testing will not be permitted until the testing laboratory has been

inspected and approved. The materials shall be tested to establish compliance with the specified requirements; testing shall be performed at the specified frequency. The Contracting Officer may specify the time and location of the tests. Copies of test results shall be furnished to the Contracting Officer within 24 hours of completion of the tests.

1.4.1 Sampling

Samples for laboratory testing shall be taken in conformance with ASTM D 75. When deemed necessary, the sampling will be observed by the Contracting Officer.

1.4.2 Tests

The following tests shall be performed in conformance with the applicable standards listed.

1.4.2.1 Sieve Analysis

Sieve analysis shall be made in conformance with ASTM C 117 and ASTM C 136. Sieves shall conform to ASTM E 11. Particle-size analysis of the soils shall also be completed in conformance with ASTM D 422.

1.4.2.2 Liquid Limit and Plasticity Index

Liquid limit and plasticity index shall be determined in accordance with ASTM D 4318.

1.4.2.3 Moisture-Density Determinations

The maximum density and optimum moisture content shall be determined in accordance with ASTM D 1557.

1.4.2.4 Field Density Tests

Density shall be field measured in accordance with ASTM D 1556. For the method presented in ASTM D 1556 the base plate as shown in the drawing shall be used.

1.4.2.5 Wear Test

Wear tests shall be made on ABC coarse material in conformance with ASTM C 131.

1.4.2.6 Fractured Faces

The percentage fractured faces will be determined in accordance with NDOT T230.

1.4.3 Testing Frequency

1.4.3.1 Initial Tests

One of each of the following tests shall be performed on the proposed material prior to commencing construction to demonstrate that the proposed material meets all specified requirements when furnished. If materials from more than one source are going to be utilized, this testing shall be completed for each source.

a. Sieve Analysis.

b. Liquid limit and plasticity index.

c. Moisture-density relationship.

d. Abrasion Loss (ASTM C 131).

e. Fractured Faces.

1.4.3.2 In Place Tests

Each of the following tests shall be performed on samples taken from the placed and compacted ABC. Samples shall be taken and tested at the rates indicated.

a. Density tests shall be performed on every lift of material placed and at a frequency of one set of tests for every 500 square meters, or portion thereof, of completed area.

b. Sieve Analysis shall be performed for every 1000 metric tons, or portion thereof, of material placed.

c. Liquid limit and plasticity index, abrasion loss and fractured faces tests shall be performed at the same frequency as the sieve analysis.

1.4.4 Approval of Material

The source of the material shall be selected 15 days prior to the time the material will be required in the work. Tentative approval of material will be based on initial test results. Final approval of the materials will be based on sieve analysis, liquid limit, and plasticity index tests performed on samples taken from the completed and fully compacted ABC.

1.5 WEATHER LIMITATIONS

Construction shall be done when the atmospheric temperature is above 2 degrees C. When the temperature falls below 2 degrees C, the Contractor shall protect all completed areas by approved methods against detrimental effects of freezing. Completed areas damaged by freezing, rainfall, or other weather conditions shall be corrected to meet specified requirements.

1.6 PLANT, EQUIPMENT, AND TOOLS

All plant, equipment, and tools used in the performance of the work will be subject to approval before the work is started and shall be maintained in satisfactory working condition at all times. The equipment shall be adequate and shall have the capability of producing the required compaction, meeting grade controls, thickness control, and smoothness requirements as set forth herein.

PART 2 PRODUCTS

2.1 AGGREGATES

The ABC shall consist of clean, sound, durable particles of stone, crushed stone, gravel, crushed gravel, angular sand, or other approved material. ABC shall be free of lumps of clay, organic matter, and other objectionable materials or coatings. The portion retained on the 4.75 mm sieve shall be

known as coarse aggregate; that portion passing the 4.75 mm sieve shall be known as fine aggregate.

2.1.1 Coarse Aggregate

Only one type of coarse aggregate shall be used on the project. Coarse aggregate shall not show more than 45 percent loss when subjected to the Los Angeles abrasion test in accordance with ASTM C 131. The amount of flat and elongated particles shall not exceed 30 percent. A flat particle is one having a ratio of width to thickness greater than 3; an elongated particle is one having a ratio of length to width greater than 3.

2.1.2 Fine Aggregate

Fine aggregates shall be angular particles of uniform density. When the fine aggregate is supplied from more than one source, aggregate from each source shall meet the specified requirements.

2.1.3 Gradation Requirements

The specified gradation requirements shall apply to the completed base course. The aggregates shall have a maximum size of 25 mm and shall be continuously well graded within the limits specified in TABLE 1. Sieves shall conform to ASTM E 11.

TABLE 1. GRADATION OF AGGREGATES

Percentage by Weight Passing Square-Mesh Sieve

Sieve Designation	No. 1
25.0 mm	100
19.0 mm	90-100
4.75 mm	35-65
1.18 mm	15-40
0.075 mm	2-10

NOTE 1: Particles having diameters less than 0.02 mm shall not be in excess of 3 percent by weight of the total sample tested.

NOTE 2: The values are based on aggregates of uniform specific gravity. If materials from different sources are used for the coarse and fine aggregates, they shall be tested in accordance with ASTM C 127 and ASTM C 128 to determine their specific gravities. If the specific gravities vary by more than 10 percent, the percentages passing the various sieves shall be corrected as directed by the Contracting Officer.

2.1.4 Liquid Limit and Plasticity Index

Liquid limit and plasticity index requirements shall apply to the completed course and shall also apply to any component that is blended to meet the required gradation. The portion of any component or of the completed course passing the 0.425 mm sieve shall be either nonplastic or have a liquid limit not greater than 35 and a plasticity index not greater than 5.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

When the ABC is constructed in more than one layer, the previously constructed layer shall be cleaned of loose and foreign matter by sweeping with power sweepers or power brooms, except that hand brooms may be used in areas where power cleaning is not practicable. Adequate drainage shall be provided during the entire period of construction to prevent water from collecting or standing on the working area. Line and grade stakes shall be provided as necessary for control. Grade stakes shall be in lines parallel to the centerline of the area under construction and suitably spaced for string lining.

3.2 OPERATION OF AGGREGATE SOURCES

Aggregate sources shall be cleared, stripped and excavated to working depths producing excavation faces that are as nearly vertical as practicable for the materials being excavated. Strata of unsuitable materials overlying or occurring in the deposit shall be wasted. Methods of operating aggregate sources, and the processing and blending of the materials, shall be changed or modified if necessary to obtain material conforming to the specified requirements. Upon completion of the work, aggregate sources shall be conditioned to drain readily and be left in a satisfactory condition.

3.3 STOCKPILING MATERIAL

Prior to stockpiling of material, storage sites shall be cleared and leveled by the Contractor. All materials, including approved material available from excavation and grading, shall be stockpiled in the manner and at the locations designated. Aggregates shall be stockpiled on the cleared and leveled areas designated by the Contracting Officer to prevent segregation. Materials obtained from different sources shall be stockpiled separately.

3.4 PREPARATION OF UNDERLYING COURSE

Prior to constructing the ABC, the underlying course or subgrade shall be cleaned of all foreign substances. At the time of construction of the ABC, the underlying course shall contain no frozen material. The surface of the underlying course or subgrade shall meet specified compaction and surface tolerances. The underlying course shall conform to Section 02300 EARTHWORK. Ruts or soft yielding spots in the underlying courses, areas having inadequate compaction, and deviations of the surface from the requirements set forth herein shall be corrected by loosening and removing soft or unsatisfactory material and by adding approved material, reshaping to line and grade, and recompacting to specified density requirements. For cohesionless underlying courses containing sands or gravels, as defined in ASTM D 2487, the surface shall be stabilized prior to placement of the ABC. Stabilization shall be accomplished by mixing ABC into the underlying course and compacting by approved methods. The stabilized material shall be considered as part of the underlying course and shall meet all requirements of the underlying course. The finished underlying course shall not be disturbed by traffic or other operations and shall be maintained by the Contractor in a satisfactory condition until the ABC is placed.

3.5 INSTALLATION

3.5.1 Mixing the Materials

The coarse and fine aggregates shall be mixed in a stationary plant. The Contractor shall make adjustments in mixing procedures or in equipment as directed to obtain true grades, to minimize segregation or degradation, to obtain the required water content, and to insure a satisfactory ABC meeting all requirements of this specification.

3.5.2 Placing

The mixed material shall be placed on the prepared subgrade or subbase in layers of uniform thickness with an approved spreader. When a compacted layer 150 mm or less in thickness is required, the material shall be placed in a single layer. When a compacted layer in excess of 150 mm is required, the material shall be placed in layers of equal thickness. No layer shall exceed 150 mm or less than 75 mm when compacted. The layers shall be so placed that when compacted they will be true to the grades or levels required with the least possible surface disturbance. Where the ABC is placed in more than one layer, the previously constructed layers shall be cleaned of loose and foreign matter by sweeping with power sweepers, power brooms, or hand brooms, as directed. Such adjustments in placing procedures or equipment shall be made as may be directed to obtain true grades, to minimize segregation and degradation, to adjust the water content, and to insure an acceptable ABC.

3.5.3 Grade Control

The finished and completed ABC shall conform to the lines, grades, and cross sections shown. Underlying material(s) shall be excavated and prepared at sufficient depth for the required ABC thickness so that the finished ABC with the subsequent surface course will meet the designated grades.

3.5.4 Edges of Base Course

Approved fill material shall be placed along the outer edges of ABC in sufficient quantities to compact to the thickness of the course being constructed, or to the thickness of each layer in a multiple layer course, allowing in each operation at least a 600 mm width of this material to be rolled and compacted simultaneously with rolling and compacting of each layer of ABC. If this base course material is to be placed adjacent to another pavement section, then the layers for both of these sections shall be placed and compacted along this edge at the same time.

3.5.5 Compaction

Each layer of the ABC shall be compacted as specified with approved compaction equipment. Water content shall be maintained during the compaction procedure to within plus or minus 2 percent of the optimum water content determined from laboratory tests as specified in paragraph SAMPLING AND TESTING. Rolling shall begin at the outside edge of the surface and proceed to the center, overlapping on successive trips at least one-half the width of the roller. Alternate trips of the roller shall be slightly different lengths. Speed of the roller shall be such that displacement of the aggregate does not occur. In all places not accessible to the rollers, the mixture shall be compacted with hand-operated power tampers. Compaction shall continue until each layer has a degree of compaction that is at least 100 percent of laboratory maximum density through the full depth of the layer. The Contractor shall make such adjustments in

compacting or finishing procedures as may be directed to obtain true grades, to minimize segregation and degradation, to reduce or increase water content, and to ensure a satisfactory ABC. Any materials that are found to be unsatisfactory shall be removed and replaced with satisfactory material or reworked, as directed, to meet the requirements of this specification.

3.5.6 Thickness

Compacted thickness of the aggregate course shall be as indicated. No individual layer shall exceed 150 mm nor be less than 75 mm compacted thickness. The total compacted thickness of the ABC course shall be within 13 mm of the thickness indicated. Where the measured thickness is more than 13 mm deficient, such areas shall be corrected by scarifying, adding new material of proper gradation, reblading, and recompacting as directed. Where the measured thickness is more than 13 mm thicker than indicated, the course shall be considered as conforming to the specified thickness requirements. Average job thickness shall be the average of all thickness measurements taken for the job, but shall be within 6 mm of the thickness indicated. The total thickness of the ABC course shall be measured at intervals in such a manner as to ensure one measurement for each 500 square meters of base course. Measurements shall be made in 75 mm diameter test holes penetrating the base course.

3.5.7 Finishing

The surface of the top layer of ABC shall be finished after final compaction by cutting any overbuild to grade and rolling with a steel-wheeled roller. Thin layers of material shall not be added to the top layer of base course to meet grade. If the elevation of the top layer of ABC is 13 mm or more below grade, then the top layer should be scarified to a depth of at least 75 mm and new material shall be blended in and compacted to bring to grade. Adjustments to rolling and finishing procedures shall be made as directed to minimize segregation and degradation, obtain grades, maintain moisture content, and insure an acceptable base course. Should the surface become rough, corrugated, uneven in texture, or traffic marked prior to completion, the unsatisfactory portion shall be scarified, reworked and recompacted or it shall be replaced as directed.

3.5.8 Smoothness

The surface of the top layer shall show no deviations in excess of 10 mm when tested with a 3.05 meter straightedge. Measurements shall be taken in successive positions parallel to the centerline of the area to be paved. Measurements shall also be taken perpendicular to the centerline at 20 meter intervals. Deviations exceeding this amount shall be corrected by removing material and replacing with new material, or by reworking existing material and compacting it to meet these specifications.

3.6 TRAFFIC

Completed portions of the ABC course may be opened to limited traffic, provided there is no marring or distorting of the surface by the traffic. Heavy equipment shall not be permitted except when necessary to construction, and then the area shall be protected against marring or damage to the completed work.

3.7 MAINTENANCE

The ABC shall be maintained in a satisfactory condition until the full pavement section is completed and accepted. Maintenance shall include immediate repairs to any defects and shall be repeated as often as necessary to keep the area intact. Any ABC that is not paved over prior to the onset of winter, shall be retested to verify that it still complies with the requirements of this specification. Any area of ABC that is damaged shall be reworked or replaced as necessary to comply with this specification.

3.8 DISPOSAL OF UNSATISFACTORY MATERIALS

Any unsuitable materials that must be removed shall be disposed of as directed. No additional payments will be made for materials that must be replaced.

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SECTION 02741

HOT-MIX ASPHALT (HMA) FOR ROADS

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 117	(1995) Materials Finer Than 75 micrometer (No. 200) Sieve in Mineral Aggregates by Washing
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 150	(1999a) Portland Cement
ASTM C 566	(1997) Total Evaporable Moisture Content of Aggregate by Drying
ASTM D 140	(2000) Sampling Bituminous Materials
ASTM D 422	(1963; R 1998) Particle-Size Analysis of Soils
ASTM D 995	(1995b) Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures
ASTM D 1461	(1985; R 1994) Moisture or Volatile Distillates in Bituminous Paving Mixtures
ASTM D 1559	(1989) Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus
ASTM D 2172	(1995) Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
ASTM D 2489	(1984; R 1994el) Degree of Particle Coating of Bituminous-Aggregate Mixtures
ASTM D 2950	(1997) Density of Bituminous Concrete in Place by Nuclear Method
ASTM D 3381	(1999) Viscosity-Graded Asphalt Cement for Use in Pavement Construction

ASTM D 3666	(1998) Minimum Requirements for Agencies Testing and Inspecting Bituminous Paving Materials
ASTM D 4318	(2000) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D 4867/D 4867M	(1996) Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D 5444	(1998) Mechanical Size Analysis of Extracted Aggregate
ASTM D 6307	(1998) Asphalt Content of Hot Mix Asphalt by Ignition Method

ASPHALT INSTITUTE (AI)

AI MS-2	(1997) Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types

STATE OF NEVADA DEPARTMENT OF TRANSPORTATION (NDOT) MATERIALS TESTING DIVISION

NDOT T230	(Rev C) Method of Test For Determining the Percent of Fractured Faces

1.2 DESCRIPTION OF WORK

The work shall consist of pavement courses composed of mineral aggregate and asphalt material heated and mixed in a central mixing plant and placed on a prepared course. HMA designed and constructed in accordance with this section shall conform to the lines, grades, thicknesses, and typical cross sections shown on the drawings. Each course shall be constructed to the depth, section, or elevation required by the drawings and shall be rolled, finished, and approved before the placement of the next course.

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 "RE" designates that the Resident Office will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Waybills and Delivery Tickets; G, RE.

Waybills and delivery tickets, during progress of the work.

SD-06 Test Reports

Bituminous Pavement Mix Design; G, RE.

Copy of Mix Design selected. Report to be submitted and signed by a Civil

Engineer Licensed to Practice in the State of Nevada.

Properties of Bituminous Pavement Mixture; G, RE.

Copies of test results. Reports to be submitted and signed by a Civil Engineer Licensed to Practice in the State of Nevada.

Report of Density, asphalt content, and gradation; G, RE.

Copies of test results. Reports to be submitted and signed by a Civil Engineer Licensed to Practice in the State of Nevada.

Report of Grade Conformance and Surface Smoothness; G, RE.

Copies of test results. Reports to be submitted and signed by a Civil Engineer Licensed to Practice in the State of Nevada.

Aggregates; G, RE.

QC Monitoring; G, RE.

Aggregate and QC test results.

SD-07 Certificates

Testing Laboratory; G, RE.

Certification of compliance.

Plant Scale Calibration Certification.

1.4 ASPHALT MIXING PLANT

Plants used for the preparation of hot-mix asphalt shall conform to the requirements of ASTM D 995 with the following changes:

a. Truck Scales. The asphalt mixture shall be weighed on approved certified scales at the Contractor's expense. Scales shall be inspected and sealed at least annually by an approved calibration laboratory.

b. Testing Facilities. The Contractor shall provide all necessary laboratory facilities for the Contractor's quality control testing and use of the Government for acceptance testing, as necessary.

c. Inspection of Plant. The Contracting Officer shall have access at all times, to all areas of the plant for checking adequacy of equipment; inspecting operation of the plant; verifying weights, proportions, and material properties; checking the temperatures maintained in the preparation of the mixtures and for taking samples. The Contractor shall provide assistance as requested, for the Government to procure any desired samples.

d. Storage Bins. Use of storage bins for temporary storage of hot-mix asphalt will be permitted as follows:

(1) The asphalt mixture may be stored in non-insulated storage bins for a period of time not exceeding 3 hours.

(2) The asphalt mixture may be stored in insulated storage bins for a

period of time not exceeding 8 hours. The mix drawn from bins shall meet the same requirements as mix loaded directly into trucks.

1.5 HAULING EQUIPMENT

Trucks used for hauling hot-mix asphalt shall have tight, clean, and smooth metal beds. To prevent the mixture from adhering to them, the truck beds shall be lightly coated with a minimum amount of paraffin oil, lime solution, or other approved material. Petroleum based products shall not be used as a release agent. Each truck shall have a suitable cover to protect the mixture from adverse weather. When necessary to ensure that the mixture will be delivered to the site at the specified temperature, truck beds shall be insulated or heated and covers (tarps) shall be securely fastened.

1.6 ASPHALT PAVERS

Asphalt pavers shall be self-propelled, with an activated screed, heated as necessary, and shall be capable of spreading and finishing courses of hot-mix asphalt which will meet the specified thickness, smoothness, and grade. The paver shall have sufficient power to propel itself and the hauling equipment without adversely affecting the finished surface. The paver shall have a receiving hopper of sufficient capacity to permit a uniform spreading operation. The hopper shall be equipped with a distribution system to place the mixture uniformly in front of the screed without segregation. The screed shall effectively produce a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture.

1.7 ROLLERS

Rollers shall be in good condition and shall be operated at slow speeds to avoid displacement of the asphalt mixture. The number, type, and weight of rollers shall be sufficient to compact the mixture to the required density while it is still in a workable condition. Equipment which causes excessive crushing of the aggregate shall not be used.

1.8 STRAIGHTEDGE

The Contractor shall furnish and maintain at the site, in good condition, one 3.66 m straightedge for each bituminous paver. Straightedge shall be made available for Government use. Straightedges shall be constructed of aluminum or other lightweight metal and shall have blades of box or box-girder cross section with flat bottom reinforced to insure rigidity and accuracy. Straightedges shall have handles to facilitate movement on pavement.

1.9 GRADE AND SURFACE-SMOOTHNESS REQUIREMENTS

Finished surface of bituminous courses shall conform to gradeline and elevations shown and to surface?smoothness requirements specified.

1.9.1 Plan Grade

The grade of the completed surface shall not deviate more than 15.2 mm from the plan grade.

1.9.2 Surface Smoothness

When a 3.66 m straightedge is laid on the surface parallel with the centerline of the paved area or transverse from crown to pavement edge, the surface shall vary not more than 6.4 mm from the straightedge.

1.10 GRADE CONTROL

Lines and grades shall be established and maintained by means of line and grade stakes placed at site of work. Elevations of bench marks used by the Contractor for controlling pavement operations at the site of work will be determined, established, and maintained by the Government. Finished pavement elevations shall be established and controlled at the site of work by the Contractor in accordance with bench mark elevations furnished by the Contracting Officer.

1.11 WEATHER LIMITATIONS

The hot-mix asphalt shall not be placed upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 1. The temperature requirements may be waived by the Contracting Officer, if requested; however, all other requirements, including compaction, shall be met.

Table 1. Surface Temperature Limitations of Underlying Course

Mat Thickness, mm	Degrees C
75 or greater	4
Less than 75	7

PART 2 PRODUCTS

2.1 AGGREGATES

Aggregates shall consist of stone, crushed stone, gravel, crushed gravel, screenings, natural sand and mineral filler, as required. The portion of material retained on the 4.75 mm sieve is coarse aggregate. The portion of material passing the 4.75 mm sieve and retained on the 0.075 mm sieve is fine aggregate. The portion passing the 0.075 mm sieve is defined as mineral filler. All aggregate test results and samples shall be submitted to the Contracting Officer at least 14 days prior to start of construction.

2.1.1 Coarse Aggregate

Coarse aggregate shall consist of sound, tough, durable particles, free from films of material that would prevent thorough coating and bonding with the asphalt material and free from organic matter and other deleterious substances. All individual coarse aggregate sources shall meet the following requirements:

a. The percentage of loss shall not be greater than 45 percent after 500 revolutions when tested in accordance with ASTM C 131.

b. The portion of the material larger than the 10 mm screen shall contain at least 75 percent particles having fractured faces when tested in accordance with NDOT T230.

2.1.2 Fine Aggregate

Fine aggregate shall consist of clean, sound, tough, durable particles. The aggregate particles shall be free from coatings of clay, silt, or any objectionable material and shall contain no clay balls. Fine aggregate shall have a plasticity index of 6 percent or less and a liquid limit of 35 percent or less when tested in accordance with ASTM D 4318.

2.1.3 Mineral Filler

Mineral filler shall consist of Portland cement conforming to ASTM C 150 or shall be mechanically reduced rock with the following gradation.

Grain size in mm	Percent Finer
0.075	75-100
0.05	65-100
0.02	35-65
0.01	26-35
0.005	10-22

Grain size shall be determined in accordance with ASTM D 422.

2.1.4 Aggregate Gradation

The combined aggregate gradation shall conform to the gradation specified in Table 2, when tested in accordance with ASTM C 136 and ASTM C 117, and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve or vice versa, but grade uniformly from coarse to fine.

Table 2. Aggregate Gradation

Sieve Size, mm	Percent Passing by Mass
12.5	100
9.5	90-100
4.75	55-85
2.36	32-67
0.30	7-27
0.075	2-10

2.2 ASPHALT CEMENT BINDER

Asphalt cement binder shall conform to ASTM D 3381 Table 2, Viscosity Grade AC-40. Test data indicating grade certification shall be provided by the supplier at the time of delivery of each load to the mix plant. Copies of these certifications shall be submitted to the Contracting Officer. The supplier is defined as the last source of any modification to the binder. The Contracting Officer may sample and test the binder at the mix plant at any time before or during mix production. Samples for this verification testing shall be obtained by the Contractor in accordance with ASTM D 140 and in the presence of the Contracting Officer. These samples shall be furnished to the Contracting Officer for the verification testing, which

shall be at no cost to the Contractor. Samples of the asphalt cement specified shall be submitted for approval not less than 14 days before start of the test section.

2.3 MIX DESIGN

The Contractor shall develop the mix design. The asphalt mix shall be composed of a mixture of well-graded aggregate, mineral filler if required, and asphalt material. The aggregate fractions shall be sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula (JMF). No hot-mix asphalt for payment shall be produced until a JMF has been approved. The hot-mix asphalt shall be designed using procedures contained in AI MS-2 and the criteria shown in Table 3. If the Tensile Strength Ratio (TSR) of the composite mixture, as determined by ASTM D 4867/D 4867M is less than 75, the aggregates shall be rejected or the asphalt mixture treated with an approved anti-stripping agent. The amount of anti-stripping agent added shall be sufficient to produce a TSR of not less than 75. If an antistrip agent is required, it shall be provided by the Contractor at no additional cost. Sufficient materials to produce 90 kg of blended mixture shall be provided to the Contracting Officer for verification of mix design at least 14 days prior to the start of construction.

2.3.1 JMF Requirements

The job mix formula shall be submitted in writing by the Contractor for approval at least 14 days prior to the start of paving operations and shall include as a minimum:

a. Percent passing each sieve size.

b. Percent of asphalt cement.

c. Percent of each aggregate and mineral filler to be used.

d. Asphalt viscosity grade.

e. Number of blows of hammer per side of molded specimen.

f. Laboratory mixing temperature.

g. Lab compaction temperature.

h. Temperature-viscosity relationship of the asphalt cement.

i. Plot of the combined gradation on the 0.45 power gradation chart, stating the nominal maximum size.

j. Graphical plots of stability, flow, air voids, voids in the mineral aggregate, and unit weight versus asphalt content as shown in AI MS-2.

k. Specific gravity and absorption of each aggregate.

l. Percent natural sand.

m. Percent particles with 2 or more fractured faces (in coarse aggregate).

n. Fine aggregate angularity.

o. Tensile Strength Ratio (TSR).

p. Antistrip agent (if required) and amount.

q. List of all modifiers and amount used.

Table 3. Marshall Design Criteria

Test Property	50 Blow Mix
Stability, newtons minimum	*4450
Flow, 0.25 mm	8-18
Air voids, percent	3-5
TSR, minimum percent	75

* This is a minimum requirement. The average during construction shall be significantly higher than this number to ensure compliance with the specifications.

2.3.2 Adjustments to Field JMF

The Laboratory JMF for each mixture shall be in effect until a new formula is approved in writing by the Contracting Officer. Should a change in sources of any materials be made, a new laboratory design shall be performed and a new JMF approved before the new material is used. The Contractor will be allowed to adjust the Laboratory JMF within the limits specified below to optimize mix volumetric properties with the approval of the Contracting Officer. Adjustments to the Laboratory JMF shall be applied to the field (plant) established JMF and limited to those values as shown. Adjustments shall be targeted to produce or nearly produce 4 percent voids total mix.

Table 4. Field (Plant) Established JMF Tolerances

Sieves	Adjustments (plus or minus), percent
12.5 mm	3
4.75 mm	3
2.36 mm	3
0.075 mm	1
Binder Content	0.4

If adjustments are needed that exceed these limits, a new mix design shall be developed. Tolerances given above may permit the aggregate grading to be outside the limits shown in Table 2; while not desirable, this is acceptable.

PART 3 EXECUTION

3.1 PREPARATION OF ASPHALT BINDER MATERIAL

The asphalt cement material shall be heated avoiding local overheating and providing a continuous supply of the asphalt material to the mixer at a uniform temperature. The temperature of unmodified asphalts shall be no more than 160 degrees Cwhen added to the aggregates. Modified asphalts shall be no more than 174 degrees C when added to the aggregates.

3.2 PREPARATION OF MINERAL AGGREGATE

The aggregate for the mixture shall be heated and dried prior to mixing. No damage shall occur to the aggregates due to the maximum temperature and rate of heating used. The temperature of the aggregate and mineral filler shall not exceed 175 degrees C when the asphalt cement is added. The temperature shall not be lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide a mixture of satisfactory workability.

3.3 PREPARATION OF HOT-MIX ASPHALT MIXTURE

The aggregates and the asphalt cement shall be weighed or metered and introduced into the mixer in the amount specified by the JMF. The combined materials shall be mixed until the aggregate obtains a uniform coating of asphalt binder and is thoroughly distributed throughout the mixture. Wet mixing time shall be the shortest time that will produce a satisfactory mixture, but no less than 25 seconds for batch plants. The wet mixing time for all plants shall be established by the Contractor, based on the procedure for determining the percentage of coated particles described in ASTM D 2489, for each individual plant and for each type of aggregate used. The wet mixing time will be set to at least achieve 95 percent of coated particles. The moisture content of all hot-mix asphalt upon discharge from the plant shall not exceed 0.5 percent by total weight of mixture as measured by ASTM D 1461.

3.4 PREPARATION OF THE UNDERLYING SURFACE

The underlying surface shall be maintained in suitable condition for the placement of asphaltic pavement. Immediately before placing the hot mix asphalt, the underlying course shall be cleaned of dust and debris. The surface of the base course will be inspected for adequate compaction and surface tolerances specified in paragraph: GRADE AND SURFACE-SMOOTHNESS REQUIREMENTS. Unsatisfactory areas shall be corrected, prior to commencement of asphaltic pavement lay down operations.

3.5 TESTING LABORATORY

The laboratory used to develop the JMF shall meet the requirements of ASTM D 3666. A certification signed by the manager of the laboratory stating that it meets these requirements or clearly listing all deficiencies shall be submitted to the Contracting Officer prior to the start of construction. The certification shall contain as a minimum:

a. Qualifications of personnel; laboratory manager, supervising technician, and testing technicians.

b. A listing of equipment to be used in developing the job mix.

c. A copy of the laboratory's quality control system.

d. Evidence of participation in the AASHTO Materials Reference Laboratory (AMRL) program.

3.6 TRANSPORTING AND PLACING

3.6.1 Transporting

The hot-mix asphalt shall be transported from the mixing plant to the site in clean, tight vehicles. Deliveries shall be scheduled so that placing and compacting of mixture is uniform with minimum stopping and starting of the paver. Adequate artificial lighting shall be provided for night placements. Hauling over freshly placed material will not be permitted until the material has been compacted as specified, and allowed to cool to 60 degrees C. To deliver mix to the paver, the Contractor shall use a material transfer vehicle which shall be operated to produce continuous forward motion of the paver.

3.6.2 Placing

The mix shall be placed and compacted at a temperature suitable for obtaining density, surface smoothness, and other specified requirements. Upon arrival, the mixture shall be placed to the full width by an asphalt paver; it shall be struck off in a uniform layer of such depth that, when the work is completed, it shall have the required thickness and conform to the grade and contour indicated. The speed of the paver shall be regulated to eliminate pulling and tearing of the asphalt mat. Unless otherwise permitted, placement of the mixture shall begin along the centerline of a crowned section or on the high side of areas with a one-way slope. The mixture shall be placed in consecutive adjacent strips having a minimum width of 3 m. The longitudinal joint in one course shall offset the longitudinal joint in the course immediately below by at least 300 mm; however, the joint in the surface course shall be at the centerline of the pavement. Transverse joints in one course shall be offset by at least 3 m from transverse joints in the previous course. Transverse joints in adjacent lanes shall be offset a minimum of 3 m. On isolated areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the mixture may be spread and luted by hand tools.

3.7 COMPACTION OF MIXTURE

After placing, the mixture shall be thoroughly and uniformly compacted by rolling. The surface shall be compacted as soon as possible without causing displacement, cracking or shoving. The sequence of rolling operations and the type of rollers used shall be at the discretion of the Contractor. The speed of the roller shall, at all times, be sufficiently slow to avoid displacement of the hot mixture and be effective in compaction. Any displacement occurring as a result of reversing the direction of the roller, or from any other cause, shall be corrected at once. Sufficient rollers shall be furnished to handle the output of the plant. Rolling shall continue until the surface is of uniform texture, true to grade and cross section, and the required field density is obtained. After the Contractor is assured of meeting grade and smoothness requirements, rolling shall be continued until all roller marks are eliminated and at least 95 percent of the laboratory maximum density has been achieved. To prevent adhesion of the mixture to the roller, the wheels shall be kept properly moistened but excessive water will not be permitted. In areas not accessible to the roller, the mixture shall be

thoroughly compacted with hand tampers. Any mixture that becomes loose and broken, mixed with dirt, contains check-cracking, or is in any way defective shall be removed full depth, replaced with fresh hot mixture and immediately compacted to conform to the surrounding area. This work shall be done at the Contractor's expense. Skin patching will not be allowed.

3.8 JOINTS

The formation of joints shall be made ensuring a continuous bond between the courses and to obtain the required density. All joints shall have the same texture as other sections of the course and meet the requirements for smoothness and grade.

3.8.1 Transverse Joints

The roller shall not pass over the unprotected end of the freshly laid mixture, except when necessary to form a transverse joint. When necessary to form a transverse joint, it shall be made by means of placing a bulkhead or by tapering the course. The tapered edge shall be cut back to its full depth and width on a straight line to expose a vertical face prior to placing material at the joint. The cutback material shall be removed from the project. In both methods, all contact surfaces shall be given a light tack coat of asphalt material before placing any fresh mixture against the joint.

3.8.2 Longitudinal Joints

Longitudinal joints which are irregular, damaged, uncompacted, cold (less than 80 degrees C at the time of placing adjacent lanes), or otherwise defective, shall be cut back a minimum of 50 mm from the edge with a cutting wheel to expose a clean, sound vertical surface for the full depth of the course. All cutback material shall be removed from the project. All contact surfaces shall be given a light tack coat of asphalt material prior to placing any fresh mixture against the joint. The Contractor will be allowed to use an alternate method if it can be demonstrated that density, smoothness, and texture can be met.

3.9 CONTRACTOR QUALITY CONTROL

3.9.1 General Quality Control Requirements

The Contractor shall develop an approved Quality Control Plan. Hot-mix asphalt for payment shall not be produced until the quality control plan has been approved. The plan shall address all elements which affect the quality of the pavement including, but not limited to:

a. Mix Design

b. Aggregate Grading

c. Quality of Materials

d. Stockpile Management

e. Proportioning

f. Mixing and Transportation

g. Mixture Volumetrics

h. Moisture Content of Mixtures

i. Placing and Finishing

j. Joints

k. Compaction

l. Surface Smoothness

3.9.2 Testing Laboratory

The Contractor shall have access to a fully equipped asphalt laboratory. The laboratory shall meet the requirements as required in ASTM D 3666. Laboratory facilities shall be kept clean and all equipment shall be maintained in proper working condition. The Contracting Officer shall be permitted unrestricted access to inspect the Contractor's laboratory facility, to witness quality control activities, and to perform any check testing desired. The Contracting Officer will advise the Contractor in writing of any noted deficiencies concerning the laboratory facility, equipment, supplies, or testing personnel and procedures. When, in the opinion of the Contracting Officer, the deficiencies are serious enough to adversely affect test results, the incorporation of the materials into the work shall be suspended immediately and will not be permitted to resume until the deficiencies are corrected.

3.9.3 Quality Control Testing

The Contractor shall perform all quality control tests applicable to these specifications and as set forth in the Quality Control Program. The testing program shall include, but shall not be limited to, tests for the control of asphalt content, aggregate gradation, temperatures, aggregate moisture, moisture in the asphalt mixture, laboratory air voids, stability, flow, in-place density, grade and smoothness. A Quality Control Testing Plan shall be developed as part of the Quality Control Program.

3.9.3.1 Asphalt Content

A minimum of two tests to determine asphalt content will be performed per 1000 metric tons of asphaltic concrete produced by one of the following methods: the extraction method in accordance with ASTM D 2172, Method A or B, the ignition method in accordance with the ASTM D 6307. For the extraction method, the weight of ash, as described in ASTM D 2172, shall be determined as part of the first extraction test performed at the beginning of plant production; and as part of every tenth extraction test performed thereafter, for the duration of plant production. The last weight of ash value obtained shall be used in the calculation of the asphalt content for the mixture.

3.9.3.2 Gradation

Aggregate gradations shall be determined for each 1000 metric tons of asphaltic concrete produced from mechanical analysis of recovered aggregate in accordance with ASTM D 5444. For batch plants, aggregates shall be tested in accordance with ASTM C 136 using actual batch weights to determine the combined aggregate gradation of the mixture.

3.9.3.3 Aggregate Moisture

The moisture content of aggregate used for production shall be determined a minimum of once per shift in accordance with ASTM C 566.

3.9.3.4 Temperatures

At least one measurement of asphaltic concrete temperature shall be taken in each hour, in which paving operations are being conducted. Additional tests at additional locations, to determine the temperature at the dryer, the asphalt cement in the storage tank, the asphalt mixture at the plant, and the asphalt mixture at the job site, may be required as directed by the Contracting Officer.

3.9.3.5 Moisture Content of Mixture

The moisture content of the mixture shall be determined at least once per shift in accordance with ASTM D 1461 or an approved alternate procedure.

3.9.3.6 Laboratory Air Voids, Marshall Stability and Flow

Mixture samples shall be taken at least once per 1000 metric tons and compacted into specimens, using 50 blows per side with the Marshall hammer as described in ASTM D 1559. After compaction, the laboratory air voids of each specimen shall be determined, as well as the Marshall stability and flow.

3.9.3.7 In-Place Density

At least three cores will be recovered and tested for every 1000 square meters of pavement, or one day's production, whichever is smaller. Additional tests may be taken as required by the Contracting Officer. The Contractor may conduct any additional necessary testing to ensure the specified density is achieved. A nuclear gauge may be used to monitor pavement density in accordance with ASTM D 2950. Record sampling will be by use of cores as indicated above.

3.9.3.8 Thickness

At least three cores will be recovered and tested for every 1000 square meters of pavement, or one day's production, whichever is smaller. Additional tests may be taken as required by the Contracting Officer.

3.9.3.9 Grade and Smoothness

The Contractor shall conduct the necessary checks to ensure the grade and smoothness requirements are met in accordance with paragraph GRADE AND SURFACE SMOOTHNESS REQUIREMENTS.

3.9.3.10 Additional Testing

Any additional testing, which the Contractor deems necessary to control the process, may be performed at the Contractor's option.

3.9.3.11 QC Monitoring

The Contractor shall submit all QC test results to the Contracting Officer on a daily basis as the tests are performed. The Contracting Officer reserves the right to monitor any of the Contractor's quality control testing and to perform duplicate testing as a check to the Contractor's

quality control testing.

3.9.4 Action Required

3.9.4.1 Asphalt Content

If there is a failure to meet the specified asphalt content production will cease and the Contracting Officer will be immediately notified. No additional paving will occur until adjustments to the plant and test results confirm that the specified asphalt is being supplied.

3.9.4.2 Aggregate Gradation

When the amount passing any sieve is outside the specification limits, the aggregate shall be immediately resampled and retested. If there is another failure on any sieve, the fact shall immediately be reported to the Contracting Officer, and immediate steps shall be taken to rectify the situation.

3.9.4.3 Aggregate Moisture Content

When the moisture content of the aggregates is outside specification requirements the aggregates shall be immediately resampled and retested. If there is another failure, the fact shall immediately be reported to the Contracting Officer, and immediate steps shall be taken to rectify the situation.

3.9.4.4 Temperature

When the temperature of the bituminous mixture is outside specification requirements the mixture shall be immediately resampled and retested. If there is another failure, the fact shall immediately be reported to the Contracting Officer, and immediate steps shall be taken to rectify the situation. In no case will overheated or carbonized mixtures be allowed.

3.9.4.5 Asphalt Properties

If there is a failure in any of the asphalt properties production will cease and the Contracting Officer will be immediately notified. No additional paving will occur until adjustments to the plant and test results confirm that the specified properties are being achieved.

3.9.4.6 Density

When test results indicate lack of compaction additional specimens will be obtained as directed by the Contracting Officer. Based on the test results the Contractor will remove and replace the affected areas of pavement.

3.9.4.7 Thickness

When test results indicate that the finished pavement is 6 mm less than the thickness shown on the drawings, additional samples will be taken to determine the extent of defective thickness. The area determined will be removed and replaced or may be overlaid. The overlay will be a minimum of 25 mm thick and will be placed to duplicate slopes and drainages of the original pavement. No skin patching will be allowed.

3.9.5 Sampling

When directed by the Contracting Officer, the Contractor shall sample and test any material which appears inconsistent with similar material being produced, unless such material is voluntarily removed and replaced or deficiencies corrected by the Contractor. All sampling shall be in accordance with standard procedures specified.

3.9.6 Reports

All results of tests conducted shall be reported as required. During periods requiring protection from weather, reports of pertinent temperatures or other relevant values shall be made daily. These requirements do not relieve the contractor of the obligation to report certain failures immediately as required in preceding paragraphs. Such reports of failures and the action taken shall be confirmed in writing in the routine reports. The Contracting Officer has the right to examine all Contractor Quality Control records.

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SECTION 02748

BITUMINOUS TACK AND PRIME COATS

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 140	(2000) Sampling Bituminous Materials
ASTM D 977	(1998) Emulsified Asphalt
ASTM D 2027	(1976; R 1997) Cutback Asphalt (Medium-Curing Type)
ASTM D 2995	(1999) Determining Application Rate of Bituminous Distributors

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 "RE" designates that the Resident Office will review the submittal for the Government. Submit the following in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-03 Product Data

Waybills and Delivery Tickets

Waybills and delivery tickets, during progress of the work.

SD-06 Test Reports

Sampling and Testing.

Copies of all test results for bituminous materials, within 24 hours of completion of tests. Certified copies of the manufacturer's test reports indicating compliance with applicable specified requirements, not less than 15 days before the material is required in the work.

1.3 PLANT, EQUIPMENT, MACHINES AND TOOLS

1.3.1 General Requirements

Plant, equipment, machines and tools used in the work shall be subject to approval and shall be maintained in a satisfactory working condition at all times.

1.3.2 Bituminous Distributor

The distributor shall have pneumatic tires of such size and number to prevent rutting, shoving or otherwise damaging the base surface or other layers in the pavement structure. The distributor shall be designed and equipped to spray the bituminous material in a uniform coverage at the specified temperature, at readily determined and controlled rates with an allowable variation from the specified rate of not more than plus or minus 5 percent, and at variable widths. Distributor equipment shall include a separate power unit for the bitumen pump, full-circulation spray bars, tachometer, pressure gauges, volume-measuring devices, adequate heaters for heating of materials to the proper application temperature, a thermometer for reading the temperature of tank contents, and a hand hose attachment suitable for applying bituminous material manually to areas inaccessible to the distributor. The distributor shall be equipped to circulate and agitate the bituminous material during the heating process.

1.3.3 Power Brooms and Power Blowers

Power brooms and power blowers shall be suitable for cleaning the surfaces to which the bituminous coat is to be applied.

1.4 WEATHER LIMITATIONS

Bituminous coat shall be applied only when the surface to receive the bituminous coat is dry. Bituminous coat shall be applied only when the atmospheric temperature in the shade is 10 degrees C or above and when the temperature has not been below 2 degrees C for the 12 hours prior to application.

PART 2 PRODUCTS

2.1 TACK COAT

Emulsified asphalt shall conform to ASTM D 977, SS-1h.

2.2 PRIME COAT

Cutback asphalt shall conform to ASTM D 2027, Grade MC-70.

PART 3 EXECUTION

3.1 PREPARATION OF SURFACE

Immediately before applying the bituminous coat, all loose material, dirt, clay, or other objectionable material shall be removed from the surface to be treated. The surface shall be dry and clean at the time of treatment.

3.2 APPLICATION RATE

The exact quantities within the range specified, which may be varied to suit field conditions, will be determined by the Contractor and approved by the Contracting Officer.

3.2.1 Tack Coat

Bituminous material for the tack coat shall be applied in quantities of not less than 0.20 liter nor more than 0.70 liter per square meter of pavement

surface.

3.2.2 Prime Coat

Bituminous material for the prime coat shall be applied in quantities of not less than 0.70 liter nor more than 1.80 liters per square meter of pavement surface.

3.3 APPLICATION TEMPERATURE

3.3.1 Viscosity Relationship

Asphalt application temperature shall provide an application viscosity between 10 and 60 seconds, Saybolt Furol, or between 20 and 120 square mm/sec, kinematic. The temperature viscosity relation shall be furnished to the Contracting Officer.

3.3.2 Temperature Ranges

The viscosity requirements shall determine the application temperature to be used. The following is a normal range of application temperatures:

Liquid Asphalts	
MC-70	50-107 degrees C
Emulsions	
SS-1h	20-70 degrees C

3.4 APPLICATION

3.4.1 General

Following preparation and subsequent inspection of the surface, the bituminous coat shall be applied at the specified rate with uniform distribution over the surface to be treated. All areas and spots missed by the distributor shall be properly treated with the hand spray. Until the succeeding layer of pavement is placed, the surface shall be maintained by protecting the surface against damage and by repairing deficient areas at no additional cost to the Government. If required, clean dry sand shall be spread to effectively blot up any excess bituminous material. No smoking, fires, or flames other than those from the heaters that are a part of the equipment shall be permitted within 8 meters of heating, distributing, and transferring operations of bituminous material other than bituminous emulsions. All traffic, except for paving equipment used in constructing the surfacing, shall be prevented from using the underlying material, whether primed or not, until the surfacing is completed. The bituminous coat shall conform to all requirements as described herein.

3.4.2 Prime Coat

The type of liquid asphalt and application rate will be as specified herein. The Contractor shall protect the underlying from any damage (water, traffic, etc.) until the surfacing is placed. If the Contractor places the surfacing within seven days, the choice of protection measures

or actions to be taken is at the Contractor's option. Damage to the underlying material caused by lack of, or inadequate, protection shall be repaired (recompacted or replaced) by approved methods at no additional cost to the Government. If the Contractor options to use the prime coat, it shall be applied as soon as possible after consolidation of the underlying material. To obtain uniform application of the prime coat on the surface treated at the junction of previous and subsequent applications, building paper shall be spread on the surface for a sufficient distance back from the ends of each application to start and stop the prime coat on the paper. Immediately after application, the building paper shall be removed and destroyed.

3.4.3 Tack Coat

Contact surfaces of previously constructed pavement, curbs, manholes, and other structures shall be sprayed with a thin coat of bituminous material conforming to paragraph TACK COAT.

3.5 CURING PERIOD

Following application of the bituminous material and prior to application of the succeeding layer of pavement, the bituminous coat shall be allowed to cure and to obtain evaporation of any volatiles or moisture. Prime coat shall be allowed to cure without being disturbed for a period of at least 48 hours or longer, as may be necessary to attain penetration into the treated course.

3.6 FIELD QUALITY CONTROL

A sample shall be obtained and tested by the Contractor for every 100 metric tons of bituminous material used.

3.7 SAMPLING AND TESTING

Sampling and testing shall be performed by an approved commercial testing laboratory or by facilities furnished by the Contractor. No work requiring testing will be permitted until the facilities have been inspected and approved.

3.7.1 Sampling

The samples of bituminous material, unless otherwise specified, shall be in accordance with ASTM D 140. Sources from which bituminous materials are to be obtained shall be selected and notification furnished the Contracting Officer within 15 days after the award of the contract.

3.7.2 Calibration Test

The Contractor shall furnish all equipment, materials, and labor necessary to calibrate the bituminous distributor. Calibration shall be made with the approved job material and prior to applying the bituminous coat material to the prepared surface. Calibration of the bituminous distributor shall be in accordance with ASTM D 2995.

3.7.3 Trial Applications

Before providing the complete bituminous coat, three lengths of at least 30 meters for the full width of the distributor bar shall be applied to evaluate the amount of bituminous material that can be satisfactorily

applied.

3.7.3.1 Tack Coat Trial Application Rate

Unless otherwise authorized, the trial application rate of bituminous tack coat materials shall be applied in the amount of 0.20 liters per square meter. Other trial applications shall be made using various amounts of material as may be deemed necessary.

3.7.3.2 Prime Coat Trial Application Rate

Unless otherwise authorized, the trial application rate of bituminous materials shall be applied in the amount of 1.10 liters per square meter. Other trial applications shall be made using various amounts of material as may be deemed necessary.

3.7.4 Sampling and Testing During Construction

Quality control sampling and testing shall be performed as required in paragraph FIELD QUALITY CONTROL.

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SECTION 02821

FENCING AND RAILING

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 123/A 123M	(2000) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 153/A 153M	(2000) Zinc Coating (Hot Dip) on Iron and Steel Hardware
ASTM A 392	(1996) Zinc-Coated Steel Chain-Link Fence Fabric
ASTM A 475	(1998) Zinc-Coated Steel Wire Strand
ASTM A 491	(1996) Aluminum-Coated Steel Chain-Link Fence Fabric
ASTM A 501	(1999) Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
ASTM A 780	(2000) Repair of Damaged and Uncoated Areas of Hot-Dipped Galvanized Coatings
ASTM A 824	(1995) Metallic-Coated Steel Marcelled Tension Wire for Use With Chain Link Fence
ASTM B 32	(1996) Solder Metal
ASTM C 94/C 94M	(2000) Ready-Mixed Concrete
ASTM F 626	(1996a) Fence Fittings
ASTM F 883	(1997) Padlocks
ASTM F 900	(1994) Industrial and Commercial Swing Gates
ASTM F 1043	(2000) Strength and Protective Coatings on Metal Industrial Chain-Link Fence Framework
ASTM F 1083	(1997) Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures

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 "RE" designates that the Resident Office will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-07 Certificates

Chain Link Fence; G, RE.

Statement, signed by an official authorized to certify on behalf of the manufacturer, attesting that the chain link fence and component materials meet the specified requirements.

PART 2 PRODUCTS

2.1 FENCE FABRIC

Fence fabric shall conform to the following:

2.1.1 Chain Link Fence Fabric

ASTM A 392, Class 1, zinc-coated steel wire with minimum coating weight of 610 grams of zinc per square meter of coated surface, or ASTM A 491, Type I, aluminum-coated steel wire. Fabric shall be fabricated of 9 gauge wire woven in 50 mm mesh. Fabric height shall be 1.83 meters. Fabric shall be twisted and barbed on the top selvage and knuckled on the bottom selvage.

2.2 GATES

ASTM F 900 gate shall be the type and swing shown. Gate frames shall conform to strength and coating requirements of ASTM F 1083 for Group IA, steel pipe, with external coating Type A, nominal pipe size (NPS) 1-1/2. Gate frames shall conform to strength and coating requirements of ASTM F 1043, for Group IC, steel pipe with external coating Type A or Type B, nominal pipe size (NPS) 1-1/2. Gate fabric shall be as specified for chain link fabric. Gate leaves more than 2.44 m wide shall have either intermediate members and diagonal truss rods or shall have tubular members as necessary to provide rigid construction, free from sag or twist. Gate leaves less than 2.44 m wide shall have truss rods or intermediate braces. Gate fabric shall be attached to the gate frame by method standard with the manufacturer except that welding will not be permitted. Latches, hinges, stops, keepers, rollers, and other hardware items shall be furnished as required for the operation of the gate. Latches shall be arranged for padlocking so that the padlock will be accessible from both sides of the gate. Stops shall be provided for holding the gates in the open position.

2.3 METAL POSTS FOR CHAIN LINK FENCE AND POST AND CABLE RAILING

2.3.1 Metal Posts for Chain Link Fence

ASTM F 1083, zinc-coated. Group IA, with external coating Type A steel pipe. Group IC steel pipe, zinc-coated with external coating Type A or Type B and Group II , formed steel sections, shall meet the strength and coating requirements of ASTM F 1043. Group III, ASTM F 1043 steel H-section may be used for line posts in lieu of line post shapes specified for the other classes. Sizes shall be as shown on the drawings. Line

posts and terminal (corner, gate, and pull) posts selected shall be of the same designation throughout the fence. Gate post shall be for the gate type specified subject to the limitation specified in ASTM F 900.

2.3.2 Metal Posts for Post and Cable Railing

Posts for Post and Cable Railing shall be per ASTM A 501 and shall be hot-dip galvanized after drilling holes and other fabrication as shown on the drawings. Galvanizing shall be in accordance with ASTM A 123/A 123M, as applicable. Welded, cut, damaged, and deformed areas of galvanizing metal shall be neatly coated with Grade 50B solder conforming to ASTM B 32.

2.4 BRACES AND RAILS

ASTM F 1083, zinc-coated, Group IA, steel pipe, size NPS 1-1/4. Group IC steel pipe, zinc-coated, shall meet the strength and coating requirements of ASTM F 1043. Group II, formed steel sections, size 42 mm, conforming to ASTM F 1043, may be used as braces and rails if Group II line posts are furnished.

2.5 WIRE

2.5.1 Tension Wire

Tension wire shall be Type I or Type II, Class 2 coating, in accordance with ASTM A 824.

2.6 CABLES FOR POST AND CABLE RAILING

Cables shall be prestretched, galvanized wire rope of the size indicated, ungreased. Wire rope shall conform to ASTM A 475, high strength grade with Class A coating. Fittings and accessories shall be hot-dip galvanized.

2.7 ACCESSORIES

Fence fittings and accessories shall be per ASTM F 626 and as shown on the drawings. Ferrous accessories shall be zinc or aluminum coated. Truss rods shall be furnished for each terminal post. Truss rods shall be provided with turnbuckles or other equivalent provisions for adjustment. Tie wire for attaching fabric to rails, braces, and posts shall be 9 gauge steel wire and match the coating of the fence fabric. Miscellaneous hardware coatings shall conform to ASTM A 153/A 153M unless modified. For the Post and Cable Railing system the turnbuckles, eyebolts, anchors, u-bolt clips, nuts and washers shall be galvanized or zinc plated.

2.8 CONCRETE

ASTM C 94/C 94M, using 19 mm maximum size aggregate, and having minimum compressive strength of 21 MPa at 28 days. Grout shall consist of one part portland cement to three parts clean, well-graded sand and the minimum amount of water to produce a workable mix.

2.9 PADLOCKS

Padlocks shall conform to ASTM F 883, Type PO1 Grade 2. Padlocks shall be a combination commercial type Padlock Master #175 or equivalent

PART 3 EXECUTION

3.1 INSTALLATION

Fence shall be installed to the lines and grades indicated. The area on either side of the fence line shall be cleared to the extent indicated. Line posts shall be spaced equidistant at intervals not exceeding 3 m. Terminal (corner, gate, and pull) posts shall be set at abrupt changes in vertical and horizontal alignment. Fabric shall be continuous between terminal posts; however, runs between terminal posts shall not exceed 152.4 m. Any damage to galvanized surfaces, including welding, shall be repaired with paint containing zinc dust in accordance with ASTM A 780.

3.2 EXCAVATION

Post holes shall be cleared of loose material. Waste material shall be spread where directed. The ground surface irregularities along the fence line shall be eliminated to the extent necessary to maintain a 50 mm clearance between the bottom of the fabric and finish grade.

3.3 POST INSTALLATION, CHAIN LINK FENCE

3.3.1 Posts for Chain Link Fence

Posts shall be set plumb and in alignment. Except where solid rock is encountered, posts shall be set in concrete to the depth indicated on the drawings. Where solid rock is encountered with no overburden, posts shall be set to a minimum depth of 457 mm in rock. Where solid rock is covered with an overburden of soil or loose rock, posts shall be set to the minimum depth indicated on the drawing unless a penetration of 457 mm in solid rock is achieved before reaching the indicated depth, in which case depth of penetration shall terminate. All portions of posts set in rock shall be grouted. Portions of posts not set in rock shall be set in concrete from the rock to ground level. Posts set in concrete shall be set in holes not less than the diameter shown on the drawings. Diameters of holes in solid rock shall be at least 25 mm greater than the largest cross section of the post. Concrete and grout shall be thoroughly consolidated around each post, shall be free of voids and finished to form a dome. Concrete and grout shall be allowed to cure for 72 hours prior to attachment of any item to the posts. Group II line posts may be mechanically driven, for temporary fence construction only, if rock is not encountered. Driven posts shall be set to a minimum depth of 914 mm and shall be protected with drive caps when being set.

3.4 RAILS

3.4.1 Top Rail

Top rail shall be supported at each post to form a continuous brace between terminal posts. Where required, sections of top rail shall be joined using sleeves or couplings that will allow expansion or contraction of the rail.

3.4.2 Bottom Rail

The bottom rail shall be bolted to double rail ends and double rail ends shall be securely fastened to the posts. Bolts shall be peened to prevent easy removal. Bottom rail shall be installed before chain link fabric.

3.5 BRACES AND TRUSS RODS

Braces and truss rods shall be installed as indicated and in conformance

with the standard practice for the fence furnished. Horizontal (compression) braces and diagonal truss (tension) rods shall be installed on fences over 1.83 m in height. A center brace or 2 diagonal truss rods shall be installed on 3.66 m fences. Braces and truss rods shall extend from terminal posts to line posts. Diagonal braces shall form an angle of approximately 40 to 50 degrees with the horizontal. No bracing is required on fences 1.83 m high or less if a top rail is installed.

3.6 TENSION WIRES

Tension wires shall be installed along the top and bottom of the fence line and attached to the terminal posts of each stretch of the fence. Top tension wires shall be installed within the top 102 mm of the installed fabric. Bottom tension wire shall be installed within the bottom 152 mm of the installed fabric. Tension wire shall be pulled taut and shall be free of sag.

3.7 CHAIN LINK FABRIC

Chain link fabric shall be installed on the side of the post indicated. Fabric shall be attached to terminal posts with stretcher bars and tension bands. Bands shall be spaced at approximately 381 mm intervals. The fabric shall be installed and pulled taut to provide a smooth and uniform appearance free from sag, without permanently distorting the fabric diamond or reducing the fabric height. Fabric shall be fastened to line posts at approximately 381 mm intervals and fastened to all rails and tension wires at approximately 610 mm intervals. Fabric shall be cut by untwisting and removing pickets. Splicing shall be accomplished by weaving a single picket into the ends of the rolls to be joined. The bottom of the installed fabric shall be 50 mm plus or minus 13 mm above the ground.

3.8 GATE INSTALLATION

Gates shall be installed at the locations shown. Hinged gates shall be mounted to swing as indicated. Latches, stops, and keepers shall be installed as required.

3.9 GROUNDING

Fences crossed by power lines of 600 volts or more shall be grounded at or near the point of crossing and at distances not exceeding 45 m on each side of crossing. Ground conductor shall consist of No. 8 AWG solid copper wire. Grounding electrodes shall be 19 mm by 3.05 m long copper-clad steel rod. Electrodes shall be driven into the earth so that the top of the electrode is at least 152 mm below the grade. Where driving is impracticable, electrodes shall be buried a minimum of 305 mm deep and radially from the fence. The top of the electrode shall be not less than 0.6 m or more than 2.4 m from the fence. Ground conductor shall be clamped to the fence and electrodes with bronze grounding clamps to create electrical continuity between fence posts, fence fabric, and ground rods. After installation the total resistance of fence to ground shall not be greater than 25 ohms.

3.10 POST AND CABLE RAILING INSTALLATION

3.10.1 Posts for Post and Cable Railing

Posts for Post and Cable Railing shall be installed as shown on the drawings. All posts for the post and cable railing installation shall be

true vertical or plumb and not normal to the top of the channel walls.

3.10.2 Cables for Post and Cable Railing

Cables for the post and cable railing shall be installed as shown in the drawings. Cables shall be pulled taut and shall be free of sag. Cables shall be parallel to the top of the channel wall.

3.10.3 After Installation

The Contractor shall examine and certify the operation of all post and cable railing not sooner than 30 days after installation.

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SECTION 03200

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SECTION 03200

CONCRETE REINFORCEMENT

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.

ACI INTERNATIONAL (ACI)

ACI 318M	(1995) Metric Building Code Requirements for Structural Concrete and Commentary

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 53	(1999b) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 615/A 615M	(2000) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM A 675/A 675M	(1990a; R 1995el) Steel Bars, Carbon, Hot-Wrought, Special Quality, Mechanical Properties

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)

CRSI MSP-1	(1996) Manual of Standard Practice

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 "RE" designates that the Resident Office will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Reinforcement; G, RE.

Detail drawings showing reinforcing steel placement, schedules, sizes, grades, and splicing and bending details. Drawings shall show support details including types, sizes and spacing.

SD-07 Certificates

Reinforcing Steel.

Certified copies of mill reports attesting that the reinforcing steel

furnished contains no less than 25 percent recycled scrap steel and meets the requirements specified herein, prior to the installation of reinforcing steel.

1.3 DELIVERY AND STORAGE

Reinforcement and accessories shall be stored off the ground on platforms, skids, or other supports.

PART 2 PRODUCTS

2.1 DOWELS

Dowels shall conform to ASTM A 675/A 675M, Grade 80. Steel pipe conforming to ASTM A 53, Schedule 80, may be used as dowels provided the ends are closed with metal or plastic inserts or with mortar.

2.2 REINFORCING STEEL

Reinforcing steel shall be deformed bars conforming to ASTM A 615/A 615M grades and sizes as indicated.

2.3 WIRE TIES

Wire ties shall be 16 gauge or heavier black annealed steel wire.

2.4 SUPPORTS

Bar supports for formed surfaces shall be designed and fabricated in accordance with CRSI MSP-1 and shall be steel or precast concrete blocks. Precast concrete blocks shall have wire ties and shall be not less than 100 by 100 mm when supporting reinforcement on ground. Precast concrete block shall have compressive strength equal to that of the surrounding concrete. Where concrete formed surfaces will be exposed to weather or where surfaces are to be painted, steel supports within 13 mm of concrete surface shall be galvanized, plastic protected or of stainless steel. Concrete supports used in concrete exposed to view shall have the same color and texture as the finish surface. For slabs on grade, supports shall be precast concrete blocks, plastic coated steel fabricated with bearing plates, or specifically designed wire-fabric supports fabricated of plastic.

PART 3 EXECUTION

3.1 REINFORCEMENT

Reinforcement shall be fabricated to shapes and dimensions shown and shall conform to the requirements of ACI 318M. Reinforcement shall be cold bent unless otherwise authorized. Bending may be accomplished in the field or at the mill. Bars shall not be bent after embedment in concrete. Safety caps shall be placed on all exposed ends of vertical concrete reinforcement bars that pose a danger to life safety. Wire tie ends shall face away from the forms.

3.1.1 Placement

Reinforcement shall be free from loose rust and scale, dirt, oil, or other deleterious coating that could reduce bond with the concrete. Reinforcement shall be placed in accordance with ACI 318M at locations shown plus or minus one bar diameter. Reinforcement shall not be

continuous through expansion joints and shall be as indicated through construction or contraction joints. Concrete coverage shall be as indicated or as required by ACI 318M . If bars are moved more than one bar diameter to avoid interference with other reinforcement, conduits or embedded items, the resulting arrangement of bars, including additional bars required to meet structural requirements, shall be approved before concrete is placed.

3.1.2 Splicing

Splices of reinforcement shall conform to ACI 318M and shall be made only as required or indicated. Splicing shall be by lapping or by mechanical or welded butt connection. Lapped bars shall be placed in contact and securely tied or spaced transversely apart to permit the embedment of the entire surface of each bar in concrete. Lapped bars shall not be spaced farther apart than one-fifth the required length of lap or 150 mm.

3.2 DOWEL INSTALLATION

Dowels shall be installed in slabs on grade at locations indicated and at right angles to joint being doweled. Dowels shall be accurately positioned and aligned parallel to the finished concrete surface before concrete placement. Dowels shall be rigidly supported during concrete placement. One end of dowels shall be coated with a bond breaker.

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SECTION 05500

MISCELLANEOUS METAL

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	(2000) Carbon Structural Steel
ASTM A 48	(1994ael) Gray Iron Casting
ASTM A 53/A 53M	(1999b) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 123/A 123M	(2000) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 320/A 320M	(2000) Alloy Steel Bolting Materials for Low Temperature Service
ASTM A 467/A 467M	(1998) Machine and Coil Chain
ASTM B 32	(1996) Solder Metal
ASTM B 221	(2000) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM B 221M	(2000) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)
ASTM C 478	(1997) Precast Reinforced Concrete Manhole Sections
ASTM C 497	(1997) Concrete Pipe, Manhole Sections, or Tile
ASTM F 593	(1998) Stainless Steel Bolts, Hex Cap Screws, and Studs
ASTM F 594	(1998) Stainless Steel Nuts

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B16.3	(1998) Mallable Iron Threaded Fittings
ASME B18.2.2	(1987; R 1993) Square and Hex Nuts (Inch Series)

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	(2000) Structural Welding Code - Steel

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

CID A-A-1923	(Rev A) Shield, Expansion (Lag, Machine and Externally Threaded Wedge Bolt Anchors)

DEPARTMENT OF PUBLIC WORKS, CLARK COUNTY, NEVADA

UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA

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 "RE" designates that the Resident Office will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Miscellaneous Metal Items; G, RE.

Detail drawings indicating material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation instructions, and templates. Detail drawings for the stilling well access door, plates and appurtenances.

1.3 GENERAL REQUIREMENTS

The Contractor shall verify all measurements and shall take all field measurements necessary before fabrication. Welding to or on structural steel shall be in accordance with AWS D1.1. Items specified to be galvanized, when practicable and not indicated otherwise, shall be hot-dip galvanized after fabrication. Galvanizing shall be in accordance with ASTM A 123/A 123M, as applicable. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and shall harmonize with the material to which fastenings are applied. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Poor matching of holes for fasteners shall be cause for rejection. Thickness of metal and details of assembly and supports shall provide strength and stiffness. Joints exposed to the weather shall be formed to exclude water.

1.4 WORKMANSHIP

Miscellaneous metalwork shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Welding shall be continuous along the entire area of contact except where tack welding is permitted. Exposed connections of work in place shall not be tack welded. Exposed welds shall be ground smooth. Exposed surfaces of work in place shall have a smooth

finish, and unless otherwise approved, exposed riveting shall be flush. Where tight fits are required, joints shall be milled. Corner joints shall be coped or mitered, well formed, and in true alignment. Work shall be accurately set to established lines and elevations and securely fastened in place. Installation shall be in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

1.5 ANCHORAGE

Anchorage shall be provided where necessary for fastening miscellaneous metal items securely in place. Anchorage not otherwise specified or indicated shall include slotted inserts made to engage with the anchors, expansion shields, and power-driven fasteners when approved for concrete; toggle bolts and through bolts for masonry; machine and carriage bolts for steel; and lag bolts and screws for wood.

1.6 SHOP PAINTING

Surfaces of ferrous metal except galvanized surfaces, shall be cleaned and shop coated with the manufacturer's standard protective coating unless otherwise specified. Surfaces of items to be embedded in concrete shall not be painted. Items to be finish painted shall be prepared according to manufacturer's recommendations or as specified.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 General

Materials indicated on the drawings or required in the work and not covered elsewhere by detailed requirements shall conform to the requirements of this section. In all cases not specifically covered in these specifications, the Contractor shall furnish approved highest grade commercial materials or products which are suitable for the intended use of the item.

2.1.2 Structural Shapes and Plates

Steel bars, shapes and plates shall conform to ASTM A 36/A 36M. Galvanized coatings where required, shall conform to ASTM A 123/A 123M.

2.1.3 Wall Ladders Rungs (Galvanized)

Manhole steps shall conform to ASTM C 478 and ASTM C 497. Aluminum steps shall be solid made from material in conformance with ASTM B 221 (Alloy 6005-TS) and with ASTM B 221M. Reinforced plastic steps may only be used in manholes or other locations not exposed to sunlight and shall be polypropylene plastic coated 10 mm deformed steel rod pen ASTM A 36/A 36M. All steps shall be epoxied in place during the installation process.

2.1.4 Corrosion-Resisting Steel Bolts and Anchor Bolts

Corrosion-resisting steel bolts and anchor bolts shall conform to ASTM F 593, or the applicable requirements of ASTM A 320/A 320M, Grade B8.

2.1.5 Bolts

Bolts shall conform to ASME B18.2.2, or the applicable requirements of ASTM

A 320/A 320M, Grade B8. The turned eye bolt shall have a 19 mm eye size, leg length of 100 mm and at least 3 mm thick.

2.1.6 Nuts

Nuts shall conform to ASME B18.2.2. Nuts shall be galvanized. Stainless Steel nuts shall conform to ASTM F 594

2.1.7 Expansion Anchors

Expansion anchors shall conform to the applicable requirements of CID A-A-1923. Anchors shall be multiple unit with inside thread.

2.1.8 Concrete, Mortar and Grout

Cast-In-Place Structural Concrete, mortar and grout shall conform to the requirements of Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE.

2.1.9 Steel Pipes

Steel pipe shall conform to ASTM A 53/A 53M, Type E or S, Grade A, galvanized nominal size and weight unless noted otherwise.

2.1.10 Pipe Caps

Pipe caps shall conform to ASME B16.3.

2.1.11 Cover Plate

Cover plates shall conform to FS QQ-F-461, Class 1, Pattern No. 7, 10, 12, or 17. Sharp edges and burrs shall be removed from plates.

2.1.12 Manhole Frames and Covers

Frames and covers are to be Gray Iron Castings, Type A-1497 as manufactured by Alhambra Foundry Co. Ltd. or approved equal. Castings for manhole frames and covers shall conform to ASTM A 48, Class 30. Frame and cover shall be machined to fit. Lids shall be imprinted with the words "Clark County Public Works Storm Drain".

2.1.13 Steel Chain Gate

Chain safety gate shall be manufactured from 6 mm diameter carbon steel coil in accordance with ASTM A 467/A 467M.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

All items shall be installed at the locations shown and according to the manufacturer's recommendations. Items listed below require additional procedures as specified.

3.2 FINISHING

In general, tolerances for machine-finished surfaces designated by nondeciaml dimensions shall be within 0.4 mm. Sufficient machining stock shall be allowed on placing pads to insure true surfaces of solid material. Finished contacts of bearing surfaces shall be true and exact to secure

full contact. All drilled holes for bolts shall be accurately located and drilled from templates.

3.3 ZINC COATING (GALVANIZING)

Zinc coatings shall be applied in a manner and of a thickness and quality conforming to ASTM A 123/A 123M. All exposed ferrous metalwork, except cast-iron and corrosion resistant steel and items to be completely embedded in concrete, shall be galvanized unless other protective coatings are specified. Metalwork shall be galvanized after fabrication. In the event that any portion of galvanized metalwork is abraded or otherwise damaged to the extent that the base metal is exposed, such damaged or abraded portions shall be neatly covered with Grade 50B solder conforming to the requirements of ASTM B 32.

3.4 WELDING

Welding shall conform to the provisions of AWS D1.1. Welders who have not been certified within two years of the date of commencement of work under this contract will not be allowed to perform the work.

3.5 BOLTED CONNECTIONS

Bolt holes shall be reamed normal to the member and shall be truly cylindrical throughout. Unless otherwise specified, holes for bolts shall not be more than 1.60 mm larger than the diameter of the bolt. Cutting bolt holes with a torch will not be permitted without the prior written approval of the Contracting Officer. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Poor matching of holes for fasteners shall be cause for rejection. Fastenings shall be concealed where practicable.

3.6 EXCAVATION

Excavation for concrete-embedded items shall be of the dimensions indicated on the drawings. Holes shall be cleared of loose materials prior to placement of concrete.

3.7 PIPE BOLLARDS

Pipe bollards shall be fabricated with heavy duty steel pipe conforming to ASTM A 53/A 53M, Type E or S, weight STD, galvanized after fabrication as shown on the drawings. Pipe bollards shall be set vertically in concrete encasements. Concrete for encasements and pipe fill where indicated shall be as specified in SECTION 03301 CAST-IN-PLACE STRUCTURAL CONCRETE having a compressive strength of 21 MPa.

3.8 PAINTING

Painting of pipe bollards shall be in accordance with the requirements of the UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA, SECTIONS 614 AND SECTION 714.

3.9 STILLING WELLS

3.9.1 Steel Cover Plates and Frames

Steel cover plates and frames shall be of the type and size specified or shown on the drawings and shall be fabricated to accurately fit the

supporting member. Openings shall be provided as shown on the drawings or as required. Steel cover plates and frames shall be galvanized after fabrication.

-- End of Section --

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SECTION 09900

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SECTION 09900

PAINTS, COATINGS AND STATION MARKINGS

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 within the text by the basic designation only.

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)

ACGIH Limit Values	(1999) Threshold Limit Values for Chemical Substances and Physical Agents Biological Exposure Indices

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910.1000	Air Contaminants

FEDERAL SPECIFICATIONS (FS)

FS TT-P-115	(Rev. F) Paint, Traffic (Highway, White and Yellow)

FEDERAL STANDARDS (FED-STD)

FED-STD-313	(Rev. C) Material Safety Data, Transportation Data and Disposal Data for Hazardous Materials Furnished to Government Activities

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC PA 1	(1991) Shop, Field, and Maintenance Painting
SSPC PA 3	(1995) Safety in Paint Application

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE EM 385-1-1	(1996) Safety and Health Requirements Manual

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 "RE" designates that the Resident Office will review the submittal for the Government. Submit the following in accordance with Section 01330, SUBMITTAL PROCEDURES:

Samples of specified materials may be taken and tested for compliance with

specification requirements.

SD-03 Product Data

Manufacturer's Technical Data Sheets.

SD-04 Samples

Color; G, RE.

Submit manufacturer's samples of paint colors. Cross reference color samples to color scheme as indicated.

SD-07 Certificates

Statements.

Submit statements signed by responsible officials of manufacturer of product or material attesting that product or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

SD-08 Manufacturer's Instructions

Application instructions.

Mixing.

Detailed mixing instructions, minimum and maximum application temperature and humidity, potlife, and curing and drying times between coats.

Manufacturer's Material Safety Data Sheets.

Submit manufacturer's Material Safety Data Sheets for coatings, solvents, and other potentially hazardous materials, as defined in FED-STD-313.

1.3 QUALITY ASSURANCE

1.3.1 Statements of Product or Material

The Contractor shall provide statements signed by responsible officials of manufacturer of product or material attesting that product or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

1.4 REGULATORY REQUIREMENTS

1.4.1 Environmental Protection

In addition to requirements specified elsewhere for environmental protection, provide coating materials that conform to the restrictions of the local Air Pollution Control District and regional jurisdiction. Notify Contracting Officer of any paint specified herein which fails to conform.

1.4.2 Lead Content

Do not use coatings having a lead content over 0.06 percent by weight of nonvolatile content.

1.4.3 Chromate Content

Do not use coatings containing zinc-chromate or strontium-chromate.

1.4.4 Asbestos Content

Materials shall not contain asbestos.

1.4.5 Mercury Content

Materials shall not contain mercury or mercury compounds.

1.4.6 Human Carcinogens

Materials shall not contain ACGIH Limit Values confirmed human carcinogens (A1) or suspected human carcinogens (A2).

1.5 PACKAGING, LABELING, AND STORAGE

Paints shall be in sealed containers that legibly show the contract specification number, designation name, formula or specification number, batch number, color, quantity, date of manufacture, manufacturer's formulation number, manufacturer's directions including any warnings and special precautions, and name and address of manufacturer. Pigmented paints shall be furnished in containers not larger than 20 liters. Paints and thinners shall be stored in accordance with the manufacturer's written directions, and as a minimum, stored off the ground, under cover, with sufficient ventilation to prevent the buildup of flammable vapors, and at temperatures between 4 to 35 degrees C. Paints shall be stored on the project site or segregated at the source of supply sufficiently in advance of need to allow 30 days for testing.

1.6 SAFETY AND HEALTH

Apply coating materials using safety methods and equipment in accordance with the following:

Work shall comply with applicable Federal, State, and local laws and regulations, and with the ACCIDENT PREVENTION PLAN, including the Activity Hazard Analysis as specified in the CONTRACT CLAUSES and in COE EM 385-1-1 Appendix A. The Activity Hazard Analysis shall include analyses of the potential impact of painting operations on painting personnel and on others involved in and adjacent to the work zone.

1.6.1 Safety Methods Used During Coating Application

Comply with the requirements of SSPC PA 3.

1.6.2 Toxic Materials

To protect personnel from overexposure to toxic materials, conform to the most stringent guidance of:

a. The applicable manufacturer's Material Safety Data Sheets (MSDS) or local regulation.

b. 29 CFR 1910.1000.

c. ACGIH Limit Values, threshold limit values.

1.6.3 Worker Exposures

Exposure of workers to hazardous chemical substances shall not exceed limits established by ACGIH Limit Values, or as required by a more stringent applicable regulation.

1.6.4 Toxic Compounds

Toxic products having ineffective physiological warning properties, such as no or low odor or irritation levels, shall not be used unless approved by the Contracting Officer.

1.6.5 Training

Workers having access to an affected work area shall be informed of the contents of the applicable material safety data sheets (MSDS) and shall be informed of potential health and safety hazard and protective controls associated with materials used on the project. An affected work area is one which may receive mists and odors from the painting operations. Workers involved in preparation, painting and clean-up shall be trained in the safe handling and application, and the exposure limit, for each material which the worker will use in the project. Personnel having a need to use respirators and masks shall be instructed in the use and maintenance of such equipment.

1.6.6 Coordination

Work shall be coordinated to minimize exposure of building occupants, other Contractor personnel, and visitors to mists and odors from preparation, painting and clean-up operations.

1.7 ENVIRONMENTAL CONDITIONS

1.7.1 Coatings

Do not apply coating when air or substrate conditions are:

a. Less than 3 degrees C above dew point;

b. Below 10 degrees C or over 35 degrees C, unless specifically pre-approved by the Contracting Officer and the product manufacturer. Under no circumstances shall application conditions exceed manufacturer recommendations.

c. Unless otherwise recommended by the paint manufacturer, the ambient temperature shall be between 7 and 35 degrees C when applying coatings other than water-thinned, epoxy, and moisture-curing polyurethane coatings. Water-thinned coatings shall be applied only when ambient temperature is between 10 and 32 degrees C. Epoxy, and moisture-curing polyurethane coatings shall be applied only within the nimimum and maximum temperatures recommended by the coating manufacturer. Mositure-curing polyurethane shall not be applied when the relative humidity is below 30 percent.

1.8 COLOR SELECTION

Colors of finish coats shall be as indicated or specified. Where not indicated or specified, colors shall be selected by the Contracting Officer. Manufacturers' names and color identification are used for the purpose of color identification only. Named products are acceptable for use only if they conform to specified requirements. Products of other manufacturers are acceptable if the colors approximate colors indicated and the product conforms to specified requirements.

Tint each coat progressively darker to enable confirmation of the number of coats.

PART 2 PRODUCTS

2.1 MATERIALS

Conform to the coating specifications and standards referenced in PART 3. Submit manufacturer's technical data sheets for specified coatings and solvents.

2.1.1 Paint

The term "paint" as used herein includes emulsions, enamels, paints, stains, varnishes, sealers, cement-emulsion filler, and other coatings, whether used as prime, intermediate, or finish coat. Additional requirements are as follows:

2.1.1.1 Colors and Tints

Color samples for concrete channel wall stain and for pipe safety railing paint shall be submitted to the Contracting Officer and approved colors shall be determined by Contracting Officer.

2.1.1.2 Exterior Paint on Concrete

Exterior paint on concrete shall conform to FS TT-P-115, except the color shall be non-fading black, non-fading yellow,and reflective white.

PART 3 EXECUTION

3.1 PROTECTION OF AREAS AND SPACES NOT TO BE PAINTED

Prior to surface preparation and coating applications, remove, mask, or otherwise protect, hardware, hardware accessories, machined surfaces, radiator covers, plates, lighting fixtures, public and private property, and other such items not to be coated that are in contact with surfaces to be coated. Following completion of painting, workmen skilled in the trades involved shall reinstall removed items. Restore surfaces contaminated by coating materials, to original condition and repair damaged items.

3.2 SURFACE PREPARATION

Remove dirt, splinters, loose particles, grease, oil, and other foreign matter and substances deleterious to coating performance as specified for each substrate before application of paint or surface treatments. Oil and grease shall be removed prior to mechanical cleaning. Cleaning shall be programmed so that dust and other contaminants will not fall on wet, newly painted surfaces. Exposed ferrous metals such as nail heads on or in contact with surfaces to be painted with water-thinned paints, shall be spot-primmed with a suitable corrosion-inhibitive primer capable of

preventing flash rusting and compatible with the coating specified for the adjacent areas.

3.3 PREPARATION OF CONCRETE AND CEMENTITIOUS SURFACE

3.3.1 Concrete and Masonry

a. Curing: Concrete and masonry surfaces shall be allowed to cure at least 30 days before painting, except concrete slab on grade, which shall be allowed to cure 90 days before painting.

b. Surface Cleaning: Remove the following deleterious substances.

(1) Dirt, Chalking, Grease, and Oil: Wash new and existing uncoated surfaces with a solution composed of 0.2 liter trisodium phosphate, 0.1 liter household detergent, and 6.4 liters of warm water. Then rinse thoroughly with fresh water. For large areas, water blasting or light sand blasting may be used.

(2) Fungus and Mold: Wash new and existing uncoated surfaces with a solution composed of 0.2 liter trisodium phosphate, 0.1 liter household detergent, 1.6 liters 5 percent sodium hypochlorite solution and 4.8 liters of warm water. Rinse thoroughly with fresh water.

(3) Paint and Loose Particles: Remove by wire brushing.

(4) Efflorescence: Remove by scraping or wire brushing followed by washing with a 5 to 10 percent by weight aqueous solution of hydrochloric (muriatic) acid. Do not allow acid to remain on the surface for more than five minutes before rinsing with fresh water. Do not acid clean more than 0.4 square meter of surface, per workman, at one time.

c. Cosmetic Repair of Minor Defects: Repair or fill mortar joints and minor defects, including but not limited to spalls, in accordance with manufacturer's recommendations and prior to coating application.

3.4 APPLICATION

3.4.1 Coating Application

Painting practices shall comply with applicable federal, state and local laws enacted to insure compliance with Federal Clean Air Standards. Apply coating materials in accordance with SSPC PA 1. SSPC PA 1 methods are applicable to all substrates, except as modified herein.

At the time of application, paint shall show no signs of deterioration. Uniform suspension of pigments shall be maintained during application.

Unless otherwise specified or recommended by the paint manufacturer, paint may be applied by brush, roller, or spray. Rollers for applying paints and enamels shall be of a type designed for the coating to be applied and the surface to be coated.

Paints, except water-thinned types, shall be applied only to surfaces that are completely free of moisture as determined by sight or touch.

Thoroughly work coating materials into joints, crevices, and open spaces. Special attention shall be given to insure that all edges, corners, crevices, welds, and rivets receive a film thickness equal to that of adjacent painted surfaces.

Each coat of paint shall be applied so dry film shall be of uniform thickness and free from runs, drops, ridges, waves, pinholes or other voids, laps, brush marks, and variations in color, texture, and finish. Hiding shall be complete.

Touch up damaged coatings before applying subsequent coats.

a. Drying Time: Allow time between coats, as recommended by the coating manufacturer, to permit thorough drying, but not to present topcoat adhesion problems. Provide each coat in specified condition to receive next coat.

b. Primers, and Intermediate Coats: Do not allow primers or intermediate coats to dry more than 30 days, or longer than recommended by manufacturer, before applying subsequent coats. Follow manufacturer's recommendations for surface preparation if primers or intermediate coats are allowed to dry longer than recommended by manufacturers of subsequent coatings. Each coat shall cover surface of preceding coat or surface completely, and there shall be a visually perceptible difference in shades of successive coats.

c. Finished Surfaces: Provide finished surfaces free from runs, drops, ridges, waves, laps, brush marks, and variations in colors.

3.5 COATING SYSTEMS FOR CONCRETE SUBSTRATES OTHER THAN STATION MARKING

Safety Striping at access ladders shall follow the same surface preparation and paint application requirements as Station Marking.

3.6 STATION MARKING

3.6.1 General, Station Marking

All markings shall be painted on concrete walls (channel walls, headwalls, abutments, etc. See included Table or Contract Drawings for required locations.

3.6.2 Preparation of Surfaces, Station Marking

See Paragraph PREPARATION OF CONCRETE AND CEMENTITIOUS SURFACE

3.6.3 Application, Station Marking

Painting shall be done in a neat and workmanlike manner and may be applied by brush, spray, roller or any combination of these methods. Painting of numbers and letters shall be accomplished with stencils and brush or spray application. Color for letters and numbers shall be black. All markings on concrete shall be in uniform capital block letters and numbers, 150 mm high, 75 mm wide, and 9 mm width of line. Markings on concrete walls shall be horizontal with the bottom of the marking not lower than 610 mm below the top of the wall or below the soffit of the Reinforced Concrete Box (RCB).

3.6.4 TABULATION OF LOCATION AND TEXT OF STATION MARKINGS

3.6.4.1 Tabulation F-1 Channel, New Channel, Hualapai Way to Beltway

Location of Marking Wall	Station*	Text of Marking	Location of Marking Wall	Station*	Text of Marking
B	14+49.120	F1 4700	B	26+07.362	F1 8500
B	14+79.600	F1 4800	B	26+37.842	F1 8600
B	15+10.080	F1 4900	B	26+68.322	F1 8700
B	15+40.560	F1 5000	B	26+98.802	F1 8800
B	15+71.040	F1 5100	B	27+29.282	F1 8900
B	16+01.520	F1 5200	B	27+59.763	F1 9000
B	16+32.000	F1 5300	B	27+90.243	F1 9100
B	16+62.480	F1 5400	B	28+20.723	F1 9200
B	16+92.960	F1 5500	B	28+51.203	F1 9300
B	17+23.440	F1 5600	B	28+81.683	F1 9400
B	17+53.921	F1 5700	B	29+12.163	F1 9500
B	17+84.401	F1 5800	B	29+42.643	F1 9600
B	18+14.881	F1 5900	B	29+73.123	F1 9700
B	18+45.361	F1 6000	B	30+03.603	F1 9800
B	18+75.841	F1 6100	B	30+34.083	F1 9900
B	19+06.321	F1 6200	B	30+64.563	F1 10000
B	19+36.801	F1 6300	B	30+95.043	F1 10100
B	19+67.281	F1 6400	B	31+25.523	F1 10200
B	19+97.761	F1 6500	B	31+56.003	F1 10300
B	20+28.241	F1 6600	B	31+86.483	F1 10400
B	20+58.721	F1 6700	B	32+16.963	F1 10500
B	20+89.201	F1 6800	B	32+47.444	F1 10600
B	21+19.681	F1 6900	B	32+77.924	F1 10700
B	21+50.161	F1 7000	B	33+08.404	F1 10800
B	21+80.641	F1 7100	B	33+38.884	F1 10900
B	22+11.121	F1 7200	B	33+69.364	F1 11000
B	22+41.602	F1 7300	B	33+99.844	F1 11100
B	22+72.082	F1 7400	B	34+30.324	F1 11200
B	23+02.562	F1 7500	B	34+60.804	F1 11300
B	23+33.042	F1 7600	B	34+91.284	F1 11400
B	23+63.521	F1 7700	B	35+21.764	F1 11500
B	23+94.002	F1 7800	B	35+52.244	F1 11600
B	24+24.482	F1 7900	B	35+82.724	F1 11700
B	24+54.962	F1 8000	B	36+13.204	F1 11800
B	24+85.442	F1 8100	B	36+43.684	F1 11900
B	25+15.922	F1 8200	B	36+74.164	F1 12000
B	25+46.402	F1 8300	B	37+04.644	F1 12100
B	25+76.882	F1 8400	B	37+35.125	F1 12200

R = Right Channel Wall (looking downstream)
L = Left Channel Wall (looking downstream)
B = Both Channel Walls
* = The actual location of the channel station shall be accurate to the nearest half meter.

3.6.4.2 Tabulation F-2 Channel, New Channel, Hualapai Way to Beltway

Location of Marking Wall	Station*	Text of Marking

B	10+00.000	F2 000
B	10+30.480	F2 100
B	10+60.960	F2 200
B	10+91.440	F2 300
B	11+21.920	F2 400
B	11+52.400	F2 500
B	11+82.880	F2 600
B	12+13.360	F2 700
B	12+43.840	F2 800

R = Right Channel Wall (looking downstream)
L = Left Channel Wall (looking downstream)
B = Both Channel Walls
* = The actual location of the channel station shall be accurate to the nearest half meter.
Text

3.6.4.3 Tabulation F-1 Channel, Existing Channel, Section 8

Location of Marking Wall	Station*	Text of Marking
B	7+74.270	F1 4000
B	8+74.270	F1 4100
B	9+74.270	F1 4200
B	10+74.270	F1 4300
B	11+74.270	F1 4400
B	12+74.270	F1 4500
B	13+74.270	F1 4600

R = Right Channel Wall (looking downstream)
L = Left Channel Wall (looking downstream)
B = Both Channel Walls
* = The actual location of the channel station shall be accurate to the nearest half meter.

3.7 INSPECTION AND ACCEPTANCE

In addition to meeting previously specified requirements, demonstrate mobility of moving components, including swinging and sliding doors, cabinets, and windows with operable sash, for inspection by the Contracting Officer. Perform this demonstration after appropriate curing and drying times of coatings have elapsed and prior to invoicing for final payment.

-- End of Section --