Department of Transportation
Federal Highway Administration
Central Federal Lands Highway Division

CO PFH 80-1(1) & 2(2)
Guanella Pass Road Phase I
7th Street Bridge and Road Improvements
Pike and Arapahoe National Forests
Park and Clear Creek Counties, Colorado

INVITATION FOR BID

This invitation for bid cites Federal Highway Administration
Specifications FP-96, 1996

Cut & Paste on Bid Submittal Envelope

OF-17 (cflhd7/03) FAR (48) CFR 53.214(g)
OFFER LABEL FAR (48) CFR 53.215-1(h)

NOTICE TO OFFEROR

1. THIS LABEL MAY ONLY BE USED ON ENVELOPES LARGER THAN 156 mm (6 ½ INCHES) IN HEIGHT AND 292 mm (11 ½ INCHES) IN LENGTH.
2. Print or type your name and address in the UPPER left corner of the envelope containing your offer.
3. Complete the bottom portion of this form and paste it on the lower left corner of the envelope, unless the envelope is 156 mm by 292 mm (6 ½ inches by 11 ½ inches) or smaller.

OFFER

SOLICITATION NO.
DATE FOR RECEIPT OF OFFERS
TIME FOR RECEIPT OF OFFERS
OFFICE DESIGNATED TO RECEIVE OFFERS

Contractor_____

Street Address _____

City/State/Zip _____

State:	COLORADO
County:	PARK AND CLEAR CREEK
Location:	PIKE AND ARAPAHOE NATIONAL FORESTS
Length:	Schedule A = 10.02 km Schedule B = 12.32 km Schedule C = 14.17 km Schedule Z = 7th Street Bridge and Road Improvements
Type of Improvement:	Grading, Drainage, Retaining Walls, Bridge Asphalt, and Gravel Surfacing including 7th Street Bridge/Road Improvements in the town of Georgetown

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NOTICE TO BIDDERS AND OFFERORS

Before mailing your offer, please recheck the following:

(1) Does your offer set forth full, accurate, and complete information as required by this solicitation, including representations and certifications and acknowledgement of any amendments which may have been issued?

(2) Have you completed the bid schedule and rechecked your bid figures, including calculations on your work sheets?

(3) If bid guarantee is required, is it enclosed in proper form and amount including Power of Attorney Affidavit? See FAR Provision 52.228-1

(4) Have you completed and signed all required documents?

INVITATION FOR BID BOOKLET AND BID SUBMITTAL

It is the responsibility of the bidder to verify that this proposal booklet is complete as listed in the table of contents. Also, the bidder is responsible for submitting all required forms and documents with the bid.

Bidders **must** fill out and submit with their offers completed page 1 of 3, "Notice to Bidders and Offerors," which indicates interest in partnering, pages numbered A-l through D-14, and pages F-3 and F-8 of the Contract Clauses indicating Bidder's option to waive the price evaluation preference for HUBZone Certified Firms and/or the price evaluation adjustment for Small Disadvantaged Business Concerns. The remaining pages may be retained by the bidders for their information.

Facsimile or telegraphic bids are not authorized for this solicitation. Bids may be modified or withdrawn by facsimile or telegraphic notice, if such notice is received by the time specified for receipt of bids. The Government will not be responsible for ANY failure attributable to the transmission or receipt of telegraphic or facsimile data.

FAX Number for modifications to bids is (303) 969-5971.

PARTNERING (See Section I, Subsection 103.05 of the Special Contract Requirements)

Please indicate your interest in participating in Partnering by checking the appropriate blank below.

__ The offeror is interested in participating in partnering.

__ The offeror is not interested in participating in partnering.

UTILIZATION OF SMALL BUSINESS, HUBZone SMALL BUSINESS, SMALL DISADVANTAGED BUSINESS, WOMEN-OWNED SMALL BUSINESS, VETERAN OWNED, AND SERVICE-DISABLED VETERAN OWNED SMALL BUSINESS CONCERNS SUBCONTRACTING PROGRAM

Bidders should note their responsibilities in the awarding of subcontracts in accordance with the Utilization of Small Business Concerns clause which is included in the Contract Clauses section of this contract.

The Bidder, if a large business concern, should note their responsibility to establish and conduct a Small Business, HUBZone Small Business, Small Disadvantaged Business, Women-owned Small Business, Veteran Owned, and Disabled Service Veteran Owned Small Business Subcontracting Program in accordance with the Small Business Subcontracting Plan clause included in Contract Clause 52.219-9, Alternate I. The successful Low Bidder will be required to submit a Subcontracting Plan upon request from the Contracting Officer (CO). If the apparent successful bidder fails to submit a subcontracting plan acceptable to the CO within the allowable time, that bidder may be ineligible for award of the contract.

A list of currently known business concerns owned and controlled by socially and economically disadvantaged individuals and/or women-owned small business concerns that have indicated an interest in participating in highway construction is available at http://pro-net.sba.gov/.

BONDING

Small business concerns, including minority business enterprises, may obtain assistance in securing necessary bonding for this project by contacting the office of the Small Business Administration located in their State.

FOR MINORITY, WOMEN AND DISADVANTAGED BUSINESS ENTERPRISES ONLY:

The Department of Transportation (DOT) Office of Small and Disadvantaged Business Utilization (OSDBU) has programs to assist minority, women-owned and disadvantaged business enterprises to acquire short-term working capital and bonding assistance for transportation-related contracts. This is applicable to any eligible prime or subcontract at any tier. The DOT Bonding Assistance Program enables firms to apply for bid, performance and payment bonds up to $1.0 million per contract. The DOT provides an 80% guaranty on the bond amount to a surety against losses. Loans are also available under the DOT Short Term Lending Program (STLP) at prime interest rates to provide accounts receivable financing. The maximum line of credit is $500,000. For further information and applicable forms concerning the Bonding Assistance Program and/or the STLP, please call (800) 532-1169.

INDIVIDUAL SURETIES

See FAR contract clause 52.228-11, Pledges of Assets.

PROGRESS PAYMENTS

Bidders are advised that under Construction Contract Requirement Clauses 52.232-5, Payments Under Fixed-Price Construction Contracts, 52.232-27, Prompt Payment for Construction Contracts, and 52.232-33, Payment by Electronic Funds Transfer -- Central Contractor Registration.

(1) Reimbursement will be made for premiums paid by the Contractor to obtain performance and payment bonds as required under this contract. Payment will be included in the mobilization item and shall not be in addition to the contract price.

(2) The due date for progress payments shall be the 14th day after receipt of the payment request by the Government's designated billing office.

USE OF RECOVERED MATERIALS ON FEDERAL LANDS HIGHWAY PROJECTS

Use of fly ash and ground granulated blast furnace slag and construction materials containing fly ash and ground granulated blast furnace slag on Federal Lands Highway projects:

- It is the policy of the United States Government that fly ash and ground granulated blast furnace slag and materials containing fly ash and ground granulated blast furnace slag shall have maximum practicable opportunity for incorporation into its construction projects.

- The Contractor agrees to investigate the use of fly ash and ground granulated blast furnace slag and materials containing fly ash and ground granulated blast furnace slag to the fullest extent consistent with the efficient performance of this contract. Both the contractor and the subcontractors are urged to seek out suppliers of fly ash and ground granulated blast furnace slag, cement and concrete containing fly ash and ground granulated blast furnace slag and to solicit bids for these materials.

- Names of firms that supply fly ash and ground granulated blast furnace slag and materials containing fly ash and ground granulated blast furnace slag are available from the American Coal Ash Association and the National Slag Association.

SOLICITATION, OFFER, AND AWARD (Construction, Alteration, or Repair)	1. SOLICITATION NO. CO PFH 80-1(1) & 2(2)	2. TYPE OF SOLICITATION [X] SEALED BID (IFB) [ ] NEGOTIATED (RFP)	3. DATE ISSUED NOVEMBER 3, 2003	PAGE OF PAGES 1 OF 3

IMPORTANT - The "offer" section on the reverse must be fully completed by offeror.

4. CONTRACT NO.	5. REQUISITION/PURCHASE REQUEST NO.	6. PROJECT NO. CO PFH 80-1(1) & 2(2)

7. ISSUED BY: I CODE: 69050001 I

Federal Highway Administration
Central Federal Lands Highway Division
555 Zang Street, Room 259
Lakewood, CO 80228

8. ADDRESS OFFER TO:

Larry C. Smith, Division Engineer
Federal Highway Administration
Central Federal Lands Highway Division
Attn: Lori K Rivera HFAC-16
555 Zang Street, Room 259
Lakewood, Colorado 80228
Bid Opening will be held on the Third Floor Conference Room B

9. FOR INFORMATION CALL	A. NAME: See Continuation of SF 1442	B. TELEPHONE NO. (Include area code) (NO COLLECT CALLS) See Continuation of SF 1442.

SOLICITATION

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".

10. THE GOVERNMENT REQUIRES PERFORMANCE OF THE WORK DESCRIBED IN THESE DOCUMENTS (TITLE, IDENTIFYING NO., DATE):

CONSTRUCTION OF COLORADO PFH 80-1(1) & 2(2), GUANELLA PASS ROAD PHASE I & 7TH STREET BRIDGE AND ROAD IMPROVEMENTS, IN STRICT ACCORDANCE WITH:

1. FAR CONTRACT CLAUSES
2. DEPARTMENT OF LABOR, DAVIS BACON MINIMUM WAGE RATES
3. STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS, FP-96 (1996)
4. SPECIAL CONTRACT REQUIREMENTS
5. BID SCHEDULE
6. PLANS

* ALL WORK MUST BE COMPLETED BY AUGUST 31, 2006

11. The Contractor shall begin performance within 10 calendar days and complete it within * calendar days after receiving [ ] award, [X] notice to proceed. This performance period is [X] mandatory, [ ] negotiable.

12A. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE AND PAYMENT BONDS? (If "YES," indicate within how many calendar days after award in Item 12B.) [X] YES [ ] NO	12B. CALENDAR DAYS 10

13. ADDITIONAL SOLICITATION REQUIREMENTS:

A. Sealed offers in original and 0 copies to perform the work required are due at the place specified in Item 8. by 2:00 pm (hour) local time 12/04/03 (date). If this is a sealed bid solicitation, offers will be publicly opened at that time. Sealed envelopes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.

B. An offer guarantee [X] is, [ ] is not required.

C. All offers are subject to the (1) work requirements, and (2) other provisions and clauses incorporated in the solicitation in full text or by reference.

D. Offers providing less than 60 calendar days for Government acceptance after the date offers are due will not be considered and will be rejected.

OFFER (Must be fully completed by offeror)

14. NAME AND ADDRESS OF OFFEROR (Include ZIP code)	15. TELEPHONE NO. (Include area code)
	16. REMITTANCE ADDRESS (Include only if different than Item 14)
CODE FACILITY CODE	

17. The offeror agrees to perform the work required at the prices specified below in strict accordance with the terms of this solicitation, if this offer is accepted by the Government in writing within ____ calendar days after the date offers are due. (Insert any number equal to or greater than the minimum requirement stated in Item 13D. Failure to insert any number means the offeror accepts the minimum in Item 13D.

AMOUNTS ÷	See Bid Schedule.

18. The offeror agrees to furnish any required performance and payment bonds.

19. ACKNOWLEDGMENT OF AMENDMENTS
(The offeror acknowledges receipt of amendments to the solicitation - give number and date of each)

AMENDMENT NO.								
DATE								

20A. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER (Type or print)	20B. SIGNATURE	20C. OFFER DATE

AWARD (***To be completed by Government***)

21. ITEMS ACCEPTED:

22. AMOUNT	23. ACCOUNTING AND APPROPRIATION DATA

24. SUBMIT INVOICES TO ADDRESS SHOWN IN ÷ (4 copies unless otherwise specified)	ITEM See Block 26	25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO ☐ 15 U.S.C. 637( ) ☐ 41 U.S.C. 253(c)( )

26. ADMINISTERED BY CODE: _____	27. PAYMENT WILL BE MADE BY
SEE CONTINUATION OF SF 1442	FEDERAL HIGHWAY ADMINISTRATION CENTRAL FEDERAL LANDS HIGHWAY DIVISION 555 ZANG STREET, ROOM 259 LAKEWOOD, CO 80228

CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE

☐ 28. NEGOTIATED AGREEMENT (Contractor is required to sign this document and return ___ copies to issuing office.) Contractor agrees to furnish and deliver all items or perform all work requirements identified on this form and any continuation sheets for the consideration stated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications incorporated by reference in or attached to this contract.	☐ 29. AWARD (Contractor is not required to sign this document.) Your offer on this solicitation is hereby accepted as to the items listed. This award consummates the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.
30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN (Type or print)	31A. NAME OF CONTRACTING OFFICER (Type or print)

30B. SIGNATURE	30C. DATE	31B. UNITED STATES OF AMERICA BY	31C. AWARD DATE

CONTINUATION OF SF l442

Block 9: DATA AVAILABLE FOR REVIEW

The following hard copy materials can be obtained by calling (303) 716-2015 or (303) 716-2080:

Geotech Report and Pavement Documents

Earthwork Summary

FP-96, Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, 1996

The following materials are available electronically:

Manual of Uniform Traffic Control Devices for Streets and Highways, (Current Edition published by U.S. Government Printing Office found at http://mutcd.fhwa.dot.gov .

AASHTO Manuals found at http://fhwapap04.fhwa.dot.gov/index.jsp under the Standard Specifications and Supplements link.

FP-96, Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, 1996, found at http://www.cflhd.gov/design/index.cfm# under the Construction Specs tab.

Contractor Guidelines for Quality Control Plans and example QC Plans found at http://www.cflhd.gov/design/index.cfm# under the Construction Specs tab.

Environmental Impact Study (EIS) Report and Right of Decision (ROD) for this project found at http://www.cflhd.gov/projects/co/guanella/index.cfm.

For amendments, bid results and tabulations or other procurement information please visit our website at www.cflhd.gov/procurement

Block 13: A bid guarantee of not less than 20 percent of the amount of the bid is required with any bid in excess of $25,000. If the bidder fails to accompany the bid with the required bid guarantee, such failure may require rejection of the bid. See FAR Provision 52.228-1, Bid Guarantee. If the bid guarantee is a bid bond, it must be submitted on Standard Form 24.

Block 26: The Contractor shall submit invoices to:

FHWA, CFLHD, Project Engineer's Office (Address to be designated at preconstruction conference), for submission to the designated billing office shown in Block 7.

Final billing shall be submitted directly to the address shown in Block 7.

Other: The estimated price range of the project work is greater than $10,000,000.00

For technical questions about plans and specifications, please call in the following order:

(1) Mr. Kevin Black, Construction Operations Engineer (COE), at (303) 716-2153.
(2) Ms. Lee Ann Bush, A/E Contracting Specialist, at (303) 716-2126.
(3) Mr. Gary Strike, Highway Design Manager (HDM), at (303) 716-2171.

Bid Schedule Instructions

BIDDERS, PLEASE NOTE: Before preparing the bid, carefully read the Solicitation Provisions.

This Bid Proposal is comprised of three alternatives as follows:

I. Schedule A - Grading, Drainage, Retaining Walls, Bridge, Asphalt, and Gravel Surfacing = 10.02 km Plus Schedule Z - 7th Street Bridge/Road Improvements in the town of Georgetown

II. Schedule B - Grading, Drainage, Retaining Walls, Bridge, Asphalt, and Gravel Surfacing = 12.32 km Plus Schedule Z - 7th Street Bridge/Road Improvements in the town of Georgetown

III. Schedule C - Grading, Drainage, Retaining Walls, Bridge, Asphalt, and Gravel Surfacing = 14.17 km Plus Schedule Z - 7th Street Bridge/Road Improvements in the town of Georgetown

- ✓ Insert a unit price, in figures, for each pay item for which a quantity appears in each bid schedules. When the words "Lump Sum" appear as a unit price, insert an amount for each lump sum pay item.
- ✓ Multiply the unit price by the quantity for each pay item and show the amount bid.
- ✓ Total all amounts bid for each pay item and show the Total on line provided on Page B-12 for Schedule A, Page B-24 for Schedule B, Page B-36 for Schedule C and Page B-40 for Schedule Z.
- ✓ Complete the Summary Sheet on Page B-41 for each Alternative I, II and III.

Evaluation Factors for Award

To be eligible for award of contract, the bidder shall submit prices in each bid schedule for each bid item necessary to complete all contract work.

Evaluation for award of a contract will consist of Schedule Z combined with either Schedule A, B or C.

The successful bidder will be determined as the low bidder with the lowest Overall Project Bid Total; Alternative I, II or III. Accordingly, award of contract, if made, will be made to the lowest responsive, responsible bidder, if funds are available on the alternative considered to be most advantageous to the Government.

The possibility of having different low bidders on different alternatives is recognized and prospective bidders are hereby notified that there will be no protest by any bidder whose bid would have been lowest under a different alternative than the one selected for award.

Liquidated damages will be assessed according to Subsection 108.04, as amended, by the Special Contract Requirements, in the event contract work is not completed by the final contract completion; date(s) listed below. Liquidated damages apply to Schedules A, B, C and Z.

Subcontracting Plan

In accordance with FAR 52.219-9 as noted in section above titled "Notice to Bidders and Offerors," if you are the low bidder and a large business, and the project awarded amount exceeds $1 million, an acceptable subcontracting plan will be required prior to award. It is not mandatory to return this sub-contracting plan at the time bid documents are due; however, in an attempt to expedite the award process, a sample subcontracting plan and a full text copy of FAR Clause 52.219-9 is provided in the Appendix for your convenience. Your **bid submittal** will not be evaluated upon receipt of this subcontracting plan, however, failure on the part of the successful bidder to complete and return an acceptable plan prior to award will result in a non-responsive bid.

All work must be completed by August 31, 2006.

Project: CO PFH 80-1(1) & 2(2)
GUANELLA PASS ROAD PHASE I

SCHEDULE A

CO PFH 80-1(1) & 2(2)
GUANELLA PASS ROAD PHASE I
PIKE AND ARAPAHOE NATIONAL FORESTS
CLEAR CREEK AND PARK COUNTIES, COLORADO

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
15101	Mobilization		
	ALL	Lump Sum	$_____
15202	Slope, reference, and clearing and grubbing stakes		
	10.024 km	$_____	$_____
15204	Drainage structure survey and staking		
	80 Each	$_____	$_____
15204A	Concrete box culvert layout and control		
	2 Each	$_____	$_____
15206	Retaining wall survey and staking		
	ALL	Lump Sum	$_____
15207	Grade finishing stakes		
	20.048 km	$_____	$_____
15209	Miscellaneous survey and staking		
	220 Hour	$_____	$_____
15212	Approach road survey and Staking		
	4 Each	$_____	$_____
15216A	Parking area survey and staking		
	5 Each	$_____	$_____
15401	Contractor testing		
	ALL	Lump Sum	$_____
15501	Construction schedule		
	ALL	Lump Sum	$_____
15702	Temporary turf establishment		
	6 ha	$_____	$_____
15703	Silt fence		
	8,000 m	$_____	$_____
15709	Check dams		
	17 Each	$_____	$_____

Bid Schedule A

Project: PFH 80-1(1) & 2(2)
GUANELLA PASS ROAD PHASE 1

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
15711	Sediment traps		
	2		
	Each	$_____	$_____
15718	Inlet protection		
	9		
	Each	$_____	$_____
15725A	Temporary diversion channel		
	ALL	Lump Sum	$_____
15734	Sediment control log		
	1,100		
	m	$_____	$_____
15801	Watering for dust control		
	9,000		
	m3	$_____	$_____
20101	Clearing and grubbing		
	20.0		
	ha	$_____	$_____
20202	Selective clearing and grubbing		
	2.0		
	ha	$_____	$_____
20204	Removal of individual trees		
	16		
	m2	$_____	$_____
20301B	Removal of signs		
	14		
	Each	$_____	$_____
20301H	Removal of pipe culverts		
	37		
	Each	$_____	$_____
20302V	Removal of fence		
	180		
	m	$_____	$_____
20302W	Removal of guardrail		
	490		
	m	$_____	$_____
20311	Brow removal		
	900		
	m	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
20401	Roadway excavation		
	58,000		
	m3	$_____	$_____
20402	Subexcavation		
	750		
	m3	$_____	$_____
20413A	Slope Scaling Crew		
	1,200		
	Hour	$_____	$_____
20501	Controlled blast hole		
	50		
	m	$_____	$_____
20802	Foundation fill		
	8,300		
	m3	$_____	$_____
20804	Shoring and bracing		
	ALL	Lump Sum	$_____
21101	Roadway obliteration		
	3,300		
	m2	$_____	$_____
25101B	Placed riprap class 2		
	3,200		
	m3	$_____	$_____
25101C	Placed riprap class 3		
	220		
	m3	$_____	$_____
25101E	Placed riprap class 5		
	170		
	m3	$_____	$_____
25108	Placed boulder, class 7		
	600		
	Each	$_____	$_____
25111	Placed individual boulders		
	35		
	Each	$_____	$_____
25203	Rock buttress		
	2,650		
	m3	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
25206	Rockery wall		
	2,600 m2	$_____	$_____
25501A	Mechanically stabilized earth wall, welded wire face		
	16,000 m2	$_____	$_____
26006	Soil nail retaining wall		
	700 m2	$_____	$_____
30101	Aggregate base		
	42,500 t	$_____	$_____
30107	Aggregate surface course		
	17,500 t	$_____	$_____
30304U	Road reconditioning, scarify 300 mm depth		
	21,000 m2	$_____	$_____
30402	Aggregate stabilization		
	41,500 m2	$_____	$_____
30602	Dust palliative application		
	25,900 m2	$_____	$_____
30611	Lignin sulfonate / Magnesium chloride, 50/50 mix		
	70 t	$_____	$_____
40103PGCD	Asphalt cement grade PG 58-34		
	360 t	$_____	$_____
40105C	Antistrip additive type 3		
	60 t	$_____	$_____
40106ABA	Superpave asphalt concrete pavement, 12.5 nominal maximum size aggregate, 0.3 to 1 million ESAL's, type 1 pavement smoothness		
	5,900 t	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
40901GAP	Surface treatment aggregates gradation A, precoated		
	2,100 t	$_____	$_____
40901GC	Surface treatment aggregates gradation C		
	1,100 t	$_____	$_____
40904AR	Emulsified Asphalt grade HFMS-2P or HFRS-2P		
	3 t	$_____	$_____
41101MB	Prime coat grade MC-70		
	36 t	$_____	$_____
41103	Blotter		
	200 t	$_____	$_____
41201CM	Tack coat grade CSS-1, CSS-1h, SS-1, or SS-1h		
	11 t	$_____	$_____
55201A	Structural concrete class A (AE)		
	74 m3	$_____	$_____
55401	Reinforcing steel te class A (AE)		
	4,193 kg	$_____	$_____
56304	Rock stain		
	2,000 m2	$_____	$_____
60105C	Concrete for pipe collar		
	30 m3	$_____	$_____
60201K	450 mm pipe culvert		
	40 m	$_____	$_____
60201M	600 mm pipe culvert		
	900 m	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
60201N	750 mm pipe culvert		
	70 m	$_____	$_____
60201P	900 mm pipe culvert		
	19 m	$_____	$_____
60202N	885 mm span, 610 mm rise pipe arch culvert		
	80 m	$_____	$_____
60205NG	4200 mm span, 2100 mm rise precast reinforced concrete box culvert (bottomless)		
	13 m	$_____	$_____
60206K	End section for 450 mm pipe culvert		
	5 Each	$_____	$_____
60206M	End section for 600 mm pipe culvert		
	97 Each	$_____	$_____
60206N	End section for 750 mm pipe culvert		
	6 Each	$_____	$_____
60206P	End section for 900 mm pipe culvert		
	1 Each	$_____	$_____
60207N	End section for 885 mm span, 610 mm rise pipe arch culvert		
	12 Each	$_____	$_____
60209M	Elbow, 600 mm		
	38 Each	$_____	$_____
60209MN	Elbow, 885 mm span, 610 mm rise pipe arch culvert		
	4 Each	$_____	$_____
60209N	Elbow, 750 mm		
	6 Each	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
60209P	Elbow, 900 mm		
	2 Each	$_____	$_____
60305ADA	10'-10" span, 3'-5" rise, structural-plate box, 0.109 inch (bottomless)		
	14 m	$_____	$_____
60404A	Catch basin type 1		
	12 Each	$_____	$_____
60409A	Metal frame and grate type A		
	7 Each	$_____	$_____
60409AB	Metal frame and grate type B		
	5 Each	$_____	$_____
60501	Underdrain system		
	1,200 m	$_____	$_____
60507F	150 mm outlet pipe		
	200 m	$_____	$_____
60901ZA	Portland cement concrete curb, 450 mm depth		
	3,100 m	$_____	$_____
60909B	Wheelstop (timber)		
	124 Each	$_____	$_____
60917	Timber curb		
	679 m	$_____	$_____
61301	Simulated stone masonary surface treatment (Box Culvert Concrete Form-liner)		
	63 m2	$_____	$_____
61301A	Simulated stone surfacing (MSE Wall Concrete Form-liner)		
	3,822 m2	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
61302	Simulated stone masonary test wall (Box Culverts Concrete Form-liner)		
	1 Each	$_____	$_____
61302A	Simulated stone surfacing test section (MSE Walls Concrete Form-liner)		
	1 Each	$_____	$_____
61501BA	Colored Portland cement concrete sidewalk		
	29 m2	$_____	$_____
61504B	Portland cement concrete wheelchair ramp		
	5 m2	$_____	$_____
61701H	Guardrail system SBTB		
	4,450 m	$_____	$_____
61702FAT	Terminal section type FAT-9		
	12 Each	$_____	$_____
61702FATA	Terminal section type FAT-6		
	36 Each	$_____	$_____
61715	Guardrail, steel tube-backed timber (Box Culverts)		
	6 m	$_____	$_____
61901FA	Fence temporary construction		
	500 m	$_____	$_____
61901HD	Fence post and rail, wood		
	18 m	$_____	$_____
61901LB	Fence, log barrier (toad)		
	770 m	$_____	$_____
61902F	Gate road closure		
	2 Each	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
61906	Remove and reset fence		
	60 m	$_____	$_____
62201AD	Dump truck, 7 cubic meter minimum capacity		
	180 Hour	$_____	$_____
62201BC	Backhoe loader, 180 liter minimum rated capacity bucket (600 mm width)		
	180 Hour	$_____	$_____
62201CE	Wheel loader, 3 cubic meter minimum rated capacity		
	180 Hour	$_____	$_____
62201DG	Bulldozer, 250 kW minimum flywheel power		
	110 Hour	$_____	$_____
62201LB	Motor grader, 3.6 meter minimum blade		
	180 Hour	$_____	$_____
62201M	Hydraulic excavator		
	110 Hour	$_____	$_____
62301	General labor		
	300 Hour	$_____	$_____
62406	Placing conserved topsoil		
	6,200 m3	$_____	$_____
62501B	Seeding, hydraulic method		
	23.0 ha	$_____	$_____
62504B	Mulching, hydraulic method		
	23.0 ha	$_____	$_____
62516	Fertilizer, hydraulic method		
	15.0 ha	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
62602	Remove and replant trees and shrubs		
	1,100 Each	$_____	$_____
62602C	Emergent plugs		
	100 Each	$_____	$_____
62613B	Container stock, 20 liter		
	2,396 Each	$_____	$_____
62614	Willow staking		
	19,500 Each	$_____	$_____
62701D	Salvaged sod (alpine)		
	4,700 m2	$_____	$_____
62901B	Erosion control mat type 2		
	1,900 m2	$_____	$_____
63304CC	Signs, aluminum panels, type 3 sheeting		
	23 m2	$_____	$_____
63305BA	Posts, wood 100 mm x 100 mm		
	139 m	$_____	$_____
63305BB	Posts, wood 100 mm x 150 mm		
	74 m	$_____	$_____
63306B	Object markers type 2 150 mm		
	114 Each	$_____	$_____
63307A	Delineators type 1		
	285 Each	$_____	$_____
63307G	Delineators flexible		
	323 Each	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
63310	Installing government furnished sign		
	12 Each	$_____	$_____
63401BA	Pavement markings type B, solid		
	328 m	$_____	$_____
63406	Pavement markings, symbols		
	129 Each	$_____	$_____
63504C	Barricade type 3		
	35 m	$_____	$_____
63506A	Cone type A		
	50 Each	$_____	$_____
63507	Construction sign		
	80 m2	$_____	$_____
63508	Drum		
	150 Each	$_____	$_____
63509	Flagger		
	11,000 Hour	$_____	$_____
63510	Pilot car		
	3,800 Hour	$_____	$_____
63511	Temporary concrete barrier		
	700 m	$_____	$_____
63521B	Warning light type B		
	8 Each	$_____	$_____
63529	Temporary traffic signal system		
	2 Each	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
63543A	Traffic and safety supervisor		
	ALL	Lump Sum	$_____
65001	Landscaping logs		
	5		
	Each	$_____	$_____
66201	Rockfall fence system		
	70		
	m	$_____	$_____

TOTAL $_____

Submitted by: _____
Name of Bidder

SCHEDULE B

CO PFH 80-1(1) & 2(2)
GUANELLA PASS ROAD PHASE I
PIKE AND ARAPAHOE NATIONAL FORESTS
CLEAR CREEK AND PARK COUNTIES, COLORADO

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
15101	Mobilization		
	ALL	Lump Sum	$_____
15202	Slope, reference, and clearing and grubbing stakes		
	12.324 km	$_____	$_____
15204	Drainage structure survey and staking		
	106 Each	$_____	$_____
15204A	Concrete box culvert layout and control		
	3 Each	$_____	$_____
15206	Retaining wall survey and staking		
	ALL	Lump Sum	$_____
15207	Grade finishing stakes		
	24.648 km	$_____	$_____
15209	Miscellaneous survey and staking		
	280 Hour	$_____	$_____
15212	Approach road survey and Staking		
	4 Each	$_____	$_____
15216A	Parking area survey and staking		
	5 Each	$_____	$_____
15401	Contractor testing		
	ALL	Lump Sum	$_____
15501	Construction schedule		
	ALL	Lump Sum	$_____
15702	Temporary turf establishment		
	7 ha	$_____	$_____
15703	Silt fence		
	9,900 m	$_____	$_____
15709	Check dams		
	20 Each	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
15711	Sediment traps		
	3		
	Each	$_____	$_____
15718	Inlet protection		
	16		
	Each	$_____	$_____
15725A	Temporary diversion channel		
	ALL	Lump Sum	$_____
15734	Sediment control log		
	1,300		
	m	$_____	$_____
15801	Watering for dust control		
	10,000		
	m3	$_____	$_____
20101	Clearing and grubbing		
	21.0		
	ha	$_____	$_____
20202	Selective clearing and grubbing		
	2.0		
	ha	$_____	$_____
20204	Removal of individual trees		
	18		
	m2	$_____	$_____
20301B	Removal of signs		
	16		
	Each	$_____	$_____
20301H	Removal of pipe culverts		
	47		
	Each	$_____	$_____
20302V	Removal of fence		
	180		
	m	$_____	$_____
20302W	Removal of guardrail		
	490		
	m	$_____	$_____
20311	Brow removal		
	1,100		
	m	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
20401	Roadway excavation		
	70,000		
	m3	$_____	$_____
20402	Subexcavation		
	750		
	m3	$_____	$_____
20403	Unclassified borrow		
	2,400		
	m3	$_____	$_____
20413A	Slope Scaling Crew		
	1,200		
	Hour	$_____	$_____
20501	Controlled blast hole		
	50		
	m	$_____	$_____
20802	Foundation fill		
	8,400		
	m3	$_____	$_____
20804	Shoring and bracing		
	ALL	Lump Sum	$_____
21101	Roadway obliteration		
	3,300		
	m2	$_____	$_____
25101B	Placed riprap class 2		
	3,500		
	m3	$_____	$_____
25101C	Placed riprap class 3		
	280		
	m3	$_____	$_____
25101E	Placed riprap class 5		
	260		
	m3	$_____	$_____
25108	Placed boulder, class 7		
	600		
	Each	$_____	$_____
25111	Placed individual boulders		
	120		
	Each	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
25203	Rock buttress		
	2,650 m3	$_____	$_____
25206	Rockery wall		
	2,800 m2	$_____	$_____
25501A	Mechanically stabilized earth wall, welded wire face		
	16,200 m2	$_____	$_____
26006	Soil nail retaining wall		
	700 m2	$_____	$_____
30101	Aggregate base		
	56,600 t	$_____	$_____
30107	Aggregate surface course		
	17,500 t	$_____	$_____
30304U	Road reconditioning, scarify 300 mm depth		
	23,400 m2	$_____	$_____
30402	Aggregate stabilization		
	62,500 m2	$_____	$_____
30602	Dust palliative application		
	25,900 m2	$_____	$_____
30611	Lignin sulfonate / Magnesium chloride, 50/50 mix		
	70 t	$_____	$_____
40103PGCD	Asphalt cement grade PG 58-34		
	360 t	$_____	$_____
40105C	Antistrip additive type 3		
	60 t	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
40106ABA	Superpave asphalt concrete pavement, 12.5 nominal maximum size aggregate, 0.3 to 1 million ESAL's, type 1 pavement smoothness		
	5,900 t	$_____	$_____
40901GAP	Surface treatment aggregates gradation A, precoated		
	3,100 t	$_____	$_____
40901GC	Surface treatment aggregates gradation C		
	1,600 t	$_____	$_____
40904AR	Emulsified Asphalt grade HFMS-2P or HFRS-2P		
	4 t	$_____	$_____
41101MB	Prime coat grade MC-70		
	36 t	$_____	$_____
41103	Blotter		
	200 t	$_____	$_____
41201CM	Tack coat grade CSS-1, CSS-1h, SS-1, or SS-1h		
	11 t	$_____	$_____
55201A	Structural concrete class A (AE)		
	120 m3	$_____	$_____
55401	Reinforcing steel		
	6,697 kg	$_____	$_____
56304	Rock stain		
	2,000 m2	$_____	$_____
60105C	Concrete for pipe collar		
	30 m3	$_____	$_____
60201K	450 mm pipe culvert		
	46 m	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
60201M	600 mm pipe culvert		
	1,160 m	$_____	$_____
60201N	750 mm pipe culvert		
	100 m	$_____	$_____
60201P	900 mm pipe culvert		
	32 m	$_____	$_____
60202N	885 mm span, 610 mm rise pipe arch culvert		
	110 m	$_____	$_____
60205ND	4200 mm span, 1200 mm rise precast reinforced concrete box culvert		
	14 m	$_____	$_____
60205NG	4200 mm span, 2100 mm rise precast reinforced concrete box culvert		
	13 m	$_____	$_____
60206K	End section for 450 mm pipe culvert		
	7 Each	$_____	$_____
60206M	End section for 600 mm pipe culvert		
	132 Each	$_____	$_____
60206N	End section for 750 mm pipe culvert		
	10 Each	$_____	$_____
60206P	End section for 900 mm pipe culvert		
	3 Each	$_____	$_____
60207N	End section for 885 mm span, 610 mm rise pipe arch culvert		
	16 Each	$_____	$_____
60209M	Elbow, 600 mm		
	51 Each	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
60209MN	Elbow, 885 mm span, 610 mm rise pipe arch culvert		
	4 Each	$_____	$_____
60209N	Elbow, 750 mm		
	7 Each	$_____	$_____
60209P	Elbow, 900 mm		
	2 Each	$_____	$_____
60305ADA	10'-10" span, 3'-5" rise, structural-plate box, 0.109 inch		
	14 m	$_____	$_____
60404A	Catch basin type 1		
	19 Each	$_____	$_____
60409A	Metal frame and grate type A		
	7 Each	$_____	$_____
60409AB	Metal frame and grate type B		
	12 Each	$_____	$_____
60501	Underdrain system		
	1,500 m	$_____	$_____
60507F	150 mm outlet pipe		
	250 m	$_____	$_____
60901ZA	Portland cement concrete curb, 450 mm depth		
	4,578 m	$_____	$_____
60909B	Wheelstop (timber)		
	124 Each	$_____	$_____
60917	Timber curb		
	679 m	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
61301	Simulated stone masonary surface treatment (Box Culvert Concrete Form-liner)		
	102 m2	$_____	$_____
61301A	Simulated stone surfacing (MSE Wall Concrete Form-liner)		
	3,822 m2	$_____	$_____
61302	Simulated stone masonary test wall (Box Culvert Concrete Form-liner)		
	1 Each	$_____	$_____
61302A	Simulated stone surfacing test section (MSE Wall Concrete Form-liner)		
	1 Each	$_____	$_____
61501BA	Colored Portland cement concrete sidewalk		
	29 m2	$_____	$_____
61504B	Portland cement concrete wheelchair ramp		
	5 m2	$_____	$_____
61701H	Guardrail system SBTB		
	4,610 m	$_____	$_____
61702FAT	Terminal section type FAT-9		
	14 Each	$_____	$_____
61702FATA	Terminal section type FAT-6		
	38 Each	$_____	$_____
61715	Guardrail, steel tube-backed timber		
	22 m	$_____	$_____
61901FA	Fence temporary construction		
	500 m	$_____	$_____
61901HD	Fence post and rail, wood		
	18 m	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
61901LB	Fence, log barrier (toad)		
	1,000 m	$_____	$_____
61902F	Gate road closure		
	2 Each	$_____	$_____
61906	Remove and reset fence		
	60 m	$_____	$_____
62201AD	Dump truck, 7 cubic meter minimum capacity		
	200 Hour	$_____	$_____
62201BC	Backhoe loader, 180 liter minimum rated capacity bucket (600 mm width)		
	200 Hour	$_____	$_____
62201CE	Wheel loader, 3 cubic meter minimum rated capacity		
	200 Hour	$_____	$_____
62201DG	Bulldozer, 250 kW minimum flywheel power		
	120 Hour	$_____	$_____
62201LB	Motor grader, 3.6 meter minimum blade		
	200 Hour	$_____	$_____
62201M	Hydraulic excavator		
	120 Hour	$_____	$_____
62301	General labor		
	320 Hour	$_____	$_____
62406	Placing conserved topsoil		
	7,800 m3	$_____	$_____
62501B	Seeding, hydraulic method		
	28.0 ha	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
62504B	Mulching, hydraulic method		
	28.0 ha	$_____	$_____
62516	Fertilizer, hydraulic method		
	18.0 ha	$_____	$_____
62602	Remove and replant trees and shrubs		
	1,130 Each	$_____	$_____
62602C	Emergent plugs		
	110 Each	$_____	$_____
62613B	Container stock, 20 liter		
	3,268 Each	$_____	$_____
62614	Willow staking		
	21,500 Each	$_____	$_____
62701D	Salvaged sod (alpine)		
	4,700 m2	$_____	$_____
62901B	Erosion control mat type 2		
	2,100 m2	$_____	$_____
63304CC	Signs, aluminum panels, type 3 sheeting		
	24 m2	$_____	$_____
63305BA	Posts, wood 100 mm x 100 mm		
	147 m	$_____	$_____
63305BB	Posts, wood 100 mm x 150 mm		
	74 m	$_____	$_____
63306B	Object markers type 2		
	156 Each	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
63307A	Delineators type 1		
	291		
	Each	$_____	$_____
63307G	Delineators flexible		
	337		
	Each	$_____	$_____
63310	Installing government furnished sign		
	12		
	Each	$_____	$_____
63401BA	Pavement markings type B, solid		
	328		
	m	$_____	$_____
63406	Pavement markings, symbols		
	129		
	Each	$_____	$_____
63504C	Barricade type 3		
	35		
	m	$_____	$_____
63506C	Cone type C		
	50		
	Each	$_____	$_____
63507	Construction sign		
	80		
	m2	$_____	$_____
63508	Drum		
	150		
	Each	$_____	$_____
63509	Flagger		
	12,000		
	Hour	$_____	$_____
63510	Pilot car		
	4,000		
	Hour	$_____	$_____
63511	Temporary concrete barrier		
	750		
	m	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
63521B	Warning light type B		
	8 Each	$_____	$_____
63529	Temporary traffic signal system		
	2 Each	$_____	$_____
63543A	Traffic and safety supervisor		
	ALL	Lump Sum	$_____
65001	Landscaping logs		
	35 Each	$_____	$_____
66201	Rockfall fence system		
	70 m	$_____	$_____

TOTAL $_____

Submitted by: _____
Name of Bidder

SCHEDULE C

CO PFH 80-1(1) & 2(2)
GUANELLA PASS ROAD PHASE I
PIKE AND ARAPAHOE NATIONAL FORESTS
CLEAR CREEK AND PARK COUNTIES, COLORADO

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
15101	Mobilization		
	ALL	Lump Sum	$_____
15202	Slope, reference, and clearing and grubbing stakes		
	14.174 km	$_____	$_____
15204	Drainage structure survey and staking		
	121 Each	$_____	$_____
15204A	Concrete box culvert layout and control		
	4 Each	$_____	$_____
15206	Retaining wall survey and staking		
	ALL	Lump Sum	$_____
15207	Grade finishing stakes		
	28.348 km	$_____	$_____
15209	Miscellaneous survey and staking		
	320 Hour	$_____	$_____
15212	Approach road survey and Staking		
	5 Each	$_____	$_____
15216A	Parking area survey and staking		
	5 Each	$_____	$_____
15401	Contractor testing		
	ALL	Lump Sum	$_____
15501	Construction schedule		
	ALL	Lump Sum	$_____
15702	Temporary turf establishment		
	8 ha	$_____	$_____
15703	Silt fence		
	11,300 m	$_____	$_____
15709	Check dams		
	20 Each	$_____	$_____

Bid Schedule C

Project: PFH 80-1(1) & 2(2)
GUANELLA PASS ROAD PHASE1

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
15711	Sediment traps		
	3		
	Each	$_____	$_____
15718	Inlet protection		
	21		
	Each	$_____	$_____
15725A	Temporary diversion channel		
	ALL	Lump Sum	$_____
15734	Sediment control log		
	1,450		
	m	$_____	$_____
15801	Watering for dust control		
	12,000		
	m3	$_____	$_____
20101	Clearing and grubbing		
	24.0		
	ha	$_____	$_____
20202	Selective clearing and grubbing		
	2.0		
	ha	$_____	$_____
20204	Removal of individual trees		
	20		
	m2	$_____	$_____
20301B	Removal of signs		
	20		
	Each	$_____	$_____
20301H	Removal of pipe culverts		
	51		
	Each	$_____	$_____
20302V	Removal of fence		
	180		
	m	$_____	$_____
20302W	Removal of guardrail		
	490		
	m	$_____	$_____
20311	Brow removal		
	1,100		
	m	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
20401	Roadway excavation		
	78,000		
	m3	$_____	$_____
20402	Subexcavation		
	750		
	m3	$_____	$_____
20403	Unclassified borrow		
	2,400		
	m3	$_____	$_____
20413A	Slope Scaling Crew		
	1,200		
	Hour	$_____	$_____
20501	Controlled blast hole		
	50		
	m	$_____	$_____
20802	Foundation fill		
	9,000		
	m3	$_____	$_____
20804	Shoring and bracing		
	ALL	Lump Sum	$_____
21101	Roadway obliteration		
	3,300		
	m2	$_____	$_____
25101B	Placed riprap class 2		
	3,700		
	m3	$_____	$_____
25101C	Placed riprap class 3		
	320		
	m3	$_____	$_____
25101E	Placed riprap class 5		
	300		
	m3	$_____	$_____
25108	Placed boulder, class 7		
	600		
	Each	$_____	$_____
25111	Placed individual boulders		
	170		
	Each	$_____	$_____

Bid Schedule C

Project: PFH 80-1(1) & 2(2)
GUANELLA PASS ROAD PHASE1

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
25203	Rock buttress		
	2,650 m3	$_____	$_____
25206	Rockery wall		
	3,600 m2	$_____	$_____
25501A	Mechanically stabilized earth wall, welded wire face		
	17,400 m2	$_____	$_____
26006	Soil nail retaining wall		
	700 m2	$_____	$_____
30101	Aggregate base		
	68,900 t	$_____	$_____
30107	Aggregate surface course		
	17,500 t	$_____	$_____
30304U	Road reconditioning, scarify 300 mm depth		
	27,000 m2	$_____	$_____
30402	Aggregate stabilization		
	79,000 m2	$_____	$_____
30602	Dust palliative application		
	26,000 m2	$_____	$_____
30611	Lignin sulfonate / Magnesium chloride, 50/50 mix		
	70 t	$_____	$_____
40103PGCD	Asphalt cement grade PG 58-34		
	360 t	$_____	$_____
40105C	Antistrip additive type 3		
	60 t	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
40106ABA	Superpave asphalt concrete pavement, 12.5 nominal maximum size aggregate, 0.3 to 1 million ESAL's, type 1 pavement smoothness		
	5,900 t	$_____	$_____
40901GAP	Surface treatment aggregates gradation A, precoated		
	3,900 t	$_____	$_____
40901GC	Surface treatment aggregates gradation C		
	2,000 t	$_____	$_____
40904AR	Emulsified Asphalt grade HFMS-2P or HFRS-2P		
	5 t	$_____	$_____
41101MB	Prime coat grade MC-70		
	36 t	$_____	$_____
41103	Blotter		
	200 t	$_____	$_____
41201CM	Tack coat grade CSS-1, CSS-1h, SS-1, or SS-1h		
	11 t	$_____	$_____
55201A	Structural concrete class A (AE)		
	152 m3	$_____	$_____
55401	Reinforcing steel		
	8,684 kg	$_____	$_____
56304	Rock stain		
	2,000 m2	$_____	$_____
60105C	Concrete for pipe collar		
	30 m3	$_____	$_____
60201K	450 mm pipe culvert		
	67 m	$_____	$_____

Bid Schedule C

Project: PFH 80-1(1) & 2(2)
GUANELLA PASS ROAD PHASE1

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
60201M	600 mm pipe culvert		
	1,350 m	$_____	$_____
60201N	750 mm pipe culvert		
	111 m	$_____	$_____
60201P	900 mm pipe culvert		
	32 m	$_____	$_____
60202N	885 mm span, 610 mm rise pipe arch culvert		
	110 m	$_____	$_____
60205ND	4200 mm span, 1200 mm rise precast reinforced concrete box culvert (bottomless)		
	31 m	$_____	$_____
60205NG	4200 mm span, 2100 mm rise precast reinforced concrete box culvert (bottomless)		
	13 m	$_____	$_____
60206K	End section for 450 mm pipe culvert		
	11 Each	$_____	$_____
60206M	End section for 600 mm pipe culvert		
	149 Each	$_____	$_____
60206N	End section for 750 mm pipe culvert		
	12 Each	$_____	$_____
60206P	End section for 900 mm pipe culvert		
	3 Each	$_____	$_____
60207N	End section for 885 mm span, 610 mm rise pipe arch culvert		
	16 Each	$_____	$_____
60209M	Elbow, 600 mm		
	59 Each	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
60209MN	Elbow, 885 mm span, 610 mm rise pipe arch culvert		
	4 Each	$_____	$_____
60209N	Elbow, 750 mm		
	7 Each	$_____	$_____
60209P	Elbow, 900 mm		
	2 Each	$_____	$_____
60305ADA	10'-10" span, 3'-5" rise, structural-plate box, 0.109 inch (bottomless)		
	14 m	$_____	$_____
60404A	Catch basin type 1		
	24 Each	$_____	$_____
60409A	Metal frame and grate type A		
	7 Each	$_____	$_____
60409AB	Metal frame and grate type B		
	17 Each	$_____	$_____
60501	Underdrain system		
	1,500 m	$_____	$_____
60507F	150 mm outlet pipe		
	250 m	$_____	$_____
60901ZA	Portland cement concrete curb, 450 mm depth		
	5,655 m	$_____	$_____
60909B	Wheelstop (timber)		
	124 Each	$_____	$_____
60917	Timber curb		
	679 m	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
61301	Simulated stone masonary surface treatment (Box Culvert Concrete Form-liner)		
	131 m2	$_____	$_____
61301A	Simulated stone surfacing (MSE Wall Concrete Form-liner)		
	3,822 m2	$_____	$_____
61302	Simulated stone masonary test wall (Box Culverts Concrete Form-liner)		
	1 Each	$_____	$_____
61302A	Simulated stone surfacing test section (MSE Walls Concrete Form-liner)		
	1 Each	$_____	$_____
61501BA	Colored Portland cement concrete sidewalk		
	29 m2	$_____	$_____
61504B	Portland cement concrete wheelchair ramp		
	5 m2	$_____	$_____
61701H	Guardrail system SBTB		
	5,140 m	$_____	$_____
61702FAT	Terminal section type FAT-9		
	15 Each	$_____	$_____
61702FATA	Terminal section type FAT-6		
	39 Each	$_____	$_____
61715	Guardrail, steel tube-backed timber (Box Culverts)		
	22 m	$_____	$_____
61901FA	Fence temporary construction		
	500 m	$_____	$_____
61901HD	Fence post and rail, wood		
	18 m	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
61901LB	Fence, log barrier (toad)		
	1,250 m	$_____	$_____
61902F	Gate road closure		
	2 Each	$_____	$_____
61906	Remove and reset fence		
	60 m	$_____	$_____
62201AD	Dump truck, 7 cubic meter minimum capacity		
	200 Hour	$_____	$_____
62201BC	Backhoe loader, 180 liter minimum rated capacity bucket (600 mm width)		
	200 Hour	$_____	$_____
62201CE	Wheel loader, 3 cubic meter minimum rated capacity		
	200 Hour	$_____	$_____
62201DG	Bulldozer, 250 kW minimum flywheel power		
	120 Hour	$_____	$_____
62201LB	Motor grader, 3.6 meter minimum blade		
	200 Hour	$_____	$_____
62201M	Hydraulic excavator		
	120 Hour	$_____	$_____
62301	General labor		
	320 Hour	$_____	$_____
62406	Placing conserved topsoil		
	8,800 m3	$_____	$_____
62501B	Seeding, hydraulic method		
	32.0 ha	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
62504B	Mulching, hydraulic method		
	32.0 ha	$_____	$_____
62516	Fertilizer, hydraulic method		
	20.0 ha	$_____	$_____
62602	Remove and replant trees and shrubs		
	1,167 Each	$_____	$_____
62602C	Emergent plugs		
	100 Each	$_____	$_____
62613A	Container stock, 4 liter		
	18 Each	$_____	$_____
62613B	Container stock, 20 liter		
	4,457 Each	$_____	$_____
62614	Willow staking		
	23,000 Each	$_____	$_____
62701D	Salvaged sod (alpine)		
	4,700 m2	$_____	$_____
62901B	Erosion control mat type 2		
	2,100 m2	$_____	$_____
63304CC	Signs, aluminum panels, type 3 sheeting		
	27 m2	$_____	$_____
63305BA	Posts, wood 100 mm x 100 mm		
	175 m	$_____	$_____
63305BB	Posts, wood 100 mm x 150 mm		
	80 m	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
63306B	Object markers type 2		
	176		
	Each	$_____	$_____
63307A	Delineators type 1		
	303		
	Each	$_____	$_____
63307G	Delineators flexible		
	374		
	Each	$_____	$_____
63310	Installing government furnished sign		
	14		
	Each	$_____	$_____
63401BA	Pavement markings type B, solid		
	328		
	m	$_____	$_____
63406	Pavement markings, symbols		
	129		
	Each	$_____	$_____
63504C	Barricade type 3		
	35		
	m	$_____	$_____
63506A	Cone type A		
	50		
	Each	$_____	$_____
63507	Construction sign		
	80		
	m2	$_____	$_____
63508	Drum		
	150		
	Each	$_____	$_____
63509	Flagger		
	13,000		
	Hour	$_____	$_____
63510	Pilot car		
	4,200		
	Hour	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
63511	Temporary concrete barrier		
	800 m	$_____	$_____
63521B	Warning light type B		
	8 Each	$_____	$_____
63529	Temporary traffic signal system		
	2 Each	$_____	$_____
63543A	Traffic and safety supervisor		
	ALL	Lump Sum	$_____
65001	Landscaping logs		
	35 Each	$_____	$_____
66201	Rockfall fence system		
	70 m	$_____	$_____

TOTAL $_____

Submitted by: _____
Name of Bidder

SCHEDULE Z

CO PFH 80-1(1) & 2(2)
7TH STREET BRIDGE AND ROAD IMPROVEMENTS
PIKE AND ARAPAHOE NATIONAL FORESTS
CLEAR CREEK AND PARK COUNTIES, COLORADO

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
15101	Mobilization		
	ALL	Lump Sum	$_____
15201	Construction survey and staking		
	ALL	Lump Sum	$_____
15205	Bridge survey and staking		
	ALL	Lump Sum	$_____
15401	Contractor testing		
	ALL	Lump Sum	$_____
15501	Construction schedule		
	ALL	Lump Sum	$_____
15703	Silt fence		
	120 m	$_____	$_____
15725A	Temporary diversion channel		
	ALL	Lump Sum	$_____
15732	Sediment log		
	15 m	$_____	$_____
15801	Watering for dust control		
	40 m3	$_____	$_____
20103	Clearing and grubbing		
	100 m2	$_____	$_____
20301B	Removal of signs		
	1 Each	$_____	$_____
20305	Removal of structures and obstructions		
	ALL	Lump Sum	$_____
20307	Sawcutting pavement		
	50 m	$_____	$_____
20401	Roadway excavation		
	130 m3	$_____	$_____
20402	Subexcavation		
	40 m3	$_____	$_____

Bid Schedule Z

Project: PFH 80-1(1) & 2(2)
GEORGETOWN 7TH STREET BRIDGE AND ROAD IMPROVEMENTS

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
20405	Select borrow		
	70 m3	$_____	$_____
20804	Shoring and bracing		
	ALL	Lump Sum	$_____
25101E	Placed riprap class 5		
	75 m3	$_____	$_____
25101F	Placed riprap class 6		
	15 m3	$_____	$_____
25111	Placed individual boulders		
	20 Each	$_____	$_____
30802B	Roadway aggregate method 2		
	160 t	$_____	$_____
40201	Minor hot asphalt concrete		
	100 t	$_____	$_____
41101MB	Prime coat grade MC-70		
	0.6 t	$_____	$_____
41103	Blotter		
	3.3 t	$_____	$_____
41201CM	Tack coat grade CSS-1, CSS-1h, SS-1, or SS-1h		
	0.2 t	$_____	$_____
50101N	Reinforced portland cement concrete pavement, 150 mm depth		
	112 m2	$_____	$_____
55201A	Structural concrete class A (AE)		
	135 m3	$_____	$_____
55301BM	Precast, prestressed concrete structural members, slab, 955 width, 216 depth		
	4 Each	$_____	$_____

Bid Schedule Z

Project: PFH 80-1(1) & 2(2)
GEORGETOWN 7TH STREET BRIDGE AND ROAD IMPROVEMENTS

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
55301BN	Precast, prestressed concrete structural members, slab, 1000 width, 216 depth		
	5 Each	$_____	$_____
55401	Reinforcing steel		
	371 kg	$_____	$_____
55402	Epoxy coated reinforcing steel		
	5,951 kg	$_____	$_____
55601D	Timber bridge railing		
	27 m	$_____	$_____
55702	Treated structural timber and lumber		
	6.0 m3	$_____	$_____
60424B	Trench drain		
	18 m	$_____	$_____
60808	Concrete swale gutter		
	63 m2	$_____	$_____
60902N	Portland cement concrete curb and gutter, 150 mm depth		
	142 m	$_____	$_____
61906	Remove and reset fence		
	18 m	$_____	$_____
62101A	Right-of-way monument		
	3 Each	$_____	$_____
62401F	Furnishing and placing topsoil, 50 mm depth		
	70 m2	$_____	$_____
62502A	Seeding, dry method		
	70 m2	$_____	$_____

Pay Item No.	Estimated Quantity	Unit Bid Price	Amount Bid
62901B	Erosion control mat type 2		
	70 m2	$_____	$_____
63301	Sign installation		
	2 Each	$_____	$_____
63308A	Removing and resetting sign		
	7 Each	$_____	$_____
63504C	Barricade type 3		
	12 m	$_____	$_____
63507	Construction sign		
	15 m2	$_____	$_____
63508	Drum		
	20 Each	$_____	$_____
63509	Flagger		
	200 Hour	$_____	$_____
63801	Locate utilities		
	20 Each	$_____	$_____

TOTAL $_____

Submitted by: _____
Name of Bidder

SUMMARY SHEET

ALTERNATIVE I.

Schedule A subtotal $_____

Schedule Z subtotal $_____

OVERALL PROJECT BID TOTAL, ALTERNATIVE I. $_____

ALTERNATIVE II.

Schedule B subtotal $_____

Schedule Z subtotal $_____

OVERALL PROJECT BID TOTAL, ALTERNATIVE II. $_____

ALTERNATIVE III.

Schedule C subtotal $_____

Schedule Z subtotal $_____

OVERALL PROJECT BID TOTAL, ALTERNATIVE III. $_____

Continuation of Bid Schedule

BUY AMERICAN ACT

It is understood and agreed that the materials and components listed in Subpart 25.1 of the Federal Acquisition Regulations are a part of this contract and are deemed to be Domestic Construction Material for the purposes of this contract.

Note to Contractor:

The following information and any applicable supporting data is required for evaluation of requests under FAR 52.225-11 paragraph (c) & (d) and FAR 52.225-12 paragraph (b).

Item 1.

Construction Material Description	Unit of Measure	Quantity	Cost Delivered to Job Site
Foreign Construction Material			
Comparable Domestic Material			

Item 2.

Construction Material Description	Unit of Measure	Quantity	Cost Delivered to Job Site
Foreign Construction Material			
Comparable Domestic Material			

[Include all delivery costs to the construction site and any applicable duty (whether or not a duty-free entry certificate is issued).]*

Please include name, address, telephone number and contact for suppliers surveyed. Attach copy of response; if oral, attach summary.

HAZARDOUS MATERIALS

The following information and any applicable supporting data is required under FAR 52.223-3 paragraph (b) and defined under the latest version of Federal Standard No. 313.

Hazardous Material	Identification Number

BID BOND (See instructions on reverse)	DATE BOND EXECUTED (Must not be later than bid opening date)	OMB NO. 9000-0045

Public reporting burden for this collection of information is estimated to average 25 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the FAR Secretariat (MVR), Federal Acquisition Policy Division, GSA, Washington, D.C. 20405.

PRINCIPAL (Legal name and business address)	TYPE OF ORGANIZATION ("X" one) ☐ INDIVIDUAL ☐ PARTNERSHIP ☐ JOINT VENTURE ☐ CORPORATION STATE OF INCORPORATION

SURETY(IES) (Name and business address)

PENAL SUM OF BOND					BID IDENTIFICATION	
PERCENT OF BID PRICE	AMOUNT NOT TO EXCEED				BID DATE	INVITATION NO. CO PFH 80-1(1) & 2(2) GUANELLA PASS ROAD PHASE I
20 PERCENT	MILLION(S)	THOUSAND(S)	HUNDRED(S)	CENTS	FOR (Construction, Supplies or Services)	CONSTRUCTION

OBLIGATION:

We, the Principal and Surety(ies) are firmly bound to the United States of America (hereinafter called the Government) in the above penal sum. For payment of the penal sum, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally. However, where the Sureties are corporations acting as co-sureties, we, the Sureties, bind ourselves in such sum "jointly and severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us. For all other purposes, each Surety binds itself, jointly and severally with the Principal, for the payment of the sum shown opposite the name of the Surety. If no limit of liability is indicated, the limit of liability is the full amount of the penal sum.

CONDITIONS:

The Principal has submitted the bid identified above.

THEREFORE:

The above obligation is void if the Principal - (a) upon acceptance by the Government of the bid identified above, within the period specified therein for acceptance (sixty (60) days if no period is specified), executes the further contractual documents and gives the bond(s) required by the terms of the bid as accepted within the time specified (ten (10) days if no period is specified) after receipt of the forms by the principal; or (b) in the event of failure to execute such further contractual documents and give such bonds, pays the Government for any cost of procuring the work which exceeds the amount of the bid.

Each Surety executing this instrument agrees that its obligation is not impaired by any extension(s) of time for acceptance of the bid that the Principal may grant to the Government. Notice to the surety(ies) of extension(s) are waived. However, waiver of the notice applies only to extensions aggregating not more than sixty (60) calendar days in addition to the period originally allowed for acceptance of the bid.

WITNESS:

The Principal and Surety(ies) executed this bid bond and affixed their seals on the above date.

PRINCIPAL

SIGNATURE(S)	1. (Seal)	2. (Seal)	3. (Seal)	Corporate Seal
NAMES(S) & TITLE(S) (Typed)	1.	2.	3.	

INDIVIDUAL SURETY(IES)

SIGNATURE(S)	1. (Seal)	2. (Seal)
NAME(S) (Typed)	1.	2.

CORPORATE SURETY(IES)

SURETY A	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAMES(S) & TITLE(S) (Typed)	1.	2.		

CORPORATE SURETY(IES) (Continued)					
SURETY B	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAMES(S) & TITLE(S) (Typed)	1.	2.		
SURETY C	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAMES(S) & TITLE(S) (Typed)	1.	2.		
SURETY D	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAMES(S) & TITLE(S) (Typed)	1.	2.		
SURETY E	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAMES(S) & TITLE(S) (Typed)	1.	2.		
SURETY F	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAMES(S) & TITLE(S) (Typed)	1.	2.		
SURETY G	NAME & ADDRESS		STATE OF INC.	LIABILITY LIMIT $	Corporate Seal
	SIGNATURE(S)	1.	2.		
	NAMES(S) & TITLE(S) (Typed)	1.	2.		

INSTRUCTIONS

1. This form is authorized for use when a bid guaranty is required. Any deviation from this form will require the written approval of the Administrator of General Services.

2. Insert the full legal name and business address of the Principal in the space designated "Principal" on the face of the form. An authorized person shall sign the bond. Any person signing in a representative capacity (e.g., an attorney-in-fact) must furnish evidence of authority if that representative is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved.

3. The bond may express penal sum as a percentage of the bid price. In these cases, the bond may state a maximum dollar limitation (e.g., 20% of the bid price but the amount not to exceed _____ dollars).

4. (a) Corporations executing the bond as sureties must appear on the Department of the Treasury's list of approved sureties and must act within the limitation listed therein. Where more than one corporate surety is involved, their names and addresses shall appear in the spaces (Surety A, Surety B, etc.) headed "CORPORATE SURETY(IES)." In the space designated "SURETY(IES)" on the face of the form, insert only the letter identification of the sureties.

(b) Where individual sureties are involved, a completed Affidavit of Individual Surety (Standard Form 28), for each individual surety, shall accompany the bond. The Government may require the surety to furnish additional substantiating information concerning its financial capacity.

5. Corporations executing the bond shall affix their corporate seals. Individuals shall execute the bond opposite the word "Corporate Seal"; and shall affix an adhesive seal if executed in Maine, New Hampshire, or any other jurisdiction requiring adhesive seals.

6. Type the name and title of each person signing this bond in the space provided.

7. In its application to negotiated contracts, the terms "bid" and "bidder" shall include "proposal" and "offeror."

FEDERAL ACQUISITION REGULATION

SOLICITATION PROVISIONS

Representations and Certifications

The offeror makes the following representations and certifications as a part of its offer. (Check the appropriate boxes and fill in any required information on D-1 through D-14)

52.203-2 CERTIFICATE OF INDEPENDENT PRICE DETERMINATION. (APR 1985)

(a) The offeror certifies that -

(1) The prices in this offer have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other offeror or competitor relating to (i) those prices, (ii) the intention to submit an offer, or (iii) the methods or factors used to calculate the prices offered;

(2) The prices in this offer have not been and will not be knowingly disclosed by the offeror, directly or indirectly, to any other offeror or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the offeror to induce any other concern to submit or not to submit an offer for the purpose of restricting competition.

(b) Each signature on the offer is considered to be a certification by the signatory that the signatory -

(1) Is the person in the offeror's organization responsible for determining the prices being offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above; or

(2) (i) Has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above _____ (insert full name of person(s) in the offeror's organization responsible for determining the prices offered in this bid or proposal, and the title of his or her position in the offeror's organization);

(ii) As an authorized agent, does certify that the principals named in subdivision (b)(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above; and

(iii) As an agent, has not personally participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above.

(c) If the offeror deletes or modifies subparagraph (a)(2) above, the offeror must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

52.204-3 TAXPAYER IDENTIFICATION. (OCT 1998)

(a) Definitions.

"Common parent," as used in this provision, means that corporate entity that owns or controls an affiliated group of corporations that files its Federal income tax returns on a consolidated basis, and of which the offeror is a member.

"Taxpayer Identification Number (TIN)," as used in this provision, means the number required by the Internal Revenue Service (IRS) to be used by the offeror in reporting income tax and other returns. The TIN may be either a Social Security Number or an Employer Identification Number.

(b) All offerors must submit the information required in paragraphs (d) through (f) of this provision to comply with debt collection requirements of 31 U.S.C. 7701(c) and 3325(d), reporting requirements of 26 U.S.C. 6041, 6041A, and 6050M, and implementing regulations issued by the IRS. If the resulting contract is subject to the payment reporting requirements described in Federal Acquisition Regulation (FAR) 4.904, the failure or refusal by the offeror to furnish the information may result in a 31 percent reduction of payments otherwise due under the contract.

(c) The TIN may be used by the Government to collect and report on any delinquent amounts arising out of the offeror's relationship with the Government (31 U.S.C. 7701(c)(3)). If the resulting contract is subject to the payment reporting requirements described in FAR 4.904, the TIN provided hereunder may be matched with IRS records to verify the accuracy of the offeror's TIN.

(d) Taxpayer Identification Number (TIN).

_____ TIN: _____

_____ TIN has been applied for.

_____ TIN is not required because:

_____ Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the conduct of a trade or business in the United States and does not have an office or place of business or a fiscal paying agent in the United States;

_____ Offeror is an agency or instrumentality of a foreign government;

_____ Offeror is an agency or instrumentality of the Federal Government.

(e) Type of organization.

_____ Sole proprietorship;

_____ Partnership;

_____ Corporate entity (not tax-exempt);

_____ Corporate entity (tax-exempt);

_____ Government entity (Federal, State, or local);

_____ Foreign government;

_____ International organization per 26 CFR 1.6049-4;

_____ Other _____

(f) Common parent.

_____ Offeror is not owned or controlled by a common parent as defined in paragraph (a) of this provision.

_____ Name and TIN of common parent:

Name _____

TIN _____

52.204-5 WOMEN-OWNED BUSINESS (OTHER THAN SMALL BUSINESS) (MAY 1999)

(a) Definition.

"Women-owned business concern," as used in this provision, means a concern that is at least 51 percent owned by one or more women; or in the case of any publicly owned business, at least 51 percent of its stock is owned by one or more women; and whose management and daily business operations are controlled by one or more women.

(b) Representation. [Complete only if the offeror is a women-owned business concern and has not represented itself as a small business concern in paragraph (b)(1) of FAR 52.219-1, Small Business Program Representations, of this solicitation.] The offeror represents that it ____ is _____ is not a women-owned business concern.

52.209-5 CERTIFICATION REGARDING DEBARMENT, SUSPENSION, PROPOSED DEBARMENT, AND OTHER RESPONSIBILITY MATTERS. (DEC 2001)

(a) (1) The Offeror certifies, to the best of its knowledge and belief, that--

(i) The Offeror and/or any of its Principals--

(A) Are ___ are not ___ presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency;

(B) Have ___ have not ___, within the three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property;

(C) Are ___ are not ___ presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in paragraph (a)(1)(i)(B) of this provision; and

(ii) The Offeror has ___ has not ___, within a three-year period preceding this offer, had one or more contracts terminated for default by any Federal agency.

(2) "Principals," for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions).

THIS CERTIFICATION CONCERNS A MATTER WITHIN THE JURISDICTION OF AN AGENCY OF THE UNITED STATES AND THE MAKING OF A FALSE, FICTITIOUS, OR FRAUDULENT CERTIFICATION MAY RENDER THE MAKER SUBJECT TO PROSECUTION UNDER SECTION 1001, TITLE 18, UNITED STATES CODE.

(b) The Offeror shall provide immediate written notice to the Contracting Officer if, at any time prior to contract award, the Offeror learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(c) A certification that any of the items in paragraph (a) of this provision exists will not necessarily result in withholding of an award under this solicitation. However, the certification will be considered in connection with a determination of the Offeror's responsibility. Failure of the Offeror to furnish a certification or provide such additional information as requested by the Contracting Officer may render the Offeror nonresponsible.

(d) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and information of an Offeror is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror knowingly rendered an erroneous certification, in addition to other remedies available to the Government, the Contracting Officer may terminate the contract resulting from this solicitation for default.

52.219-1 SMALL BUSINESS PROGRAM REPRESENTATIONS (APR 2002)

(a) (1) The North American Industry Classification System (NAICS) code for this acquisition is 237310.

(2) The small business size standard is $28.5 million or fewer.

(3) The small business size standard for a concern which submits an offer in its own name, other than on a construction or service contract, but which proposes to furnish a product which it did not itself manufacture, is 500 employees.

(b) Representations.

(1) The offeror represents as part of its offer that it ____ is, _____ is not a small business concern.

(2) [Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.] The offeror represents, for general statistical purposes, that it _____ is, _____ is not, a small disadvantaged business concern as defined in 13 CFR 124.1002.

(3) [Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.] The offeror represents as part of its offer that it _____ is, _____ is not a women-owned small business concern.

(4) [Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.] The offeror represents as part of its offer that it _____ is, _____ is not a veteran-owned small business concern.

(5) [Complete only if the offeror represented itself as a veteran-owned small business concern in paragraph (b)(4) of this provision.] The offeror represents as part of its offer that it _____ is, _____ is not a service-disabled veteran-owned small business concern.

(6) [Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.] The offeror represents, as part of its offer, that-

(i) It _____ is, _____ is not a HUBZone small business concern listed, on the date of this representation, on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration, and no material change in ownership and control, principal office, or HUBZone employee percentage has occurred since it was certified by the Small Business Administration in accordance with 13 CFR part 126; and

(ii) It _____ is, _____ is not a joint venture that complies with the requirements of 13 CFR part 126, and the representation in paragraph (b)(6)(i) of this provision is accurate for the HUBZone small business concern or concerns that are participating in the joint venture. [The offeror shall enter the name or names of the HUBZone small business concern or concerns that are participating in the joint venture:_____.] Each HUBZone small business concern participating in the joint venture shall submit a separate signed copy of the HUBZone representation.

(c) Definitions. As used in this provision-

"Service-disabled veteran-owned small business concern"-

(1) Means a small business concern-

(i) Not less than 51 percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and

(ii) The management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a veteran with permanent and severe disability, the spouse or permanent caregiver of such veteran.

(2) Service-disabled veteran means a veteran, as defined in 38 U.S.C. 101(2), with a disability that is service-connected, as defined in 38 U.S.C. 101(16).

"Small business concern" means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria in 13 CFR part 121 and the size standard in paragraph (a) of this provision.

"Veteran-owned small business concern" means a small business concern-

(1) Not less than 51 percent of which is owned by one or more veterans (as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans; and

(2) The management and daily business operations of which are controlled by one or more veterans.

"Women-owned small business concern" means a small business concern-

(1) That is at least 51 percent owned by one or more women; or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and

(2) Whose management and daily business operations are controlled by one or more women.

(d) Notice.

(1) If this solicitation is for supplies and has been set aside, in whole or in part, for small business concerns, then the clause in this solicitation providing notice of the set-aside contains restrictions on the source of the end items to be furnished.

(2) Under 15 U.S.C. 645(d), any person who misrepresents a firm's status as a small, HUBZone small, small disadvantaged, or women-owned small business concern in order to obtain a contract to be awarded under the preference programs established pursuant to section 8(a), 8(d), 9, or 15 of the Small Business Act or any other provision of Federal law that specifically references section 8(d) for a definition of program eligibility, shall-

(i) Be punished by imposition of fine, imprisonment, or both;

(ii) Be subject to administrative remedies, including suspension and debarment; and

(iii) Be ineligible for participation in programs conducted under the authority of the Act.

52.219-2 EQUAL LOW BIDS. (OCT 1995)

(a) This provision applies to small business concerns only.

(b) The bidder's status as a labor surplus area (LSA) concern may affect entitlement to award in case of tie bids. If the bidder wishes to be considered for this priority, the bidder must identify, in the following space, the LSA in which the costs to be incurred on account of manufacturing or production (by the bidder or the first-tier subcontractors) amount to more than 50 percent of the contract price.

_____

_____

(c) Failure to identify the labor surplus area as specified in paragraph (b) of this provision will preclude the bidder from receiving priority consideration. If the bidder is awarded a contract as a result of receiving priority consideration under this provision and would have otherwise received award, the bidder shall perform the contract or cause the contract to be performed in accordance with the obligations of an LSA concern.

52.219-19 SMALL BUSINESS CONCERN REPRESENTATION FOR THE SMALL BUSINESS COMPETITIVENESS DEMONSTRATION PROGRAM (OCT 2000) Deviated

Note to Contractor: If you require specifics about self certification for emerging small business, consult your telephone directory under Federal Government for the U.S. Small Business Administration's Office in your area. If you prefer, the Denver SBA Office would welcome your call at (303) 844-0513. You can locate the size standards on the following web site, http://www.sba.gov/size

The applicable small business concern size standard is North American Industry Classification System, NAICS Industry Code 234110 for highways and streets or 234120 for bridges and tunnels, Highway and Street Construction (formerly Standard Industrial Classification, Division C, Contract Construction, Code1611 for highways and 1622 for bridges), for which the concern's average annual receipts for its preceding three fiscal years do not exceed $27.5 million. The emerging small business size standard is $13.75 million or fewer.

In paragraph (c) below, please fill out only Average Annual Gross Revenue. Number of Employees is not required and may be left blank.

(a) Definition. "Emerging small business" as used in this solicitation, means a small business concern whose size is no greater than 50 percent of the numerical size standard applicable to the North American Industry Classification System (NAICS) code assigned to a contracting opportunity.

(b) [Complete only if the Offeror has represented itself under the provision at 52.219-1 as a small business concern under the size standards of this solicitation.] The Offeror ____ is, ____ is not an emerging small business.

(c) [Complete only if the Offeror is a small business or an emerging small business, indicating its size range.] Offeror's number of employees for the past 12 months [check this column if size standard stated in solicitation is expressed in terms of number of employees] or Offeror's average annual gross revenue for the last 3 fiscal years [check this column if size standard stated in solicitation is expressed in terms of annual receipts].

[Check one of the following.]

No. of Employees		Avg. Annual Gross Revenues	
____	50 or fewer	____	$1 million or less
____	51 - 100	____	$1,000,001 - $2 million
____	101 - 250	____	$2,000,001 - $3.5 million
____	251 - 500	____	$3,500,001 - $5 million
____	501 - 750	____	$5,000,001 - $10 million
____	751 - 1,000	____	$10,000,001 - $17 million
____	Over 1,000	____	Over $17 million

52.219-22 SMALL DISADVANTAGED BUSINESS STATUS. (OCT 1999) ALTERNATE I (OCT 1998)

(a) General. This provision is used to assess an offeror's small disadvantaged business status for the purpose of obtaining a benefit on this solicitation. Status as a small business and status as a small disadvantaged business for general statistical purposes is covered by the provision at FAR 52.219-1, Small Business Program Representations.

(b) Representations.

(1) General. The offeror represents, as part of its offer, that it is a small business under the size standard applicable to this acquisition; and either--

____ (i) It has received certification by the Small Business Administration as a small disadvantaged business concern consistent with 13 CFR 124, Subpart B; and

(A) No material change in disadvantaged ownership and control has occurred since its certification;

(B) Where the concern is owned by one or more disadvantaged individuals, the net worth of each individual upon whom the certification is based does not exceed $750,000 after taking into account the applicable exclusions set forth at 13 CFR 124.104(c)(2); and

(C) It is identified, on the date of its representation, as a certified small disadvantaged business concern in the database maintained by the Small Business Administration (PRO-Net); or

____ (ii) It has submitted a completed application to the Small Business Administration or a Private Certifier to be certified as a small disadvantaged business concern in accordance with 13 CFR 124, Subpart B, and a decision on that application is pending, and that no material change in disadvantaged ownership and control has occurred since its application was submitted.

(2) ____ For Joint Ventures. The offeror represents, as part of its offer, that it is a joint venture that complies with the requirements at 13 CFR 124.1002(f) and that the representation in paragraph (b)(1) of this provision is accurate for the small disadvantaged business concern that is participating in the joint venture. [The offeror shall enter the name of the small disadvantaged business concern that is participating in the joint venture:_____.]

(3) Address. The offeror represents that its address ____ is, ____ is not in a region for which a small disadvantaged business procurement mechanism is authorized and its address has not changed since its certification as a small disadvantaged business concern or submission of its application for certification. The list of authorized small disadvantaged business procurement mechanisms and regions is posted at **http://www.arnet.gov/References/sdbadjustments.htm**. The offeror shall use the list in effect on the date of this solicitation. "Address," as used in this provision, means the address of the offeror as listed on the Small Business Administration's register of small disadvantaged business concerns or the address on the completed application that the concern has submitted to the Small Business Administration or a Private Certifier in accordance with 13 CFR part 124, subpart B. For joint ventures, "address" refers to the address of the small disadvantaged business concern that is participating in the joint venture.

(c) Penalties and Remedies. Anyone who misrepresents any aspects of the disadvantaged status of a concern for the purposes of securing a contract or subcontract shall--

(1) Be punished by imposition of a fine, imprisonment, or both;

(2) Be subject to administrative remedies, including suspension and debarment; and

(3) Be ineligible for participation in programs conducted under the authority of the Small Business Act.

52.222-22 PREVIOUS CONTRACTS AND COMPLIANCE REPORTS. (FEB 1999)

The offeror represents that--

(a) It _____ has, _____ has not participated in a previous contract or subcontract subject the Equal Opportunity clause of this solicitation;

(b) It _____ has, _____ has not filed all required compliance reports; and

(c) Representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained before subcontract awards.

52.223-13 CERTIFICATION OF TOXIC CHEMICAL RELEASE REPORTING (AUG 2003)

(a) Executive Order 13148, of April 21, 2000, Greening the Government through Leadership in Environmental Management, requires submission of this certification as a prerequisite for contract award.

(b) By signing this offer, the offeror certifies that--

(1) As the owner or operator of facilities that will be used in the performance of this contract that are subject to the filing and reporting requirements described in section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11023) and section 6607 of the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13106), the offeror will file and continue to file for such facilities for the life of the contract the Toxic Chemical Release Inventory Form (Form R) as described in sections 313(a) and (g) of EPCRA and section 6607 of PPA; or

(2) None of its owned or operated facilities to be used in the performance of this contract is subject to the Form R filing and reporting requirements because each such facility is exempt for at least one of the following reasons: [Check each block that is applicable.]

____ (i) The facility does not manufacture, process, or otherwise use any toxic chemicals listed in 40 CFR 372.65;

____ (ii) The facility does not have 10 or more full-time employees as specified in section 313(b)(1)(A) of EPCRA, 42 U.S.C. 11023(b)(1)(A);

____ (iii) The facility does not meet the reporting thresholds of toxic chemicals established under section 313(f) of EPCRA, 42 U.S.C. 11023(f) (including the alternate thresholds at 40 CFR 372.27, provided an appropriate certification form has been filed with EPA);

____ (iv) The facility does not fall within the following Standard Industrial Classification (SIC) codes or their corresponding North American Industry Classification System (NAICS) sectors:

(A) Major group code 10 (except 1011, 1081, and 1094.
(B) Major group code 12 (except 1241).
(C) Major group codes 20 through 39.
(D) Industry code 4911, 4931, or 4939 (limited to facilities that combust coal and/or oil for the purpose of generating power for distribution in commerce).
(E) Industry code 4953 (limited to facilities regulated under the Resource Conservation and Recovery Act, Subtitle C (42 U.S.C. 6921, *et seq*.), or 5169, or 5171, or 7389 (limited to facilities primarily engaged in solvent recovery services on a contract or fee basis); or

____ (v) The facility is not located within any State of the United States or its outlying areas.

****

FEDERAL HIGHWAY ADMINISTRATION
CENTRAL FEDERAL LANDS HIGHWAY DIVISION
555 Zang Street, Room 259
Lakewood, Colorado 80228

BIDDER'S QUALIFICATIONS

INSTRUCTIONS: Answer all questions on this form inserting "none" or "not applicable" where appropriate. If more space is required attach additional sheets. Return the signed, dated and completed form with the bid to the address shown in the invitation for bids on or before the time set for bid opening. The prospective bidder shall provide any additional information requested by the Government during evaluation of the bids.

If the prospective bidder is a joint venture or general partnership, a separate Bidder's Qualifications form shall be provided individually for each joint venture participant or partner.

1. Name and address of business:

Name _____

Street _____

City _____ State _____ Zip Code _____

County _____

Telephone Number (Include Area Code) _____

Fax Number (Include Area Code) _____

DUNS Number * _____

Home Office Congressional District (Insert District #) * _____

* Necessary for Government reporting purposes

2. a. Type of organization (check appropriate box):

☐ Individual ☐ Non-profit organization ☐ Corporation

☐ Partnership ☐ Joint Venture ☐ Incorporated in: _____

If a Foreign entity:

☐ Individual ☐ Non-profit organization ☐ Corporation

☐ Partnership ☐ Joint Venture ☐ Registered in: _____

b. Size and type of Business Concern (check appropriate boxes):

☐ Large Business Concern ☐ Small Disadvantaged Business Concern ☐ Emerging Small Business

☐ Small Business Concern ☐ Women-Owned Small Business ☐ SBA 8(a) Certified

☐ HUB Zone Business Concern ☐ Veteran Owned Business Concern ☐ Service-Disabled Veteran-Owned Business Concern

3. If a joint venture or general partnership:

   a. Provide the name under which the project will be bid, the home office address, and name of the principal who will represent the company with regard to this project if different from "1." above.

   _____
   Principal

   _____
   Business Name

   _____
   Street

   _____
   City State Zip Code

   b. Provide the name and home office addresses of each of the joint venture partners; indicate which partner is the sponsoring partner. Attach a separate sheet for additional partners.

Sponsoring Partner	Other Partner
Street	Street
City State Zip Code	City State Zip Code

4. Date organization established:_____

5. Name of succeeded business, if any: _____

6. How many years have you been in business as:

   a. General contractor ___ years.

   b. Subcontractor ___ years.

7. a. Furnish the following information concerning the owner, partners, officers and directors:

Name	Title	Percent of Business Owned	Years of Business Experience	
			Contracting	Other

   b. Attach resumes of these key personnel as well as the on-site project manager(s) and superintendent(s), and specifically identify the following:

- Present position, responsibility, and length of employment.
- Amount and type of construction experience.
- Amount and type of highway construction experience, including position, responsibility, and a brief project description of each period of employment.
- Formal education and training, professional or technical registrations or licenses.

8. a. Contracts in force. (Attach additional sheets if necessary)

Project Name and Contract Numbers	Owner's Name, Address, and Contact Name and Telephone #	Scope of Work Performed	Contract Amount	Estimated Completion Date	Name of Surety

b. Are there any unresolved claims or lawsuits associated with these projects? If so, state the amount in dispute, parties involved, nature and circumstances of the dispute, and status of the matter on a separate sheet.

9. a. List at least five of the largest jobs you have completed in the last five years which are similar in project work scope to this project. (Attach additional sheets if necessary)

Project Name and Contract Numbers	Owner's Name, Address, Contact Name and Telephone #	Scope of Work Performed	Original and Final Contract Amounts	Original and Final Completion Dates	Names of On-site Project Manager and Superintendent	Name of Surety

b. Are there any unresolved claims or lawsuits associated with these projects? If so, state the amount in dispute, parties involved, nature and circumstances of the dispute, and status of the matter on a separate sheet.

10. Termination:

    a. Has your firm ever had a contract terminated for any reason? _____

    b. If the answer is yes, identify the project and owner for each termination, and explain the circumstances surrounding each termination. Attach additional sheet if necessary.

    _____

    _____

    _____

    _____

11. Debarment and Suspension:

    a. Has your firm or any of the principals been suspended or debarred from bidding by any agency? _____

    b. If the answer is yes, identify the agency by which debarred or suspended, and date of reinstatement. Attach additional sheet if necessary.

    _____

    _____

    _____

12. What types of work do you perform as general contractor?

    _____
    _____
    _____

13. What types of work do you perform as subcontractor?

    _____
    _____
    _____

14. What types of work do you generally sublet?

    _____
    _____
    _____

15. Affidavit:

    Certification: For the purpose of establishing construction capabilities, we furnish the above as a true and correct statement of our construction experience and further certify that all other statements are true and correct.

    _____
    Business Name

    _____ _____
    By (Signature of Authorized Official)

    _____ _____
    Date Title

FEDERAL ACQUISITION REGULATION

SOLICITATION PROVISIONS

Instructions to Bidders

52.252-1 SOLICITATION PROVISIONS INCORPORATED BY REFERENCE. (FEB 1998)

This solicitation incorporates one or more solicitation provisions by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. The offeror is cautioned that the listed provisions may include blocks that must be completed by the offeror and submitted with its quotation or offer. In lieu of submitting the full text of those provisions, the offeror may identify the provision by paragraph identifier and provide the appropriate information with its quotation or offer. Also the full text of a solicitation provision may be accessed electronically at this address: http://www.arnet.gov/far/.

52.203-11 CERTIFICATION AND DISCLOSURE REGARDING PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (APR 1991)

52.204-6 DATA UNIVERSAL NUMBERING SYSTEM (DUNS) NUMBER (OCT 2003)

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

52.214-4 FALSE STATEMENTS IN BIDS. (APR 1984)

52.214-5 SUBMISSION OF BIDS (MAR 1997)

52.214-6 EXPLANATION TO PROSPECTIVE BIDDERS. (APR 1984)

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

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

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

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

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

52.223-4 RECOVERED MATERIAL CERTIFICATION (OCT 1997)

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

52.211-4 AVAILABILITY FOR EXAMINATION OF SPECIFICATIONS NOT LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS. (JUN 1988)

Specifications cited in this solicitation which are not available for distribution may be examined at the following location:

Federal Highway Administration
Central Federal Lands Highway Division
555 Zang Street, 4th Floor Lehigh Building
Lakewood, Colorado 80228
Contact: Lori K Rivera @ (303) 716-2015 or Brenda McGehee @ (303) 716-2080

52.216-1 TYPE OF CONTRACT. (APR 1984)

The Government contemplates award of a firm-fixed price contract resulting from this solicitation.

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

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

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

Goals for minority participation for each trade	Goals for female participation for each trade
12.8% Clear Creek and Park Counties	6.9%

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

(c) The Contractor's compliance with Executive Order 11246, as amended, and the regulations in 41 CFR 60-4 shall be based on

(1) its implementation of the Equal Opportunity clause,

(2) specific affirmative action obligations required by the clause entitled "Affirmative Action Compliance Requirements for Construction," and

(3) its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade. The Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor, or from project to project, for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, Executive Order 11246, as amended, and the regulations in 41 CFR 60-4. Compliance with the goals will be measured against the total work hours performed.

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

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

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

(3) Estimated dollar amount of the subcontract;

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

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

(e) As used in this Notice, and in any contract resulting from this solicitation, the "covered area" is Clear Creek and Park Counties, Colorado .

52.225-12 NOTICE OF BUY AMERICAN ACT REQUIREMENT-CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS. (May 2002)

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

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

(c) *Evaluation of offers*.

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

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

(d) *Alternate offers*.

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

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

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

(i) Will be rejected as nonresponsive if this acquisition is conducted by sealed bidding; or
(ii) May be accepted if revised during negotiations.

52.228-1 BID GUARANTEE. (SEP 1996)

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

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

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

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

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

52.233-2 SERVICE OF PROTEST. (AUG 1996)

(a) Protests, as defined in section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the General Accounting Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgment of receipt from:

Suzanne M. Schmidt, P.E.
Contract Development Engineer
Central Federal Lands Highway Division
555 Zang Street, Room 259
Lakewood, Colorado 80228

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

52.252-5 AUTHORIZED DEVIATIONS IN PROVISIONS. (APR 1984)

(a) The use in this solicitation of any Federal Acquisition Regulation (48 CFR Chapter 1) provision with an authorized deviation is indicated by the addition of "(DEVIATION)" after the date of the provision.

(b) The use in this solicitation of any Transportation Acquisition Regulations (48 CFR Chapter 12) provision with an authorized deviation is indicated by the addition of "(DEVIATION)" after the name of the regulation.

FEDERAL ACQUISITION REGULATION
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52.252-2 CLAUSES INCORPORATED BY REFERENCE. (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also the full text of a clause may be accessed electronically at this address: http://www.arnet.gov/far/.

52.202-1 DEFINITIONS. (DEC 2001)--ALTERNATE I (MAY 2001)

52.203-3 GRATUITIES. (APR 1984)

52.203-5 COVENANT AGAINST CONTINGENT FEES. (APR 1984)

52.203-7 ANTI-KICKBACK PROCEDURES. (JUL 1995)

52.203-8 CANCELLATION, RESCISSION, AND RECOVERY OF FUNDS FOR ILLEGAL OR IMPROPER ACTIVITY (JAN 1997)

52.203-10 PRICE OR FEE ADJUSTMENT FOR ILLEGAL OR IMPROPER ACTIVITY (JAN 1997)

52.203-12 LIMITATION ON PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS. (JUN 2003)

52.204-4 PRINTING/COPYING DOUBLE-SIDED ON RECYCLED PAPER. (AUG 2000)

52.209-6 PROTECTING THE GOVERNMENT'S INTEREST WHEN SUBCONTRACTING WITH CONTRACTORS DEBARRED, SUSPENDED, OR PROPOSED FOR DEBARMENT. (JUL 1995)

52.211-5 MATERIAL REQUIREMENTS. (AUG 2000)

52.211-13 TIME EXTENSIONS. (SEPT 2000)

52.211-18 VARIATION IN ESTIMATED QUANTITY. (APR 1984)

52.214-26 AUDIT AND RECORDS--SEALED BIDDING. (OCT 1997)

52.214-27 PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA - MODIFICATIONS - SEALED BIDDING. (OCT 1997)

52.214-28 SUBCONTRACTOR COST OR PRICING DATA - MODIFICATIONS - SEALED BIDDING. (OCT 1997)

52.215-21 REQUIREMENTS FOR COST OR PRICING DATA OR INFORMATION OTHER THAN COST OR PRICING DATA--MODIFICATIONS.--(OCT 1997)--ALTERNATE I (OCT 1997)

52.219-4 NOTICE OF PRICE EVALUATION PREFERENCE FOR HUBZONE SMALL BUSINESS CONCERNS (JAN 1999) __10%__ **Offeror elects to waive the evaluation. _____**

52.219-8 UTILIZATION OF SMALL BUSINESS CONCERNS. (OCT 2000)

52.219-9 SMALL BUSINESS SUBCONTRACTING PLAN (JAN 2002) -- ALTERNATE I (OCT 2001)

52.219-16 LIQUIDATED DAMAGES-SUBCONTRACTING PLAN. (JAN 1999)

52.222-3 CONVICT LABOR. (JUN 2003)

52.222-4 CONTRACT WORK HOURS AND SAFETY STANDARDS ACT - OVERTIME COMPENSATION. (SEPT 2000)

52.222-6 DAVIS-BACON ACT. (FEB 1995)

52.222-7 WITHHOLDING OF FUNDS. (FEB 1988)

52.222-8 PAYROLLS AND BASIC RECORDS. (FEB 1988)

52.222-9 APPRENTICES AND TRAINEES. (FEB 1988)

52.222-10 COMPLIANCE WITH COPELAND ACT REQUIREMENTS. (FEB 1988)

52.222-11 SUBCONTRACTS (LABOR STANDARDS). (FEB 1988)

52.222-12 CONTRACT TERMINATION-DEBARMENT. (FEB 1988)

52.222-13 COMPLIANCE WITH DAVIS-BACON AND RELATED ACT REGULATIONS. (FEB 1988)

52.222-14 DISPUTES CONCERNING LABOR STANDARDS. (FEB 1988)

52.222-15 CERTIFICATION OF ELIGIBILITY. (FEB 1988)

52.222-21 PROHIBITION OF SEGREGATED FACILITIES (FEB 1999)

52.222-26 EQUAL OPPORTUNITY. (APR 2002)

52.222-27 AFFIRMATIVE ACTION COMPLIANCE REQUIREMENTS FOR CONSTRUCTION. (FEB 1999)

52.222-35 EQUAL OPPORTUNITY FOR SPECIAL DISABLED VETERANS, VETERANS OF THE VIETNAM ERA, AND OTHER ELIGIBLE VETERANS. (DEC 2001)

52.222-36 AFFIRMATIVE ACTION FOR WORKERS WITH DISABILITIES. (JUN 1998)

52.222-37 EMPLOYMENT REPORTS ON SPECIAL DISABLED VETERANS, VETERANS OF THE VIETNAM ERA, AND OTHER ELIGIBLE VETERANS. (DEC 2001)

52.223-3 HAZARDOUS MATERIAL IDENTIFICATION AND MATERIAL SAFETY DATA. (JAN 1997) -- ALTERNATE I (JUL 1995) **(See Buy American Page, Section "B")**
Material _____ , I.D. No. _____

52.223-5 POLLUTION PREVENTION AND RIGHT TO KNOW INFORMATION. (AUG 2003)

52.223-6 DRUG-FREE WORKPLACE (MAY 2001)

52.223-14 TOXIC CHEMICAL RELEASE REPORTING. (AUG 2003)

52.225-13 RESTRICTIONS ON CERTAIN FOREIGN PURCHASES. (JUN 2003)

52.227-1 AUTHORIZATION AND CONSENT. (JUL 1995)

52.227-2 NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT. (AUG 1996)

52.227-4 PATENT INDEMNITY - CONSTRUCTION CONTRACTS. (APR 1984)

52.228-2 ADDITIONAL BOND SECURITY. (OCT 1997)

52.228-11 PLEDGES OF ASSETS. (FEB 1992)

52.228-12 PROSPECTIVE SUBCONTRACTOR REQUESTS FOR BONDS. (OCT 1995)

52.228-15 PERFORMANCE AND PAYMENT BONDS—CONSTRUCTION (JUL 2000)

52.229-3 FEDERAL, STATE, AND LOCAL TAXES. (APR 2003)

52.232-5 PAYMENTS UNDER FIXED - PRICE CONSTRUCTION CONTRACTS. (SEPT 2002)

52.232-17 INTEREST. (JUN 1996)

52.232-23 ASSIGNMENT OF CLAIMS. (JAN 1986)

52.232-27 PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS. (OCT 2003)

52.232-33 PAYMENT BY ELECTRONIC FUNDS TRANSFER--CENTRAL CONTRACTOR REGISTRATION (OCT 2003)

52.233-1 DISPUTES. (JUL 2002) -- ALTERNATE I (JUL 2002)

52.233-3 PROTEST AFTER AWARD. (AUG 1996)

52.236-1 PERFORMANCE OF WORK BY THE CONTRACTOR. (APR 1984) 50%

52.236-2 DIFFERING SITE CONDITIONS. (APR 1984)

52.236-3 SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK. (APR 1984)

52.236-5 MATERIAL AND WORKMANSHIP. (APR 1984)

52.236-6 SUPERINTENDENCE BY THE CONTRACTOR. (APR 1984)

52.236-7 PERMITS AND RESPONSIBILITIES. (NOV 1991)

52.236-8	OTHER CONTRACTS. (APR 1984)
52.236-9	PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS. (APR 1984)
52.236-10	OPERATIONS AND STORAGE AREAS. (APR 1984)
52.236-11	USE AND POSSESSION PRIOR TO COMPLETION. (APR 1984)
52.236-12	CLEANING UP. (APR 1984)
52.236-13	ACCIDENT PREVENTION. (NOV 1991) -- ALTERNATE I (NOV 1991)
52.236-15	SCHEDULES FOR CONSTRUCTION CONTRACTS. (APR 1984)
52.236-17	LAYOUT OF WORK. (APR 1984)
52.236-21	SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FEB 1997)
52.236-26	PRECONSTRUCTION CONFERENCE. (FEB 1995)
52.242-13	BANKRUPTCY. (JUL 1995)
52.242-14	SUSPENSION OF WORK. (APR 1984)
52.243-4	CHANGES. (AUG 1987)
52.243-6	CHANGE ORDER ACCOUNTING. (APRIL 1984)
52.245-1	PROPERTY RECORDS. (APR 1984)
52.245-2	GOVERNMENT PROPERTY (FIXED-PRICE CONTRACTS). (JUN 2003)
52.246-12	INSPECTION OF CONSTRUCTION. (AUG 1996)
52.248-3	VALUE ENGINEERING - CONSTRUCTION. (FEB 2000) -- ALTERNATE I (APR 1984)
52.249-2	TERMINATION FOR CONVENIENCE OF THE GOVERNMENT (FIXED-PRICE). (SEP 1996) -- ALTERNATE I (SEP 1996)
52.249-10	DEFAULT (FIXED-PRICE CONSTRUCTION). (APR 1984)
52.253-1	COMPUTER GENERATED FORMS. (JAN 1991)
1252.211-71	INDEX FOR SPECIFICATIONS. (OCT 1996)
1252.219-70	SMALL BUSINESS AND SMALL DISADVANTAGED BUSINESS SUBCONTRACTING REPORTING. (JUN 1997)
1252.242-73	CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE (OCT 1994)

52.204-1 APPROVAL OF CONTRACT (DEC 1989)

This contract is subject to the written approval of the Central Federal Lands Division Engineer and shall not be binding until so approved.

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

The Contractor shall be required to (a) commence work under this contract within __10__ calendar days after the date the Contractor receives the notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than (See Standard Form 1442). The time stated for completion shall include final cleanup of the premises.

The completion date is based on the assumption that the successful offeror will receive the notice to proceed by the 70th day following the bid opening. The completion date will be extended by the number of calendar days after the above date that the Contractor receives the notice to proceed, except to the extent that the delay in issuance of the notice to proceed results from the failure of the Contractor to execute the contract and give the required performance and payment bonds within the time specified in the offer.

52.211-12 LIQUIDATED DAMAGES - CONSTRUCTION. (SEPT 2000)

(a) If the Contractor fails to complete the work within the time specified in the contract, the Contractor shall pay liquidated damages to the Government in the amount of (See FP-96, Subsection 108.04, Page I-24) for each calendar day of delay until the work is completed or accepted.

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

52.219-23 NOTICE OF PRICE EVALUATION ADJUSTMENT FOR SMALL DISADVANTAGED BUSINESS CONCERNS. (JUNE 2003)

(a) Definitions. As used in this clause-

"Small disadvantaged business concern" means an offeror that represents, as part of its offer, that it is a small business under the size standard applicable to this acquisition; and either-

(1) It has received certification by the Small Business Administration as a small disadvantaged business concern consistent with 13 CFR part 124, subpart B; and

(i) No material change in disadvantaged ownership and control has occurred since its certification;

(ii) Where the concern is owned by one or more disadvantaged individuals, the net worth of each individual upon whom the certification is based does not exceed $750,000 after taking into account the applicable exclusions set forth at 13 CFR 124.104(c)(2); and

(iii) It is identified, on the date of its representation, as a certified small disadvantaged business concern in the database maintained by the Small Business Administration (PRO-Net).

(2) It has submitted a completed application to the Small Business Administration or a Private Certifier to be certified as a small disadvantaged business concern in accordance with 13 CFR part 124, subpart B, and a decision on that application is pending, and that no material change in disadvantaged ownership and control has occurred since its application was submitted. In this case, in order to receive the benefit of a price evaluation adjustment, an offeror must receive certification as a small disadvantaged business concern by the Small Business Administration prior to contract award; or

(3) Is a joint venture as defined in 13 CFR 124.1002(f).

"Historically black college or university" means an institution determined by the Secretary of Education to meet the requirements of 34 CFR 608.2. For the Department of Defense (DoD), the National Aeronautics and Space Administration (NASA), and the Coast Guard, the term also includes any nonprofit research institution that was an integral part of such a college or university before November 14, 1986.

"Minority institution" means an institution of higher education meeting the requirements of Section 1046(3) of the Higher Education Act of 1965 (20 U.S.C. 1067k, including a Hispanic-serving institution of higher education, as defined in Section 316(b)(1) of the Act (20 U.S.C. 1101a)).

(b) Evaluation adjustment.

(1) The Contracting Officer will evaluate offers by adding a factor of __10__ [Contracting Officer insert the percentage] percent to the price of all offers, except-

(i) Offers from small disadvantaged business concerns, that have not waived the adjustment, whose address is in a region for which an evaluation adjustment is authorized;

(ii) An otherwise successful offer of eligible products under the Trade Agreements Act when the dollar threshold for application of the Act is equaled or exceeded (see section 25.402 of the Federal Acquisition Regulation (FAR));

(iii) An otherwise successful offer where application of the factor would be inconsistent with a Memorandum of Understanding or other international agreement with a foreign government;

(iv) For DoD, NASA, and Coast Guard acquisitions, an otherwise successful offer from a historically black college or university or minority institution; and

(v) For DoD acquisitions, an otherwise successful offer of qualifying country end products (see sections 225.000-70 and 252.225-7001 of the Defense FAR Supplement).

(2) The Contracting Officer will apply the factor to a line item or a group of line items on which award may be made. The Contracting Officer will apply other evaluation factors described in the solicitation before application of the factor. The factor may not be applied if using the adjustment would cause the contract award to be made at a price that exceeds the fair market price by more than the factor in paragraph (b)(1) of this clause.

(c) Waiver of evaluation adjustment. A small disadvantaged business concern may elect to waive the adjustment, in which case the factor will be added to its offer for evaluation purposes. The agreements in paragraph (d) of this clause do not apply to offers that waive the adjustment.

_____ Offeror elects to waive the adjustment.

(d) Agreements.

(1) A small disadvantaged business concern, that did not waive the adjustment, agrees that in performance of the contract, in the case of a contract for-

(i) Services, except construction, at least 50 percent of the cost of personnel for contract performance will be spent for employees of the concern;

(ii) Supplies (other than procurement from a nonmanufacturer of such supplies), at least 50 percent of the cost of manufacturing, excluding the cost of materials, will be performed by the concern;

(iii) General construction, at least 15 percent of the cost of the contract, excluding the cost of materials, will be performed by employees of the concern; or

(iv) Construction by special trade contractors, at least 25 percent of the cost of the contract, excluding the cost of materials, will be performed by employees of the concern.

(2) A small disadvantaged business concern submitting an offer in its own name shall furnish in performing this contract only end items manufactured or produced by small disadvantaged business concerns in the United States or its outlying areas. This paragraph does not apply to construction or service contracts.

52.225-11 Buy American Act-Construction Materials under Trade Agreements. (June 2003)

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

"Component" means an article, material, or supply incorporated directly into a construction material.

"Construction material" means an article, material, or supply brought to the construction site by the Contractor or subcontractor for incorporation into the building or work. The term also includes an item brought to the site preassembled from articles, materials, or supplies. However, emergency life safety systems, such as emergency lighting, fire alarm, and audio evacuation systems, that are

discrete systems incorporated into a public building or work and that are produced as complete systems, are evaluated as a single and distinct construction material regardless of when or how the individual parts or components of those systems are delivered to the construction site. Materials purchased directly by the Government are supplies, not construction material.

"Cost of components" means-

(1) For components purchased by the Contractor, the acquisition cost, including transportation costs to the place of incorporation into the construction material (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued); or

(2) For components manufactured by the Contractor, all costs associated with the manufacture of the component, including transportation costs as described in paragraph (1) of this definition, plus allocable overhead costs, but excluding profit. Cost of components does not include any costs associated with the manufacture of the end product.

"Designated country" means any of the following countries:

Aruba	Kiribati
Austria	Korea, Republic of
Bangladesh	Lesotho
Belgium	Liechtenstein
Benin	Luxembourg
Bhutan	Malawi
Botswana	Maldives
Burkina Faso	Mali
Burundi	Mozambique
Canada	Nepal
Cape Verde	Netherlands
Central African Republic	Niger
Chad	Norway
Comoros	Portugal
Denmark	Rwanda
Djibouti	Sao Tome and Principe
Equatorial Guinea	Sierra Leone
Finland	Singapore
France	Somalia
Gambia	Spain
Germany	Sweden
Greece	Switzerland
Guinea	Tanzania U.R.
Guinea-Bissau	Togo
Haiti	Tuvalu

Hong Kong	Uganda
Iceland	United Kingdom
Ireland	Vanuatu
Israel	Western Samoa
Italy	Yemen
Japan	

"Designated country construction material" means a construction material that-

(1) Is wholly the growth, product, or manufacture of a designated country; or

(2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a designated country into a new and different construction material distinct from the materials from which it was transformed.

"Domestic construction material" means-

(1) An unmanufactured construction material mined or produced in the United States; or

(2) A construction material manufactured in the United States, if the cost of its components mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. Components of foreign origin of the same class or kind for which nonavailability determinations have been made are treated as domestic.

"Foreign construction material" means a construction material other than a domestic construction material.

"North American Free Trade Agreement country" means Canada or Mexico.

"North American Free Trade Agreement country construction material" means a construction material that-

(1) Is wholly the growth, product, or manufacture of a North American Free Trade Agreement (NAFTA) country; or

(2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a NAFTA country into a new and different construction material distinct from the materials from which it was transformed.

"United States" means the 50 States, the District of Columbia, and outlying areas.

(b) *Construction materials*.

(1) This clause implements the Buy American Act (41 U.S.C. 10a - 10d) by providing a preference for domestic construction material. In addition, the Contracting Officer has determined that the Trade Agreements Act and the North American Free Trade Agreement (NAFTA) apply to this acquisition. Therefore, the Buy American Act restrictions are waived for designated country and NAFTA country construction materials.

(2) The Contractor shall use only domestic, designated country, or NAFTA country construction material in performing this contract, except as provided in paragraphs (b)(3) and (b)(4) of this clause.

(3) The requirement in paragraph (b)(2) of this clause does not apply to the construction materials or components listed by the Government as follows:

_____

[*Contracting Officer to list applicable excepted materials or indicate "none"*]

(4) The Contracting Officer may add other foreign construction material to the list in paragraph (b)(3) of this clause if the Government determines that-

(i) The cost of domestic construction material would be unreasonable. The cost of a particular domestic construction material subject to the restrictions of the Buy American Act is unreasonable when the cost of such material exceeds the cost of foreign material by more than 6 percent;

(ii) The application of the restriction of the Buy American Act to a particular construction material would be impracticable or inconsistent with the public interest; or

(iii) The construction material is not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality.

(c) *Request for determination of inapplicability of the Buy American Act*.

(1) (i) Any Contractor request to use foreign construction material in accordance with paragraph (b)(4) of this clause shall include adequate information for Government evaluation of the request, including-

(A) A description of the foreign and domestic construction materials;
(B) Unit of measure;
(C) Quantity;
(D) Price;
(E) Time of delivery or availability;
(F) Location of the construction project;
(G) Name and address of the proposed supplier; and
(H) A detailed justification of the reason for use of foreign construction materials cited in accordance with paragraph (b)(3) of this clause.

(ii) A request based on unreasonable cost shall include a reasonable survey of the market and a completed price comparison table in the format in paragraph (d) of this clause.

(iii) The price of construction material shall include all delivery costs to the construction site and any applicable duty (whether or not a duty-free certificate may be issued).

(iv) Any Contractor request for a determination submitted after contract award shall explain why the Contractor could not reasonably foresee the need for such determination and could not have requested the determination before contract award. If the Contractor does not submit a satisfactory explanation, the Contracting Officer need not make a determination.

(2) If the Government determines after contract award that an exception to the Buy American Act applies and the Contracting Officer and the Contractor negotiate adequate consideration, the Contracting Officer will modify the contract to allow use of the foreign construction material. However, when the basis for the exception is the unreasonable price of a domestic construction material, adequate consideration is not less than the differential established in paragraph (b)(4)(i) of this clause.

(3) Unless the Government determines that an exception to the Buy American Act applies, use of foreign construction material is noncompliant with the Buy American Act.

(d) *Data*. To permit evaluation of requests under paragraph (c) of this clause based on unreasonable cost, the Contractor shall include the following information and any applicable supporting data based on the survey of suppliers: See Page B-41.

[Include all delivery costs to the construction site and any applicable duty (whether or not a duty-free entry certificate is issued).]*

52.236-4 PHYSICAL DATA. (APR 1984)

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

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

(b) Weather conditions: Contact National Weather Service.

(c) Transportation facilities _____NA_____.

(d) _____*_____.

* See continuation of Standard Form 1442

52.244-6 SUBCONTRACTS FOR COMMERCIAL ITEMS. (APR 2003)

(a) Definitions. As used in this clause -

"Commercial item" has the meaning contained in the clause at 52.202-1, Definitions.

"Subcontract" includes a transfer of commercial items between divisions, subsidiaries, or affiliates of the Contractor or subcontractor at any tier.

(b) To the maximum extent practicable, the Contractor shall incorporate, and require its subcontractors at all tiers to incorporate, commercial items or nondevelopmental items as components of items to be supplied under this contract.

(c) (1) The Contractor shall insert the following clauses in subcontracts for commercial items:

(i) 52.219-8, Utilization of Small Business Concerns (OCT 2000) (15 U.S.C. 637(d)(2) and (3)), in all subcontracts that offer further subcontracting opportunities. If the subcontract (except subcontracts to small business concerns) exceeds $500,000 ($1,000,000 for construction of any public facility), the subcontractor must include 52.219-8 in lower tier subcontracts that offer subcontracting opportunities.

(ii) 52.222-26, Equal Opportunity (APR 2002) (E.O. 11246).

(iii) 52.222-35, Equal Opportunity for Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans. (DEC 2001) (38 U.S.C. 4212(a)).

(iv) 52.222-36, Affirmative Action for Workers with Disabilities (JUNE 1998) (29 U.S.C. 793).

(v) 52.247-64, Preference for Privately Owned U.S.-Flagged Commercial Vessels (APR 2003) (46 U.S.C. Appx 1241) (flowdown not required for subcontracts awarded beginning May, 1996).

(2) While not required, the Contractor may flow down to subcontracts for commercial items a minimal number of additional clauses necessary to satisfy its contractual obligations.

(d) The Contractor shall include the terms of this clause, including this paragraph (d), in subcontracts awarded under this contract.

52.252-6 AUTHORIZED DEVIATIONS IN CLAUSES. (APR 1984)

(a) The use in this solicitation or contract of any Federal Acquisition Regulation (48 CFR Chapter 1) clause with an authorized deviation is indicated by the addition of "(DEVIATION)" after the date of the clause.

(b) The use in this solicitation or contract of any Transportation Acquisition Regulations (48 CFR Chapter 12) clause with an authorized deviation is indicated by the addition of "(DEVIATION)" after the name of the regulation.

GENERAL DECISION: **CO20030015** 09/19/2003 CO15 Date: September 19, 2003
General Decision Number: **CO20030015** 09/19/2003

Superseded General Decision Number: CO020015

State: Colorado

Construction Types: Highway

Counties: Alamosa, Archuleta, Baca, Bent, Chaffee, Cheyenne, Clear Creek, Conejos, Costilla, Crowley, Custer, Delta, Dolores, Eagle, Elbert, Fremont, Garfield, Gilpin, Grand, Gunnison, Hinsdale, Huerfano, Jackson, Kiowa, Kit Carson, La Plata, Lake, Las Animas, Lincoln, Logan, Mineral, Moffat, Montezuma, Montrose, Morgan, Otero, Ouray, Park, Phillips, Pitkin, Prowers, Rio Blanco, Rio Grande, Routt, Saguache, San Juan, San Miguel, Sedgwick, Summit, Teller, Washington and Yuma Counties in Colorado.

HIGHWAY CONSTRUCTION PROJECTS

Modification Number	Publication Date
0	06/13/2003
1	08/15/2003
2	09/19/2003

ELEC0012-006 09/01/2003

ALAMOSA, ARCHULETA, BACA, BENT, CHAFFEE, CONEJOS, COSTILLA, CROWLEY, CUSTER, FREEMONT, HUERFANO, KIOWA, LAS ANIMAS, MINERAL, OTERO, PROWERS, RIO GRANDE AND SAGUACHE COUNTIES

	Rates	Fringes
Electrician		
(Including traffic signal installation):		
Electrical work where the total cost is $200,000 or less.....	$ 18.98	8.44
the total cost is over $200,000.....	$ 24.74	8.44

ELEC0068-013 06/01/2003

CLEAR CREEK, EAGLE, GILPIN, GRAND, JACKSON,LAKE, LOGAN, MORGAN, PHILLIPS, SEDGWICK, SUMMIT, WASHINGTON AND YUMA COUNTIES

	Rates	Fringes
Electrician (Including traffic signal installation).....	$ 27.91	8.67

ELEC0113-006 01/01/2003

CHEYENNE, ELBERT, KIT CARSON, LINCOLN, PARL AND TELLER COUNTIES

	Rates	Fringes
Electrician (Including traffic signal installation).....	$ 24.10	3%+10.59

ELEC0969-006 06/01/2000

DELTA, DOLORES, GARFIELD, GUNNISON, HINSDALE, LA PLATA, MOFFAT, MONTEZUMA, MONTROSE, OURAY, PITKIN, RIO BLANCO, ROUTT, SAN JUAN AND SAN MIGUEL COUNTIES

	Rates	Fringes
Electrician (Including traffic signal installation).....	$ 20.35	4%+5.14

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* ENGI0009-006 05/01/2003	Rates	Fringes
Power equipment operators:		
Bituminous or Asphalt Spreader/Laydown Machine....	$ 20.17	6.22
Bulldozer.....	$ 20.17	6.22
Crane: 50 tons and under.....	$ 20.32	6.22
Crane: 51 to 90 tons.....	$ 20.47	6.22
Crane: 91 to 140 tons.....	$ 20.62	6.22
Crane: 141 tons and over....	$ 21.38	6.22
Grade Checker.....	$ 20.32	6.22
Loader: Barber Green etc. & Up to and including 6 cubic yards	$ 20.17	6.22
Loader: Over 6 cubic yards.....	$ 20.32	6.22
Oiler.....	$ 19.47	6.22
Roller: Self-propelled all types over 5 tons.....	$ 20.17	6.22
Roller: Self-propelled rubber tires under 5 tons.....	$ 19.82	6.22
Trackhoe.....	$ 20.32	6.22
Water Wagon.....	$ 20.32	6.22

SUCO2001-016 12/20/2001	Rates	Fringes
Carpenters:		
All Other Work.....	$ 16.30	3.71
Form Building & Setting (Excluding curbs and gutters).....	$ 15.92	5.38
Concrete Finisher/Cement Mason.....	$ 15.55	2.85
Groundman (Traffic Signalization).....	$ 11.57	3.50

Ironworkers:

Bridgerail (Excluding Guardrail).....	$ 16.76	6.01
Reinforcing.....	$ 16.94	6.77

Laborers:

Asphalt/Raker.....	$ 12.40	2.92
Common.....	$ 12.44	3.53
Concrete Laborer/MasonTender.....	$ 12.44	3.10
Formwork (Curbs and gutters only).....	$ 12.92	4.54
Guardrail (Excludes bridgerail).....	$ 12.78	3.31
Landscape Laborer (Including Irrigation Work).....	$ 12.21	3.16
Striping-Paint Laborer (Pre-form layout and removal of pavement markings).....	$ 12.90	3.07
Traffic Director/Flagger....	$ 9.42	3.21
Traffic/Sign Laborer (Sets cones and barricades, installs permanent signs).....	$ 12.39	3.20

Painter, Spray.....	$ 17.54	3.52

Power equipment operators:

Asphalt Plant.....	$ 17.23	1.20
Asphalt Screed.....	$ 16.21	3.76
Backhoe.....	$ 16.42	4.42
Compactor.....	$ 16.52	3.13
Grader/Blade.....	$ 16.39	4.20
Mechanic and/or Welder (Includes heavy duty and combination mechanic and welder).....	$ 16.74	4.20
Post Driver/Punch Machine.....	$ 16.07	4.41
Rotomill Operator.....	$ 16.28	4.41
Scraper.....	$ 17.62	3.16

Truck drivers:

Dump.....	$ 14.15	3.83
Low Boy.....	$ 15.07	4.56
MultipurposeTruck-Specialty.	$ 14.60	3.49
Pickup (Including Pilot Car).....	$ 14.04	3.49
Truck Mechanic.....	$ 15.97	4.61
Water Truck.....	$ 14.88	2.07

TEAM0435-003 05/01/2000	Rates	Fringes
Truck drivers:		
Distributor.....	$ 15.80	5.27

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

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 (29CFR 5.5 (a) (1) (ii)).

In the listing above, the "SU" designation means that rates listed under the 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, DC 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, DC 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, DC 20210

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

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END OF GENERAL DECISION

SPECIAL CONTRACT REQUIREMENTS

for

CO PFH 80-1(1) & 2(2)
Guanella Pass Road Phase I
Pike and Arapahoe National Forests
Clear Creek and Park Counties, Colorado

Prepared by Carter :: Burgess

for

Department of Transportation
Federal Highway Administration
Central Federal Lands Highway Division

SPECIAL CONTRACT REQUIREMENTS

The following Special Contract Requirements amend and supplement the *Standard Specifications for Construction of Roads and Bridges, on Federal Highway Projects (FP-96),* U.S. Department of Transportation, Federal Highway Administration.

SI (METRIC) TO ENGLISH CONVERSION FACTORS (approximate)

To the table on page iv, amend the second and third lines of the MASS portion of the table as follows:

Symbol	When You Know	Multiply By	To Find	Symbol
kg	kilograms	2.2046	pounds	lb
Mg (or "t")	megagrams (or "metric ton")	1.1023	short tons (2000 lb)	T

Section 101. – TERMS, FORMAT, AND DEFINITIONS

101.02 Specifications Format. Delete the third and fourth paragraphs and substitute the following:

Division 150 consists of project contract requirements that are applicable to all contracts. Work under Division 150 is paid for directly or indirectly according to Subsection 109.05 and the Section ordering the work. When there is no pay item in the bid schedule, no direct payment is made.

Divisions 200 through 600 consist of construction contract requirements for specific items of work. Work under these Divisions is paid for directly or indirectly according to Subsection 109.05 and the Section ordering the work.

101.04 Definitions.

Suitable Material - Add the following:

Suitable material may necessitate drying, the addition of moisture, reduction in size, screening, or other common methods of manipulation prior to use. Suitable material includes the classification(s) of materials, resulting R-values and other characteristics, for which the project was designed.

Unsuitable Material - Delete the text and substitute the following:

Material which the CO determines to be unsuitable for use in the construction of foundations, embankments, or roadbeds. Unsuitable materials generally include muck and soils with high organic contents.

Section 102. – BID, AWARD, AND EXECUTION OF CONTRACT

102.03 Bid Guarantee.

(a) General. Delete the first sentence and substitute the following:

Submit a bid guarantee of 20 percent of the amount of the bid or $3 million, whichever is less.

102.06 Performance and Payment Bonds. Delete the first paragraph including lines (a), (b), and (c), and substitute the following:

FAR Clause 52.228-15 - Performance and Payment Bonds - Construction is supplemented as follows. Furnish a performance bond and a payment bond in the penal amounts of 100 percent of the original contract price.

Section 103. – SCOPE OF WORK

103.03 Value Engineering. Delete the second paragraph and substitute the following:

Before undertaking significant expenditures, provide the CO with a written description of the value engineering change proposal (VECP) concept. Within 14 days, the CO will inform the Contractor as to whether the concept appears to be viable or if the concept is unacceptable. If the CO indicates that the concept appears to be viable, prepare and submit the formal VECP proposal.

103.05 Partnering. Delete the last sentence of the fourth paragraph and substitute the following:

The Government's share will not exceed $5,000.

Section 104. – CONTROL OF WORK

104.03 Specifications and Drawings. Delete the text and substitute the following:

FAR Clause 52.236-21 - Specifications and Drawings for Construction is supplemented as follows:

(a) General. Prepare drawings as necessary to adequately construct the work. Drawings include, but are not limited to, layouts that show the relative position (vertical and horizontal, as appropriate) of work to be performed, fabrication details for manufactured items and assemblies, installation and erection procedures, details of post-tensioning and other systems, detailed trench and excavation procedures that conform to OSHA requirements, traffic control implementation drawings, and methods for performing work near existing structures or other areas to be protected. Show all the drawing dimensions in metric units according to the International System of Units (SI), IEEE/ASTM SI 10.

Limit drawings to a maximum size of 610 by 920 millimeters. Include on each drawing and calculation sheet, the project number, name, and other identification as shown in the contract.

Furnish 5 sets of drawings and supporting calculations for acceptance before performing work covered by the drawings. If drawings are returned for revision, correct and resubmit for acceptance. Allow 40 days per submission for railroad structures and 30 days per submission for all other structures. If drawings must be resubmitted, the time for acceptance starts over. Obtain prior written approval for changes or deviations from accepted drawings.

(b) Specific requirements for concrete and miscellaneous structures. Drawings will be reviewed in the order they are received. The review time as specified in (a) above is applied separately to each drawing submitted. The CO may request additional specific drawings for unique situations in order to clarify layout, construction details, or methodology.

(1) Furnish drawings for the following:

(a) Site-specific layouts for all wall types and gabion installations.
(b) Gabion and revet mattress details and installation procedures.
(c) Forms and falsework for reinforced concrete box culverts less than or equal to 1800 mm in height.
(d) Fabrication drawings for bridge railings and parapets.
(e) Fabrication drawings for pre-stressed members.
(f) Fabrication and installation drawings for expansion joint assemblies.
(g) Fabrication drawings for bearing assemblies.
(h) Construction joint location and concrete deck placement sequences not shown on the plans.
(i) Erection diagrams for Soil-Corrugated Metal Structure interaction systems (multi-plate structures).
(j) Structural steel fabrication drawings.
(k) Utility hangar details.
(l) Detour layouts.
(m) Fabrication and installation drawings for pre-cast items.

(2) Furnish drawings which bear the seal and signature of a professional engineer proficient in the pertinent design field for the following:

(a) Erection plans.
(b) Reinforced soil slopes details.
(c) MSE wall and crib wall details.
(d) Details and installation procedures for proprietary wall systems.
(e) Temporary bridge structures.
(f) All bridge forms except for railings, parapets, and components less than 1800 mm in height.
(g) Shoring systems and cofferdams greater than 1800 millimeters in height.
(h) All shoring systems that support traffic loadings.
(i) Forms and falsework for all structures greater than 1800 millimeters in height.

(j) Post-tensioning systems.
(k) Ground anchors, soil nail, and rock bolt assembly details, layout, and installation and testing procedures.
(l) Tie back wall details.
(m) Alternate retaining wall details.

(3) Furnish drawings which bear the seal and signature of a professional engineer proficient in forms and falsework design, and who is licensed in the state where the project will be constructed, for the following:

(a) Falsework for any structure with a span exceeding 5000 millimeters.
(b) Falsework for any structure with a height exceeding 4300 millimeters.
(c) Falsework for structures where traffic, other than workers involved in constructing the structure, will travel under the structure.

Section 105. – CONTROL OF MATERIAL

105.01 Source of Supply and Quality Requirements. Add the following:

Submit samples of materials for quality verification testing for materials required to conform to Sections 703, 704, and 705.

Materials containing petroleum-based solvents such as cutback asphalts and traffic paints may be restricted from use by local laws or ordinances in certain geographic areas. Upon presenting proof of such restrictions, alternate materials considered acceptable to the CO may be substituted for the materials specified in the contract.

105.02 Local Material Sources

(a) Government-provided sources. Add the following:

The material source near Duck Lake at station 19+200 on the east side of Guanella Pass Road has been identified for use on the project.

The contractor will submit a Material Source Development Plan. Use the project Geotechnical reports to develop the Material Source Development plan. The plan will be approved by the CO prior to performing work within the Government-provided source. The Material Source Development Plan will include the method to best optimize all the material to produce the aggregate types required in the contract. The contractor will perform all work necessary to produce acceptable material including site development, preparation, erosion control and reclamation.

The Material Source Plan must address, but is not limited to, the following:

- Estimated quantities of material for each zone
- Expected quality characteristics for each zone
- Optimization plan to utilize material zones for required aggregate types
- Erosion control plan
- Reclamation plan

Two water sources are available for the project at no cost. 5,000 gallons per day may be obtained from Duck Lake. The contact for the Duck Lake water supply is Julie Holmes. In addition, Lower Cabin Creek Reservoir may be used for a maximum water supply of one acre foot per construction season. The contact for Lower Cabin Creek Reservoir is Larry Claxton with Xcel Energy. No separate permits are required for either water source, but this work must comply with the applicable portions of the Nationwide permit issued by the Army Corps of Engineers and the NPDES permit obtained from the Colorado Department of Public Health and Environment.

(c) Contractor-located sources. Add the following at the end of the first paragraph:

For Contractor-located, non-commercial sources, secure environmental clearances according to Subsection 107.10. See section 108 for restrictions on aggregate material hauling dates.

105.04 Storing and Handling Material. Add the following after the third sentence of the second paragraph:

For Contractor-located, non-commercial staging, storing, and material handling areas, secure environmental clearances according to Subsection 107.10.

Add the following:

The Contractor will use the Duck Lake material source site, Geneva Basin Ski Area parking lot and other existing disturbed areas (pullouts, dispersed recreation parking areas, etc.) for staging areas and for storage of materials/hot plant site/stockpiles/ etc). In addition, any new parking areas could be used for staging, while they are under construction, but at least one parking area at the Guanella Pass Road summit (existing or new) must remain open at all times for public use.

Section 106. – ACCEPTANCE OF WORK

106.01 Conformity with Contract Requirements. Delete the fourth sentence of the fifth paragraph and substitute the following:

If Contractor testing and inspection are verified by the Government, the Contractor's results may be used by the Government to evaluate work for acceptance.

Add the following:

When removal, replacement, or corrective measures are required, obtain approval for the proposed method of performing the work.

Where sample/testing procedures make reference to AASHTO, ASTM, or other standards (designated as FLH T), the procedure as modified in the Materials Manual shall govern. Where the specifications make reference to AASHTO Test T11, "Procedure B - Washing Using a Wetting Agent" shall be the procedure followed.

Delete references made to AASHTO T-238 or T-239 and substitute with ASTM D 2922 and D3017 or AASHTO T-310.

Reference to the Materials Manual means the Federal Lands Highway "Field Materials Manual, U.S. Department of Transportation, Federal Highway Administration," Publication No. FHWA-FL-91-002, dated March 1991, revised March 1994, and all amendments and supplements thereto. Copies are available from the Materials Engineer, Federal Highway Administration, Central Federal Lands Highway Division, Materials Branch, P.O. Box 25246, Denver, Colorado 80225-0246, Telephone: (303) 716-2176.

106.03 Certification. Add the following after the first paragraph:

Other than references in or to the FAR or Federal Law, when this contract references certifications; certificates; or certified documents, equipment or individuals, these references are not certifications within the meaning of Section 4301 of Public Law 104-106, the National Defense Authorization Act for Fiscal Year 1996. These references simply refer to documentation of peripheral contract requirements required to be validated by an individual or organization having unique knowledge or qualifications to perform such validation.

Add the following after the second paragraph:

See Table 106-3 for Schedule for Full or Partial Acceptance by Material Certification. Submit certification and sample of material for testing as required.

(a) Production certification. Delete items (2) through (5) and substitute the following:

(2) Lot number or other means of cross-referencing to the manufacturer's inspection and testing system

(3) Substantiating evidence that the material conforms to the contract quality requirements as required by FAR 46.105(a)(4), including all of the following:

(a) Test results on material from the same lot and documentation of the inspection and testing system

(b) Manufacturer's statement that the material complies with all contract requirements

(c) Manufacturer's signature or other means of demonstrating accountability for the certification

106.05 Statistical Evaluation of Work and Determination of Pay Factor (Value of Work).

(b) Acceptance. Delete the last sentence of the second paragraph and substitute the following:

If a lot is concluded or terminated with fewer than five samples, the samples will be combined with those of an adjacent lot. In the event there is no adjacent lot, the material will be accepted according to Subsection 106.04.

Delete the third paragraph and substitute the following:

If the current pay factor of a lot falls below 0.90, terminate production. The current lot is terminated at this point and the material represented by the lot will be accepted as provided in the following paragraphs. After the Contractor has taken effective actions to improve the quality of the production, production may resume and a new lot will begin.

Table 106-3
Schedule For Full or Partial Acceptance by Materials Certification

Section	Description	Material	Material Property or Specification	Frequency	
				Certification	Sample
306	Dust Palliative	Magnesium Chloride, Emulsified Asphalt, Lignin Sulfonate, Calcium Chloride	As specified	1 per shipment	First shipment
308	Minor Crushed Aggregate	Crushed Aggregate	Source, Quality and Gradation	1 per source	1 per source
634 and 635	Permanent Pavement Markings, Temporary Traffic Control	634.02 as applicable, 635 as applicable	As specified	1 per source	-----
701	Hydraulic Cement	Portland Cement, Blended Hydraulic Cement and Masonry Cement	AASHTO M 85, M 240, and ASTM C 91	1 per shipment	1 per 100 tons
702.01	Asphalt Material	Asphalt Cement	AASHTO M 20, M 226, MP 1 or as applicable	1 per shipment	1 per shipment
702.02	Asphalt Material	Cut-back Asphalt	AASHTO M 81 or M 82 as applicable	1 per shipment	1 per shipment
702.03	Asphalt Material	Emulsified Asphalt	AASHTO M 140 or M 208 as applicable	1 per shipment	1 per shipment
702.05	Asphalt Material	Asphalt Materials used for Damproofing and Waterproofing Concrete Surfaces	As specified for each type of asphalt material	1 per shipment	-----

702.08	Antistrip	As specified	As applicable	1 per shipment	-----
706	Concrete and Plastic Pipe	As specified	As applicable	1 per shipment	-----
707	Metal Pipe	Metal Pipe as specified	As applicable	1 per shipment	-----
708	Paint	As specified	As applicable	1 per batch\lot	1 sample for quantities >100L
709	Reinforcing Steel and Wire Rope	As specified	As applicable	1 per shipment	For 709.01 & 709.03 submit 3, 1-meter bars of each size and grade of bar furnished. 709.02 submit 1, 2-meter length for each size furnished
710	Fence and Guardrail	As specified	As applicable	1 per shipment	-----
711	Concrete Curing Material and Admixtures	As specified	As applicable	1 per material source per material type	-----
712	Joint Material (all)	As specified	As applicable	1 per shipment	-----
713	Roadside Improvement Materials (all)	As specified	As applicable	1 per shipment	-----
714	Geotextile and Geocomposite Drain	As specified	As applicable	1 per shipment	1 per project per type
716	Material for Timber Structures	Timber and Hardware	As applicable	1 per shipment	-----
717	Structural Metal	As specified	As applicable	1 per shipment	717.01(e) minimum 6 per shipment for each size used. 717.10 1 per project
718	Traffic Signing and Marking (all)	As specified	As applicable	1 per shipment	-----
720	Structural Wall and Stabilized Materials (all)	As specified	As applicable	1 per shipment per material type	-----
722	Anchor Material	As specified	As applicable	1 per shipment per material type	-----
725	Miscellaneous materials	As specified	As applicable	1 per shipment per material type	-----

Section 107. – LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

107.01 Laws to be Observed. Add the following:

This project will be constructed within the requirements of the following permits.

(a) Section 404 permit. The U.S. Army Corps of Engineers has issued a Section 404 individual permit authorizing the discharge of fill material into waters of the United States. The contractor is required to comply with the terms and conditions of the permit. A copy of the permit and associated conditions is included in Appendix A.

(b) Section 401 certification. The Colorado Department of Health and Environment (CDPHE) has certified that the project will not violate water quality standards. The contractor is required to comply with the terms and conditions of the certification and ensure construction activities do not cause a violation of water quality standards. A copy of the certification and associated conditions is included in Appendix B.

(c) Colorado Discharge Permit System (CDPS). The Colorado Department of Public Health and Environment (CDPHE), acting as the regulating agency to implement the requirements of the National Pollutant Discharge Elimination System (NPDES) for the Environmental Protection Agency (EPA) requires construction projects disturbing 1 acre or more land to obtain coverage under the Storm Water General Permit (GP) for Colorado. The contractor is required to obtain coverage under Colorado Permit No. COR-30000 by submitting a complete State of Colorado GP Application to the CDPHE at least 10-days prior to the start of construction. As part of the process the contractor will certify that the Storm Water Management Plan (SWMP) has been developed and is complete. A copy of the GP, application, and guidance document for preparing a SWMP is included in Appendix C. In addition the contractor will pay the annual fee (approximately $450.00). The GP will expire at midnight, June 30, 2007. If continued coverage under this permit is required the Contractor must submit a renewal application at least 90 days prior to the expiration date.

Provide a copy of the permit with the Storm Water Management Plan (SWMP) to the Park and Clear Creek County Planning Departments and the Pike and Arapahoe National Forest District Offices prior to construction as required in the Mineral Material Extraction Contracts.

(1) General. To comply with the General Permit, the Contractor and the CO shall jointly review and agree on the Contractor's Storm Water Management Plan (SWMP). The Contractor shall then file a Permit application and implement the SWMP during construction all as described in the following Special Contract Requirements.

Designate the erosion control/water quality supervisor in accordance with Subsection 157.03 who will be responsible for implementing the SWMP. The erosion control/water quality supervisor shall be familiar with the SWMP procedures and practices and shall ensure that emergency procedures and the SWMP are updated as needed and available for inspection.

The permit covers storm water from sand and gravel operations and asphalt and concrete plants located at the construction site. The contractor will include coverage of these facilities in the SWMP.

(2) Preparation of SWMP. The approved SWMP will describe and ensure the implementation of practices which will be used to reduce the pollutants in storm water discharges from construction activities, dedicated asphalt plants and concrete plants, and earthen material source sites to assure compliance with the terms and conditions of the General Permit.

The project plans contain erosion control details and quantities which shall become a part of the SWMP. At least three weeks prior to beginning construction, provide a draft SWMP for the project to the CO. Incorporate any revisions resulting from the CO's review. The CO and the Contractor shall then approve and sign the revised SWMP. When the SWMP is approved, it will be the document in force on the project.

Place the SWPP and all updates in a three-ring binder so that completed inspection forms and other records may be inserted. The Contractor shall maintain a current copy of the SWMP and all associated records and forms at the job site throughout the duration of the project. The SWMP shall be available for public inspection and for the inspection and use of the CO.

Implement the SWMP as required throughout the construction period and maintain all related erosion control elements in proper working order. Do not perform clearing and grubbing or earthwork until the SWMP has been implemented.

Prior to construction, the Contractor and all subcontractors shall sign certifications (included in the SWMP) that they understand the requirements of the GP permit. All subcontractors shall comply with the requirements of the GP under the supervision of the Contractor.

The SWMP, including inspection forms and all data used to complete the GP application, shall be provided to the CO at the completion of the project. The Contractor shall retain his own records for a period of at least three years from the date the site is finally stabilized.

(3) State of Colorado Stormwater General Permit (GP).

The application for coverage under the GP may be downloaded at the following address:

http://www.cdphe.state.co.us/wq/PermitsUnit/SW%20Construction%20Application.pdf

All required information must be provided on the form. The GP application must be submitted to the following address at least ten days prior to the start of construction, including clearing and grubbing:

Colorado Department of Public Health and Environment
Water Quality Control Division
WQCD-Permits
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530
Attention: Permits Unit

(4) Erosion Controls.

Implement soil erosion controls in accordance with the SWMP and Section 157.

(5) Controls for Other Pollutants.

Implement controls to eliminate the discharge of pollutants, other than erodible soil, into storm water such as pollutants from materials stored onsite. The work shall include the implementation of spill prevention and material management controls and practices to prevent the release of pollutants into storm water. These controls and practices shall be specified in the SWMP and shall include storage procedures for chemicals, construction materials and other pollution prevention measures.

Spill prevention, containment and counter-measures will be required if the volume of fuel in a single container exceeds 2500 liters, or if the total storage volume at any one site exceeds 5000 liters.

Assist in any efforts to clean up hazardous material spills as instructed by the CO or other authorities. Haul soil contaminated with smaller spills from the project site and dispose of according to applicable State and Federal laws.

Contact the CO, and the US Forest Service, immediately in the event of any spill of a hazardous material.

(6) "Good Housekeeping" Practices and Requirements.

The SWMP shall specify the Contractor's "good housekeeping" practices and requirements including vehicle wash-down areas, onsite and offsite tracking control, protection of equipment storage and maintenance areas, and sweeping of highways and roadways related to hauling activities.

The Contractor shall take sufficient precautions, considering all conditions, to prevent pollution of streams, lakes, and reservoirs with fuels, oil, bitumens, calcium chloride, magnesium chloride, Portland cement, fresh Portland cement concrete, raw sewage, muddy water, chemicals or other harmful materials. None of these materials shall be discharged into any channels leading to such streams, lakes or reservoirs.

To reduce the possibility and minimize the impacts of accidental spills or discharge, machinery service and refueling areas shall be located away from stream beds or washes.

Non-waste materials such as used cans, oils, machine and equipment parts, paint, hazardous materials, plastic and rubber parts, discarded metals, and building materials, shall be removed from the construction site and disposed of at an approved landfill.

Where the Contractor's working area encroaches on a running or intermittent stream, barriers shall be constructed and maintained between the working areas and the stream bed adequate to prevent the discharge of any contaminants.

Unless approved in writing by the CO, and the US Forest Service, mechanical equipment shall not be operated in running streams. Fording of running streams with construction equipment will not be permitted. Temporary bridges or other structures, approved by the CO, shall be used whenever crossings are necessary.

Streams, lakes and reservoirs shall be immediately cleared of all work items, debris or other obstructions inadvertently placed thereby or resulting from construction operations.

(7) Inspections and Revisions to the SWMP.

For active sites (where construction has not been completed) perform a thorough inspection of the stormwater management system at least every 14 days and after any precipitation or snowmelt event that causes surface erosion. For completed sites that have not reached final stabilization, perform a thorough inspection of the stormwater management system at least once every month. Inspections are not required where snow cover exists over the site for an extended period and melting conditions do not exist. Monitor rainfall with a rain gauge accurate to the nearest 3 millimeters (0.1 inch) of rain.

Document the inspections on forms provided in the SWMP. The inspection forms shall be signed in accordance with the requirements of the SWMP and the GP permit. The inspection forms shall be retained onsite in the SWMP notebook throughout the construction period.

It may be necessary to revise the SWMP during construction to make necessary improvements or revisions or to respond to unforeseen conditions noted during construction or site inspections. For that purpose, the SWMP shall specify the mechanism whereby revisions may be proposed by the Contractor or the CO and incorporated into the plan, including review and approval of minor changes. The CO and the Contractor shall jointly approve and sign each revision to the SWMP before implementation. Approved modifications shall be implemented within seven calendar days following the date of the inspection when deficiencies or necessary corrections were first noted.

(8) Notice of Inactivation.

File a Notice of Inactivation when final stabilization is reached. Final stabilization means that the density of vegetative cover on soil-disturbed sites is at least 70 percent of pre-disturbance levels or equivalent permanent, physical erosion reduction methods have been employed. If final stabilization has not been established at the completion of the project, file a Notice of Transfer with the CDPHE. Coordinate this task with Park County and Clear Creek County who will accept responsibility, coverage, and liability for compliance with the GP and SWMP.

(d) Contract for the Sale of Mineral Material (aggregate) and Special Use Permit. The Pike National Forest has approved a contract for the Sale of Mineral Material for this project. Mineral material for this project will be free-use as long as it is utilized within the ROW. A Special Use Permit has been obtained from the Arapaho National Forest to authorize activities within Temporary Construction Easement areas. Both the contract and permit were applied for and will be held by the Federal Highway Administration for this contract. All requirements for these permits are included in the contract through the FP-96 and these Special Contract Requirements.

(e) Timber Sale Contract. A timber sale contract is required to harvest and purchase merchantable timber from National Forest Lands. (See subsection 201.06 for definitions of merchantable timber.) Approximately 183 ccf (100 cubic feet) of timber will be removed for this project having an estimated value of $12,500. The final volume and value will be determined when the clearing limits have been established and the timber is cruised using standard USFS appraisal methods. The contract shall be awarded and money collected prior to the start of clearing and grubbing operations. An example of the Timber Sale Contract is in Appendix D.

107.02 Protection and Restoration of Property and Landscape.

<u>Add the following at the end of the third paragraph</u>:

If there is any damage to existing trees designated to remain in place, a contract reduction will be accessed based on the trees' merchantable value and damage done to those trees. The value of the trees will be at the CO's discretion upon consultation with the Forest Service.

<u>Add the following at the end of the first sentence of the fourth paragraph</u>:

or potential historic or historic properties or features.

<u>Add the following at the end of the sixth paragraph</u>:

Utilities along the project will be relocated during construction. Extensive coordination with utility companies will be required for the project. Delays and impacts to construction operations should be expected to allow time and room for the utility companies to complete relocations. Comply with all regulations, requirements, and rules of Colorado Senate Bill 00-184 which concerns prevention of damage to underground facilities resulting from excavation. This regulation establishes requirements relating to plans and specifications, pre-excavation notification, duties of Contractors, duties of owners and operators, and penalties. At the preconstruction conference designate a contact

person who will be responsible for coordinating all utility work with the utility companies. The person may not be the Superintendent. Notify the utility companies a minimum of 7 business days prior to requiring relocations. The notification should be in letter form and include a station to station listing of relocation needs for the following two weeks. Coordinate closely with the CO and utility company to ensure the work is completed within this time period. Survey control needed to relocate the utilities to proper horizontal and vertical location is expected to be established under the contract using miscellaneous survey and staking hours.

The utility company impacted under this contract is Qwest Communications. There is one existing direct buried 6-pair copper telephone line, and necessary appurtenances such as pedestals, repeaters, underground storage tubs, etc. located along the roadway. The approximate horizontal location of utilities are shown in the plans on the mainline plan and profile sheets and the cross-sections sheets. There is no information regarding vertical location.

Qwest Communications will install a temporary surface telephone cable around excavation sites. It is anticipated that the relocated permanent cable will be installed in the inside shoulder of the road. Qwest Communications will install relocated telephone cables when earthwork operations are completed to rough subgrade elevation and prior to finishing operations. Areas where trenching was done to install the utility may need to be recompacted. Relocations have been identified at culvert, subexcavation, retaining wall, and grade change locations. The utility company will provide all materials and perform all work necessary for relocating the existing utilities.

The contact for the Guanella Pass Road utility company is:

Dan Lewis
Field Engineer
Qwest Communication
(303) 441-7142

107.08 Sanitation, Health, and Safety. Add the following:

Keep work areas in an orderly condition, dispose of all refuse properly, and obtain permits for the construction and maintenance of all construction camps, warehouses, latrines, and other structures in accordance with applicable requirements. No food or trash will be stored in a location accessible to scavengers. Only bear-proof dumpsters may be used for food related garbage disposal. Store all food in hard-sided vehicles or bear-proof locations.

107.10 Environmental Protection. Add the following:

Contractor-Selected, Non-Commercial Areas. Contractor-selected, non-commercial areas, include, but are not limited to material sources, disposal sites, waste areas, haul roads, and staging areas. (A commercial source is a current operating concern which has in the recent past provided same-type materials or services). These requirements do not apply for areas identified by the FHWA as having previously received clearance.

Prior to construction activities in contractor-selected, non-commercial areas, provide the following to the CO and the FHWA Environmental section (555 Zang Street, Lakewood, CO 80228/Fax 303-969-5903):

(1) A report with documentation, according to the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation, to determine if prehistoric or historic buildings, structures, sites, objects, or districts listed or eligible for listing in the National Register of Historic Places (NRHP) are present and if they will be affected by the proposed activity. Include information identifying the location, total land area, and type of activity proposed. The FHWA will review this documentation. If NRHP listed or eligible sites are present and/or will be affected, the FHWA will coordinate with the State Historic Preservation Officer (SHPO) and other parties, which will require the following time frames:

(a) Coordination on eligibility and affects may require 45 days or longer.
(b) Coordination on mitigation of adverse effects may require 60 days or longer.

(2) Written documentation that such activities will not affect any "Waters of the U.S." as defined by the U.S. Army Corps of Engineers. Provide documentation by an individual capable of performing wetland delineations in accordance with the 1987 Corps of Engineers' manual. Documentation of effects to wetlands or other Waters of the U.S. will be submitted to the CO and to the FHWA Environment section for coordination with the Corps of Engineers. This coordination may require 45 days or longer. Substantial additional delays could result from wetland impacts.

(3) Written documentation that such activities will not affect any species protected under the Endangered Species Act (ESA). Provide documentation prepared by a biological specialist. The written documentation will include a "no affect", a "may affect-is not likely to adversely affect", or a "may affect-is likely to adversely affect", determination according to Section 7 of the Endangered Species Act. Submit the documentation to the CO and the FHWA Environmental section. If the determination is "may affect-is not likely to adversely affect" or "may affect-is likely to adversely affect", the FHWA will coordinate with the U.S. Fish and Wildlife Service (FWS), which will require the following time frames:

(a) "May affect-is not likely to adversely affect" may require 45 days or longer.
(b) "May affect-is likely to adversely affect" may require 150 days or longer.

Contract time will not be increased due to the submittal and approval process for the above three items.

(4) Contractor shall save all existing wetland, riparian, and other existing vegetation within the project area, except where vegetation must be removed to accommodate construction of the project. Contractor shall fence areas of vegetation to be protected in accordance with the plans and as directed by the CO before any work in that area begins.

If the fence is knocked down, destroyed or made invisible, the Engineer will suspend project work, wholly or in part, until the fence is repaired to the CO's satisfaction and at the Contractor's expense. Time lost due to this suspension will not be considered a basis for adjustment of time charges, but will be charged as contract time.

(5) Contractor shall perform all work in such a manner that the least environmental damage will result. Questionable areas or items shall be brought to the attention of the CO for approval prior to removal or beginning damaging activity. Damaged or destroyed vegetation, including wetlands, riparian and special plant communities marked with fence, shown on the plans, or directed by Engineer to be preserved; which could have been saved, shall be replaced at the expense of the Contractor and to the satisfaction of the U.S. Forest Service, Section 7, 404 and 401 permitting agencies and the CO.

107.11 Protection of Forests, Parks, and Public Lands. Add the following:

(a) Fire prevention plan. The following Forest Service fire prevention plan involving emergency curtailment of operations is in effect on this project. The CO will order the suspension of burning and other operations when directed to do so by the Forest Service. No adjustment in the contract completion date will be made for partial or total suspensions of burning operations related to fire restrictions.

During the period January 1 through December 31, the Contractor shall take the following precautions:

(1) Smoking and Lunch Fires. Smoking is prohibited except inside a building, developed recreation site, vehicle, or while seated in an area at least three feet in diameter that is barren or cleared of all flammable materials. 36 CFR 261.52(d).

The building of camp, lunch, warming, and other fires within the project area and vicinity is prohibited, except at established camps or at other safe places where all flammable material has been cleared away sufficiently to prevent the start and spread of wildfires. Forest Service may, upon written request of the Contractor, designate specific places where campfires may be built for purposes of heating lunches and/or warming. These fires shall never be left unattended.

(2) Spark Arrester and Mufflers. Operating or using any internal combustion engine, on any timber, brush, or grass covered land, including trails and roads traversing such land, without a spark arrester, maintained in effective working order, meeting either (I) Department of Agriculture, Forest Service standard 5100, "SPARK ARRESTERS FOR INTERNAL COMBUSTION ENGINES," (current edition); or (II) the Society of Automotive Engineers (SAE) recommended practices J335, "MULTIPOSITION SMALL ENGINE EXHAUST SYSTEM FIRE IGNITION SUPPRESSION," (current revision) and J350, 36 CFR 261.52(j), is prohibited.

Passenger carrying vehicles, pickups, medium and large highway trucks (80,000 GVW) will be equipped with a factory designed muffler system which is specified for the make and model of the respective vehicle/truck or with a muffler system that is equivalent or that exceeds factory specifications.

Exhaust systems shall be properly installed and continually maintained in serviceable condition.

(3) Fire Extinguishers and Tools on Equipment. At all times each internal combustion engine including tractors, trucks, graders, yarders, loaders, welders, generators, stationary engines, or comparable powered equipment shall be provided with at least the following:

(a) One fire extinguisher, at least 5# ABC with an Underwriters Laboratory (UL) rating of 3A-40BC, or greater.

(b) One shovel, sharp, size O or larger, round-pointed with an overall length of at least 48 inches.

(c) One axe, sharp, double bit 3-1/2#, or one sharp pulaski.

Extinguishers, shovels, axes, and pulaskis shall be mounted so as to be readily available from the ground. All tools shall be maintained in a serviceable condition. The CO, with cooperation from the Forest Service, will inspect all pieces of equipment brought onto the project for compliance. Any piece of equipment found not in compliance will be not allowed to perform work on the project until it is brought into compliance. All Required tools and equipment shall be kept in serviceable condition ***and immediately available for fire fighting at all times.***

(4) Power Saws. Each gasoline engine power saw shall be provided with one chemical-pressurized fire extinguisher of not less than 8-ounce capacity by weight, and one size O or larger round-pointed shovel with an overall length of at least 48 inches. The extinguisher, and shovel shall be maintained in good working order. The extinguisher shall be with the power saw operator immediately available for use at all times. The extinguisher shall not be affixed to the saw. The shovel shall be readily available to the operator of the saw at all times. Having the shovel with the gas can used to refuel the saw may be considered "readily available" if not more than 200 feet from the saw. During periods of critical fire danger, the Forest Service may prescribe other precautionary measures.

Any fueling or refueling of a power saw shall be done in an area which has first been cleared of material which will carry fire. The power saw shall be moved at least 10 feet from the place of fueling or refueling before starting.

(5) Blasting and Welding. Blasting is prohibited except by written agreement. Such written agreement shall set forth necessary fire prevention requirements.

Unless otherwise directed in writing by the Forest Service, all flammable material shall be cleared for 10 feet around any piece of equipment being welded. In addition, provide a fire extinguisher of a size and type designed to extinguish a fire in the flammable materials surrounding the spot being welded.

(a) Storage of explosives. Explosives shall be stored at all times in a locked box marked: "Explosives". Powder and blasting caps shall be stored in separate boxes.

(b) Use of Cutting Torches. Locations where cutting torches are used shall be cleared of flammable materials for a distance of 10 feet surrounding the location of use. A fire extinguisher (at least 5#ABC with a UL rating of 3A-40BC, or greater) shall be provided in all locations where cutting torches are used.

(c) Fire Precautionary Periods. During Fire Precautionary periods, blasting shall be permitted as follows:

(1) When the predicted condition class reaches 3 (High), a watchman shall patrol the blasting area for at least one (1) hour following blasting. The watchman shall have available for immediate use a standard fire shovel and a five (5) gallon water filled backpack pump.

(2) When the predicted condition class reaches 4 (Very High), blasting shall be restricted to clear areas and terminated by 11 a.m. local time. The watchman requirements shall be as in item A above.

(3) All blasting operations shall be terminated when the predicted fire danger reaches EXTREME.

(6) Storage of flammables. Gasoline, oil, grease, and other highly flammable substances shall be stored in a separate building, or at a site where all debris is cleared within a radius of 25 feet. Storage buildings or sites shall be a minimum distance of 50 feet from other structures. Storage buildings shall be adequately posted to warn of the presence of flammable materials and to prohibit smoking in or around the buildings. The appropriate Fire Department shall be updated with precise, current locations of flammable substances within the project area whenever locations change.

(7) Gas and oil. Gas and oil for power saws or other hand power tools shall be carried in metal safety cans.

(8) Fueling and refueling of power equipment. Power tools shall be fueled and refueled in an area that has been cleared of flammable material. Power equipment shall be moved at least 10 feet from the fueling/refueling location before starting.

(9) Oil-contaminated waste materials. The Contractor shall transport all used oil filters, cartridges, oily rags and other waste to an established waste disposal installation specifically intended for the type of waste being disposed of. Glass jugs or bottles shall not be used for gas, oil or water.

(10) Storage, staging and parking areas. Equipment service areas, parking areas, gas and oil storage areas, and explosives storage areas will be cleared of all flammable material. Small, stationary engine sites will be cleared of all flammable material for a distance of 15 feet on all sides. Storage areas for flammable materials and explosives will be clearly labeled and "No Smoking" signs will be posted.

(b) Additional Fire Prevention Procedures. Additional fire prevention procedures may be added as fire danger rating increases. Additional procedures will be developed and implemented as needed by the USFS, in conjunction with Clear Creek County, Park County and the local fire departments, and may include the following (in order of increasing severity):

(1) Increase in on-site fire suppression capabilities, including additional fire extinguishers, water supplies (portable ponds, water trucks, pumps, hoses, etc.) bladder bags, backpacks, shovels and other equipment.

(2) Temporary restriction in location or extent of especially hazardous activities such as blasting, cutting or welding (anticipated when Red Flag Warnings are issued or under other conditions as deemed necessary by the Clear Creek or Park County Sheriffs Department or USFS).

(3) Reduction in the number of, or restriction of the locations of, work crews.

The addition of extra fire prevention requirements is intended to prevent or delay suspension of construction activities. However, under prohibitively dangerous conditions where acceptable procedures cannot be implemented, some or all construction activities may be temporarily suspended, at the direction of the USFS.

(c) Fire Incident Reporting Requirements. Comply with the following:

(1) <u>ALL FIRES STARTS ARE TO BE REPORTED IMMEDIATELY TO 911 EMERGENCY DISPATCH,</u> regardless of the contractor's perceived ability to extinguish them through the use of onsite facilities. Immediately report the following information:

Name of caller
Location of fire
Size of fire
Current suppression activities
Direction of fire spread
Rate of fire spread/wind direction
Threatened properties and personnel

(2) Use on-site equipment and follow radio instructions provided by responding fire department.

(3) Immediately begin to clear access road(s) identified by the responding department of obstructions, with the goal of providing access through construction areas by emergency equipment by the time it arrives.

(4) Keep responding firefighters apprised of conditions via radio.

(5) Evacuate location if instructed to do so, using the evacuation route specified.

(6) Report all fires extinguished by the use of on-site facilities on National Forest System land to the USFS promptly.

(7) Cooperate with local fire protection district personnel in fire cause determination. Protect the origin of all fires to the extent practical.

(d) Fire Control. Contractor shall, both independently and in cooperation with the USFS, take all reasonable and practicable actions to prevent and suppress fires resulting from Contractor's Operations and to suppress any forest fire in the project area. Contractor's independent initial fire suppression action on such fires shall be immediate and shall include the use of all necessary personnel and equipment at Contractor's disposal on site.

(e) Fire Suppression Costs. Contractor's obligation for cost of fire suppression vary according to three classifications of fires as follows:

(1) Operations Fire. An "Operations Fire" is a fire caused by Contractor's Operations other than a "Negligent Fire".

(2) Negligent Fire. A "Negligent Fire" is a fire caused by negligence or fault of Contractor's Operations during the course of their employment, or during rest or lunch periods; or if Contractor's failure to comply with fire prevention requirements results in a fire starting or permits a fire to spread. Damages and the cost of suppressing Negligent Fires shall be borne by the Contractor.

(3) Other Fires in Project Area. USFS shall pay Contractor, at fire fighting rates common in the area or at prior agreed rates, for equipment or personnel furnished by Contractor at the request of UFSF, on any fire in Project Area other than an Operations Fire or Negligent Fire.

(f) Noxious Weed Prevention. The following Forest Service weed prevention plan involving cleaning of construction equipment prior to entering the national forests is in effect on this project. The CO and Forest Service will inspect for conformance to weed-free requirements before admitting equipment and materials to the construction project. No adjustment in the contract completion date will be made. The cost to conform to weed-free requirements will be included in the cost of the work for each pay item.

The Contractor shall during the life of the project take the following measures:

(1) Site Protection From Weeds. Ensure all equipment and materials moved onto National Forest System land is free of soil, seeds, vegetative matter, or other debris that could contain or hold noxious weed seed.

(2) Weed-free Equipment. Ensure equipment is adequately washed to remove weeds and toxic materials prior to arrival on Guanella Pass Road (starting at Grant/US 285 and ending at Georgetown/I 70). Power washing shall be done to clean equipment and repeated each time equipment returns to the project site. Power washing shall remove all noxious weeds, weed seed and materials harboring noxious weed or weed seed, including the removal of debris on vehicle undercarriages, wheel wells and equipment parts. Equipment will be inspected by the CO prior to entering the work site. Minimum 24 hour notice will be given to CO for inspections.

(3) Weed-free Materials: Straw, hay, road fill, rip-rap, gravel and all materials provided for construction shall be certified as weed-free. Certified weed free mulch, (straw or hay) and seed shall conform to the Colorado Weed-free certifications standards.

(4) Weed Monitoring. Any noxious weeds appearing within one full growing season after project implementation will be due to the project and shall be the Contractors responsibility to control in accordance with the Arapahoe and Roosevelt National Forests and Pawnee National Grassland Noxious Weed Management Plan. Post-construction weed inventories shall be made annually by Contractor, under the supervision of the CO and National Forests, to determine the extent of weed invasion and appropriate weed control measures.

(g) Existing waterway conditions. At all times during construction, maintain fish passage in existing waterways that is equivalent to or exceeds the existing site conditions. Existing waterways requiring fish passage are: Duck Creek (Access Road Station 124+958), Naylor Tributary (Station 25+208), and S. Clear Creek Culvert #1 (Station 28+109) and #2 (Station 28+634).

(h) Spill Response. When fuel, chemicals, or other hazardous substances are spilled, comply with all requirements in the Spill Response document included in Appendix E.

Section 108. – PROSECUTION AND PROGRESS

108.01 Commencement, Prosecution, and Completion of the Work: Delete the second paragraph and substitute the following:

A preconstruction conference will be held after the contract is awarded and before beginning work. Seven days before the preconstruction conference, furnish three copies of the preliminary construction schedule according to Section 155.

Add the following:

Limit operations as follows (see Subsection 156.06 for additional limitations):

(a) No construction activities (e.g. grading, drainage, retaining walls between Stations 1+000 to 12+000) or aggregate material hauling will take place from Memorial Day through Labor Day from approximate Stations 1+000 to 12+000 (Grant to Geneva Park Campground/Duck Creek Picnic Ground). To the extent practical, materials that can be stockpiled in advance of construction will be hauled to staging areas between October 1 and May 1. Hauling of other construction materials including fuel, asphalt cement, culvert pipes, retaining wall material, and machinery will need to be done throughout the year. From Memorial Day to Labor Day unimpeded road access will be provided from Grant to the Tumbling River Ranch. The CO will coordinate limited hauling activities from Memorial Day through Labor Day to avoid conflict with Tumbling River Ranch activities, to the extent possible. Limited construction and controlled construction traffic will be allowed in May and September. From Labor Day to Memorial Day, construction activities, including aggregate hauling, in the vicinity of Tumbling River Ranch (Stations 6+500 to 7+000) will only occur from 7:00 a.m. to 7:00 p.m.

(b) If Tumbling River Ranch provides a schedule of travel times across Guanella Pass, the Contractor will try and meet reasonable requests for unimpeded travel. Such scheduled travel will be accommodated to the maximum extent possible with as little delay as possible. All travel time requests will be coordinated through the CO.

(c) Follow the haul route through the Town of Georgetown: From I-70 interchange to Argentine Street, Argentine Street to Brownell Street, Brownell Street to 7th Street, 7th Street to Rose Street, Rose Street to 2nd Street, thence on Guanella Pass Road.

(d) Except for the hauling of time/temperature sensitive materials, limit haul operations through the Town of Georgetown to the following times:

M-F 7:00 am to 10:00 am (haul operations allowed)
M-Th 4:00 pm to Sunset (haul operations allowed)

Additionally, the contractor will have trucks haul on the designated route in "platoons" and not individually. All haul "platoons" will be flagged through the town without stopping. Flaggers will be placed at stop signs in town to facilitate their transit through town without stoppage.

(e) No construction activities will take place at Boreal toad sites for the time periods listed below. Contractor will coordinate all construction activities at these sites with CO.

Site 1 (Approximate stations 25+250 to 26+000): May 15 to June 15 (1st and 2nd construction season) and August 15 to September 15 (1st construction season)

Site 2 (Approximate stations 27+030 to 27+250): May 15 to June 15 (1st and 2nd construction seasons) and August 15 to September 15 (1st construction season)

(f) Perform no work except to maintain traffic control, erosion control devices, maintain the roadway driving surface, and to control dust during the listed Federal holidays and surrounding days:

- Memorial Day Weekend: Noon Friday to 6:00 am Tuesday.
- Independence Day: Noon July 3 to 6:00 am July 5. If July 4th falls on a weekend, Friday, or Monday, do not work the weekend.
- Labor Day Weekend: Noon Friday to 6:00 am Tuesday.
- Thanksgiving: Noon Wednesday to 6:00 am Monday.
- Christmas/New Years Holiday: Noon Dec. 23 to 6:00 am Jan. 2.

If December 23 or January 1 falls on a Monday, do not work the adjacent weekend and do not work on December 23. If January 1 falls on a Friday, do not work the weekend.

(g) The road will be kept open on weekends, without construction delays, from 6:00 p.m. Friday to 11:00 p.m. Sunday and on National holidays.

(h) With the exception of materials from the on-site materials sources, material for the Clear Creek County construction will be hauled in from the Clear Creek County side of the pass and material for the Park County construction will be hauled in from the Park County side of the pass.

(i) No construction activity will take place at the proposed Upper, Lower, and existing Guanella Pass Summit parking areas during dawn, dusk, and nighttime hours to minimize potential impacts to the Canada lynx. Borrow site activity will be restricted to daylight hours. Notify the CO immediately if any lynx has been killed, or found dead, in the project area.

(j) Due to the possible presence of Boreal owls and other raptor species, surveys will be conducted by the end of April for Boreal Owls and by the end of July for raptors for each construction season. If an occupied owl or raptor nest is found within a 400 meter radius of the project construction area, then Limited Operating Periods (LOP) within a 400 meter radius of the species will be imposed to avoid the possibility of activity related disturbance. Activities restricted will include clearing, all heavy earthwork operations, placing culvert pipe, blasting, and guardrail post installation. Activities that will be allowed within the LOP will include hauling, light grading (surface maintenance), watering, and paving. LOPs will be in effect until August 1 of each construction season unless the nest site is determined to be inactive (written notice from the CO is required). No species were found within 400 meters of the project construction area during the 2003 surveys, however past surveys have identified species that would fall within the 400 meter corridor. For bidding purposes assume that one LOP will be imposed for the project for each construction season.

If a LOP is required no equitable adjustments will be made costs, delays, or other damages due to restrictions or stoppage of work.

(k) Due to the possible presence of nesting birds, perform clearing and grubbing work in designated wetland and riparian construction areas prior to March 15 or after July 31 unless approved by CO.

Schedule at least 2 non-work days out of every 14 calendar days. The selected non-work days do not need to be consecutive, but they must be scheduled. Provide at least 2 weeks notice before changing the scheduled days off.

Exemptions to scheduled days off may be granted by written approval from the CO for specific project operations and/or for periods of limited duration.

A Notice to Proceed must be issued before commencement of any work.

108.04 Failure to Complete Work on Time. Delete the contents of the Table 108-1 and substitute the following:

Original Contract Price		Daily Charge
From More Than	To and Including	
$ 0.00	$ 2,000,000.00	$ 600.00
2,000,000.00	5,000,000.00	1,600.00
5,000,000.00	and more	1,800.00

Section 109. – MEASUREMENT AND PAYMENT

109.01 Measurement Methods. Delete the first sentence and substitute the following:

Take or convert all measurement of work according to the International System of Units (SI), IEEE/ASTM SI 10.

Add the following after the third paragraph:

Submit measurement notes to the CO within 24 hours of performing the work. For on-going work, submit measurement notes weekly. When work is not complete, identify the measurement as being an interim measurement. Submit the final measurement when the installation is completed. Measurement notes form the basis of the Government's receiving report (see Subsection 109.08(d)). For lump sum items, submit documentation to support invoiced progress payment on a monthly basis.

Use an acceptable format for measurement records. As a minimum, include the following information in all records of measurement:

(a) Project name and number
(b) Contract item number
(c) Date the work was performed

(d) Location of the work
(e) Measured quantity
(f) Calculations made to arrive at the quantity
(g) Supporting sketch and/or details as needed to clearly define the work performed and the quantity measured.
(h) Names of persons measuring the work
(i) Identification as to whether the measurement is interim or final
(j) Signed certification statement by the persons taking the measurements, performing the calculations, and submitting them for payment that the measurement and calculations are correct to the best of their knowledge and that the quantity being measure is subject to direct payment for the identified item under the contract.

109.06 Pricing of Adjustments.

(a) Proposal.

(3) Cost or pricing data. Delete the third paragraph and substitute the following:

Submit with the cost or pricing data a written proposal for pricing the work according to (1) above. See Table 15-2 following FAR Subpart 15.4 for guidance.

109.08 Progress Payments. Delete the text and substitute the following:

FAR Clauses 52.232-5 - Payments under Fixed-Price Construction Contracts and 52.232-27 - Prompt Payment for Construction Contracts are supplemented as follows:

(a) General. Only invoice payments will be made under this contract. Invoice payments include progress payments made monthly as work is accomplished and the final payment made upon final acceptance. Only one progress payment will be made each month. No progress payment will be made in a month when the work accomplished results in a net payment of less than $1,000. Full or partial progress payment will be withheld until a construction schedule or schedule update is submitted to and accepted by the CO.

(b) Closing date and invoice submittal date. The closing date for progress payments will be designated by the CO. Include work performed after the closing date in the following month's invoice. Submit invoices to the designated billing office by the 7th day after the closing date. Invoices received by the designated billing office after the 16th day following the closing date will not be accepted for payment processing that month. Include late, unprocessed invoice submittals in the following month's invoice.

(c) Invoice requirements. Submit the invoice to the government's designated billing office. Include the following items in the invoice:

(1) The information required in FAR Clause 52.232-27(a)(2)(I) through (a)(2)(x).

(2) A tabulation of total quantities and unit prices of work accomplished or completed on each pay item as of the monthly closing date. Do not include any quantities unless field note documentation for those quantities was submitted by the closing date. Do not include any work involving material for which test reports required under Sections 153 or 154 or certifications required by Subsection 106.03 are past due as of the closing date.

(3) The certification required by FAR Clause 52.232-5(c) and, if applicable, the notice required by FAR Clause 52.232-5(d). Provide an original signature on the certification. Facsimiles are not acceptable.

(4) If applicable, a copy of the notices that are required by FAR Clause 52.232-27(e)(5) and (g).

(5) The amount included for work performed by each subcontractor under the contract.

(6) The total amount of each subcontract under the contract.

(7) The amounts previously paid to each subcontractor under the contract.

(8) Adjustments to the proposed total payment which relate to the quantity and quality of individual items of work. Adjustments for the following may be made by the Government after validation of the invoice.

(a) Retent resulting from a failure to maintain acceptable progress.
(b) Retent resulting from violations of the labor provisions.
(c) Retent pending completion of incomplete work, other "no pay" work, and verification of final quantities.
(d) Obligations to the Government such as excess testing cost or the cost of corrective work pursuant to FAR Clause 52.246-12(g).
(e) Liquidated damages for failure to complete work on time.

(d) Government's receiving report. The Government's receiving report will be developed using the measurement notes received and accepted by the CO. Within 4 days after the closing date, the CO will be available by appointment at the Government's designated billing office to advise the Contractor of quantities and unit prices appearing on the Government's receiving report.

(e) Processing progress payment requests. No payment will be made for work unless field note documentation for the work was provided by the closing date.

(1) Invoices received by the 7th day following the closing date.

(a) Proper invoices. If the invoice meets the requirements of Subsection 109.08(c), and the quantities and unit prices shown on the contractor's invoice agree with the corresponding quantities and unit prices shown on the Government's receiving report, the invoice will be paid.

(b) Defective invoices. If the invoice does not meet the requirements of Subsection 109.08(c), or if any of the quantities or unit prices shown on the contractor's invoice exceed the corresponding quantities and unit prices shown on the Government's receiving report, the invoice will be deemed defective and the Contractor so notified according to FAR Clause 52.232-27(a)(2). Defective invoices will not be corrected by the Government and will be returned to the Contractor within 7 days after the Government's designated billing office receives the invoice.

Revise and resubmit returned invoices by the 18th day following the closing date. The CO will evaluate the revised invoice. If the invoice still does not meet the requirements of Subsection 109.08(c), the Contractor will be so notified according to FAR Clause 52.232-27(a)(2), and no progress payment will be made that month. Correct the deficiencies and resubmit the invoice the following month.

If the revised invoice meets the requirements of Subsection 109.08(c), but still had quantities or unit prices exceeding the corresponding quantities and unit prices shown on the Government's receiving report, the Government's data for that item or work will be used. The Contractor's invoice, as revised by the Government's receiving report, will be forwarded for processing by the 23rd day following the closing date. The Contractor will be notified by the 23rd day following the closing date of the reasons for any changes to the invoice.

(2) Invoices received between the 8th and 16th day following the closing date.

(a) Proper invoices. If the invoice meets the requirements of Subsection 109.08(d), and the quantities and unit prices shown on the Contractor's invoice agree with the corresponding quantities and unit prices shown on the CO's receiving report, the invoice will be deemed proper and forwarded for processing within 7 days of receipt.

(b) Defective invoices. If the invoice does not meet the requirements of Subsection 109.08(d), the invoice will be deemed defective, the Contractor so notified according to FAR Clause 52.232-27(a)(2), and no progress payment will be made that month. Correct the deficiencies and resubmit the invoice the following month.

If the invoice meets the requirements of Subsection 109.08(d), but has quantities or unit prices exceeding the corresponding quantities and unit prices shown on the Government's receiving report, the Government's data for that item of work will be used. The Contractor's invoice, as revised by the Government's receiving report, will be forwarded for processing within 7 days of the Government's receipt of the invoice. The Contractor will be notified of the reasons for any changes to the invoice.

(f) Partial payments. Progress payments may include partial payment for material to be incorporated in the work, provided the material meets the requirements of the contract and is delivered on or in the vicinity of the project site or stored in acceptable storage places.

Partial payments for stockpiled manufactured material (aggregates) will be based on Contractor process control test results. If test results show the material to be out-of-specification, or in "reject" where statistical evaluation procedures are used, no payment for stockpiled materials will be made.

Partial payment for material does not constitute acceptance of such material for use in completing items of work. Partial payments will not be made for living or perishable material until incorporated into the project.

Partial payments for material will not exceed the lesser of:

(1) 80 percent of the contract bid price for the item, or

(2) 100 percent of amount supported by copies of invoices submitted.

The quantity paid will not exceed the corresponding quantity estimated in the contract.

109.09 Final Payment. Delete the first sentence and substitute the following:

FAR Clause 52.232-5, Payment under Fixed-Price Construction Contracts, and FAR Clause 52.232-27 - Prompt Payment for Construction Contracts are supplemented as follows:

Section 152. – CONSTRUCTION SURVEY AND STAKING

Construction Requirements

152.02 General. Delete the first paragraph and substitute the following:

The Government will furnish to the Contractor one copy of each of the following information:

- 3D coordinates and offset distance from centerline for subgrade and surface course finishing stakes at 20 meter intervals and miscellaneous intermediate stations.

- Slope stake books containing centerline grade and slope staking information at 20 meter station intervals and miscellaneous intermediate stations.

- Computer listings containing: horizontal alignment, vertical alignment, earthwork quantities, and staking details showing superelevation template data and slope information.

The Government will provide files for downloading 3D data. Following is the information that will be provided electronically:

- 3D coordinates of traverse control points and benchmarks.

- 3D coordinates of grade finishing stakes.

The Government will perform the following:

- Establish basic survey control points for vertical and horizontal control of the project.

- Set centerline stakes, take cross-sections, and set reference hubs at 20 meter intervals and miscellaneous intermediate stations.

Add the following to the fourth paragraph:

Protect all land survey monuments, property corners, USGS bench marks and USGS control points. Move and reference those which fall within the construction limits according to Subsection 107.02, Protection and Restoration of Property and Landscape. Coordinate the new locations with the CO.

Add the following to the first paragraph on page 67:

Use the procedures contained in the current "Location/Construction Surveying Guide" issued by the U.S. Department of Transportation, Central Federal Lands Highway Division, Lakewood, Colorado, as a guide to the work in this Section.

Delete the second sentence of the second paragraph and substitute the following:

Reestablish missing terrain cross-section reference hubs, control points, and stakes before slope staking begins.

Add the following:

Furnish a practicable schedule of staking activities with the construction schedule submitted according to Section 155. Include the dates and sequence of staking requirements.

152.03 Survey and Staking Requirements. Add the following before the first paragraph:

General. Construction survey and staking includes layout, controls, and measurement as necessary to construct the project. Perform the work listed below according to Subsection **152.03(a)** through **152.03(m)**:

- Control Points.
- Roadway Cross Sections
- Slope Stakes and References: Both sides of the road.
- Clearing and Grubbing Limits: Both sides of the road and for all parking areas.
- Centerline Reestablishment: 7th Street and Argentine Street.
- Grade Finishing Stakes: Top of subgrade and top of roadway aggregate.
- Drainage Structures: Flowlines, curbs, trench grates.
- Bridges and abutments.
- Retaining Walls.
- Miscellaneous survey and staking: Driveways, sidewalks.
- Intermediate Survey and Staking.

(b) Roadway cross-sections. Delete the text and substitute the following:

Take roadway cross-sections normal to centerline. When the centerline curve radius is less than or equal to 75 meters, take cross-sections at a maximum centerline spacing of 10 meters. When the centerline curve radius is greater than 75 meters, take cross-sections at a maximum centerline spacing of 20 meters. Take additional cross-sections at significant breaks in topography and at changes in the typical section. Ensure that, at a minimum, roadway cross-sections are taken at each cross-section station shown in the plans. Along each cross-section, measure and record points at breaks in topography, but no further apart than 5 meters. Space the points so that the maximum variation in vertical distance from a straight line between two consecutive points and the ground line does not exceed ± 0.2 meters. Measure and record points to at least the anticipated slope stake and reference locations. Reduce all cross-section distances to horizontal distances from centerline.

Submit the cross-sectional data in GEOPAK ASCII text format: station, offset, elevation, north coordinate, east coordinate, p-code text format. Include a file header that defines the data type of the column. (Contact Central Federal lands Survey Manager, at 303-716-2078 for more information on the format.) Include one shot per line in the submitted files showing the following data:

Station (nominal), offset from centerline, elevation, north coordinate, east coordinate, p-code (Feature code: RH for reference hub, CL for centerline).

Deliver all data to the CO after completing the roadway cross-section survey. Submit data to CO at least 10 days prior to anticipated construction. Do not begin embankment construction or excavation operations on the proposed site until the design profile has been verified. The CO will send the cross-sectional data to CFL Survey manager to review for survey sufficiency. If significant differences in terrain are found, the Design Engineer will modify the profile if necessary to match the new terrain. If the design profile is modified, new design data will be provided for only those locations where the design profile has been modified. (The Design Engineer will re-run all cross-sections using the new terrain to provide final earthwork quantities). It will be the Contractor's responsibility to re-catch slope stakes according to Subsection 152.03(c).

(e) Centerline reestablishment. Delete the text and substitute the following:

Reestablish centerline from instrument control points. The maximum spacing between centerline points is 10 meters when centerline curve radius is less than or equal to 75 meters. When the centerline curve radius is greater than 75 meters, the maximum distance between centerline points is 20 meters. Reestablish centerline as many times as necessary to construct the work.

(f) Grade finishing stakes. Delete the third paragraph and substitute the following:

The maximum longitudinal spacing between stakes is 10 meters when the centerline curve radius is less than or equal to 75 meters. When the centerline curve radius is greater than 75 meters, the maximum longitudinal spacing between stakes is 20 meters. The maximum transverse spacing between stakes is 10 meters. Reset grade finishing stakes as many times as necessary to construct the subgrade and each aggregate course. Use brushes or guard stakes at each stake.

(g) Drainage structures. Add the following:

Verify, in the field, the approximate location of each individual structure with the CO prior to surveying, designing, and staking culverts. Use the "Guide for Designing and Staking Culvert in the Field", dated January 9, 1996, issued by the U.S. Department of Transportation, Central Federal Lands Highway Division, Lakewood, CO, as a guide to the work in this section.

(5) Add the following:

Plot at a scale of 1:100.

Add the following:

(7) When the field design has been approved, set drainage structure survey stakes, reference stakes, and stake inlet and outlet ditches to make the structure, including end treatments (e.g., drop inlets) functional.

(8) Adjust slope stakes to provide for catch basins (and transitions into and out of catch basins) which correspond to the final culvert location and design. If the culvert was moved from location shown in the plans, review the slope stakes in the vicinity of the plan location and adjust the slope stakes to remove the planned catch basin.

(l) Miscellaneous survey and staking.

(3) Approach Roads. Add the following:

For approach roads that have a site-specific profile grade shown in the plans, set slope stakes and references, clearing and grubbing limits, re-establish centerline, and set grade finishing stakes according the applicable portions of Subsection 152.03 and the other requirements in Section 152.

Add the following:

(6) Re-establishing land survey monuments, property boundary monuments, and geodetic control monuments found within the construction limits.

(7) Relocating utilities to proper horizontal and vertical location.

(8) Slope stake changes under Section 201, when directed by the CO.

(9) Borrow site.

(m) Intermediate surveying and staking. Delete the text of the third paragraph and substitute the following:

Remeasure quantities if it has been determined that any portion of the work is acceptable but has not been completed to the lines, grades, and dimensions shown on the plans or established by the CO.

Delete Table 152-1 and substitute the following:

Table 152-1
Construction Survey and Staking Tolerances [7]

Staking Phase	Horizontal	Vertical
Existing Government network control points	±20 mm	±8 mm * √K [5]
Local supplemental control points set from existing Government network points	±10 mm	±3 mm * √N [6]
Centerline points [1] – (PC), (PT), (POT), and (POC) including references	±10 mm	±10 mm
Other centerline points	±50 mm	±50 mm
Cross-section points and slope stakes [2]	±50 mm	±50 mm
Slope stake references [2]	±50 mm	±50 mm
Culverts and minor drainage structures	±50 mm	±20 mm
Retaining walls and curb and gutter	±20 mm	±10 mm
Bridge substructures	±10 mm [3]	±10 mm
Bridge superstructures	±10 mm [3]	±10 mm
Clearing and grubbing limits	±500 mm	---
Roadway subgrade finish stakes [4]	±50 mm	±10 mm
Roadway finish grade stakes [4]	±50 mm	±10 mm

[1] Centerline points: PC – point of curve; PT – point of tangent; POT – point on curve.
[2] Take the cross-sections normal to the centerline ±1 degree.
[3] Bridge control is established as a local network and the tolerances are relative to that network.
[4] Includes paved ditches
[5] K is the distance in kilometers
[6] N is the number of instrument setups.
[7] At 95% confidence level. Tolerances are relative to existing Government network control points.

Add the following Subsection:

(n) Reference hub establishment. Establish reference hubs and guard stakes on both sides of centerline at 20 meter station intervals and each intermediate cross-section as shown in the plans, according to the offset distance and elevation data furnished. Reference hubs shall be 19 millimeter square, 300 millimeter long oak or ash (hardwood) stakes driven flush with the natural ground. If rocky soil prohibits the use of stakes this long, 200 millimeter stakes can be substituted. Reference hubs shall be set approximately 6 meters outside of the proposed cut limits and 5 meters outside of the proposed fill limits, except in rock cuts and wall areas. Should the Contractor be unable to set any of the reference hubs because of obstructions such as trees or boulders, alternate locations for the hubs shall be determined and computed in the field by the contractor. The alternate point for the hub shall be along the station right-angle line to a more usable location. This move should be of minimal distance. Centerline points shall be 12d light boat nails (or equivalent) with cloth flagging if the points fall within the existing highway surface, or 19 millimeter by 38 millimeter by 450 millimeter guard stakes if they fall outside the existing roadway. Reference hub and centerline guard/offset stakes shall be 19 millimeter by 38 millimeter by 450 millimeter finished size pine stakes painted white. Remove and dispose of any reference hubs and guard stakes previously placed by the Government.

Measurement

152.05 Add the following:

Re-establishing missing Government-set terrain cross-section reference hubs, control points, and stakes will be measured under Miscellaneous Survey and Staking when it is paid by the hour. No payment will be made for re-establishing missing hubs, control points, or stakes after construction operations have begun.

Payment

152.06 Add the following:

Pay Item		Pay Unit
15212	Approach road survey and staking	Each
15216A	Parking area survey and staking	Each

Section 153. – CONTRACTOR QUALITY CONTROL

Description

153.01 Add the following:

This work also consists of obtaining samples for acceptance testing and furnishing a water and electrical supply for the Government's field laboratory (the Government-furnished laboratory is for the exclusive use of the CO).

Furnish water to the Government field laboratory which is reasonably clear and free of oil, acid, rust, alkali, sugar, and vegetable substances. Furnish 220-volt, 60-cycle, single-phase current adequate to operate all of the Government field laboratory facilities at all times as required by the CO. A minimum of 15 kilowatts of power at the entrance box is required for effective use of electrical equipment. Equip the power supply with a regulator that will limit the voltage of the power furnished to the laboratory to not more than 240 volts and not less than 220 volts.

Construction Requirements

153.02 Contractor Quality Control Plan.

(a) Process control testing. Add the following:

See Table 153-1 for schedule of minimum sampling and testing for process control. Where no minimums are specified, submit proposed tests to be performed and the proposed sampling and testing frequencies.

(b) Inspection/control procedures.

(3) Production phase. Add the following:

(d) Inspect materials or assemblies accepted under Subsection 106.03 to ensure that the work and materials comply with all contract requirements. Furnish the results of the inspection, along with the product certification or commercial certification as applicable, to the CO prior to incorporating the materials into the work.

(c) Description of records. Add the following:

Identify the format for reporting test results and the procedures to be used to maintain inspection records.

(d) Personnel qualifications.

(1) Delete the text and substitute the following:

Designate a Quality Control Supervisor (QCS) whose primary responsibility is managing the inspection system. The QCS shall not be the Contractor's Superintendent. Designate a QCS who is experienced to perform and supervise all sampling, testing, and inspection. The QCS shall monitor all phases of the work and identify deficiencies and take appropriate corrective action.

Add the following:

(3) Personnel assigned to sampling or testing shall have 1 year or more of recent job experience in the type of sampling and testing required by the contract, WAQTC or SHA certification for the sampling and testing responsibilities, and the following:

(a) NICET Level II certification in highway materials, or State or industry certification-related sampling and testing equivalent to their intended responsibilities.

or

(b) Current or previous employment by an AASHTO accredited laboratory performing sampling and testing equivalent to their intended responsibilities.

(c) Demonstrated proficiency or successful testing of one or more proficiency samples may be substituted for basic qualifications pending verification of test results.

153.03 Testing. Delete the title and text and substitute the following:

153.03 Sampling and Testing. Perform the work required by Table 153-1 and by the acceptable Quality Control Plan.

(a) Sampling.

(1) Acceptance sampling. Acceptance sampling schedules and times or locations will be provided by the CO.

(2) Quality control sampling. Use a procedure for random sampling. Sample according to the acceptable Quality Control Plan. In addition, sample any material that appears defective or inconsistent with similar material being produced, unless such material is voluntarily removed and replaced or otherwise corrected.

(b) Testing. Furnish laboratory equipment which conforms to the applicable test requirements and is properly calibrated. Provide a certification stating the equipment conforms to requirements. The CO may require the Contractor to perform testing to demonstrate acceptable equipment and an acceptable level of technician competence.

Keep laboratory facilities clean and maintain equipment in proper working condition. Provide the CO unrestricted access to the laboratory for inspection and review.

153.04 Records. Add the following to the first paragraph:

When tests are on material being incorporated into the work, report test results within 24 hours.

Add the following to the second paragraph:

Detail inspection results including deficiencies observed and corrective actions taken.

153.05 Acceptance. Add the following:

If chronic deficiencies are noted in the Contractor's inspection or testing systems, the CO may order supplemental inspection and/or testing to be performed. The Government will charge to the Contractor all costs associated with such supplemental inspection or testing.

Measurement

153.06 Delete the text and substitute the following:

Contractor quality control will be subsidiary to the 15401 Contractor Testing Item.

Table 153-1
Schedule of Minimum Sampling and Testing For Process Control
(to be performed by the contractor)

Section(s): 204, 208, 209.

Material	Property or Characteristic	Test Method or Specification	Frequency	Sampling Point
Embankment Construction	Classification	AASTHO T 145	1 per material/type	Source of material
Composition of Roadbed in Cuts	Moisture/Density	AASHTO T 99 or AASTHO T 180 (minimum of 5 proctor points)	1 per material/type	Source of material
Bedding/Backfill for Structures and Culvert Pipe	Gradation and liquid limit	AASHTO T 11 AASHTO T 27 AASHTO T 89 AASHTO T 90	1 per material/type	Source of material
	In-place density and moisture content	AASHTO T 310	For embankment and composition of roadway in cuts: 2 per lift, but not less than 2 every 800 cubic meters. For structure and culvert backfill: 1 per 15 meters/lift Minimum 2 per lift	Compacted embankment, subgrade or backfill as applicable
	Classification and R-value	Tested by FHWA Central Lab	1 per 700 meters, or change in material type	Sample depth: 0-300 mm, finished subgrade

Section(s): 255.

Material	Property or Characteristic	Test Method or Specification	Frequency	Sampling Point
Reinforced Fill and Retained Fill	Gradation and liquid limit	AASHTO T 11 AASHTO T 27 AASHTO T 89 AASHTO T 90	1 per material/type	Source of material
	Moisture Density	AASHTO T99, method C	1 per material/type	Source of material
	In-place density and moisture content	AASHTO T 310	For MSE walls: 1 per 300-mm lift per 75-meters of wall length (minimum of 2 per lift)	Compacted backfill

Section(s): 301, 303, 304, 305, 306, 308.

Material	Property or Characteristic	Test Method or Specification	Frequency	Sampling Point
Subbase, Base Course Aggregate Stabilization and Aggregate Topsoil Courses	Gradation (301)	AASTHO T 11 AASTHO T 27	2 per day	Crusher belt
	Moisture/Density	AASHTO T 99 or AASTHO T 180 (minimum of 5 proctor points)	1 per source of material	Source of material
	In-place density and moisture content	AASHTO T 310	2 per lift at 300 meter intervals, alternating lanes	Compacted aggregate
	Plasticity index (aggregate surfacing only)	AASHTO T 90	2 per day	Crusher belt
	Gradation (304 materials processed in place)	AASHTO T 11 AASHTO T 27	1 per 300 meters	Processed material
Magnesium Chloride and Calcium Chloride	Specific Gravity	Hydrometer	1 per shipment	Transport vehicle

Note: Density and Moisture calculations AASHTO T 310...Density corrections based on moisture for recycled materials containing asphalts, or aggregates containing MgCl or CaCl shall be made based on samples taken from each test site and oven-dried in the laboratory.

Section(s): 401 (Superpave).

Material	Property or Characteristic	Test Method or Specification	Frequency	Sampling Point
Superpave Hot Asphalt Concrete Pavement	Gradation	AASTHO T 11 AASHTO T 27	2 per day per stockpile	Crusher belt (during production) and Cold Feed or Hot Bins (as applicable during production of hot mix)
	Moisture content of aggregates	FLH T 509	1 per day	Cold Feed (during production of hot mix)
	Compaction	ASTM D2950	Test strip, first day of production to establish roller pattern: 12 per 500 meters, then 3 per 500 meters	In place, after compaction
	Placement temperature	Thermometer	As directed	Behind laydown machine
	Surface tolerance	Straight edge and FLH T 504	During and after compaction	See subsection 401.16
Aggregate	Fine aggregate angularity	AASHTO T 304, Method A	1 per day	Cold Feed

Section(s): 402, 403, 404, 405.

Material	Property or Characteristic	Test Method or Specification	Frequency	Sampling Point
Asphalt Concrete Pavement Open-Graded Asphalt Friction Course Asphalt Treated Base Course	Gradation	AASTHO T 11 AASHTO T 27	2 per day per stockpile	Crusher belt (during production) and Cold Feed or Hot Bins (as applicable during production of hot mix)
	Moisture content of aggregates	FLH T 509	1 per day	Cold Feed (during production of hot mix)
	Compaction	ASTM D2950	Test strip, first day of production to establish roller pattern: 12 per 500 meters, then 3 per 500 meters	In place, after compaction
	Placement temperature	Thermometer	As directed	Behind laydown machine
	Surface tolerance	Straight edge and FLH T 504	During and after compaction	See subsection 401.16

Section(s): 501, 552, 601.

Material	Property or Characteristic	Test Method or Specification	Frequency	Sampling Point
Concrete	Gradation and fineness modulus	AASTHO T 11 AASHTO T 27	1 per day	Aggregate, before batching
	Moisture	FLH T 509	1 per day/stockpile	Aggregate, before batching
	Slump	AASHTO T 119	1 per 25 cubic meters, minimum 1 per day	See note
	Air content	AASHTO T 152	1 per 25 cubic meters, minimum 1 per day	See note
	Unit weight	AASHTO T 121	1 per 25 cubic meters, minimum 1 per day	See note
	Temperature	Thermometer	1 per 25 cubic meters, minimum 1 per day	See note
	Making test specimens for compressive strength	AASHTO T 23	1 set per 25 cubic meters, minimum 1 set per day	At point of discharge

Note: If an extended set admixture is used for the sole purpose of extending discharge times, sampling and testing shall be performed by the contractor at point of batching and discharge location to ensure compliance with subsection 552.08.

Section 154. – CONTRACTOR SAMPLING AND TESTING

Description

154.01 Delete the second sentence and substitute the following:

When there is a pay item for Contractor testing included in the bid schedule, it also consists of testing and reporting required test results.

Construction Requirements

154.02 Sampling. Delete the second paragraph and substitute the following:

Sample and split samples according to AASHTO or other acceptable procedures. Allow the CO the opportunity to witness all sampling. Immediately perform splits on all samples. Deliver the Government's portion of the sample or split sample in an acceptable container suitable for shipment. Submit form 1600c for each sample to the CO and label all samples with the following information:

(a) Project number
(b) Source of material
(c) Item number
(d) Sample number
(e) Date sampled
(f) Time sampled
(g) Location sample taken
(h) Name of person sampling
(i) Name of person witnessing sampling
(j) Type of test required on sample

Sample according to the Sampling and Testing tables included at the end of each section.

154.03 Testing. Delete the first sentence and substitute the following:

When there is a pay item for Contractor testing included in the bid schedule, perform all tests required by the Sampling and Testing tables included at the end of each section.

Add the following:

Where Process Control Sampling and Testing frequencies as per Table 153-1 are identical to the Sampling and Testing Tables for all applicable work the Process Control Samples may be used for acceptance.

Add the following subsection:

154.03A Laboratory (Contractor-Furnished). Furnish a laboratory equipped with all necessary test equipment and accessories to satisfy the testing required by the contract. Services of a commercial laboratory equipped with all necessary test equipment and accessories to satisfy the testing required by the contract may be used (Refer to Appendix F, Laboratory Equipment List, for minimum equipment requirements).

Use equipment that is calibrated and meets the applicable testing requirements of the contract. Tag all necessary equipment indicating the date of last inspection, inspector, and calibration number.

The CO may check equipment to verify condition and calibration. Repair or replace equipment not meeting applicable requirements.

Submit documentation supporting the calibration of all necessary equipment prior to actual testing. Include the following:

(a) Description of the equipment calibrated or verified, including model number, serial number, or other acceptable identification.

(b) Identification of the individual performing the calibration or verification.

(c) Identification of the calibration or verification procedure used.

(d) The calibration number for each calibration.

154.04 Records. Add the following:

Report test results on forms containing all sample information required by Subsection 154.02. Label clearly all interim measurements used to determine the results. Attach work sheets used to determine test values to the test result forms when submitted.

154.05 Acceptance. Delete the text and substitute the following:

Contractor sampling and testing will be evaluated under Subsections 106.01, 106.02, and 106.04 based on Government verification testing.

Section 155. – SCHEDULES FOR CONSTRUCTION CONTRACTS

Construction Requirements

155.02 General. Add the following to the fourth paragraph:

No progress payment will be made for any work until a construction schedule is submitted to the CO and accepted by the CO.

155.03 Bar Chart Method (BCM). Delete the text:

155.05 Written Narrative. Add the following:

(j) List anticipated monthly and cumulative contract earnings (including, for schedule updates, any contract modifications) for each month from the beginning of construction operations through the completion of the work. Calculate and list each month's anticipated earnings through the close of business on the date provided by the CO as the cut-off date for monthly project pay estimates.

155.06 Schedule Updates. Add the following:

No progress payment will be made for any work until an updated construction schedule has been submitted to and accepted by the CO.

Allow 7 days after receipt for acceptance of the updated construction schedule or a return for revisions.

Section 156. – PUBLIC TRAFFIC

Construction Requirements

156.03 Accommodating Traffic During Work. Delete the last two sentences in the first paragraph and substitute the following:

Submit situation-specific traffic control implementation drawings and alternate traffic control proposals according to Subsection 104.03 for acceptance at least 14 days before intended use.

156.04 Maintaining Roadways During Work.

(a) Add the following:

Do not construct detours outside of the clearing limits or use alternate route detours without the approval of the CO.

(c) Delete the text and substitute the following:

Snow removal to facilitate the work is the Contractor's responsibility. Snow removal to provide public access is the responsibility of the maintaining agency and will be performed at the maintaining agency's discretion. Allow the maintaining agency access to perform snow removal.

Delete the first sentence in the last paragraph and substitute the following:

Record the condition of the existing Guanella Pass Road including the haul routes from the Town of Grant (US 285) and through the Town of Georgetown (to I-70). A narrated video will be produced to document the condition of the existing roadway at the start of each construction season. Major milestones and Stations will be identified as part of the narration and a copy of the video provided to

the CO. A meeting will be held to discuss the base condition of the roadway and discuss maintenance required from construction traffic impacts versus public traffic and environmental conditions. The Contractor will be responsible for monitoring the condition of the haul route on a daily basis. Construction impacts to the roadway and detours will be repaired by the Contractor to provide a safe and acceptable condition. The CO will evaluate the roadway, on at least a weekly basis, to identify areas needing maintenance. Minor maintenance items, including small potholes and deteriorated roadway, shall be repaired within a week of identification. Major items, including large potholes and safety items (damaged guardrail, large rocks left on the roadway, collapsed sections of roadway, etc.) will be immediately secured with temporary repairs or protection and final repairs will be initiated within 24 hours and completed as soon as practicable.

156.05 Maintaining Roadways During Non-work Periods. Delete the second sentence and substitute the following:

Snow removal to provide public access is the responsibility of the maintaining agency.

156.06 Limitations on Construction Operations. Add the following:

See Subsection 108.01 for additional limitations.

(a) Add the following:

Construction related traffic must follow speed limits and other applicable laws.

(d) Delete the first sentence and substitute the following:

For alternate one-way traffic control, provide a minimum lane width of 3 meters. For two-way traffic, provide a minimum roadway width of 6 meters.

(j) Delete the text and substitute the following:

Limit construction-caused delays to public traffic to a maximum of 30 minutes per passage through the project. When required for blasting, delays longer than 30 minutes may be requested. For delays longer than 30 minutes, public notice will be given in advance through the local news media and by informational signs. Allow two weeks prior to the planned delays for the CO to evaluate the closure need and notify the necessary parties.

Nighttime closures, from 10:00 pm to 6:00 am, will be allowed provided all restrictions in Section 108 are followed.

The road will be kept open on weekends, without construction delays, from 6:00 p.m. Friday to 11:00 p.m. Sunday and on National holidays.

Temporary roads through construction areas will be allowed with a maximum grade of 12%.

(k) Add the following:

Maintain existing guardrails and bridge railings until removal is necessary for construction. Use a temporary barrier, or other appropriate shielding or warning devices, as directed by the CO, while the guardrails and bridge rails are absent. Limit the length of area affected as directed by the CO. Install new guardrails and bridge rails as soon as possible to minimize risk to the public.

(l) Add the following:

Notify the CO of all construction activities (including construction hauling, road closures, extended traffic delays, timing of construction, etc.) that may affect the Town of Georgetown, Clear Creek County, Park County, and business and property owners along Guanella Pass Road (including Tumbling River Ranch and Julie Holmes). Notification will be updated and provided to the CO on a daily basis, from Memorial Day through Labor Day, and weekly basis the rest of the year. Notification will provide detailed information of construction operations that may affect the Town of Georgetown, Clear Creek County, Park County, and business and property owners each day and will be provided at least 48 hours in advance of the operations. Any limited hauling activities occurring between Memorial Day and Labor Day will be coordinated to avoid conflicts, as much as possible, with business activities along the road.

156.08 Traffic and Safety Supervisor.

(e) Delete the text and substitute the following:

The Traffic & Safety Supervisor shall inspect all work zone traffic control devices on the project, including those in staging areas, on-site storage areas, material sources, and disposal/waste areas, as follows:

(1) Daily during daylight hours when daylight work is being performed.
(2) Daily during hours of darkness when nighttime work is being performed.
(3) Weekly during the hours of darkness when only daylight work is being performed.
(4) Weekly during hours of darkness when work is suspended for periods of more than one week, except when the project has been shut down for the winter.
(5) Additional inspections, day or night, as directed by the CO.
(6) Before winter suspension, conduct an inspection of the project with the CO to ensure proper provisions are made for winter travel during the period of suspension.
(7) During periods of winter suspensions, inspect only as requested by the CO.

Add the following:

(i) The Traffic Control Supervisor shall be equipped with a mobile telephone unit at all times for contact with dispatchers when emergency services are required. The Supervisor shall make immediate contact with emergency personnel as required to assist accident victims, expedite the removal of broken-down vehicles, and maintain the smooth flow of traffic.

Provide CO with two hand-held radios, 5-watt, FM band, capable of transmitting and receiving on three frequencies. Traffic Control Supervisor, each flagger and the Project Superintendent shall be equipped with hand-held radios, 5-watt, FM band, capable of transmitting and receiving on three frequencies. The radio shall be equipped with battery chargers and rechargeable batteries. The radios must be capable of communication throughout the limits of the project. The Construction Superintendent shall have a mobile telephone available for use.

Mobile telephone units and hand-held radios and service plans will not be measured and paid for separately, but shall be included in the work.

Section 157. – SOIL EROSION CONTROL

Construction Requirements

157.03 General. Delete the second paragraph and substitute the following:

Standard erosion control devices are provided in the contract. Detail site-specific measures for controlling erosion and submit to the CO for acceptance prior to implementation. Provide working drawings and associated data that do not exceed 610 by 920 millimeters in size. Allow 7 days for acceptance of the drawings or a return for corrections.

Include the following in the detailed design:

(a) Address contractual requirements for storm water runoff permits, environmental commitments, and other permit requirements here or in Subsection 107.01 or 107.10.

(b) Location of each proposed erosion control measure.

(c) Type of each erosion control measure.

(d) Quantities and estimated unit costs of proposed temporary erosion control devices to be implemented during construction.

(e) A schedule detailing coordination of erosion control measures with the various construction operations or stages. Include the furnishing, installation, maintaining, and removing of temporary devices and the installation of permanent erosion control features.

(f) A schedule outlining the proposed schedule of clearing and grubbing, excavation, embankment, and culvert operations such that the area of disturbed or erodible material is minimized. Schedule the work such that temporary and permanent erosion measures can be incorporated at the earliest practical time.

(g) Construction methods used in various items of work to minimize erosion.

Add the following:

At least 5 days prior to the preconstruction conference, designate in writing an Erosion Control Supervisor who is responsible for implementing the requirements of this Section. Do not designate the project superintendent as the Erosion Control Supervisor.

When temporary erosion control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as part of the work in a timely manner, provide temporary measures at no cost to the Government.

157.04 Controls and Limitations on Work. Delete paragraphs (c) and (d) and substitute the following:

(c) Unless a specific seeding season is identified in the contract, apply permanent turf establishment to the finished slopes and ditches within 14 days according to Sections 624 and 625.

(d) Apply temporary turf establishment or other approved measures on disturbed areas within 14 days after last disturbance, except where the area will be redisturbed within 21 days after last disturbance or when initial stabilization is precluded by snow cover.

157.05 Filter Barriers. Add the following:

In some instances, the CO may direct that filter barriers remain in place after the project is complete. In this situation, the filter barrier will be removed by others.

Inspect silt fence and erosion control logs weekly and after every major storm; clean if necessary.

157.09 Diversions. Add the following:

Prepare and submit a temporary diversion plan to the CO for review and approval.

157.11 Temporary Turf Establishment. Delete the text and Table 157-1 and substitute the following:

Apply temporary turf establishment on disturbed areas per Sections 625 and 713.04. Do not prepare temporary seeding bed with fertilizer or humate. Protect and care for seeded areas, including watering, until permanent native grasses or temporary grass are established in place.

157.12 Inspection and Reporting. Add the following:

Monitor the turbidity of waters adjacent to the project. Take turbidity measurements using an HF-DRT 15CE turbidimeter or equivalent upstream of the project and 150 meters downstream of the area of the highest turbidity. If the measurements show an increase of 10 NTU or more, immediately suspend operations in the vicinity of the problem area and modify the erosion control measures to eliminate the cause of the high turbidity. Include turbidity readings, locations, and actions taken, if any, in inspection reports. Also provide documentation of meter calibration.

157.14 Acceptance. Add the following:

Soil erosion control will be evaluated under subsection 106.02 based on the demonstrated ability of the erosion control measures to result in minimal soil erosion, sedimentation and/or siltation, and turbidity increases within or adjacent to the project limits.

Measurement

157.15 Add the following:

There will be no direct payment for maintenance or replacement of erosion and sediment control measures.

Payment

157.16 Add the following:

Pay Item		Pay Unit
15718	Inlet protection	Each
15725A	Temporary diversion channel	Lump sum
15734	Sediment control log	Meter

Section 158. – WATERING FOR DUST CONTROL

Construction Requirements

158.03 General. Add the following:

See subsection 105.02 (a) for government furnished water sources.

Section 201. – CLEARING AND GRUBBING

Description

201.01 Delete the text and substitute the following:

This work consists of clearing and grubbing within the clearing limits designated by the CO based on the dimensions shown in the plans, adjusted to fit field conditions.

Construction Requirements

201.03 General. Add the following:

Prior to the start of any clearing or grubbing operations, obtain a timber harvest permit as described under Subsection 107.01 and establish slope stakes and tentative clearing limits in accordance with Subsection 152.03 (c) and (d) and the details shown on the plans. Mark existing trees more than 125 mm diameter breast height (DBH) and other significant vegetation along the clearing limits proposed to be removed with white surveyors ribbon. Schedule and attend a site meeting with the CO and the designated representatives of the Forest Service and Clear Creek and Park County to determine which vegetation, rock formations, or other features located along the tentative clearing limits will remain and which will be removed. Schedule these meetings after completing a minimum of 750 meters of continuous roadway. Schedule subsequent meetings as the staking progresses.

During the meetings the CO will either approve the clearing limits as staked or direct the Contractor specifically how to adjust the clearing limits to preserve existing vegetation, rock formations, or other features. When directed, recatch slope stakes at a new slope ratio in accordance with Subsection 152.03(l). Re-establish clearing limits and adjust markings on existing trees and vegetation to be removed along the clearing limits, in accordance with the directions of the CO.

If any revisions to the clearing limits are required after they have been approved, schedule another meeting with the CO and the designated representative of the Forest Service to review and approve the changes. Maintain the markings and the clearing limit stakes for the duration of the contract. Upon completion of the contract remove all markings and stakes.
When completing any construction operations near the clearing limits adjust operations as necessary to avoid damage to the vegetation designated to remain in place. Remove existing vegetation designated for removal in a way that does not damage adjacent vegetation that is to remain. Restore, repair, or replace all vegetation damaged by unauthorized cutting, improper operation of equipment, stockpiling of materials, or tracking of grass and other areas by equipment in accordance with Subsection 107.02. Install temporary fencing prior to clearing and grubbing operations in all sensitive locations as shown on the plans, or designated by the CO. Maintain temporary fencing for the duration of the contract and remove upon completion.

201.05 Grubbing. Add the following in front of the first paragraph:

Limit the combined grubbing and grading operations area to 3 hectares of exposed soil at one time.

201.06 Disposal. Add the following after the first sentence:

Merchantable timber is defined as Saw Logs and Products Other Than Logs. Saw Logs are greater than 180 millimeters in diameter, at least 2.4 meters in height, and are a minimum of 33 1/3% sound. Products Other Than Logs (POL) are a minimum of 125 mm and maximum of 180 millimeters in diameter, at least 2.5 meters in length, and are a minimum of 50% sound. All other timber material is considered slash and will be disposed of according to 203.05 (e). All merchantable timber shall be removed from the project within 30 days of falling. Timber salvaged for on-site use as Landscaping logs (Section 650) and Log barrier fence is excluded from the merchantable timber definition.

Section 202. – ADDITIONAL CLEARING AND GRUBBING

Description

202.01 Add the following:

Work shall include the scaling and cleaning of brow at the top of existing cut slopes.

Construction Requirements

202.03 General. Add the following:

Boundaries for clearing and grubbing shall be marked in the field by the Contractor for approval. Areas to have Selective Clearing or the Removal of Individual Trees, Stumps or rocks shall be flagged by the Contractor for approval, in coordination with the National Forest representative. Logs, Boulders and trees to be reused shall be tagged in the field by Engineer. Any object that is designated to remain and is damaged shall be repaired or replaced as directed, at the Contractor's expense.

Successful feathering of forest edge involves a reduction of vegetation density as well as a gradation of tall vegetation down to low vegetation at the clearing edge.

Additional construction surveying required to save specimen trees shall be included in the price of the work.

Section 203. – REMOVAL OF STRUCTURES AND OBSTRUCTIONS

Construction Requirements

203.05 Disposing of Material.

(a) Remove from project. Add the following:

Secure environmental clearances according to Subsection 107.10.

(c) Bury. Add the following:

Obtain CO and Forest Service approval prior to burying any debris. Seed and mulch disposal areas on Government property according to Section 625.

Add the following:

(e) Slash.

Shred slash as needed for incorporation into the manufactured topsoil. Stockpile slash/timber debris in locations approved by the CO and USFS.

Payment

203.08 Add the following:

Pay Item		Pay Unit
20311	Brow removal	Meter

Section 204. – EXCAVATION AND EMBANKMENT

Description

204.02 Definitions.

(c) Embankment material.

(1) Rock. Delete the text and substitute the following:

Rock is material containing particles that are retained on the 75 mm sieve and having less than 40 percent passing the 4.75 mm sieve or less than 35 percent passing the 2 mm sieve.

(d) Conserved topsoil. Add the following:

Conserved Topsoil consists of loose friable loam, free of stumps, rocks larger than 100 millimeters, subsoil, refuse, noxious weed seed and reproductive plant parts, and other substances detrimental to plant growth. Contractor to apply weed control treatment as needed and approved by CO per Sub-section 107.11 (d). CO to approve conserved topsoil prior to collection. Furnished topsoil from outside the project limits will not be accepted.

Add the following:

(f) Conserved wetland topsoil. Wetland topsoil shall consist of moist, organic, soil including any existing wetland vegetation, roots and seeds, to be excavated from areas shown on plans or as directed by CO.

(g) Slope scaling. This work consists of the removal of loose or potentially unstable rock and soil debris and vegetation on the slopes adjacent to the roadway within the limits on the Plans or as directed by the CO.

Construction Requirements

204.05 Conserved Topsoil. Add the following:

Topsoil to be conserved shall be excavated to a minimum depth of 100 millimeters from areas shown on the plans or as directed by CO.

Add the following:

(a) Conserved Wetland Topsoil. Wetland topsoil shall be excavated to a minimum depth of 150 mm from areas designated by the CO and placed within 48 hours in the specified location. The Contractor shall prepare the relocation site to elevations specified and approved by the CO prior to excavating the wetlands. If the Engineer determines that this is not possible, then the Contractor shall stockpile the material in an approved area, to remain undisturbed until the relocation has been prepared. Storage time within the stockpile shall be as short as possible. Wetland topsoil material shall be placed over the prepared relocation areas to a depth of 150 mm, or as otherwise designated.

Salvaged topsoils exceeding the quantity required under the contract shall be placed at locations acceptable to the CO. All suitable topsoil shall be placed on the project areas disturbed by construction.

If Wetland Topsoil and Topsoil cannot be immediately placed, it shall be stored temporarily in separate labeled piles in locations that are separate from other excavated material, construction traffic, and undisturbed existing vegetation. Labels shall include harvest date and location from where topsoil was salvaged. Topsoil stockpiles shall be protected from wind and water erosion, traffic and spills. Stockpile maximum height is 1.3 meter. Topsoil shall be stockpiled no longer than 3 months and not over the winter.

204.06 Roadway Excavation.

(b) Rock cuts. Add the following:

When blasting rock, use controlled blasting methods according to Subsection 205.07.

204.09 Preparing Foundation for Embankment Construction.

(b) Embankment less than 0.5 meter high over an existing asphalt, concrete or gravel road surface. Delete the first sentence and substitute the following:

Scarify gravel roads to a minimum depth of 300 millimeters. Remove any rock outcrops or large boulders if within 300 millimeters of the finished subgrade.

204.10 Embankment Construction. Add the following:

It is anticipated that the contractor will be required to blast or use other methods such as screening or crushing to reduce boulders to a workable size for embankments and finishing material as required by Subsection 204.10(b). It will be up to the contractor to determine the quantity and method of operations required to meet this specification. The quantity and size of boulders encountered in construction operations will not be grounds for a differing site condition.

204.11 Compaction.

(b) Earth embankment. Delete the first paragraph and substitute the following:

Classify the material according to AASHTO M 145. For material classified A-1 or A-2-4, determine the optimum moisture content and the maximum density according to AASHTO T 180 method D. For other material classifications, determine the optimum moisture content and the maximum density according to AASHTO T 99 method C.

204.12 Ditches. Add the following:

Place 150 millimeter depth of wetland topsoil on the outside slope of the ditch as shown on the plans or as designated by the CO.

204.13 Sloping, Shaping, and Finishing.

(a) Sloping. Delete the first sentence and substitute the following:

Leave all earth and rock slopes with a roughened surface as they are being constructed. Leave rock outcrops undisturbed that are firmly in place and protruding from the cut slopes. Scale rock faces to remove unstable material and to accent and/or blend newly exposed rock faces. Accomplish slope rounding in a timely manner with equipment suitable for achieving the work.

(c) Shaping. Add the following:

Final shaping and cleanup may require hand labor.

(d) Finishing. Delete the first sentence and substitute the following:

Remove all material larger than 150 millimeters from the top 300 millimeters of the roadbed.

Add the following:

(e) Slope scaling. Stabilize or scale all loose rock and other unstable materials greater than 0.03 m^3 (1 ft^3) in volume as directed by the CO. Remove and dispose of all spoil resulting from the scaling operation and all existing pre-scaling materials located between the slopes and the edge of the roadway. Prepare the cut crest by removing overburden materials to round the top of the slope. Limits of scaling will extend to the crest and may be required up to an elevation of 20 m higher than the existing roadway elevation. Scaling should be done by power equipment or by hand methods to remove potentially unstable boulders, blocks, and trees, thereby reducing the rockfall hazard and maintenance requirements following construction. The CO shall approve the use of power equipment for scaling.

This work should be done prior to installing rock buttresses along the slopes. Work shall proceed according to the work plans and schedule submitted by the Contractor prior to commencement of the work. Use concrete barriers where required to prevent safety hazards.

Scaled rocks can be utilized in rockery walls, riprap, placed boulders, and others areas where they meet quality specifications and aesthetic qualities, as determined by CO.

(1) Submittals. Six weeks prior to commencing the rock slope scaling, the contractor shall provide the following to the CO:

(a) Personnel Qualifications. The Foreman and scaling crew shall have a minimum of two years of demonstrated experience in rock scaling in similar capacities.
(b) The Contractor shall submit a detailed work plan for each rock slope to be scaled and slope crest overburden rounding. The plans shall detail the following:

(1) Proposed construction sequence and schedule.
(2) Types and number of machinery and tools to be utilized for scaling.
(3) Number of scaling crews required for the project.
(4) Rock and soil removal and disposal plan for materials generated from the scaling and slope crest preparation work.
(5) Protection plan to be implemented by the Contractor during scaling to protect personnel, facilities, and other structures from damage caused by scaling activities. The plan shall include proposed traffic control as specified in Section 156.
(6) Traffic interruptions and controls required.

Work shall be coordinated with erosion control and shall not begin until the CO has approved the submittals.

(2) Scaling Crew Requirements. The contractor shall provide scaling crews with one Foreman present at all times when scaling is performed. A scaling crew is defined as three qualified scalers, one of which could be the scaling Foreman (if a crewmember must leave for any reason that member shall be replaced by a qualified replacement).

(3) Protection of Properties. Provide adequate protection in the areas being scaled to prevent damage to property and structures and utilities by falling rock from the scaling operation. The Contractor is also responsible for the protection of personnel from the danger inherent in scaling. The Contractor shall provide devices, measures, and procedures to protect the public and any adjacent facilities or structures from danger or damage caused by scaling. This plan must be in effect prior to commencing the scaling. Any injuries or damages caused by scaling are the responsibility of the Contractor.

(4) Sequencing. Scaling shall start at the top of the slope and proceed downward towards the roadway. Slope crest rounding shall be performed using power equipment before the slope scaling is completed. The Contractor shall remove all materials scaled off the slopes.

204.14 Disposal of Unsuitable or Excess Material. Add the following:

Unsuitable or excess material may not leave Government property without a contract for the sale of mineral material (if applicable).

Secure environmental clearances according to Subsection 107.10.

Measurement

204.16

(a) Roadway Excavation.

(1) Include the following volumes in roadway excavation:

(e) Delete the text and substitute the following:

Conserved topsoil stripped from cuts.

(h) Delete the text and substitute the following:

Conserved material taken from stockpiles and used in Section 204 work except topsoil measured under Section 624. Only materials required to be conserved by the CO are eligible for measurement under this item.

(2) Do not include the following in roadway excavation: Add the following:

(m) Conserved topsoil stripped from fills.
(n) Conserved wetland topsoil stripped from cut or fill areas.

(h) Slope scaling. Delete the text and substitute the following:

Scaling will be measured by scaling crew hour in accordance with Section 623. A scaling crew is defined as three qualified scalers, one of which could be the scaling Foreman.

Power equipment required for the scaling operation will be included in the scaling crew hourly rate and will not be paid for separately. Measurements will not be made separately for individual equipment.

Removal and disposal of materials generated by scaling and slope crest rounding, including equipment needed, loading/unloading, and transporting materials is incidental to the work (most of the materials can be utilized in other areas of the work) and will not be paid for under this item.

Protection devices (such as barriers), measures, and procedures taken to protect adjacent property and structures from danger or damage and any repair required is incidental to the work and will not be paid separately.

Payment

204.17 Add the following:

Payment for Item 20401 is limited to ten percent of the plan quantity of excavation in the cut until the slope rounding in that cut is completed.

Pay Item		Pay Unit
20413A	Slope scaling crew	Hour

Section 205. – ROCK BLASTING

Description

205.01 Delete the text and substitute the following:

This work consists of fracturing rock and boulders and construction of stable final rock cut faces using controlled blasting and production blasting techniques. This work includes a preblast condition survey and environmental monitoring of nearby buildings, structures, or utilities, which could be at risk from blasting damage.

Controlled blasting, including cushion blasting and preblasting, uses explosives to form a shear plane in the rock along a specified backslope.

Production blasting uses explosives to fracture rock and boulders.

Construction Requirements

205.04 Blasting Plan. Add the following:

(h) Typical plan for drilling and blasting of boulders.

Add the following at the end of the last paragraph:

Do not deliver explosives to the project until the general blasting plan is accepted.

205.05 Blaster-In-Charge. Delete the last sentence and substitute the following:

Submit evidence that the blaster-in-charge has a valid blaster's license in the State of Colorado for the type of blasting required to the CO and to the Park and Clear Creek County Sheriff's Department prior to any blasting activities. Provide an expert who is familiar with using cushion blasting to achieve natural looking rock slopes. Provide a resume for work performed within the last three years for the type of blasting required. List contacts and phone numbers of Government Agencies for which this type of blasting was performed.

205.07 Controlled Blasting.

(a) General. Add the following:

When distances between the blast zone and adjacent structures or residences are within those shown in the table below, an expert with appropriate measuring equipment shall be required to monitor particle velocities. Particle velocities shall not exceed those listed in the table below. Damage to adjacent structures shall be repaired by the Contractor at no cost to the Government.

DISTANCE FROM THE BLASTING SITE (m)	MAXIMUM ALLOWABLE PEAK PARTICLE VELOCITY (cm/s)	SCALED DISTANCE FACTOR TO BE APPLIED WITHOUT SEISMIC MONITORING
0 to 90	**3.2**	**50**
91 to 1525	**2.5**	**55**
1525 and beyond	**1.9**	**65**

(c) Blasting. Delete the third and fourth paragraphs and substitute the following:

Perform cushion blasting on all rock cuts to produce a natural looking slope. Do not produce uniform line and surfaces. Remove or stabilize all rock that is loose, hanging, or dangerous.

Arrange for a preblast condition survey of nearby buildings, structures, or utilities, which could be at risk from blasting damage. Use a survey method acceptable to the Contractor's insurance company. Damage resulting from blasting is the Contractor's responsibility. Make all preblast condition surveys available to the CO. Notify the CO and occupants of local buildings at least 24 hours before blasting.

Control ground vibrations with properly designed delay sequences and allowable charge weights per delay when blasting near buildings, structures, or utilities that may be subject to damage from blast-induced ground vibrations. When distances between the blast zone and adjacent structures or residences are within those shown in the table in Subsection 205.07 (a), an expert with the appropriate measuring equipment shall be required to monitor particle velocities. Particle velocities shall not exceed those listed in the table in Subsection 205.07 (a).

Carry out trial blasts according to Subsection 205.06 with modifications to limit ground vibrations to a level that will not cause damage to nearby buildings, structures, or utilities.

Presplitting will not be allowed. Use cushion blasting methods for blasting to form a shear plane in the rock along the specified backslope.

205.08 Production Blasting. Add the following:

Nitroglycerin materials, safety fuse and fuse caps will not be allowed.

When blasting boulders, mudcapping will not be allowed. Drill and load explosives into the core of the boulder.

Section 208. – STRUCTURE EXCAVATION AND BACKFILL FOR SELECTED MAJOR STRUCTURES

Construction Requirements

208.04 General. Delete the last two sentences of the third paragraph and substitute the following:

Where support systems, shield systems, or other protective systems are to be used, design the shoring according to Section 562 and submit working drawings and construction details according to Subsection 104.03.

208.06 Cofferdams. Delete the first two sentences of the second paragraph and substitute the following:

Submit working drawings showing proposed methods and construction details of cofferdams according to Subsection 104.03 and Section 562.

Measurement

208.13 Delete the two paragraphs after paragraph (e) and substitute the following:

Measure foundation fill by the cubic meter in place. Limit the volume measured to that placed inside vertical (and sloping) planes as shown on the drawing details. Use these planes to determine pay quantities regardless of the amount of material placed outside these planes.

Section 209. – STRUCTURE EXCAVATION AND BACKFILL

Construction Requirements

209.09 Bedding.

(b) Culverts. Delete the third sentence and substitute the following:

When no class is specified, use bedding material that conforms to class C and to Table 2 of AASHTO M 145 for Classifications A-1, A-2, or A-3 soils.

Add the following:

If lean concrete backfill is used, the bedding requirements for (2) Class B and (3) Class C are waived.

Where installing plastic pipe, use Class B.

(c) Pre-Cast and Cast In Place Concrete Box Culverts. Construct bedding according to 209.09(b). Use Class B bedding.

209.10 Backfill.

(b) Culvert. Delete the first sentence and substitute the following:

Where installing plastic pipe, use backfill material conforming to the requirements of Class B bedding.

Add the following:

As an alternative to backfill material, the Contractor may use lean concrete backfill for backfill of pipe culverts. When utilizing lean concrete backfill, furnish materials and perform the work according to Section 614. Do not use lean concrete backfill with aluminum or aluminum-coated structures or plastic culverts.

Section 212. – LINEAR GRADING

Measurement

212.06 Add the following:

Do not measure changes in the clearing and grubbing quantity caused by alignment adjustments under subsection 212.04.

Section 251. – RIPRAP

Delete the text of this Section and substitute the following:

Description

251.01 This work consists of furnishing and placing riprap for bank protection, slope protection, drainage structures, and erosion control.

Riprap classes are designated as shown in Table 705-1.

Material

251.02 Conform to the following Subsections:

Geotextile type IV-E	714.01
Grout	725.22(e)
Riprap rock	705.02

Construction Requirements

251.03 General. Perform the work under Section 209. Dress the slope to produce a smooth surface. If earthwork geotextile is required, place according to Section 207.

251.04 Placed Riprap. Placed riprap is rock placed on a prepared surface to form a well-graded mass.

Place riprap to its full thickness in one operation to avoid displacing the underlying material. Do not place riprap material by methods that cause segregation or damage to the prepared surface. Place or rearrange individual rocks by mechanical or hand methods to obtain a dense uniform blanket with a reasonably smooth surface.

251.05 Placed Individual Boulders.

Bury individual boulders, obtained from the roadway excavation, in the finished slopes to a depth of two-thirds of their height as directed by the CO. Boulder shall very in size. Place the boulders so that the largest face is buried. Place the boulders randomly and orient to present a natural and pleasing effect.

Lay and securely place the boulders on firm beds, backfill as required, and compact with hand-operated compaction equipment.

Stake boulder locations, and obtain approval by the CO prior to installation. Locate and group small boulders according to the plans. Do not locate any boulders within the clear zone.

251.06 Grouted Riprap. Grouted riprap is rock placed or keyed on a prepared surface and with the voids filled with grout.

Place rock for grouted riprap according to Section 251.04 or 251.05. Thoroughly moisten the rocks and wash excess fines from the riprap or to the undersides of the riprap. Place grout only when the air temperature is no less than 1°C within the near-surface voids of the riprap. Also, place grout only when the air temperature 300 mm above the riprap surface is above 2°C. Place the grout in a manner to prevent segregation. Begin placing grout at the lowest elevation of the riprap. Fill all voids without unseating the rocks. Do not exceed 1.5 meter thickness for each layer of grouted riprap. Allow 3 days curing time before adding the next layer of riprap and grout. Provide weep holes through the grouted riprap as required. Keep the grouted riprap moist for 3 days after the work is completed and protect it from freezing for a minimum of 7 days after grouting.

251.07 Acceptance. Rock for riprap will be evaluated under Subsection 106.02 and 106.03.

Rock placement for riprap will be evaluated under Subsections 106.02 and 106.04.

Structure excavation and backfill will be evaluated under Section 209.

Geotextile will be evaluated under Section 207.

Material for grout will be evaluated under Subsections 106.02 and 106.03. Grout will be evaluated under Subsections 106.02 and 106.04. Grout placement will be evaluated under Subsection 106.02. See Table 251-1 for minimum sampling and testing requirements.

Measurement

251.08 Measure riprap by the metric ton or by the cubic meter in place.

Payment

251.09 The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

Payment will be made under: Add the following:

Pay Item		Pay Unit
25108	Placed boulder, class 7	Each
25111	Placed individual boulders	Each

Table 251-1
Sampling and Testing

Material or Product	Property or Characteristic	Test Methods or Specifications	Frequency	Sampling Point
Grout	Making test specimens compressive strength [2]	AASHTO T 23 AASHTO T 22	1 sample per installation [1]	Job site

[1] Sample consists of 2 test specimens.
[2] The compressive strength will be the average of two test specimens.

Section 252. – SPECIAL ROCK EMBANKMENT AND ROCK BUTTRESS

Delete the text of this Section and substitute the following:

Description

252.01 General. This work consists of designing and constructing permanent rockery walls and tiered rockery walls at the locations shown on the Plans. The Contractor shall furnish all labor, working drawings, materials, and equipment required to design and construct the walls. Rock buttress work consists of furnishing and placing hand-placed or mechanically-placed rock at the locations shown on the Plans.

Material

252.02 Materials. Materials shall conform to the following:

Granular Backfill. Furnish aggregate conforming to AASHTO M 43 no. 3.

Foundation Fill. Conform to Subsection 704.01.

Boulders. Conform to Subsection 705.07. Boulders used for rockery walls shall have a minimum dimension no smaller than 300 millimeters. Boulders shall weigh 20 kg or more and shall be roughly rectangular in shape (see rock size table on Plans). The longest dimension of any individual rock should not exceed three times its shortest dimension. Boulders shall be hard, durable, angular rock, free of organic matter and spoil material, resistant to weathering and water action. Boulders shall have the following quality recommendations:

(1) Rock that cannot be scratched with a knife or can be scratched with difficulty.
(2) Coarse, durability index complying with AASHTO T210 52 minimum.
(3) Sodium sulfate soundbess loss (5 cycles) AASHTO T104 15% maximum.
(4) No machine scaring on visible faces.

Rock for Rock Buttresses. Conform to Subsection 705.05.

All backfill, rock and boulders shall be obtained from on-site materials.

Exposed faces of rock and boulders to match the natural appearance of surrounding on-site weathered rock or will be stained to match. No exposed equipment scars shall be visible. CO to approve the appearance of rock and boulders used for rockery walls and rock butresses.

Construction Requirements

252.03 Submittals. Submit wall design calculations and working drawings to the Engineer for review in accordance with the Standard Specifications. Include all details, dimensions, quantities, ground profiles, and cross-sections necessary to construct the walls. Verify the limits of the wall and ground survey data before preparing drawings. All submitted drawings and calculations shall be signed and sealed by the Contractor's Professional Engineer.

(a) Design Calculations and Drawings. Design calculations and drawings shall include, but not be limited to, the following items:

(1) Qualifications of the Contractor's rockery wall specialist. The Contractor's rockery wall specialist shall be on site directing all rockery wall construction. The specialist shall have successfully constructed at least two rockery walls in the past 5 years. Provide project descriptions, including project owner's name and current contact information for previous projects used to qualify under this specification.

(2) Submit locations at which rockery walls shall be constructed.

(3) Cross sections at 10-m intervals and at least one for each rockery wall segment showing the base of rockery wall elevation, top of rockery wall elevation, existing ground surface and proposed slope.

(4) A written report, which describes the overall rockery wall design. As a minimum the report shall address local stability, global stability, material separation and filtration, drainage, boulder and rock size and gradation, construction sequence, and temporary support.

(b) Working Drawings. The working drawings shall be signed and sealed by the Designer of Record and include all details, dimensions, quantities, ground profiles, and cross-sections necessary to construct the wall.

Specifically, the working drawings shall include, but are not limited to, the following:

(1) A plan view of the walls identifying the following:

(i) A reference baseline and elevation datum.

(ii) The offset from the construction centerline or baseline to the face of the wall at its base at all changes in horizontal alignment.

(iii) Beginning and end of wall stations.

(iv) Right-of-way and permanent or temporary construction easement limits, location of all known active and abandoned existing utilities, adjacent structures or other potential interferences. The centerline of any drainage structure or drainage pipes behind, passing through or passing under the wall.

(2) An elevation view of the wall(s) identifying:

(i) The elevation at the top of the wall, at all horizontal and vertical break points, and at least every 10 m along the wall.

(ii) Beginning and end of wall stations.

(iii) The distance along the face of the wall to all steps in the wall base.

(iv) Existing and finish grade profiles both behind and in front of the wall.

(3) Rockery wall typical sections, including but not limited to staged excavation lift elevations, wall and excavation face batter.

252.04 Design Requirements.

(a) Design Height: Shall be as defined on the Plans and as determined by the slope geometry. The Design Height of the rockery wall shall not exceed 3.5 m.

(b) Base Width: The base of the rockery wall shall not be less than 50% of the Design Height or a minimum of 1.2 m.

(c) Base Embedment: The first coarse of rocks must be embedded under the ground surface. The depth of embedment shall be at least 500 mm.

(d) Base surface: The base of the wall shall be sloped back into the slope such that boulders are not inclined to fall out of the face of the wall.

(e) Top width: The top of the wall shall not be narrower than 0.3 times the Design Height or 500 mm, whichever is larger.

(f) Allowable Steepness: The rockery wall face shall be 4V:1H or flatter.

(g) Soil Cut: The soil cut behind the rockery wall shall be 6V:1H or flatter.

(h) Lifts: Boulders shall be placed in uniform lifts.

(i) The Contractor shall be responsible for adapting the design and construction of the rockery walls to the site conditions, including drainage, global stability and long-term foundation settlement.

(j) Basic structural boulders in the wall face shall not be loose or be able to be removed by pry bar after wall construction is complete. Non-structural boulders in the wall face shall not be loose or be able to be removed by hand after wall construction is complete.

(k) Boulders which comprise the basic structure of the wall shall be placed such that the longest dimension of the boulder is oriented in a perpendicular direction to the line of the wall, in other words, such that it points into the slope.

252.05 Rockery Wall Construction.

(a) Aggregate Infill: Aggregate infill shall be placed between lifts of boulders in the rockery wall. Infilling shall fill voids between the boulders as completely as possible.

(b) Construction stages:

(1) Excavate a strip for the base width and base embedment discussed above at the planned location of the rockery wall. Excavate 300 millimeters below the foundation elevation and backfill with foundation fill in accordance with Section 204.01. Place boulders in a stable orientation with minimal voids to produce a random pattern and maximize stability.

(2) The first lift of rock shall be placed in the excavated area, over the foundation fill, and the rocks shall be infilled with aggregate infilling to create a fairly uniform surface without completely covering the basic structural boulders.

(3) Boulders for subsequent lifts shall be placed in direct contact with the boulders from the previous lift such that boulder interlocking may occur. Rock shims may be used as appropriate. Smaller boulders shall be placed to fill in voids around the basic structural boulders. Place boulders so that no continuous joint planes exist either in the vertical or lateral direction. Each boulder should bear on at least two other boulders.

(4) Subsequent lifts of boulders and aggregate infilling shall be placed until the height of the wall is reached.

(5) If it is necessary to compact fill behind the wall after the rockery wall is constructed, this shall be done in a manner so as not to disturb the rockery wall or cause the slope of the face of the rockery wall to exceed the rockery wall face slope limits specified herein.

(6) All wall appearances will be visually inspected and approved by the CO. Naturally weathered sides of rocks shall be placed on the exposed face of the wall. No equipment scars on the rocks shall be visible. All walls (or individual rocks), which do not match the surrounding areas as determined by the CO, are to be stained with a rock penetrating stain as per Section 563. A 1 meter high by 3 meterslong test section of wall shall be stained and approved by the CO prior to staining individual rocks or wall sections.

252.06 Placing Rock for Rock Buttress. Perform the work under Section 204 or 209 as required.

Place the rock in a stable orientation with minimal voids. Offset the rock to produce a random pattern. Use spalls smaller than the minimum rock size to chock the larger rock solidly in position and to fill voids between the large rock.

Construct the exposed face of the rock mass reasonably uniform with no projections beyond the neat line of the slope that are more than 300 millimeters for mechanically-placed rock or 150 millimeters for hand-placed rock.

Rock buttress appearance shall conform to Subsection 252.05 (b) (6).

252.07 Site Drainage Control. Provide positive control and discharge of all surface water that will affect construction of the rockery walls and rock buttresses and maintain all pipes or conduits used to control surface water during construction. Damage caused by surface water shall be repaired at no additional cost. Remove surface water control pipes or conduits from the site upon substantial completion of the wall. Alternatively, with the approval of the CO, pipes or conduits that are left in place may be fully grouted and abandoned or left in a way that protects the structure and all adjacent facilities from migration of fines through the pipe or conduit and potential ground loss.

Review the Geotechnical Reports and make an assessment of the groundwater conditions. Localized areas of perched water or seepage may be encountered during excavation at the interface of geologic units or from localized groundwater seepage areas.

Immediately contact the CO if unanticipated existing subsurface drainage structures are discovered during excavation and suspend work in these areas until remedial measures meeting the CO's approval are implemented. Surface water runoff flows and flows from existing subsurface drainage structures shall be captured independently of the wall drainage network and conveyed to an outfall structure or storm sewer, as approved by the CO.

252.08 Excavation. Excavate and stabilize as necessary to perform the work and provide for safety. It is the responsibility of the Contractor to determine if temporary shoring and ground stabilization are necessary for construction and provide the appropriate means.

252.09 Performance and Acceptance of Walls and Rock Buttresses.

The performance of the walls and buttresses will be accepted based on visual observations indicating that a stable wall system has been achieved. The CO and a FHWA Geotechnical Engineer will use site observations, the design references, and sound engineering judgment to make their determination. This determination will be made at a minimum of 6 weeks after completion of the structural portions of the wall.

Measurement

252.10 Rockery walls shall be measured by the square meter of the wall front face (vertical projection) from the bottom wall elevation line to the top wall elevation line for actual wall installed and approved for payment by the CO. The wall area for payment purposes shall be the horizontal projection of the wall face in a vertical plane. The square meter area computed for payment shall be based on wall heights measured at 10-m maximum intervals along the bottom of cut wall layout line. Measure rock buttress by the cubic meter in place.

Instrumentation for monitoring wall movement, drainage, and granular fill are considered incidental to wall construction and shall not be measured nor paid for separately.

Payment

252.11 Payment will be full compensation for all materials, equipment and labor necessary to complete the rockery wall and rock buttress listed above in accordance with Section 109, Measurement and Payment. Rockery wall and rock buttress construction, monitoring, maintenance, and all work including, but not limited to boulder and aggregate infill placement and boulder wall design shall not be measured nor paid for separately.

The accepted quantity will be paid for at the contract unit of measurement for the pay item listed below:

Pay Item	Pay Unit
25203 Rock Buttress	Cubic meter
25206 Rockery wall	Square meter

Section 255. – MECHANICALLY STABILIZED EARTH WALLS

Delete the text of this Section and substitute the following:

Description

255.01 This work consists of designing, furnishing, and constructing a mechanically stabilized earth (MSE) walls with steel (mesh or strip) or geogrid reinforcement in accordance with the details shown on the plans.

Materials

255.02 Conform to the following Section and Subsections:

Foundation fill	704.01
Geocomposite sheet drain	714.02 (b)
Geotextile	714.01
Mechanically stabilized earth wall material	720.01
MSE wall facing fill	704.13
Plastic pipe	706.08 (d)
Reinforced Fill	704.13
Retained Fill	704.13

Construction Requirements

255.03 General. Survey according to Section 152 and verify the limits of the wall installation. Prepare and submit installation drawings according to Subsection 104.03. Do not prepare drawings until current cross section data has been acquired by the Contractor according to Section 152.03 (i). Do not disturb the existing ground at wall locations until current terrain data has been acquired, incorporated into the drawings, and the CO has accepted the drawings.

Perform the work according to Section 209. Grade the foundation to a width equal to the length of the reinforcing elements plus 500 mm. Excavate a minimum of 500 mm below MSE wall foundation grade and replace with Foundation Fill material. Bedrock and boulder excavation to obtain the necessary base width may be required. Excavate using equipment capable of removing the material while preventing material escape outside the construction limits. Prior to wall construction, compact the foundation according to Subsection 204.11.

(a) Design of MSE Walls. Design all MSE wall components for a 75-year design service life according to the requirements of AASHTO Standard Specifications for Highway Bridges (17th edition and interim current at time of contract award) and FHWA publication No. FHWA-NHI-00-043, "Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines" (2001).

Design the MSE walls for:

(1) External stability (sliding, overturning, bearing capacity, and eccentricity)
(2) Internal stability (tensile stresses, pullout, facing connection, and sliding along reinforcement)
(3) Local stability (bulging and maximum unreinforced height)
(4) Design the MSE wall to account for dead and live loads, seismic loads, horizontal loads from guardrails or barriers, hydrostatic loads, and other loads as appropriate.

Use the following required factors of safety per AASHTO for MSE wall stability design:

External Stability	**Static**	**Seismic (A > 0.09g)**
Base Sliding	1.5	1.1
Overturning	2.0	1.5
Bearing Capacity	2.5	1.5
Eccentricity	e < L/6	e < L/3
Internal Stability	**Static**	**Seismic (A > 0.09g)**
Tensile Stress:		
Steel Mesh	0.48Fy	0.64Fy
Steel Strips	0.55Fy	0.73Fy
Geogrids	1.5	1.1
Pullout	1.5	1.1
Facing Connection	1.5	1.1
Internal Sliding	1.5	1.1
A: Acceleration coefficient, e: Eccentricity, L: Reinforcement length, Fy: Yield strength of steel		

The following geotechnical report(s) are available for information. General soil and rock strata descriptions and indicated boundaries are based on sound engineering judgment and interpretation of all available subsurface information, and may not reflect actual variation in subsurface conditions between borings and samples. The information was prepared and intended for Government design purposes. Its availability is for the purpose of providing intended users with access to the same information available to the Government.

Title	Author	Date
Guanella Pass, Subsurface Investigation – Data Report	Yeh & Associates, Inc.	November, 2002
Guanella Pass Road Station 16+000 to Station 31+000 and Seventh Street Bridge Report, #CO-FX-0080-03-02	Geotechnical Services Branch Central Federal Lands Highway Division	March 2003

Use the following soil parameters for the internal, external, and local stability of the MSE retaining walls:

Material	Friction Angle (degrees)	Cohesion (kPa)	Unit Weight (kN/m^3)
Reinforced Fill	34	0	19.6
Retained Fill	34	0	19.6
Foundation Soil	36	0	19.6

Use permanent retaining wall systems that have previously been successfully designed and constructed for a public highway agency in the United States, and that have performed in an acceptable manner. For example, the following wire-faced retaining wall systems have been previously constructed on CFLHD projects. All wire-faced wall systems shall provide the required information listed in Subsection 255.03(b). Wire-faced systems not listed below and all concrete-faced wall systems shall submit the required information listed in Subsection 255.03(b) & (c).

- **Hilfiker Retaining Wall**
  3900 Broadway
  P.O. Box 2012 #E
  Eureka, CA 95503
  (800) 762-8962

- **SSL Retaining Walls**
  4740 Scotts Valley Dr.
  Scotts Valley, CA 95066
  (831) 430-9300

- **The Reinforced Earth Company**
  8614 Westwood Center Drive, Suite 1100
  Vienna, VA 22182-2233
  (703) 821-1175

- **Tensar Earth Technologies, Inc.**
  5883 Glenridge Dr., Suite 200
  Atlanta, GA 30328
  (800) 292-4459

- **T & B Structural Systems, Inc.**
  637 West Hurst Blvd.
  Hurst, TX 76053
  817-280-9858

(b) Design Submittal. Submit four (4) sets of drawings and supporting calculations with the initial submission according to Subsection 104.03. One set will be returned with any comments and requests for revisions or additional information. Allow 28 calendar days for review and acceptance of the submittal. If revisions are required, make corrections and resubmit four (4) revised sets. If the drawings and calculations must be resubmitted, the time for review and acceptance starts over. Upon acceptance, furnish five (5) complete sets of the submittal to the CO. Do not order materials for MSE retaining walls before the CO accepts the drawings.

To avoid having submittals returned with a request for more information, submittals should be organized in such a way to facilitate review for conformance with design standards and evaluation of design cases and loads. Include the following minimum information with the MSE wall submittals:

(1) Design calculations and information:

(a) Design calculations including an index page to the calculations.

(b) Highway Innovative Technology Evaluation Center evaluation report (not required for wire-faced wall systems). Contact the following for copies of HITEC evaluation reports.

Highway Innovative Technology
Evaluation Center (HITEC)
1015 15th Street NW, Suite 600
Washington, DC 20005-2605
Phone: 202-842-0555
Fax: 202-789-5345
E-mail: hitec@cerf.org

(c) Design notes including an explanation of any symbols and computer programs used in the wall design.

(d) Summary of soil parameters, loading conditions considered, and factors of safety, including all partial reduction factors, if any.

(e) Summary of wall reinforcing elements used and their design properties.

(f) Provide a design analysis for each possible design situation.

(g) Specify the applied bearing pressure at wall foundation.

(h) If computer analysis other than MSEW (by ADAMA Engineering, Inc.) is used, include one set of hand calculations for each unique design analysis.

(i) Special details, cross sections, and quantities.

(j) Submit design calculations on sheets approximately 200-mm by 300mm in size with the project number, wall location, date of preparation, initials of designer and checker, and page number at the top of the page.

(k) A well-documented field construction manual describing in detail and with illustrations where necessary, the step-by-step construction process.

(2) Drawings:

(a) A plan view of the wall identifying:

(1) Offset from the construction centerline to the face of the wall at its top and base at all changes in horizontal alignment.
(2) Limit of widest reinforcement.
(3) Centerline of any drainage structure or drainage pipes behind, passing through, or passing under the wall.
(4) Horizontal and vertical curve data affecting the wall. Match lines or other details to relate wall stationing to centerline stationing.

(b) An elevation view of the wall identifying:

(1) Elevation at the top of the wall, at all horizontal and vertical breaks, and at least every 10.0-meters along the wall.
(2) Elevations at the wall base or top of leveling pads.
(3) Distance along the face of the wall to all steps in the wall base or leveling pads.
(4) Length and type of reinforcement elements.
(5) Distance along the face of the wall to changes in the length of the reinforcement.
(6) Existing and final ground line along wall layout line.
(7) Existing ground line at a horizontal distance equal to the bench width away from the bottom of the wall. Refer to the MSE wall detail sheet.
(8) A listing of the summary of quantities

(c) General notes for construction of wall

(d) Wall Details:

(1) Typical section of wall
(2) Wall batter
(3) Details for constructing walls around drainage facilities entering, exiting, and within MSE wall envelope.
(4) Details for guardrail posts punching through the top two layers of reinforcement.
(5) Details for terminating walls and adjacent slope construction.

(c) Supplemental Design Submittal. Submit the following additional information for wire-faced systems not listed at the end of Subsection 255.03(a) and all concrete-faced wall systems.

(1) Examples of successful projects (design, construction, and in-service performance with a public agency)
(2) Name, address, and telephone number of agency contact
(3) Narrative descriptions and photos of example projects
(4) Limitations and constraints of the system.
(5) Details of wall elements (procedures for field and laboratory evaluation including instrumentation and special requirements, if any).
(6) Sample material and construction control specifications showing material type, certifications, field-testing, acceptance/rejection criteria, and placement procedures.
(7) Typical unit costs, supported by data from actual projects.
(8) Laboratory and field-test results which support the system design criteria.
(9) Information substantiating all partial factors of safety used in establishing the reinforcement elements long-term design strength.
(10) Additional information requested by the CO.

(d) Temporary shoring. When required, temporary shoring shall be designed using one of the methods described in the California Trenching and Shoring Manual, that was current at time of contract award. The manual is available from the California Department of Transportation or online at www.dot.ca.gov.

255.04 Wall Erection. Erect the wall according to these specifications, the drawings, and manufacturer's recommendations. When requested, have an experienced field representative from the wall system manufacturer available during the first three days of wall erection and as otherwise requested.

(a) Cast-in-place concrete form liner faced walls

Wire-faced walls are to be constructed a minimum of 12 months prior to adding the cast-in-place concrete form liner wall facing. The cast-in-place concrete form liner facing shall not be constructed until the welded wire face wall has been accepted. Grade and compact the foundation for the concrete wall facing a minimum of 500-mm from face of wire-faced walls. Attach tie wires to the welded-wire facing at a maximum center-to-center spacing of 455-mm. Attach welded-wire fabric reinforcement mesh to the tie wires. Cast-in-place concrete to be a minimum of 100-mm thick.

Install the concrete form liner and finish the surface according to Section 613.

(b) Wire-faced walls.

Place backing mats and 6-mm hardware cloth in successive horizontal lifts as backfill placement proceeds. Connect, tighten, and anchor soil reinforcement elements to the wall facing units before placing backfill. The MSE wall and the components shall be designed and constructed to meet the following tolerances:

Description	Requirement
1. Wall batter	±50-mm per 3.0-meters of wall height and 1% for the overall wall height
2. Wall height	±25-mm per 3.0-meters of wall height and a maximum of 100-mm
3. Horizontal and vertical alignment	±50-mm at any point in the wall when measured with a 3.0-meter straightedge
4. Reinforcement elevation	±50-mm of design elevation and within 25-mm of the corresponding connection elevation at the wall face
5. Reinforcement inclination	±1% slope from horizontal

All wire-faced walls shall include hardware cloth behind the wire face unless backfill adjacent to wire face is larger than wire face opening. Place a Type II-B (Subsection 714.01) geotextile between the MSE wall facing fill and reinforced fill (Subsection 704.13).

Wire-faced walls shall be terminated at the beginning and end with a turnback of the wall facing a minimum of 500-mm into the fill per manufacturers recommendations

255.05 Backfilling. Backfill the reinforced volume with reinforced fill in lifts not to exceed 150-mm where hand compaction is used or in lifts not to exceed 300-mm where heavy compaction equipment is used. Place, spread, and compact reinforced fill over the reinforcement in a manner that prevents development of slack in the reinforcement. Compact reinforced fill according to Subsection 204.11. Ensure that no voids exist below the reinforcing elements. Where the reinforced volume supports spread footings for bridges or other structural loads, compact the top 1.5-meters to at least 100 percent of the maximum density according to AASHTO T99 method C.

Use the MSE wall facing fill within 1.0-meters of the wall face. No compaction is required of the MSE wall facing fill. Do not damage or disturb the facing or reinforcing elements. Do not operate equipment directly on top of the reinforcing elements. Correct all damaged, misaligned, or distorted wall elements.

Place and compact behind the reinforced volume with retained soil according to Subsections 204.10 and 204.11. At the end of the day's operation, slope the last lift of backfill away from the wall face to direct surface runoff away from the wall face. Do not allow surface runoff from adjacent areas to enter the wall construction area.

255.06 Drainage. Subsurface drainage is required. Install the drainage system as shown in M605-05. The CO may require supplemental drainage when seepage is identified in the excavation.

255.07 Acceptance. Structure excavation, reinforced fill, retained fill, and foundation fill will be evaluated under Section 209.

Material for mechanically stabilized earth walls listed under Subsection 720.01 will be evaluated under Subsections 106.02 and 106.03.

Construction of mechanically stabilized earth wall and services will be evaluated under Subsections 106.02 and 106.04.

Survey Work will be evaluated under Section 152.

Geotextile will be evaluated under Section 207.

Measurement

255.08 Measure mechanically stabilized earth walls by the square meter of front wall face. Structure excavation, reinforced fill, retained fill, temporary shoring, drainage system, and turnback at the ends of each wall will not be measured for payment and are considered incidental to the MSE walls.

Payment

255.09 The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for the pay item listed below that is shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

This contract anticipates deviations in the MSE wall footing elevations and in overall wall heights. Payment at the unit bid price for the Section 255 pay items included in the bid schedule is full compensation for wall construction to a depth not exceeding 1.5meters below the lowest elevation shown on the plans for each MSE wall structure. MSE wall construction includes structure excavation, structural backfill, wall elements, and all other costs associated with the wall installation. When the depth of the footing below the lowest elevation shown on the plans for each MSE wall exceeds 1.5-meters, either the contractor or the CO may request an equitable price adjustment for the depth in excess of 1.5-meters. There will be no equitable adjustment when the depth of the footing does not exceed 1.5-meters below the elevation shown in the plans; however, all work constructed will be measured for payment.

<u>Add the following Section:</u>

Section 260. – SOIL NAIL RETAINING WALL

Description

260.01 This work consists of constructing soil nail retaining walls.

Material

260.02 Conform to the following Sections and Subsections:

Bolts and nuts	717.01(d)
Centralizers	722.02(f)
Geocomposite sheet drain	714.02(b)
Grout	722.02(e)
Reinforcing steel (bars)	709.01(b)
Shotcrete	566
Soil nails	722.04
Structural backfill	704.04
Structural steel (bearing plates)	717.01(a)
Welded stud sheer connectors	717.05

Construction Requirements

260.03 Qualifications. The Contractor or subcontractor must demonstrate satisfactory completion of at least 5 permanent soil nail retaining wall projects during the past 3 years, totaling at least 1000 square meters of wall face area and at least 500 permanent soil nails. Submit a brief description of each project including the owning agency's name, contact person, and current telephone number.

Provide a professional engineer with experience in constructing at least 3 soil nail retaining walls over the past 5 years. Provide on-site supervisors and drill operators with experience installing permanent soil nails on at least 3 projects over the past 5 years. At least 30 days before starting soil nail work, identify the engineer, on-site supervisors, and drill operators assigned to the project and submit a summary of each individual's experience.

260.04 General. Survey according to Section 152 and verify the limits of the wall installation.

260.05 Construction Plan. At least 30 days before starting soil nail retaining wall work, submit the following according to Subsection 104.03:

(a) Start date and proposed retaining wall construction sequence. Include the proposed method of excavating to ensure wall and slope stability.

(b) Drilling methods and equipment. Include drill hole diameter to achieve the specified pullout resistance values and any variation of drill hole diameter or specific pullout resistance along the wall alignment.

(c) Nail grout mix design, placement procedures, and equipment. Include test results conducted according to AASHTO T 106 and supplied by a qualified testing lab verifying grout 3- and 28-day compressive strengths. Previous test results for the same grout mix completed within one year of grouting are acceptable.

(d) Soil nail testing methods and equipment setup.

(e) Identification number and calibration test results for each test jack, pressure gauge, and load cell. Calibrate the test jack and pressure gauge as one unit. Submit results from calibration tests conducted by an independent testing laboratory within the previous 90 days.

(f) Ultimate strength of proposed soil nail tendons.

260.06 Excavation. Complete any clearing and excavation above the wall area according to Sections 201 and 204 prior to commencing wall excavation. Do not perform any of the wall excavation prior to beginning the wall construction. A work bench for the drilling equipment may be provided by placing material excavated from elsewhere on the project in front of the soil nail wall area.

Perform excavation for the wall in lifts concurrent with soil nail installation and shotcrete placement. Do not allow the exposed unsupported final excavation face cut height to exceed the vertical nail spacing plus the required reinforcing lap or the short-term stand-up height of the ground, whichever is less. Complete excavation to the final wall excavation line and application of the shotcrete in the same work shift. Application of the shotcrete may be delayed up to 24 hours if it can be demonstrated the delay will not adversely affect the excavation face stability. A stabilizing berm of soil may be left in place to contain the lift face during nail installation.

Do not excavate to the next lower lift until nail installation, reinforced shotcrete placement, attachment of bearing plates and nuts, and nail testing have been completed and accepted in the current lift. Cure grout and shotcrete at least 72 hours or attain the specified 3-day compressive strength before excavating the next underlying lift.

Excavate to the final wall face using procedures that:

(1) Prevent over-excavation;
(2) Prevent ground loss, swelling, air slaking, or loosening;
(3) Prevent loss of support for completed portion of the wall;
(4) Remove, or break, boulders or other subsurface obstructions that extend more than 100 millimeters past the final wall face excavation;
(5) Prevent ground freezing.

If, in the opinion of the CO, competent and stable boulders are encountered and protrude more than 100 millimeters from the final plan excavation face, leave in place and cut to the final wall face. If loose boulders that create safety issues for the installation of soil nails and for future wall stability are encountered, then they shall be removed. Determine method of removal.

If a cavity is created as a result of the removal of incompetent rock, the cavity shall be promptly backfilled with shotcrete or concrete prior to drilling for soil nail installation. Costs associated with additional thickness of shotcrete, concrete, or other remedial measures required due to irregularities in the cut face, excavation overbreak or inadvertent over-excavation shall be borne by the Contractor.

Notify the CO immediately if raveling or local instability of the final wall face excavation occurs.

Unstable areas shall be temporarily stabilized by means of buttressing the exposed face with an earth berm or other methods approved by the CO. Suspend work in unstable areas until remedial measures are developed.

260.07 Nail Installation.

(a) Storing and handling. Store and handle soil nail tendons in a manner that avoids damage or corrosion. Replace tendons exhibiting abrasions, cuts, weld splatter, corrosion, or pitting. Repair or replace any tendons exhibiting damage to the encapsulation or epoxy coating.

(b) Fabrication. Provide tendons threaded a minimum of 150 millimeters to allow proper attachment of bearing plate and nut. Threading may be continuous spiral deformed ribbing provided by the bar deformations or may be cut into the reinforcing bar. Use the next larger bar size if threads are cut into the reinforcing bar. When appropriate, repair damage to the epoxy coating with a minimum 0.3 millimeters thick coating.

Provide centralizers sized to position the tendon within 25 millimeters of the center of the drill hole. Position centralizers a maximum of 3 (text of report says 2.5) meters apart and within 600 millimeters from the top and bottom of the tendon (text of report says placed a maximum of 300 millimeters from the bottom of the grouted drill hole). Use centralizers that do not impede the free flow of grout into the drill hole.

(c) Drilling. Drill holes for the soil nails at the locations and to the orientation shown on the Plans. Select drilling equipment and methods suitable for the ground conditions. Do not use water, drilling mud, or other fluids to remove cuttings. If unstable ground is encountered, use cased drilling methods to support the circumference of the drill holes. Self-drilling tendons are not acceptable.

(d) Grouting. Insert the nail tendon into the hole and grout the drill hole within 2 hours of completing drilling. Inject the grout at the lowest point of each drill hole through a grout tube, casing, hollow-stem auger, or drill rods. Completely fill the drill hole in one continuous operation. To prevent voids, keep the outlet end of the grout conduit below the surface of the grout as the conduit is withdrawn. Cold joints in the grout column are only allowed at the top of the test bond length of proof-tested production nails.

Maintain the temporary unbonded length of proof test nails open for subsequent grouting. If the unbonded test length of production proof test nails cannot be satisfactorily grouted subsequent to testing, install a new nail in its place.

260.08 Nail Testing. Perform both verification and proof testing of designated test nails. Need information on requirements for number and locations of test nails. Do not test any nail until the nail grout and shotcrete facing have cured for at least 72 hours and attained the specified 3-day compressive strength.

(a) Testing equipment. Furnish two dial gauges, dial gauge support, jack and pressure gauge, electronic load cell, and a reaction frame. The load cell is required for verification tests only. Use pressure gauges graduated in no greater than 500-kPa increments. Measure the nail head movement with a minimum of two dial gauges capable of measuring to 0.025 millimeters.

(b) Verification test. Perform verification tests on two sacrificial test nails at locations determined by the CO. Perform verification tests prior to installation of production nails to verify drilling and installation methods, nail pullout resistance, and design assumptions.

Provide verification test nails with both bonded and unbonded lengths. The minimum unbonded length is 1 meter and the minimum bonded length is 3 meters. Determine the maximum bonded length based on the verification nail bar grade and size to avoid exceeding the allowable bar structural load during testing. Provide larger bar sizes, if required to safely accommodate the 3-meter minimum test bond length and testing to twice the allowable pullout resistance.

Use the following formula to determine the maximum bonded length:

$$L_{BV_{\max}} = \frac{Cf_y A_s}{2Q_d}$$

where:

L_{BVmax} = Maximum verification test nail bonded length (m)
C = 0.9 for grade 420 and 520 bars and 0.8 for grade 1035 bars
f_y = Bar yield or ultimate stress (kN/m^2)
A_s = Bar steel area (m^2)
Q_d = Allowable pullout resistance (kN/m)
Q_d = Q_u/FS
FS = 2.0
Q_u = Ultimate Bond stress (kPa) (see plans) x Nail drill hole circumference (m)

Determine the design test load by the following equation:

$$DTL = L_{BV} \times Q_d$$

where:

DTL = Design test load (kN)
L_{BV} = As-built bonded test length (m)
Q_d = Allowable pullout resistance (kN/m)

Perform tests by incrementally loading the verification test nails as indicated in Table 260-1.

Measure and record soil nail movement at each load increment.

Table 260-1
Verification Test Load Schedule

Test Load Increment	Hold Time (minutes)
AL (0.05DTL max.)	1
0.25DTL	10
0.50DTL	10
0.75DTL	10
1.00DTL	10
1.25DTL	10
1.50DTL (creep test)	60
1.75DTL	10
2.00DTL (maximum load)	10
AL	1

Note: AL = Alignment load and DTL = Design test load

The alignment load is the minimum load required to align the testing apparatus and should not exceed 5 percent of the design test load. Set dial gauges to "zero" after applying the alignment load. Following application of the maximum load, reduce the load to the alignment load and record the permanent set.

Hold each load increment for at least 10 minutes. Monitor the verification test nail for creep at the 1.50 DTL load increment by measuring and recording nail movement at 1, 2, 3, 5, 6, 10, 20, 30, 50, and 60 minutes. Maintain the load during the creep test within 2 percent of the intended load by use of the load cell.

(c) Proof testing of production nails. Perform proof tests on production nails at locations selected by the CO. Perform successful proof testing on 5 percent of the production nails in each nail row. Perform tests on the different nail sizes and lengths used.

Provide production proof test nails with both bonded and temporary unbonded lengths. The minimum temporary unbonded length is 1 meter. Determine the maximum bonded length based on the production nail bar grade and size to avoid exceeding the allowable bar structural load during testing. Provide a test nail bonded length of 3 meters or L_{BPmax}, whichever is less.

Use the following formula to determine the maximum bonded length:

$$L_{BP_{\max}} = \frac{Cf_y A_s}{1.5Q_d}$$

Where:

L_{BPmax} = Maximum proof test nail bonded length (m)
C = 0.9 for grade 420 and 520 bars and 0.8 for grade 1035 bars
f_y = Bar yield or ultimate stress (kN/m^2)
A_s = Bar steel area (m^2)
Q_d = Allowable pullout resistance (kN/m)

Determine the design test load by the following equation:

$$DTL = L_{BP} \times Q_d$$

Where:

DTL = Design test load (kN)
L_{BP} = As-built bonded test length (m)
Q_d = Allowable pullout resistance (kN/m)

Perform proof tests by incrementally loading the proof test nail to 150 percent of the design load as indicated in Table 260-2. Measure and record soil nail movement at each load increment.

Table 260-2
Proof Test Load Schedule

Test Load Increment	Hold Time (minutes)
AL (0.05DTL max.)	Until stable
0.25DTL	Until stable
0.50DTL	Until stable
0.75DTL	Until stable
1.00DTL	Until stable
1.25DTL	Until stable
1.50DTL (maximum load)	See below

Note: AL = Alignment load and DTL = Design test load

The alignment load should be the minimum load required to align the testing apparatus and should not exceed 5 percent of the design test load. Set dial gauges to "zero" after the alignment load has been applied.

(d) Creep Tests. Perform either 10-minute or 60-minute creep tests at the maximum load. Start the creep period after the maximum test load is applied. Measure and record nail movement at 1, 2, 3, 5, 6, and 10 minutes. When the nail movement between 1 minute and 10 minutes exceeds 1 millimeter, maintain the maximum test load an additional 50 minutes, recording movement at 20, 30, 50, and 60 minutes. Maintain all load increments within 5 percent of the intended load.

260.09 Wall Drainage Network. Install drain strips, PVC connector pipes, wall footing drains as shown on the Plans.

Install geocomposite sheet drain strips centered between nail columns with the geotextile side against the ground prior to shotcreting each lift. Add additional drain strips at locations where seepage is obvious. Secure strips to the excavated face to prevent shotcrete from contaminating the ground side of the geotextile. Construct drain strip splices with a 300 mm overlap so that the drain is vertically continuous and the splice does not impede the flow of water. Install a drain plate and connector pipe at the base of each strip. Install footing drain at the bottom of the wall according to Section 605.

260.10 Wall Construction. Place steel welded wire mesh and reinforcing steel according to Section 554.

Construct shotcrete facing according to Section 566. Completely fill the top ungrouted zone of any nail drill holes or other voids with shotcrete.

Attach a bearing plate and nut to each nail head. While the shotcrete is still plastic, uniformly seat the plate by tightening the nut with a hand wrench. Where uniform contact between the plate and the shotcrete cannot be provided, set the plate in a bed of grout and tighten the nut with a hand wrench after the grout has set for 24 hours.

Construction tolerances for wall elements are shown in Table 260-3.

Table 260-3
Wall Element Construction Tolerances

Horizontal location of headed studs, from plan location	10 mm
Location of headed studs on bearing plate, from plan location	6 mm
Nail head bearing plate, deviation from parallel to wall face	10 degrees

260.11 Permanent Wall Facing. Construct the permanent wall facing according to the Subsections below. Finish all surfaces with Rockery wall facing according to Section 252.

(a) Insulation: Install 75 millimeter thick insulation boards against the final soil nail shotcrete facing. The foam insulation boards shall be Type IV extruded polystyrene boards conforming to ASTM C578-92.

(b) Shotcrete Cover Facing: A minimum of 50 millimeters of shotcrete shall be applied over the insulation boards as shown on the Plans. Construct shotcrete cover according to Section 566. Construction tolerances for the shotcrete cover are shown in Table 260-4.

Table 260-4
Shotcrete Cover Construction Tolerances

Complete thickness of shotcrete, from plan dimension: Troweled or screeded finish Shot finish	 15 mm 30 mm
Planeness of finish face, surface gap under a 3-meter straightedge: Troweled or screeded finish Shot finish	 15 mm 30 mm

(c) Rockery Stone Facing. Construct according to the Plans and Section 252.

260.12 Backfilling Behind Wall Facing Upper Cantilever Section. Where the wall facing has an upper cantilever section, backfill with structural backfill according to Subsection 209.10. Compact backfill within 1 meter behind this wall facing section using light mechanical tampers

260.13 Acceptance. Soil nail retaining wall material, construction, and services will be evaluated as follows:

Survey work will be evaluated under Section 152.

Material for the soil nails will be evaluated under Subsections 106.03 and 106.04.

Construction of soil nails and services will be evaluated under Subsections 106.02 and 106.04.

Installed soil nails will be evaluated based on the criteria in Table 260-5.

Table 260-5
Nail Acceptance Criteria

Type of Nail Test	Total Creep Movement	Total Movement at Maximum Load (2)	Pullout Failure? (3)
Verification	< 2 mm between 6 and 60 minutes (1)	> 80%	No
Proof	< 1 mm between 1 and 10 minutes, or < 2 mm between 6 and 60 minutes (1)	> 80%	No

(1) And the creep rate is linear or decreasing throughout the creep test load hold period.
(2) Percent of the theoretical elastic elongation of the test nail unbonded length.
(3) Pullout failure is defined as the inability to further increase the test load while there is continued pullout movement of the test nail. Record the pullout failure load as part of the test data.

If a verification test fails, propose alternate installation methods prior to installing additional verification test nails and install a replacement verification test nail.

If a proof test fails, replace some or all of the installed production nails between the failed proof test nail and the next proof test nail in the row, as directed. Alternatively, install additional proof test nails within this area to ensure that the acceptance criteria is being met within this area. Propose alternative methods prior to installing additional soil nails.

Measurement

260.14 Measure soil nail retaining walls by the square meter of front wall face.

Measure rockery wall facing under Section 252.

Do not measure temporary stabilization berms.

Do not measure wall excavation.

Payment

Table 260-6
Sampling, Testing, and Acceptance Requirements

Section 260—Soil Nail Retaining Wall										
Type of Acceptance (Subsection)	**Material or Product**	**Characteristic**	**Category**	**Test Methods / Specifications**	**Tolerance**	**Sampling Frequency**	**Point of Sampling**	**Split Sample**	**Reporting Time**	**Remarks**
Certification of Compliance (Subsection 106.03)	Centralizers	Quality and Performance	—	Subsection 260.07	—	Each Shipment	Source	—	Prior to use in the work	—
	Soil Nails	Quality and Performance	—	Subsection 722.04	—	Each Shipment	Source	—	Prior to use in the work	—
	Epoxy Coating	Quality and Performance	—	Subsection 722.04	—	Each Shipment	Source	—	Prior to use in the work	—
	Geocomposite Sheet Drain	Quality and Performance	—	Subsection 714.02(b)	—	Each Shipment	Source	—	Prior to use in the work	—
	Grout Mix Design	Quality and Strength	—	Subsection 260.05	—	One per source of materials	-	—	30 days prior to beginning soil nail work	—
Measured and tested for conformance (Subsection 106.04)	Nail Grout	Compressive Strength	—	Subsection 722.02(e) AASHTO T 106	—	One per mix design	Mixer	—	Within 24 hours of completing testing	—
	Verification Test Nail	Performance	—	Subsection 260.08(b) Table 260-5	Table 260-5	Each verification nail	Installation	—	—	Witnessed by Government
	Proof Test Nail	Performance	—	Subsection 260.08(c) Table 260-5	Table 260-5	Each proof nail	Installation	—	—	Witnessed by Government
	Wall Elements	Installation	—	Table 260-3	Table 260-3	—	Installation	—	—	Witnessed by Government
	Permanent Shotcrete Facing	Placement	—	Table 260-4	Table 260-4	—	Installation	—	—	Witnessed by Government
	Wall Construction	Line and Grade	—	Field measured	1:5000 Horz. not to exceed 15 mm and 15 mm Vert. from reference stakes	As determined by the CO	Installation	—	—	—

260.15 The accepted quantities, measured as provided above, will be paid for at the contract unit price per unit of measurement for the pay items listed below that are shown on the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

Payment will be made under:

Pay Item	**Pay Unit**
26006 Soil nail retaining wall	Square meter

Section 301. – UNTREATED AGGREGATE COURSES

Construction Requirements

301.03 General. Add the following:

For base course set target values within the gradation ranges shown in Table 703-2, grading C, D, or E.

For Surface course aggregate set target values within the gradation range shown in Table 703-3.

301.08 Acceptance. Delete Table 301-1 and substitute the following:

Table 301-1
Sampling and Testing

Material or Product	Property or Characteristic	Category	Test Methods or Specifications	Frequency	Sampling Point
Subbase and Base courses	Gradation [1] –		AASHTO T 11 and AASHTO T27	1 sample per 1000 t	From the windrow of roadbed after processing
	9.5 mm	1			
	4.75 mm	1			
	75 µm	1			
	Other specified sieves	2			
	Liquid limit		AASHTO T89	1 sample per 3000 t	From the windrow or roadbed after processing
	Moisture-Density (maximum density)	---	AASHTO T180 Method D	1 for each aggregate grading produced	Production output or Stockpile
	Inplace density and moisture content	---	AASHTO T310 or other approved procedures	1 for each 500 t	Inplace completed compacted layer
Surface course aggregate	Gradation [1] –		AASHTO T 11 and AASHTO T27	1 sample per 1000 t	From the windrow or roadbed after processing
	4.75 mm	1			
	425 µm	1			
	75 µm	1			
	Other specified sieves	2			
	Plasticity index	1	AASHTO T 90	1 sample per 1000 t	From the windrow or roadbed after processing
	Moisture-Density (maximum density)	---	AASHTO T180 Method D	1 for each aggregate grading produced	Production output or stockpile
	Inplace density and moisture content	---	AASHTO T310 or other approved procedures	1 for each 500 t	Inplace completed compacted layer

[1] Use only sieves indicated for the specified gradation.

Section 303. – ROAD RECONDITIONING

303.04 Graded Roadbed. Delete the third sentence and substitute the following:

Remove all organic, deleterious, or oversize material larger than 150 millimeters from the top 300 millimeters of the roadbed.

303.05 Aggregate Surfaces. Add the following:

When leveling is complete, water and compact the aggregate surface to not less than 95% of maximum density. Apply the prime coat as soon as practicable after leveling and compaction is complete.

303.08 Scarification. Delete the first sentence and substitute the following:

Scarify the surface to a minimum depth of 300 millimeters. Reduce all particles to a maximum size of 150 millimeters or remove from site. Remove any rock outcrops or large boulders if within 300 millimeters of the finished subgrade.

Section 304. – AGGREGATE STABILIZATION

Delete the text of this Section and substitute the following:

Description

304.01 This work consists of constructing a stabilized aggregate layer with either imported or in-place aggregate. The aggregate layer is stabilized by incorporating lime, cement, fly ash, or any combination of the above with foamed asphalt binder.

Aggregate grading is designated as shown in Table 703-2.

Material

304.02 Conform to the following Subsections:

Aggregate	703.05
Asphalt Binder	702.01
Blotter	703.13
Chemical admixtures (set-retarding)	711.03
Emulsified asphalt	702.03
Fly ash	725.04
Lime	725.03
Portland cement	701.01(a)
Water	725.01

Construction Requirements

304.03 Proportioning. Submit a mix design 28 days before production for the proposed stabilization process, (a), (b) or (c).

(a) Aggregate Cement Mixtures. Estimate the median cement content required for maximum density of the mixture and select cement contents by mass at 2 percentage points above and below the estimated median cement content.

At these 3 cement contents:

(1) Use a minimum of 4 points to determine the maximum density and optimum moisture content of the 3 mixtures according to AASHTO T 134.

(2) Determine the loss in mass of the 3 mixtures according to AASHTO T 135 and T 136.

(3) Determine the 7-day unconfined compressive strength of the 3 mixtures according to ASTM D 633, method A.

Design and use a mixture that meets the requirements of Table 304-1.

Table 304-1
Aggregate Cement Mix Design Parameters

Material or Property	Requirement
Aggregate	90 – 96 %(1)
Portland cement	4 – 10 %(1)
Loss in mass, AASHTO T 135 & 136 (12 cycles) A-1, A-2-4, A-2-5, & A-3 A-2-6, A-2-7, A-4, & A-5 A-6 & A-7	 14% max. 10% max. 7% max.
7-day unconfined compressive strength, ASTM D-1633, method A	2.8 MPa min.

(1) By mass of total dry mix.

(b) Aggregate, Fly Ash, Lime, Cement Mixtures.(AFLC) Determine the optimum fly ash plus lime and cement content according to ASTM C 593 Section 10 using several mixtures with varying fly ash plus lime and cement contents. The peak of the density- fly ash plus lime and cement content curve is the optimum fly ash plus lime and cement content.

Determine the lime and cement fly ash ratio according to ASTM C 593, Sections 10 and 11 using a series of mixtures at the optimum fly ash plus lime and cement content and varying lime and cement fly ash ratio. Use a curing period from 7 to 28 days at 36 to 40°C.

Design a mixture that meets the requirements of Table 304-2.

Use a mixture with a fly ash plus lime and cement content that exceeds the optimum fly ash plus lime and cement content by 0.5 percent.

Table 304-2
AFLC Mix Design Parameters

Material or Property	Requirement
Aggregate	75 – 92 %(1)
Fly ash	6 – 20 %(1)
Lime and portland cement	2 – 5 %(1)
Average compressive strength, ASTM C 593	3.5 MPa min.
Single compressive strength, ASTM C 593	2.8 MPa min.

(1) By mass of total dry mix.

Job-mix formula. For processes (a) or (b) submit the following:

(1) Submit the following for each job-mix formula:

(a) Source of each component.

(b) Results of applicable tests.

(c) Target values for:
(1) Each aggregate sieve size specified as applicable.
(2) Stabilizing agent.

(2) At the request of the CO, submit the following:
(a) 90-kilogram sample of aggregate.

(b) 25-kilogram sample of fly ash.

(c) 10-kilogram sample of lime.

(d) 10-kilogram sample of Portland cement.

(e) 2-kilogram sample of retarder or other admixtures.

Furnish a new mix design if there is a change in a material source. Begin production only after the mix design is approved.

(c) Foamed Asphalt Mixtures. Furnish a Job Mix Formula with a mixture of aggregate material, foamed asphalt binder and one percent cement that meets the design parameters in Table 304-3. Cement will be one percent based on total mass of mixture

Table 304-3
Foamed Asphalt Stabilized Base Course Mix Requirements

Design Parameters	Value
Marshall Compacted Specimen, AASHTO T 245 Compaction, number of blows each end of test Specimen.	75
Indirect Tensile Strength, AASHTO T 283 (1) Tensile Strength Wet, min. kPa (2) Tensile Strength Ratio (TSR), min. %	 350 70
Foamed Asphalt Expansion Characteristics @ 160, 170, & 180°C (3) (1) Half-Life of Foamed Expansion, min, sec. (1) (2) Expansion Ratio, min. (2)	 12 15

(1) Total time for foamed asphalt to settle to half of the maximum foamed volume.
(2) Maximum foamed asphalt volume divided by non-foamed asphalt volume.
(3) Graph half-life to expansion ratio for the three temperatures and percentage of water (1-5 %) to determine the minimum foamed asphalt characteristics.

Submit written job-mix formulas for approval at least 28 days before production. For each job-mix formula, submit the following:

(a) Aggregate. Proportional samples representing the reclaimed asphalt pavement material, reclaimed aggregate material, and new aggregate, 115 kg total. Replace the removed pavement with a locally approved asphalt concrete mix.

(1) Gradation of Processed Material (AASHTO T 27 & T 11)

(2) Plasticity index (AASHTO T 89 & T 90)

(3) Moisture–density relation (AASHTO T 180 method D)

(b) Foamed asphalt. Five 4-liter samples of the asphalt binder and source of binder.

(c) Water. Percentage of water to be added based on total mass of mixture.

(d) Lime, Cement and/or Fly Ash. If required to meet the mix design parameters provide the percentage of lime, cement and/or fly ash based on total mass of mixture.

(e) Mix Design of Foamed Asphalt Stabilized Base Course.

(1) A minimum of 5 Marshall specimens compacted to 75 blows with asphalt contents 0.5% apart will be required.

(2) Indirect Tensile Strength (ITS) by AASHTO T 283 of both dry and soaked specimens at each asphalt content. Graph of ITS versus asphalt content for both dry and soaked specimens.

(3) Percentage of foamed asphalt binder to be added based on the total mass of the mixture.

The CO will evaluate the suitability of the material and proposed job-mix formulas.

If the job-mix formulas are not approved, submit a new job-mix formulas as described above.

304.04 General. Store stabilizing agents and admixtures in closed, weatherproof containers.

(a) Imported aggregate course. Prepare the underlying surface according to Section 204, Subsections 303.05, or 303.06, as applicable.

(b) In-place aggregate course. Recondition the aggregate according to Subsection 303.06. Shape the scarified aggregate into a windrow or blanket that is suitable for applying stabilizing agents.

304.05 When using cement, lime or fly ash as the stabilizing agents the following construction requirements will apply:

(a) Imported aggregate course. Equip the mixer with batching or metering devices for proportioning the components either by mass or volume. Maintain the accuracy of the amounts of aggregate, chemical additives, and water (based on the total dry mass) within the following tolerances:

Aggregate	±2.0% by mass
Fly ash	±1.5% by mass
Lime and cement	±0.5% by mass
Retarder or other additive	±2.0% by mass
Water	±2.0% by mass

In aggregate cement mixtures, a retarder may be used to slow initial set for maximum of 2 hours. Dissolve the retarder in water and then uniformly add it to the mixture.

(b) In-place aggregate course. Apply the moisture content of the aggregate to at least 3 percent below optimum. Do not apply stabilizing agents when conditions allow excessive loss to washing or blowing. Apply stabilizing agents at the required rates by one of the following methods:

(1) Dry method. Uniformly apply the stabilizing agents with an approved spreader. Apply water using approved methods to obtain the proper moisture content for mixing and compaction.

(2) Slurry method. Mix stabilizing agents with water and apply as a thin water suspension or slurry using either trucks with approved distributors or rotary mixers. Equip the distributor truck or rotary mixer tank with an agitator to keep the stabilizing agents suspended in water. Make successive passes over the material to obtain the moisture and stabilizing agents content for mixing and compacting.

(c) Weather Limitations. Do not construct the stabilized aggregate layer when the underlying surface is frozen, muddy, or when it is raining or snowing. Do not begin application or mixing operations when the atmospheric temperature is expected to fall below 2 ºC within 24 hours.

304.06 Mixing cement, lime or fly ash. Mix the components with suitable equipment until all additives are distributed uniformly within the aggregate to create a homogeneous mixture. When a central plant is used, transport the mixture in vehicles that maintain moisture content and prevent segregation and loss of the fine material.

(a) Aggregate cement mixtures. Add water and thoroughly mix to adjust the moisture content of the mixture as determined from the mix design and approved by the CO. Complete the mixing within 2 hours of cement application.

(b) AFLC mixtures. Add water and thoroughly mix to adjust the moisture content of the mixture to optimum moisture content plus any necessary hydration moisture as determined from the mix design and approved by the CO. Complete the mixing within 6 hours of additive application. Cure the mixture for 2 to 4 days by keeping it moist.

304.07 Placing, Compacting, and Finishing. While placing and spreading the mixture, maintain the moisture content within 2 percent of optimum. Do not leave uncompacted aggregate cement mixtures undisturbed for more than 30 minutes and complete their compaction and finishing within 1 hour from the time water is added. Additional time may be permitted if a retarder is used. Compact the mixture to at least 95 percent of the maximum density. Determine the in-place density and moisture content according to AASHTO T 310 or other approved test procedures.

Finish the aggregate course according to Subsection 301.06. to produce a surface that is smooth, dense, and free of compaction planes, ridges, or loose material.

304.08 Construction Joints. For AFLC mixtures, tie each day's work into the completed work of the previous day by remixing approximately 0.5 meter of the completed course before processing additional sections. Add 50 percent of the original amount of lime or fly ash to the remixed material.

For aggregate cement mixtures or when an AFLC mixture remains undisturbed for more than 24 hours, make a transverse construction joint by cutting back into the completed work to form an approximately vertical face.

304.09 Curing. Do not allow traffic on the stabilized aggregate surface. Apply water under pressure through a spray bar equipped with nozzles producing a fine, uniform spray. Keep the surface continuously moist until the next layer is placed.

Place the next layer within 7 days finishing the aggregate stabilization. This may be deferred up to 21 days by sealing the surface with rapid setting emulsified asphalt or cutback asphalt. Apply undiluted CRS-2 emulsified asphalt or RS-2 cutback asphalt at a rate of 1.1 liters per square meter according to Section 409. Provide a continuous film over the surface. Furnish and apply blotter according to Section 411.

If the stabilized aggregate looses stability, density, or finish, reprocess, re-compact, and add additives as necessary to restore the strength of the damaged material. Reapply the asphalt seal where the continuous film is damaged.

304.10 Foam Asphalt Process When Asphalt binder as the stabilizing agents the following construction requirements will apply:

(a) Recycler. Use equipment that is:

(1) Self-propelled recycler with an adjustable grading blade preventing segregation.

(2) Equipped with a minimum 600 horsepower engine capable of pushing the binder tanker and pulling a water tank. The engine operates an upward cutting rotary recycler capable of passing through existing asphalt with a minimum 2.5 meter width at a depth of up to 300 millimeters in one pass. Depths greater than 200 millimeters the volume of the recycler's mixing chamber will increase proportionally to the depth of cut.

(3) Capable of crushing/pulverizing, fracturing, and mixing the existing asphalt concrete pavement, aggregate base, additives and meet the approved job-mix formula and specified gradation to form a homogenous mass that will bond together when compacted.

(4) Equipped so that additive can be added only when the machine is moving.

(5) Equipped with a printer on the metering system and a liter per minute gauge to indicate instantaneous flow rate.

(6) Equipped with an exterior test nozzle to verify proper foaming action.

(7) Equipped with a heating system capable of maintaining the asphalt binder at a minimum 160° C.

(8) Equipped with 16 individual expansion chambers for which asphalt binder and water is injected under pressure through individual orifices promoting atomization and forming initial foam expansion.

(9) Equipped with an internal electric heat cleaning system for self-cleaning foaming nozzles. No diesel will be allowed for cleaning foaming nozzles.

(10) Capable of turning off individual foamed asphalt nozzles.

(11) Equipped with two microprocessor controlled systems controlling two independent pump systems regulating the application of foamed asphalt stabilizing agent and water per the required in-situ conditions needed per the approved mix design. The independent application of foamed asphalt and water must be proportional regulated by the recycler per the forward speed and mass of material being recycled.

(12) Equipped with two spray bars with a maximum nozzle spacing of 155 millimeters and the ability to verify the nozzles are open and working from within the operator cabin.

(b) Rollers. Use equipment that is:

(1) Self-propelled and in good mechanical condition.

(2) Capable of initial compaction using a 18-ton single drum vibratory compression-type roller.

(3) A minimum 14-ton single drum vibratory steel roller.

(4) A minimum 18-ton pneumatic tire roller.

Operate rollers according to the recommendation of the manufacturer.

(c) Grader. Furnish a grader with the capability to spread the pulverized material to a uniform grade and cross section.

(d) Water truck. Furnish a water truck with a minimum 7600 liter capacity.

304.11 Weather Limitations. Apply foamed asphalt binder when the surface is dry, and the air temperature in the shade is above 10°C and the surface temperature is above 4°C.

Do not begin foamed recycling operations when fog, showers, rain, frost or temperatures below 2°C are anticipated within 24 hours.

304.12 Production Start-Up Procedures. Provide 7 days notice before beginning production of Foamed Asphalt Stabilized Base Course.

At least two weeks prior to the start of foamed asphalt stabilizing operations, arrange for a conference. Coordinate attendance with CO and any application subcontractors. Discuss and submit the following:

(a) Proposed schedule of stabilizing operations.

(b) List of all equipment (excavation-compaction equipment, laydown, haul, etc., and personnel used in the production and construction of the work.

(c) Proposed Traffic Control Plan for moving operations.

(d) Discuss Section 153, Contractor Quality Control, and minimum frequency schedule for process control sampling and testing.

(e) Discuss Subsections 304.12, Production Start-Up Procedures (test strip), 304.13, Construction, and 304.14, Smoothness.

(f) Discuss Subsections 106.02, 106.03, and 106.04 and 304.15, Acceptance.

(g) Proposed Traffic Control Plan for moving operations, and the proposed method of dealing with emergencies. Show in detail how traffic will be maintained through the project in the event of equipment breakdown, sudden weather changes, or other unexpected events. Include in the plan how sufficient roadway width for safe passage of traveling public will be maintained.

(h) Proposed plan for maintaining the required moisture content of the foamed recycling areas, and the design cross slope.

On the first day of production, stabilize a 300-meter long test strip, one-lane wide, at the designated thickness and designed optimum foamed asphalt content. Construct the test strip on the project at an approved location.

Construct the test strip using construction procedures intended for the entire project. Cease production after construction of the test strip until the stabilized base course and the test strip are evaluated and accepted.

(i) Mix Design Verification. Take at least three test strip stabilized base samples and evaluate according to specification requirements in Tables 304.-3

(j) Compaction. Take nuclear gauge readings at a minimum of five locations with the test strip according to Subsection 304.13 (b), (3). Density is acceptable if all tests are above the specification limit. Furnish the CO with the nuclear gauge readings. Take nuclear density readings behind each roller pass to determine the roller pattern necessary to achieve required density.

Repeat the test strip process until an acceptable test strip is produced. See Subsection 106.01 for the disposition of material in unacceptable test strips. Accepted test strips may remain in place and will be accepted and measured as a part of the completed foamed stabilized base. Tests used for the test strip will not be included in the evaluation for payment according to Subsection 106.04. When a test strip is accepted, full production may begin.

Use these start-up procedures when a change in construction procedures occurs or when resuming production after a termination of production due to unsatisfactory quality according to Subsection 106.04.

304.13 Construction. Construct foamed asphalt stabilized base according to the following:

(a) Prior to beginning the recycling work each day, prepare a production plan detailing proposals for the forthcoming day's work. Provide the following in the production plan to the CO:

> **(1)** Diagram showing the overall layout of the length and width of roadway intended for recycling during the day, broken into the number of parallel passes required to achieve the stated width, and overlap dimensions at each joint between passes.
>
> **(2)** The sequence and length of each pass to be stabilized before starting on the adjacent or following pass.

(3) An estimate of the time required for milling, mixing, and compacting the pass. Show on the diagram the expected completion time of each pass.

(4) The location where samples were taken for determining in-situ moisture contents, and the results of the tests.

(5) The proposed water addition for each pass, and the location the change is to made within that sequence.

(6) If applicable, the quantity and location from where the aggregate base is imported.

(7) The amount and type of stabilizing agent or agents, to be applied to each pass.

(8) The proposed control testing program.

(9) Any other information that is relevant for the intended work.

(b) Foamed asphalt stabilizing and mixing operations will be completed in continuous segments. If one recycler is used, the segment includes full lane width to centerline by the end of the day's production. Open to traffic overnight and on all weekends and holidays. Broom excess material at the end of each day's production.

(1) Foamed Stabilizing. Stabilize the existing pavement, base and/or subgrade material to the depths indicated in the plans or as directed by the CO. Blend the foamed asphalt binder, base, and/or subgrade material into a homogeneous mass for the full specified depth.

For mixtures when a dry stabilization additive is required spread a uniform layer on the prepared roadway surface prior to stabilizing. A metered mechanical spreader will be used. Spreading of cementitious stabilizing additives on the roadway ahead of the recycling machine will not be allowed when windy conditions adversely affect the operation.

(2) Mixing. Obtain moisture contents of the in-situ material per FLH T 515 a minimum of one per lane mile 2 days prior to incorporation of foamed asphalt. Provide uniform moisture content in the blended mix that is within 1 % of the limits established in the design at the time of addition of the asphalt binder. Aerating of the mixture or the addition of water may be required.

Apply asphalt binder in one application to the depth as specified in the plans and at the rate established in the job-mix formula. Apply the foamed asphalt binder with 1-2% water added by volume to achieve expansion of the AC. The expansion ratio and half-life will determine the temperature that maximizes the foamed asphalt. The application temperature of the foamed asphalt will not be below 160 degrees Celsius or the temperature as determined in laboratory analysis of the asphalt binder.

(3) Grading and Compaction. Shape, grade and compact the mixture to the lines, grades and depths shown on the plans, cross section and specifications. Do not stabilize across the centerline to maintain the existing or new crown of the pavement. Monitor inplace density during the compaction process with nuclear density gauge. Compact to a minimum density of 97% and correlate to the wet density according to AASHTO T 180 method D. Determine the inplace density according to AASHTO T 310. Obtain the average inplace density by measuring with a nuclear gauge 50 mm below the bottom of foamed stabilized section and up to three readings at 50 mm increments within stabilized section.

(4) Unstable areas. Following the grading and compaction operations and remix any unstable areas. Aerate any areas that have excess moisture content.

(5) Dust Control. Control dust during the pulverization and mixing operations by applying water or by applying an asphalt emulsion fog coat according to Section 409.

(6) Longitudinal Joints. Plan longitudinal joints to coincide with each and every change in cross-slope, regardless of the overlap width. Provide a minimum longitudinal overlap of 150 millimeters. Do not apply foamed asphalt on previously treated foamed asphalt recycled pavement when overlap occurs.

304.14 Profile and Cross Slope Requirements. After final rolling, measure the profile and cross slope of the foamed asphalt stabilized base course. Use a 3-meter metal straightedge to measure at right angles and parallel to the centerline. Defective areas are surface deviations in excess of 10 millimeter in 3 meters between any two contacts of the straightedge with the surface. The profile and cross slope will match the existing conditions. The finished cross slope will not vary by more than 0.5 percent from the existing cross slope.

304.15 Acceptance. Materials for blotter, chemical admixtures , fly ash, lime, hydraulic cement, and water will be evaluated under Subsections 106.02 and 106.03. Emulsified asphalt will be evaluated under Subsections 106.03 and 702.09.

Stabilized imported and in-place aggregate courses will be evaluated under Subsections 106.02 and 106.04. See Table 304-3 for sampling and testing requirements.

Reconditioning of the aggregate course for in-place aggregate will be evaluated under Section 303.

Preparation of the surface on which the treated imported aggregate course is placed will be evaluated under Sections 204 or 303.

Asphalt binder will be evaluated under Subsection 106.04 and 702.09

Foamed Asphalt Mix Designs will be evaluated under subsection 106.01, 106.02 and 106.04

Measurement

304.16 Measure the Section 304 items listed in the bid schedule according to Subsection 109.02 and the following as applicable.

Measure square meter width to include the top of aggregate and allowable curve widening.

Payment

304.17 The accepted quantities, measured as provided in Subsection 109.02, will be paid at the contract price per unit of measurement for the Section 304 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

Payment will be made under:

	Pay Item	Pay Unit
30402	Aggregate stabilization depth	Square meter

Table 304-3
Sampling and Testing Requirements

Material or Product	Type of Acceptance (Subsection)	Characteristic	Category	Test Methods	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time
Aggregate Cement Mixtures								
Proportioning (304.03)	Source	Moisture-Density	—	Cement: AASHTO T 134 Method D (minimum of 4 points)	1 for each mixture or change in material	Processed material before incorporation into the work	Yes, when requested	Before use in work
Aggregate, Fly Ash, Lime, and Cement (AFLC)								
Proportioning (304.03)	Source	Moisture-Density	—	AFLC ASTM C 593 Section 10 and 11 (minimum of 4 points)	1 for each mixture or change in material	Processed material before incorporation	Yes, when requested	Before use in work
Imported Aggregate								
Aggregate (703.05)	Measured & tested for conformance (Subsection 106.04)	Gradation [1]		AASHTO T 11 & AASHTO T 27	1 sample per 1,000t	Processed aggregate before stabilization	Yes, when requested	4 Hours
		9.5 mm	I					
		4.75 mm	I					
		75 µm	I					
		Other specified sieves	II					
		Liquid Limit	—	ASHTO T 89	1 sample per 3,000t	Processed aggregate	—	"
Stabilized Aggregate								
Mixture (304)		In-place Density and Moisture Content	—	AASHTO 310 or other approved procedures	1 for each 500t or 2,500 m^2	Compacted material	—	End of shift

Table 304-5
Sampling and Testing For Foamed Asphalt Process

Material or Product	Property or Characteristic	Test Methods or Specifications	Frequency	Sampling Point
Asphalt Binder	Grade	AASHTO MP 1, M 226	1 every 10th tank load	From shipping container
	Foaming Quality	Sample	1 every tank load	Test nozzle on recycler
Mixture	Gradation	AASHTO T 27	1 per 1000 meters	Behind recycler before Compaction
	Tensile Strength	AASHTO T 283	1 per 1000 meters	Behind recycler before Compaction
	Moisture Density	AASHTO T 180 Method D	1 per 1000 meters	Behind recycler before Compaction
Foamed Asphalt stabilized base course	Density	AASHTO T 310	1 per 300 meters	In place after compaction

Section 306. – DUST PALLIATIVE

Delete the text of this Section and substitute the following:

Description

306.01 This work consists of furnishing and applying one or more applications of a dust palliative on a prepared surface.

Material

306.02 Conform to the following Subsections:

Blotter	703.13
Lignin sulfonate	725.20
Magnesium chloride	725.02
Water	725.01

Construction Requirements

306.03 General. Use distributor equipment conforming to Subsection 409.04, except heating capability is not required. Equip the distributor with a hose and nozzle for areas inaccessible to the distributor and for touch-up work. Do not apply a dust palliative when the weather is foggy or rainy or when rain is anticipated within 24 hours of application. Do not apply chloride brines, emulsified asphalt, or lignin sulfonate when the ground is frozen.

Protect the surfaces of structures and trees from splatter or marring during application. Use multiple applications at a reduced rate if necessary to prevent runoff. Do not discharge dust palliative into streams.

306.04 Preparation and Application. Prepare the roadbed by blading and shaping to leave 100 to 150 millimeters of relatively loose material on the surface. A 50/50 lignin sulfonate/ magnesium chloride mix shall be distributed throughout the top 100 millimeters.

Lignin sulfonate and magnesium chloride mix. Water the loose material so it is visibly moist.

When lignin sulfonate is used, dilute it with water until the mixture contains a minimum 48 percent concentration. When magnesium chloride brine is used, provide a minimum 28 percent concentration.

The CO will approve the exact proportion. Thoroughly mix the components. Apply when the ambient air temperature is 4°C or above. Apply liquid concentrations at a rate of 1.4 to 2.7 liters per square meter as approved. Apply the chloride flakes at the rate of 0.5 to 1.1 kilograms per square meter as approved.

Distribute the dust palliative uniformly throughout the layer, moisten as necessary, and compact the surface.

306.05 Maintenance and Opening to Traffic. Do not permit traffic treated surface until the dust palliative has penetrated and cured enough to prevent excessive pickup under traffic. If it becomes necessary to permit traffic before that time, apply blotter as necessary.

306.06 Acceptance. Dust palliative material (lignin sulfonate and magnesium chloride 50/50 mix) will be evaluated under Subsection 106.03.

When the lignin sulfonate/magnesium chloride mix is furnished, provide a commercial certification that includes the following information for each shipment: date, identification number (truck, trailer, etc.), net mass, net volume at 15°C, specific gravity at 15°C, percent solids by weight, pH, base cation, and brand name.

Application of dust palliative will be evaluated under Subsections 106.02 and 106.04.

Measurement

306.07 Measure dust palliative application by the kilometer or by the square meter.

Measure dust palliative material (lignin sulfonate and magnesium chloride mix) by the metric ton. Mass measurements apply to the diluted quantity.

Payment

306.08 The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

Payment will be made under:

	Pay Item	Pay Unit
30602	Dust palliative application	Square meter
30611	Lignin sulfonate/Magnesium chloride, 50/50 mix	Metric ton

Section 308. – MINOR CRUSHED AGGREGATE

308.06 Acceptance. Delete the second paragraph and substitute the following:

Construction of roadway aggregate courses will be evaluated under Subsection 106.02 and 106.04. Method 2 compaction will be evaluated under Section 106.04. During placement the Contractor will sample material from the windrow or roadbed after processing prior to compaction at the frequency shown in table 308-1. The samples will be submitted to the CO for verification. Materials which do not meet the approved certification will be considered unacceptable.

Delete Table 308-1 and substitute the following:

Table 308-1
Sampling and Testing

Material or Product	Property or Characteristic	Test Methods or Specifications	Frequency	Sampling Point
Crushed aggregate [1]	Moisture-Density	AASHTO T180 Method D	1 for each aggregate supplied.	Production output or stockpile.
	Gradation [2]	AASHTO T11 and T27	1 for each 1000 t.	From the windrow or roadbed after processing.
	In-place density and moisture content	AASHTO T310 or other approved procedures	1 for each 1000 t.	In-place completed compaction layer.

[1] Sampling and testing required for roadway aggregate.
[2] Use only sieves indicated for the specified gradation.

Section 401. – HOT ASPHALT CONCRETE PAVEMENT

Delete the title and text of this Section and substitute the following:

Section 401. – SUPERPAVE HOT ASPHALT CONCRETE PAVEMENT

Description

401.01 This work consists of constructing one or more courses of Superpave hot asphalt concrete pavement.

Superpave hot asphalt concrete is designated as shown in Table 401-1.

Nominal maximum size aggregate is designated as shown in Table 703-14.

Asphalt binder grade (PG58-34) is designated as shown in AASHTO M 20, M226, or AASHTO MP-1.

A minimum of one percent hydrated lime will be required in the Superpave hot asphalt concrete mixture.

Pavement smoothness will be Type I.

Material

401.02 Conform to the following Subsections:

Aggregate	703.17
Antistrip additive	702.08
Asphalt binder	702.01
Mineral filler	725.05

Construction Requirements

401.03 Composition of Mix (Job-Mix Formula). Furnish aggregate and additives that meet applicable gradation and materials requirements in Subsection 703.17. Furnish asphalt binder that meets the applicable materials requirements in subsection 702.01. Furnish antistrip additive that meets the applicable materials requirements in subsection 702.08 (c). The Superpave hot asphalt concrete mixture will meet the design parameters in Table 401-1. Compact specimens to N_{design} with a gyratory compactive effort specified in Table 401-1.

Use of baghouse fines in Superpave hot asphalt concrete mixtures requires approval unless included as part of the approved job-mix formula.

For all but the final surface course, recycled material may be used subject to approval and submission of test data demonstrating that the mixture and the specified asphalt binder grade will meet the mix design requirements. Recycled material may not be used in the final surface course.

Table 401-1
Superpave Hot Asphalt Concrete Mixture Requirements

Design Parameters		Requirements
Percent air voids at design gyrations, N_{design} (AASHTO MP 2)		4.0
Percent maximum density at initial gyration, $N_{initial}$ (AASHTO MP 2)		Less than 90.5
Percent maximum density at maximum gyrations, $N_{maximum}$ (AASHTO MP 2)		Less than 98.0
Tensile strength ratio [(1)], min. (AASHTO T 283)		80
Dust-asphalt ratio [(2)] (AASHTO MP 2)		0.8 - 1.6
Hveem stabilometer value, min., (AASHTO T 246 and T 247)		30
Percent voids in mineral aggregate (VMA), min. (AASHTO MP 2)	12.5 mm Nominal Max.	14.0
	19.0 mm Nominal Max.	13.0
Percent voids filled with asphalt (VFA), (AASHTO MP 2)		65 – 78
Gyratory compactive effort (AASHTO PP 28) (measure volumetric properties after compacting specimens to N_{design})		$N_{initial}$ = 7 N_{design} = 75 $N_{maximum}$ = 115

(1) Sample specimens will be100mm diameter, 7±1.0 percent air voids, with one freeze thaw cycle. Acceptable method of compaction is AASHTO T247 or the Superpave Gyratory Compactor.

(2) Hydrated lime, bag house fines, and other mineral matter added to the mixture is included in samples evaluated for the dust fraction.

Submit written job-mix formulas for approval at least 28 days before production. For each job-mix formula, submit the following:

(a) Aggregate and mineral filler.

(1) Designate target values within the gradation band for percent passing each sieve size for the specified gradation.

(2) Source and percentage of each aggregate stockpile.

(3) Gradation of each aggregate stockpile.

(4) Representative samples of each aggregate stockpile such that when combined at the proposed job mix formula total 325 kilograms.

Advise the CO of the schedule for collecting aggregate samples and provide the CO an opportunity to witness sampling. Verify the gradation of the aggregate stockpile samples to be submitted by performing a gradation on a split of each aggregate stockpile sample. Provide the results of the gradation tests to the CO. Aggregate samples when combined according to the Contractor's recommended stockpile percentages will be within the gradation band defined by the target values plus or minus the allowable deviation for each sieve or the samples will not be considered

representative. If the gradations are verified, provide the split portion of the sample as part of the mix design submitted. If the gradations are not verified, perform appropriate corrective measures to provide a job mix formula and samples which will result in a mix meeting the contract requirements. Once verified, complete a sample transmittal Form FHWA 1600c for each sample, providing the CO the opportunity to review the completed form prior to sample shipment. Include a copy of each transmittal form on the outside and inside of the corresponding sample container, and provide the CO a copy of each completed form. Ship the samples to the FHWA Materials Laboratory, Building 52, Entrance S-1, Denver Federal Center, Denver, Colorado 80225.

(b) Asphalt binder.

(1) Five 4-liter samples of the asphalt binder to be used in the mix.

(2) Recent quality test results from the manufacturer for the asphalt binder including a temperature-viscosity curve and specific gravity at 25°C according to AASHTO T 228.

(3) Mixing and compaction temperature ranges for the asphalt binder.

(4) Material safety data sheets.

(c) Antistrip additive (hydrated lime)

(1) 2 kilograms of hydrated lime.

(2) Name of product.

(3) Manufacturer.

(4) Material safety data sheet.

(d) Asphalt mixes. When applicable, the location of all commercial mixing plants to be used. A recent job-mix formula is needed for each plant. The CO will evaluate the suitability of the material and the proposed job-mix formula. If approved, the CO will develop a target value for the asphalt binder content, determine the maximum specific gravity (density) according to AASHTO T 209, and determine the discharge temperature range.

If a job-mix formula is rejected, submit a new job-mix formula as described above.

Changes to an approved job-mix formula require approval before production. Up to 14 days will be required to evaluate a change. Approved changes in target values will not be applied retroactively for payment.

The CO will deduct all job-mix formula evaluation costs incurred as a result of any of the following:

(1) Contractor-requested changes to the approved job-mix formula.

(2) Contractor requests for additional job-mix formula evaluations.

(3) Additional testing necessary due to the failure of a submitted job-mix formula.

401.04 Mixing Plant. Use mixing plants conforming to AASHTO M 156 supplemented as follows:

(a) All plants.

(1) Automated controls. Control the proportioning, mixing, and discharging of the mix automatically.

(2) Dust collector. AASHTO M 156, Requirements for All Plants, Emission

Controls is amended as follows:

Equip the plant with a dust collector. Dispose of the collected material. In the case of baghouse dust collectors, dispose of the collected material or return the collected material uniformly.

If baghouse fines are approved for use, batch plants or continuous mix plants will meter it by volume or mass into the mixing chamber. In drum dryer-mixer plants, return the material to the drum at the same location as the asphalt.

(3) Aggregate storage. Store aggregate according to Section 307.

(b) Drum dryer-mixer plants.

(1) Bins. Provide a separate bin in the cold aggregate feeder for each individual aggregate stockpile in the mix. Use bins of sufficient size to keep the plant in continuous operation and prevent overflow of material from one bin to another.

(2) Stockpiling procedures. Separate aggregate into at least 2 stockpiles with different gradations. As a minimum, one stockpile will contain mostly coarse material, and one stockpile will contain mostly fine material.

(c) Batch and continuous mix plants.

(1) Hot aggregate bin. Provide a bin with 3 or more separate compartments for storage of the screened aggregate fractions to be combined for the mix. Make the partitions between the compartments tight and of sufficient height to prevent spillage of aggregate from one compartment into another.

(2) Load cells. Calibrated load cells may be used in batch plants instead of scales.

401.05 Pavers. Use pavers that are:

(a) Self-contained, power-propelled units with adjustable vibratory screeds with full-width screw augers.

(b) Heated for the full length and width of the screed.

(c) Capable of spreading and finishing courses of asphalt mix in widths at least 300 millimeters more than the width of one lane.

(d) Equipped with a receiving hopper having sufficient capacity to ensure a uniform spreading operation.

(e) Equipped with automatic feed controls, which are properly adjusted to maintain a uniform depth of material ahead of the screed.

(f) Operable at forward speeds consistent with satisfactory mix lay down.

(g) Capable of producing a finished surface of the required smoothness and texture without segregating, tearing, shoving, or gouging the mix.

(h) Equipped with automatic screed controls with sensors capable of sensing grade from an outside reference line, sensing the transverse slope of the screed, and providing the automatic signals that operate the screed to maintain grade and transverse slope.

401.06 Surface Preparation. Prepare the surface according to 303.07, 413, 502, or 503 as applicable. Apply an asphalt tack coat to contact surfaces of pavements, curbs, gutters, manholes, and other structures according to Section 412.

401.07 Weather Limitations. Place Superpave hot asphalt concrete mix on a dry, unfrozen surface when the air temperature in the shade is above 2°C and rising and the temperature of the road surface in the shade conforms to Table 401-2.

Table 401-2
Superpave Hot Asphalt Concrete Mix Placement Temperature

Compacted Lift Thickness	< 50 mm	50 - 75 mm	> 75 mm
Road Surface Temperature,°C	Minimum Lay-Down Temperature [1]°C		
< 2	[2]	[2]	[2]
2 - 3.9	[2]	[2]	138
4 - 9.9	[2]	141	135
10 - 14.9	146	138	132
15 - 19.9	141	135	129
20 - 24.9	138	132	129
25 - 29.9	132	129	127
≥ 30	129	127	124

[1] In no case will the Superpave hot asphalt concrete mix be heated above the temperature specified in the approved mix design.
[2] Paving not allowed.

401.08 Asphalt Preparation. Uniformly heat the asphalt binder to provide a continuous supply of the heated asphalt binder from storage to the mixer. Do not heat asphalt binder above 175°C.

401.09 Aggregate Preparation. Adjust the aggregate moisture to at least 4 percent by mass of aggregate. Mix the antistrip uniformly with the aggregate before introducing the aggregate into the dryer or dryer drum. Use calibrated weighing or metering devices to measure the amount of antistrip and moisture added to the aggregate.

For batch plants, heat, dry, and deliver aggregate for pugmill mixing at a temperature sufficient to produce a mix temperature within the approved range. Adjust flames used for drying and heating to prevent damage to and contamination of the aggregate.

Control plant operations so the moisture content of the mix behind the paver is 0.5 percent or less according to AASHTO T 110 or FLH T 515.

Add hydrated lime to the aggregate by method A, B, or C as follows. Use calibrated weighing or metering devices to measure the amount of hydrated lime and moisture added to the aggregate.

Method A - Add hydrated lime to the combined cold feed aggregate using an enclosed in-line cold feed mechanical pugmill mixer. The pugmill mixer will be twin-shaft, continuous mixing with adjustable mixing paddles. There will be no trace of unmixed lime after the lime and aggregate exit the pugmill.

Method B - Add hydrated lime to the produced aggregates during stockpiling using a pugmill. Add twenty-five (25) percent of the lime to be added to the coarse aggregate stockpile, and add seventy-five (75) percent of the lime to be added to the fine aggregate stockpile. When more than two stockpiles are used, the distribution of lime per stockpile will be included in the mix design.

Minimum moisture content will be two (2) percent by dry weight for the coarse aggregate and four (4) percent by dry weight for the fine aggregate at the time the aggregates and lime are mixed.

Method C - Use a lime slurry consisting of one part hydrated lime and three parts water. The plant will be equipped with a mixing unit to allow mixing of the slurry and aggregate prior to entering the dryer or dryer drum.

Adjust the moisture of the coarse and fine aggregates, or combination of aggregates, to obtain uniform coating of the aggregate with the hydrated lime.

Prior to the production of Superpave hot asphalt concrete pavement, obtain approval of synchronized metering and weighing devices used to introduce a constant rate of hydrated lime and water.

401.10 Mixing. Measure the aggregate and asphalt into the mixer according to the approved job-mix formula. Mix until all the particles are completely and uniformly coated with asphalt according to AASHTO M 156. Maintain the discharge temperature within the approved range.

401.11 Hauling. Use vehicles with tight, clean, and smooth metal beds for hauling asphalt concrete mixes.

Thinly coat the beds with an approved material to prevent the mix from adhering to the beds. Do not use petroleum derivatives or other coating material which contaminate or alter the characteristics of the mix. Drain the bed before loading.

Equip each truck with a canvas cover or other suitable material of sufficient size to protect the mix from the weather. When necessary to maintain temperature, use insulated truck beds and securely fastened covers. Provide access ports or holes for checking temperature of asphalt mix in the truck.

401.12 Start-Up and Production Procedures.

(a) Prepaving procedures. At least 2 weeks prior to the start of paving operations, arrange for a pre-paving conference. Coordinate attendance with the CO and any applicable subcontractors. Be prepared to discuss and/or submit the following:

(1) Proposed schedule of paving operations.

(2) A list of all equipment and personnel to be used in the production and construction of the work.

(3) A proposed Traffic Control Plan.

(4) Discuss Section 153, Contractor Quality Control, minimum frequency schedule for process control sampling and testing (to be performed by the Contractor).

(5) Discuss subsections 401.12, Start-Up and Production Procedures (control strip); 401.13, Placing and Finishing; 401.14, Compacting; and 401.16, Pavement Smoothness (profilograph measurements).

(6) Discuss subsection 106.05, Statistical Evaluation of Materials for Acceptance, and 401.17, Acceptance.

Provide 7 days notice before beginning production of a Superpave hot asphalt concrete mix.

On the first day of production, produce sufficient mix to construct a 300 meter long control strip, one-lane wide, and at the designated lift thickness. Construct the control strip on the project at an approved location.

(b) Control strip procedures. Construct the control strip using mix production, lay-down, and compaction procedures intended for the entire mix. Construct control strips for each plant from which production is intended. Cease production after construction of the control strip until the Superpave hot asphalt concrete mix and the control strip are evaluated and accepted, or up to three days.

Take and deliver splits of the control strip samples to a laboratory designated by the CO. Deliver the samples within 24 hours after production of the mix. The laboratory will generally be the CO's facility at Bldg. 52 on the Denver Federal Center in Lakewood, Colorado, but may be at a closer facility. The CO will designate the laboratory to be used at the preconstruction conference.

(1) Mixture properties. Take at least three control strip Superpave hot asphalt concrete mix samples and evaluate according to Subsections 401.17 and 106.05. The split samples will be evaluated for asphalt content, gradation, VMA, VFA, Hveem stability, air voids, and other design requirements from Table 401-1. The mix is acceptable if all test results are within specification limits for VMA, VFA, gradation, and asphalt content and the resulting pay factor equals or exceeds 0.90.

(2) Compaction. Take nuclear density readings behind each roller pass to determine the roller pattern necessary to achieve specifications without damaging the mix. Correlate the gauge readings to core samples. Furnish the nuclear gauge readings, and the correlation to cores, to the CO.

At a minimum of five locations within the control strip, take nuclear gauge readings and cut core samples. Evaluate the core samples according to subsections 401.17 and 106.05. The density is acceptable when the pay factor which results from the five samples equals or exceeds 0.90.

Repeat the control strip process until an acceptable control strip is produced. See subsection 106.05(b) for the disposition of unacceptable control strips. Acceptable control strips may remain in place and will be accepted and measured as a part of the completed pavement. Tests used for evaluation of acceptable control strips will not be included in the evaluation for payment according to subsection 106.05. When a control strip is accepted, full production may begin.

Use these control strip procedures when producing material from a different plant or when resuming production after a termination of production due to unsatisfactory quality according to Subsection 106.05.

(c) Production procedures. When the control strip is accepted full paving operations may begin. Continue to sample, split, and test according to section 154. Deliver all splits to the CO.

401.13 Placing and Finishing. Do not use mixes produced from different plants unless the mixes are produced according to the same job-mix formula, use material from the same sources, and are approved.

Place Superpave hot asphalt concrete mix at a temperature conforming to Table 401-2. Measure temperature of the mix in the hauling vehicle just before dumping into spreader or measure it in the windrow immediately before pickup.

Place the mix with a paver conforming to Subsection 401.05. Control horizontal alignment using a reference line. Automatically control the grade and slope from reference lines, a ski and slope control device, or dual skis. Use skis having a minimum length of 6 meters.

On areas where mechanical spreading and finishing is impractical, place and finish the mix with alternate equipment to produce a uniform surface closely matching the surface obtained when using a mechanical paver.

Offset the longitudinal joint of one layer at least 150 millimeters from the joint in the layer immediately below. Make the longitudinal joint in the top layer along the centerline of two-lane roadways or at the lane lines of roadways with more than two lanes.

The CO will designate the job-mix formula to be used for wedge and leveling courses at each location. Place wedge and leveling courses in maximum 75 millimeter lifts. Complete the wedge and leveling before starting normal paving operations.

401.14 Compacting. Furnish at least 3 rollers. Furnish one roller each for breakdown, intermediate, and finish rolling. At least one roller will be pneumatic-tired. Size the rollers to achieve the required results. Operate rollers according to the recommendation of the manufacturer.

Thoroughly and uniformly compact the asphalt surface by rolling. Do not cause undue displacement, cracking, or shoving. Continue rolling until all roller marks are eliminated and the required density is obtained. Do not roll the mix after the surface cools below 80°C.

Monitor the compaction process with nuclear density gauges calibrated to the control strip compaction test results. Compact to a pavement specific gravity (density) that is no less than 91 percent of the maximum specific gravity (density) determined according to AASHTO T 209.

Along forms, curbs, headers, walls, and other places not accessible to the rollers, compact the mix with alternate equipment to obtain the required compaction.

401.15 Joints, Trimming Edges, and Cleanup. Complete construction of adjacent traffic lanes to the same elevation within 24 hours. If drop offs are left overnight, sign the drop offs in excess of 50 millimeters with "Uneven Lane" warning signs and provide a 1:3 fillet for drop offs in excess of 100 millimeters.

At connections to existing pavements and previously placed lifts, make the transverse joints vertical to the depth of the new pavement. Form transverse joints by cutting back on previous run to expose the full-depth course.

Apply an asphalt tack coat to the edge of the joint for both transverse and longitudinal joints according to Section 412.

Place the Superpave hot asphalt concrete mix as continuously as possible. Do not pass rollers over the unprotected end of a freshly laid mix.

Dispose of material trimmed from the edges and any other discarded asphalt mix according to Subsection 211.03(b).

401.16 Pavement Smoothness. Measure pavement smoothness using the following methods:

(a) Pavement smoothness (type I) for reconstructed and new roads. After final rolling, measure the smoothness of the final paved surface course before placement of any surface treatment. Measure in the middle portion of each lane.

Measure the traveled way parallel to the centerline according to FLH T 504 after mainline paving is completed. The contractor will furnish a California type profilograph and the CO will direct and observe its operation. Operate the profilograph in the “mode” such that the plot produced can be reduced according to FLH T 504. Furnish personnel to operate the profilograph. Furnish the trace to the CO.

Exclude areas according to FLH T 504 from the profile ride index. Excluded 0.1 kilometer sections will not be used when determining upper specification limit (USL) and length for payment determination according to subsection 401.19.

A profile ride index will be calculated for each 0.1 kilometer lane of traveled way using a zero blanking-band. The profile ride index will be determined according to FLH T 504.

The upper specification limit is 380 millimeters per kilometer for reconstructed and new roads. Bumps will be located using a 10 millimeter bump template. Defective areas are:

(1) Bumps in excess of 10 millimeters in 7.62 meters

(2) 0.1 kilometer segments with profile ride index greater than 450 millimeters per kilometer

(3) Surfaces with a pay factor less than 0.75 as determined under Subsection 106.05.

All pavement surfaces will meet the requirements of (c) below.

(b) Pavement smoothness (type II) for overlay, recycle with overlay or milling with overlay projects. Measure the profile of the existing surface prior to construction traffic. The existing surface is the original surface before milling, or recycling. Measure the profile of the existing travel way parallel to the centerline according to FLH T 504. The existing profile ride index and standard deviation will be used in formulas at the end of subsection to determine the upper specification limit (USL).

Measure the traveled way parallel to the centerline according to FLH T 504 after mainline paving is completed. The contractor will furnish a California type profilograph and the CO will direct and observe its operation. Operate the profilograph in the "mode" such that the plot produced can be reduced according to FLH T-504. Furnish personnel to operate the profilograph. Furnish the trace to the CO.

Exclude areas according to FLH T 504 from the profile ride index. Excluded 0.1 kilometer sections will not be used when determining upper specification limit (USL) and length for payment determination according to subsection 401.19.

Measure the final profile ride index on the final riding surface. The profile ride index will be calculated for each 0.1 kilometer lane of traveled way using a zero blanking-band. The profile ride index will be determined according to FLH T 504.

The minimum calculated upper specification limit is 380 millimeters per kilometer for overlay, recycle with overlay, or milled with overlay projects. Bumps will be located using a 10 millimeter bump template. Defective areas are:

(1) Bumps in excess of 10 millimeters in 7.62 meters

(2) 0.1 kilometer segments with profile ride index greater than 1.5 times the calculated upper specification limit using one of the formulas below, but not less than 380 millimeters per kilometer.

(3) Surfaces with a pay factor less than 0.75 as determined under Subsection 106.05.

All pavement surfaces will meet the requirements of (c) below.

The minimum existing profile ride index is never less than 380 millimeters per kilometer for determining the upper specification limit in the following equations:

For one-lift placement of the final surface:

$^{(1)}USL_1 = 0.71 * PRI_0 + 0.39 * Sd_0$, but not less than 380 mm/km

For two-lift placement of the final surface:

$^{(1)}USL_2 = 0.50 * PRI_0 + 0.30 * Sd_0$, but not less than 380 mm/km

(1) Round to the nearest whole number.

Where:

USL_1 = Upper specification limit for one lift (mm/km)
USL_2 = Upper specification limit for two lifts (mm/km)
PRI_0 = Existing surface profile ride index (mm/km)
Sd_0 = Existing surface profile standard deviation

Determine pay factor according to Subsection 106.05.

(c) Pavement smoothness (type III) using straightedge measurement. Use a 3 meter metal straight edge to measure at right angles and parallel to the centerline. Defective areas are surface deviations in excess of 6 millimeters in 3 meters between any two contacts of the straightedge with the surface.

(d) Defective area correction. Correct defective areas from (a), (b) and (c) above. Obtain approval for the proposed method of correction.

Re-measure corrected areas according to (a), (b) and (c) above. The smoothness pay factor will be recomputed after measurement.

401.17 Acceptance. Mineral filler and antistrip additive will be evaluated under Subsections 106.02 and 106.03.

Asphalt will be evaluated under Subsections 106.04 and 702.09.

Construction of the Superpave hot asphalt concrete pavement course will be evaluated under Subsections 106.02 and 106.04.

Asphalt content, density, VMA, and pavement smoothness will be evaluated under Subsection 106.05. Other aggregate and Superpave hot asphalt concrete mixture properties will be evaluated under Subsections 106.02 and 106.04. See Table 401-3 for minimum sampling and testing requirements and acceptance quality characteristic category.

(a) Asphalt content. The upper and lower specification limits are the approved job-mix formula target value ±0.4 percent.

(b) Density. The lower specification limit is 91 percent of the maximum specific gravity (density) determined according to AASHTO T 209 as part of the job-mix formula evaluation specified in Subsection 401.03.

(c) VMA (Voids in Mineral Aggregate). See Table 401-1 for the lower specification limit.

(d) Pavement smoothness. See Subsection 401.16. The evaluation will be made after all defective areas are corrected. A sublot is a 0.1 kilometer section of the traveled way and a lot is the surface course of the entire project. The upper specification limit is determined according to Subsection 401.16.

(e) Aggregate gradation. The upper and lower specification limits are the approved job-mix formula target values plus or minus the allowable deviations shown in Table 703-14.

(f) VFA (Voids Filled with Asphalt). See Table 401-1 for the upper and lower specification limit.

Measurement

401.18 Measure Superpave hot asphalt concrete pavement, asphalt binder, mineral filler, and antistrip additive by the metric ton.

Payment

401.19 The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the bid schedule except the Superpave hot asphalt concrete pavement contract unit bid price will be adjusted according to Subsection 106.05. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

Payment for Superpave hot asphalt concrete pavement will be made at a price determined by multiplying the contract unit bid price by the material pay factor. The material pay factor is the lowest single pay factor determined for asphalt content, VMA, and density.

When the bid schedule contains a pay item for Superpave hot asphalt concrete pavement type I pavement smoothness, a separate adjustment will be made for pavement smoothness according to the following formula:

$$A = 20300(PF - 1.00)(L)$$

Where:

A = Adjustment to contract payment in dollars for pavement smoothness.
L = Length in lane kilometers of traveled way less excluded areas measured in accordance with subsection 401.16. Measure length to 3 decimal places.
PF = Pay factor for smoothness with respect to the upper specification limit determined according to Subsection 106.05 after completion of corrective work.

Payment will be made under:

	Pay Item	Pay Unit
40103	Asphalt cement grade PG58-34	Metric ton
40104	Mineral filler	Metric ton
40105	Antistrip additive type 3	Metric ton
40106	Superpave asphalt concrete pavement	Metric ton

TABLE 401-3

Material or Property	Property or Characteristic	Category	Test Methods or Specifications	Frequency	Sampling Point
Superpave Hot Asphalt Concrete Pavement	Asphalt Content	I	AASHTO T 308 (1)	1 per 750 ton	Behind the laydown machine before rolling.
	VMA (2)	I	AASHTO TP 4 and AASHTO PP 28	1 per 750 ton	Behind the laydown machine before rolling.
	Core density (3)	I	AASHTO T 166 and AASHTO T 209 (4)	1 per 750 ton	In-place after compaction.
	Smoothness (5)	I	FLH T 504	See Subsection 401.16	See subsection 401.16
	Gradation	I (6)	AASHTO T 308 (1) and AASHTO T 30	1 per 750 ton	Behind the laydown machine before rolling.
	VFA	I (6)	AASHTO TP 4 and AASHTO PP 28	1 per 750 ton	Behind the laydown machine before rolling.
	Precent air voids at design gyrations N_{design}		AASHTO PP 28	1 per 750 ton	Behind the laydown machine before rolling.

SAMPLING and TESTING

(1) Modify AASHTO T308, parts 8.2 and 10.2 to allow the use of FLH 515, Moisture Determination Using a Microwave Oven.

(2) For acceptance samples taken on site the acceptance parameters will be based on gyratory samples compacted to N_{design}.

(3) Cut core samples from the compacted pavement according to AASHTO T 230 method B. Fill and compact the sample holes with asphalt concrete mixture.

(4) AASHTO T 209 on loose mix will be required only on the first five and one per day thereafter.

(5) Applies only to final surface course.

(6) After approval of the control strip (see subsection 401.12), data will be used for informational purposes only, not for final pay determination. Testing will continue for duration of HACP production.

Section 409. – ASPHALT SURFACE TREATMENT

409.10 Fog Seal. Add the following after the first sentence:

Unless otherwise noted on the plans, dilute the specified emulsion one part water to one part emulsified asphalt.

Delete Table 409-2 and substitute the following:

Table 409-2
Approximate Quantities of Material for Double Course Surface Treatments

Designation (Thickness)	Nominal Maximum Size of Aggregate	Aggregate Gradation[1]	Estimated Quantity of Aggregate [2] Kg/m^2	Estimated Quantity of Emulsified Asphalt [3] L/m^2	Estimated Quantity of Asphalt binder [3] L/m^2
2A (12.5 mm)					
1st Application	9.5 mm	D	14 – 19	0.9 – 1.4	0.5 – 1.0
2nd Application	4.75 mm	E	5 – 8	1.4 – 1.8	0.8 – 1.3
2B (16.0 mm)					
1st Application	12.5 mm	C	16 – 22	1.4 – 1.8	0.8 – 1.3
2nd Application	4.75 mm	E	8 – 11	1.8 – 2.3	1.1 – 1.5
2C (19.0 mm)					
1st Application	19.0 mm	B	22 – 27	1.6 – 2.3	1.0 – 1.5
2nd Application	9.5 mm	D	11 – 14	2.3 – 2.7	1.5 – 1.9
2D (25.0 mm)					
1st Application	25 mm	A	27 – 35	2.2 – 3.0	1.4 – 2.0
2nd Application	12.5 mm	C	14 - 17	2.5 – 3.5	1.7 – 2.3

(1) See Table 703-7 for aggregate gradations.
(2) Aggregate masses are for aggregates having a bulk specific gravity of 2.65, as determined by AASHTO T 84 and AASHTO T 85. Make proportionate corrections when the aggregate furnished has a bulk specific gravity above 2.75 or below 2.55.
(3) Adjust the asphalt content of the 1st application for the condition of the road.

Measurement

409.14 Add the following:

The quantity of emulsion indicated in the bid schedule is an undiluted quantity.

Water for diluting fog seal in accordance with Subsection 409.10 will not be measured for payment.

Indicate a breakdown of total emulsion and water added on the load invoices supplied to the CO for payment.

409.15 Delete the text and substitute the following:

The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the bid schedule. Payments will be full compensation for the work prescribed in this Section. See Subsection 109.05.

Payment will be made under:

	Pay Item	Pay Unit
40901GAP	Surface treatment aggregates gradation A, precoated	Metric ton
40901GC	Surface treatment aggregates gradation C	Metric ton
40904AR	Emulsified asphalt grade HFMS-2P or HFRS-2P	Metric ton

Table 409-4
Sampling, Testing and Acceptance Requirements

Material or Product	Property or Characteristic	Category	Test Methods or Specifications	Frequency	Point of Sampling
Aggregate Surface treatment aggregate [1] (703.10)	Gradation (use specified sieves)	I	AASHTO T 27 and AASHTO T 11	1 per each 750 metric tons	From the production belt or the spreader discharge
	Fractured faces	-	ASTM D 5821	"	"
	Liquid Limit [2]	-	AASHTO T89	"	"

[1] Applies to each aggregate grade furnished.
[2] For blotter material only.

Section 411. – ASPHALT PRIME COAT

Description

411.01 Delete the second paragraph and substitute the following:

Prime coat asphalt grade is designated as shown in AASHTO M 140 or AASHTO M 208 for emulsified asphalt; AASHTO M 81 or AASHTO M 82 for cut-back asphalt; or Subsection 702.11 for emulsified petroleum resin.

Material

411.02 Add the following:

Emulsified petroleum resin (concentrate) 702.11

Construction Requirements

411.06 Asphalt Application. Add the following:

Dilute emulsified petroleum resin with water in the ratio of 3 parts water to 1 part emulsified petroleum resin concentrate, and apply at a rate of 1.00 to 2.00 liters per square meter according to Subsection 409.08.

Measurement

411.08 Delete the first sentence of the second paragraph and substitute the following:

Measure prime coat asphalt by the metric ton or by the liter, without including water added for dilution. Measurement for payment will be for undiluted quantity only.

Section 412. – ASPHALT TACK COAT

Construction Requirements

412.06 Asphalt Application. Delete the first sentence of the second paragraph and substitute the following:

Apply the diluted emulsified asphalt according to Subsection 409.08 at a rate of 0.15 to 0.70 liters per square meter.

Measurement

412.08 Delete the text and substitute the following:

The quantity of emulsion indicated in the bid schedule is an undiluted quantity.

Water for diluting tack coat in accordance with Subsection 412.06 will not be measured for payment.

The load invoices supplied to the CO for payment shall indicate a breakdown of total emulsion and water added.

Section 552. – STRUCTURAL CONCRETE

Material

552.02 Add the following:

Concrete Coloring Agent	711.05
Precast Concrete Units	725.11

Construction Requirements

552.03 Composition (Concrete Mix Design). Delete the first sentence of the first paragraph and Table 552-1 and substitute the following:

Design and produce concrete mixtures that conform to Tables 552-1 and 552-1A for the class of concrete specified.

Table 552-1
Composition of Concrete

Class of Concrete	Minimum Cement Content (kg/m^3)	Maximum W/C Ratio	Slump [1] (mm)
A	360	0.49	50 to 100
A(AE)	360	0.44	25 to 100
B	310	0.58	50 to 100
B(AE)	310	0.58	50 to 100
C	390	0.49	50 to 100
C(AE)	390	0.44	25 to 75
D(AE) [2]	360	0.40	25 to 75
E(AE) [3]	360	0.40	100 to 150 [4]
P	390	0.44	0 to 100
Seal	390	0.54	100 to 200

[1] Maximum slump is 200 millimeters if approved mix design includes a high-range water reducer. The maximum slump for any mix utilizing a water reducing agent may be adjusted pending mix design approval.
[2] Concrete with a water reducing and retarding admixture conforming to AASHTO M 194 type D.
[3] A latex modified concrete with 0.31 liters of modifier per kilogram of cement.
[4] Measure the slump 4 to 5 minutes after the concrete is discharged from the mixer.

Table 552-1A
Minimum Air Content for Air Entrained Concrete

Nominal Maximum Aggregate Size	Minimum Air Content [1]
50 mm	4.0
37.5 mm	4.5
25 mm	4.5
19 mm	5.0
12.5 mm	5.5

[1] See Subsection 552.03(t) for maximum air content.

(l) Dosage of admixtures. <u>Delete the text and substitute the following:</u>

When requested by the CO, provide a qualified person from the admixture manufacturer to help establish the proper dosage. Do not mix chemical admixtures together in a mix unless they are compatible. Furnish supporting documentation of compatibility from the manufacturers.

(1) Air-entraining admixtures. Entrained air may be obtained with either an air-entraining hydraulic cement or an air-entraining admixture.

(2) Set accelerating admixtures. Do not use chloride accelerators. Do not use set accelerating admixtures with class P (prestressed) concrete.

(3) Hydration stabilizing admixtures. Hydration stabilizing admixtures may be used to extend the allowable delivery time for concrete. Base the dosage on the time needed to delay the initial set of the concrete for delivery and discharge on the job. Include the design discharge time limit in the dosage submittal. The maximum allowable design discharge time is 3.50 hours.

Add the following:

Do not use precast units unless included in the plans or approved by the CO.

552.08 Delivery. Add the following after the second paragraph:

If a hydration stabilizing admixture is approved for use in the concrete mix, deliver and place the concrete within the approved design discharge time limit. Limit the slump loss to no more than 50 millimeters during the stabilization period. An approved and compatible hydration activator may be used at the discharge site to ensure proper placement and testing.

(a) Truck mixer/agitator. Delete Table 552-2 and substitute the following:

Table 552-2
Concrete Discharge Time Limits

Cement Type	Admixtures	Time Limit (hour)
Type I, IA, II, or IIA	None	1.00
Type I, IA, II, or IIA	AASHTO M 194, type B, D, or G	1.50
Type I, IA, II, or IIA	Hydration stabilizer	Approved design discharge time limit, 3.50 maximum
Type III	None	0.75
Type III	AASHTO M 194, type B, D, or G	1.25

Add the following:

Concrete discharge times noted in Table 552-2 may be extended to 3 hours provided an extended set admixture conforming to AASHTO M 194, Type B or D is incorporated into the plastic concrete at time of mixing. Determine dosage required to stabilize concrete using job site materials and field trial mixtures. The extended-set admixture shall provide the following benefits:

(1) Control the hydration of all cement minerals and gypsum.

(2) Control slump loss of the stabilized concrete to within 50 millimeters of initial slump after addition of extended set admixture.

(3) Provide setting time characteristics measured at the end of the stabilization period to within 1 hour of that of the untreated concrete mixture.

Include the dosage and type of extended-set admixture with proposed mix design. When requested, the admixture manufacturer shall provide the service of a qualified person to assist in establishing the proper dose of extended-set admixture and make dosage adjustments required to meet changing job site conditions.

552.09 Quality Control of Mix. Add the following after the first paragraph:

At least 2 weeks prior to the start of concrete placement operations, arrange a pre-concrete placing conference. Coordinate attendance with the CO and any applicable subcontractors. Be prepared to discuss and/or submit the following:

(1) Proposed concrete placement schedule.

(2) Review approved concrete mix design and determination of batch weights.

(3) Discuss Section 153, Contractor Quality Control, minimum frequency schedule for process control sampling and testing (to be performed by the Contractor).

(4) Discuss batching, mixing, placing, and curing requirements.

(5) Discuss Subsections 106.03, Certification, and 106.05, Statistical Evaluation of Work and Determination of Pay Factor (Value of Work).

(a) Mixing.

(7) Add the following:

(l) If a hydration stabilizing mixture is used, record the slump at the plant before adding the stabilizer.

(b) Delivery and sampling.

(3) Add the following after the last paragraph:

If hydration stabilizing admixture is used, determine the slump before placement. Reject all concrete with a slump loss of more than 50 millimeters as compared to the slump recorded at the batch plant before adding the stabilizer.

(4) Add the following after the last paragraph:

Furnish and maintain curing facilities for compressive cylinders meeting the requirements of AASHTO T 23. The facilities shall have capacity sufficient to cure 4 cylinders from each compressive strength sample set.

552.16 Finishing Formed Concrete Surfaces. Add the following after the first paragraph:

Use an approved form release agent which will produce a minimum of staining, air holes, and hydration discoloration.

Add the following:

(g) Class 7 - Integral color finish. All concrete in the sidewalk at the Information plaque parking area (Station 16+230) shall be integrally colored by adding a concrete coloring pigment. CO will provide a color and/or pigment dose-rate to be used.

Prepare five square textured test panels with each panel being 300 mm square. Use coarse and fine aggregates and cement as delivered on the project at the job mix rates with variable quantities of coloring agent as directed by the CO. Complete a Class 1 finish according to (a) above. The CO will select a test panel to serve as a guide for the colored concrete. Use the same rate of coloring agent used in the selected panel on all relative subsequent work. Prepare and transport the test panels to the project staging area a minimum of two weeks prior to placing concrete requiring coloring agent.

552.19 Acceptance. Delete the third sentence of the second paragraph and substitute the following:

Perform sampling and testing according to Table 552-7.

Measurement

552.20 Add the following:

Do not measure concrete coloring agent for payment.

Section 554. – REINFORCING STEEL

Construction Requirements

554.05 Bending. Add the following to the first paragraph:

Do not shear reinforcing bars in bundles.

554.09 Splices. Add the following:

Mechanical splices, at locations where approved for use or at locations shown on the plans, may be made using the following devices:

(a) Vertical column/shaft reinforcement may be mechanically butt spliced using the **Bar-Lock MBT** coupler as produced by Splice Sleeve North America, or an approved alternative.

(b) Other reinforcement, including spirals, may be spliced using the **Bar- Lock MBT** coupler as produced by Splice Sleeve North America, the **OS** Splice Clip as produced by Splice Sleeve North America, or the **Quick-Wedge** as produced by Erico Concrete Construction Products, or an approved alternate.

Approval of an alternative splicing design will be based on technical data, including test results, and other necessary proof of satisfactory performance submitted by the manufacturer. Criteria for approval is as follows:

(a) The total slip of the reinforcing bars within the splice after loading in tension to 207 MPa and relaxing to 21 MPa shall not exceed 254 micrometers for bars No. 43 or smaller as measured between gage points clear of the splice.

(b) Acceptance on Washington DOT or Caltrans "Approved Products List" will be considered in reviewing submittal for use on this project.

Splice components shall have a clear coverage of not less than 40 mm measured from the surface of the concrete to the outside face of the splice component.

Provide 600 mm minimum distance between butt splices of adjacent bars as measured along the longitudinal axis of the shaft/column.

All splicing procedures shall be in accordance with the manufacturer's standard equipment, jigs, clamps, and other required accessories. Procedures used in making the mechanical butt splices shall be as recommended by the manufacturer and approved by the CO.

Section 562. – FORMS AND FALSEWORK

Delete the title and text of this Section and substitute the following:

Section 562. – TEMPORARY WORKS

Description

562.01 This work consists of the design, construction, inspection, and removal of temporary works for the construction and repair of permanent structures. Temporary works includes all temporary facilities used in construction that do not become part of the permanent structure. Such temporary works include, but are not limited to, falsework, formwork, cofferdams, and excavation supports.

Material

562.02 Select material consistent with the safety and quality required by the design assumptions. Furnish manufactured devices complying with the *Certification Program for Bridge Temporary Works* (FHWA-RD-93-033).

Design Requirements

562.03 Design. Design and construct safe and adequate temporary works that will support all loads imposed and provide the necessary rigidity to produce in the final structure, the lines and grades shown on the plans. Design temporary works according to the *AASHTO Guide Design Specification for Bridge Temporary Works*. When a manufactured device is to be employed, ensure that the design load on the device is within the load rating recommended by the manufacturer. Design falsework and forms supporting deck slabs and overhangs on girder bridges so that there will be no differential settlement between the girders and the deck forms during placement of deck concrete.

562.04 Drawings. Prepare and submit drawings according to Subsection 104.03. Furnish design calculations and supporting data in sufficient detail to permit a structural and safety review of the proposed design. Show all information necessary to allow the design of all components to be checked independently. When manufactured devices are used as a part of the temporary works, provide catalog or equivalent data indicating the manufacturer's recommended safe load capacities of the devices.

When concrete placement is involved, indicate on the drawings the proposed sequence, rate of placement, direction of placement, and location of all construction joints. Show anticipated total settlements and/or deflections of the falsework and forms on the drawings. Include falsework footing settlements, joint take-up, and deflection of beams or girders.

For steel girder erection, submit the erection procedure and temporary support system. Include calculations in sufficient detail to substantiate that the girder geometry is correct. Design supporting falsework to accommodate the erection procedure without over stressing the structural steel and to produce the required final structural geometry, intended continuity, and structural action. See Subsection 555.06 for additional requirements.

Do not start construction of any temporary work for which drawings are required until the drawings have been accepted by the CO.

Construction Requirements

562.05 Foundations. Determine the allowable bearing capacity of the foundation material on which the supports for temporary works will rest. Perform load tests to verify proposed bearing capacity values that are in doubt, marginal or in other high risk situations.

Foundation support values shown in the contract for the permanent structure may be used in the design of falsework foundations provided foundations are at the same elevation and on the same soil as those of the permanent structure. If temporary works are to be supported on temporary fill, construct the fill according to Section 204 and verify the bearing capacity of the placed material.

Provide adequate site drainage and soil protection to ensure the integrity of the foundation material for the temporary works supports.

If piles are used, capacities may be estimated and later confirmed during construction using standard procedures based on the driving characteristics of the pile. In the absence of more sophisticated methods of determining pile capacity, use the dynamic formula according to Section 551 to determine ultimate pile capacity. The contractor may elect to use load tests to confirm the estimated capacities. Perform load tests to verify bearing capacity values that are in doubt, marginal or in other high risk situations.

Submit all foundation design calculations and other relevant foundation design data to the CO for acceptance.

562.06 Construction. Construct temporary works according to the accepted drawings. Use material and workmanship consistent with that assumed in the design of the temporary works.

Do not weld falsework members to any portion of the permanent structure unless it is shown on the accepted drawings.

Provide tell-tales with surveyed measurements, or other acceptable means, for accurate measurement of falsework settlement. Do not use the ground surface near falsework supports as a reference elevation. During concrete placement, record settlement to the nearest 2 millimeters. Anticipated compressive settlement and/or deflection of falsework shall not exceed 25 millimeters. For cast-in-place concrete structures, the calculated deflection of falsework flexural members shall not exceed 1/360 of their span regardless of whether or not the deflection is compensated by camber strips.

562.07 Maintenance and Inspection. Inspect and maintain temporary works in an acceptable condition throughout the period of use. Clearly mark the capacity of each manufactured device according to the *Certification Program for Bridge Temporary Works*.

In the presence of the CO, perform an in-depth inspection of the temporary works not more than 24 hours before beginning each concrete placement or before allowing people to enter a cofferdam or excavation support structure. Inspect other temporary works at least once a month to ensure they are functioning properly. Inspect shoring and load test support systems before loading.

Make inspections and certifications according to the *Certification Program for Bridge Temporary Works*. Furnish written results of the inspections to the CO before placing concrete, allowing people to enter a cofferdam or excavation support structure, or loading temporary works. Include a certification that the system meets the requirements of the contract and the drawings.

562.08 Removal. Remove temporary works in such a manner as to permit the structure to uniformly and gradually take the stresses due to its own mass.

Unless otherwise permitted, remove all temporary works upon completion of the work. Do not disturb or damage the finished work. Restore the area to its original or planned condition. Clean up all debris. The removed temporary works remain the property of the contractor.

562.09 Acceptance. Temporary works will be evaluated under Subsections 106.02, 106.03, and 106.04.

Measurement and Payment

562.10 Forms. See Subsection 109.05.

Do not measure temporary works for payment.

Section 563. – PAINTING

Description

563.01 Add the following:

This work also consists of furnishing all materials, equipment and labor necessary for the application of a penetrating rock stain to all exposed surfaces of the wire faced retaining walls, exposed rock surfaces of blasted rock and exposed, unweathered or mismatched surfaces of boulders in rockery walls and other locations of individual boulders. See Section 613 for requirements for concrete form-liner rock staining.

Material

563.02 Add the following:

Furnish a rock stain material that is an aqueous solution containing salts of iron and manganese, built-in oxidizers and other trace elements including copper and zinc. Furnish a rock stain that involves a stable solution applied directly to the galvanized wire and rock surfaces.

Provide a stain that has a projected life expectancy range from 50 to 100 years. Furnish a stain that develops full coloration within two weeks after application. Supply a stain where the final color of the stain is controlled or modified by custom blending of the basic ingredients, application techniques, dilution rate of the color concentrate with water or a combination of these methods.

Furnish a stain that contains chemical components that have no adverse reactions or effects on soils, plants or animals. Furnish a stain that contains no corrosive by-products that are present once the stain has been applied; only nitrate fertilizer products are permitted to be present as soluble residues.

Potential sources are listed below:

EONITE manufactured by:
Roconco Inc.
6100 South Maple Avenue, Suite 117
Tempe, Arizona 85283-2872
Telephone: (602) 820-5688

PERMEON manufactured by:
Advanced Concrete Technologies
11622 Newport Avenue
Santa Ana, California 92705
Telephone: (714) 731-0906

Or approved equivalent rock stain products.

Construction Requirements

563.03 Protection of Public, Property, and Workers.

(b) Delete the text and substitute the following:

A detailed containment plan for removed material, cleaning products, and paint debris. Include details of attachment that do not require welding or drilling holes in the existing structure. Make connections with clamps or other approved devices.

(g) Delete the text and substitute the following:

To perform quality control functions, provide a competent person as defined in SSPC-QP 2 with the following:

(1) An SSPC Competent Person Certificate.

(2) A certificate of completion of 29 CFR 1926.62 Lead in Construction training.

(3) Minimum of 2 years industrial field painting experience.

(4) Minimum of 90 days of field supervisory or management experience in paint removal projects.

(5) Documentation of the individual's qualifications including records of training and experience.

563.04 Protection of the Work. Add the following:

Cover and/or protect all adjacent surfaces outside the work, including vegetation, from receiving application of the stain.

563.05 Surface Preparation, General. Add the following:

(g) Clean the various surfaces to be stained, prior to the stain being applied, in accordance with manufacturer's recommendations for the removal of all dirt, dust, efflorescence, scale, or other foreign substances which could be detrimental to the stain penetration or color. All surfaces to be stained shall be clean, completely dry, and free of frost, or other foreign substances a the time of the application of the stain.

563.06 Paint Application, General. Add the following:

Exposed rock surfaces of blasted rock and exposed, unweathered or mismatched surfaces of boulders in rockery walls and other locations of individual boulders are to be stained where designated by CO.

563.08 Painting Galvanized Surfaces. Delete the title and substitute the following:

563.08 Staining Galvanized Wire and Rock Surfaces. Delete the second sentence.

Add the following:

The rock stain is to be applied by a manufacturer's representative in accordance with the manufacturer's recommendations.

Submit the name of the manufacturer of the rock stain proposed for use, along with the manufacturer's specifications for mixing and application, to the CO for approval. Furnish 3 preliminary samples 300 mm by 300 mm of the galvanized wire and rock materials equivalent to that used in the MSE retaining walls. Furnish 3 preliminary samples of the rock materials equivalent to that used Rockery retaining walls and individual boulders. Vary the color intensity of the stain selected on each sample in increments normally used in actual field applications. Apply the stain using the same methods that will be used during actual field application. After the sample staining is completed and cured, allow a minimum of 28 days with the surface finish exposed to the sun. Allow an additional two weeks for evaluation and approval of the stain for both the MSE retaining walls and Rockery walls/individual boulders. The CO will select the desired color intensity of the stain. Do not acquire the materials to stain the surfaces until written approval of the final color selection has been given.

Adjustments to the final shade and tone will be made with aesthetic considerations, and final approval may require such adjustments. Approximate application rate per coat will be 2.5 – 4.0 square meters per liter. Approximately two coats will be required.

Measurement

563.12 Add the following:

Rock stain will be measured by the square meter, complete, as applied by the manufacturer's representative. All areas of boulders and rockery walls to be measured are exposed surfaces of blasted rock or unweathered or mismatched surfaces of boulders where designated by CO.

Do not measure samples for payment.

Do not measure the stained surface area of boulders where boulders can be placed with a weathered surface exposed and meet all project requirements without staining.

Do not measure the staining of MSE wall faces or MSE concrete form liner faces or headwall/wingwall concrete form liner faces. Staining of these retaining walls is subsidiary to Section 255 and 613 pay items.

Payment

563.13 Add the following:

Pay Item		Pay Unit
56304	Rock Stain	Square meter

Add the following Section:

Section 566. – SHOTCRETE

Description

566.01 This work consists of batching, mixing, transporting, applying, finishing, testing, and cleaning-up shotcrete materials.

Material

566.02 Material shall conform to the following subsections:

Shotcrete Fine Aggregate	703.01
(Meet quality requirements for fine aggregate in 703.01)	
Coarse Aggregate (Class B)	703.02
Combined Shotcrete Aggregate Grading	703.18
Chemical Admixtures (Wet mix only)	711.03
Air-Entraining Admixture (Wet mix only)	711.02
Curing Compound	711.01
Portland Cement, Type II, Low Alkali	701.01
Water	725.01
Fly Ash	725.04
Silica Flume	725.04

Shotcrete shall consist of a pneumatically-applied mixture of Portland cement, aggregate, and water, which is conveyed through a hose and projected at high velocity onto a surface. The mixture may contain admixtures to provide quick set, high early strength, and satisfactory adhesion.

Combined fine and coarse aggregates shall be rounded particles meeting the grading requirements of Table 566-1.

Table 566-1
Combined Aggregate Gradation

Sieve Size	Percent by Mass Passing Designated Sieve (AASHTO T27 and T11)
12.5 mm	100
9.5 mm	90 – 100
4.75 mm	70 – 85
2.36 mm	50 - 70
1.18 mm	35 – 55
600 µm	20 – 35
300 µm	8 – 20
150 µm	2 – 10

Construction Requirements

566.03 General. Conform to the following:

ACI 506.2	Specifications for Proportioning and Application of Shotcrete.
ACI 506R	Guide to Shotcrete
AASHTO T 23	Making and Curing Concrete Test Specimens in the Field.
AASHTO T 24	Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
AASHTO C 311	Method for Sampling and Testing Fly Ash or Natural Possolans for Use as a Mineral Admixture in Concrete.
ASTM C 1077	Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.

Submittals

Submit the following (**a**, **b**, and **c**) at least 36 calendar days before placing shotcrete:

(a) Shotcrete Materials, Preparation, and Application.

(1) Proposed method of applying shotcrete.

(2) Description of proposed equipment for mixing and applying shotcrete.

(3) Proposed shotcrete mix design according to subsection 556.06.

(4) Provide other information necessary to verify compliance with ACI 506.2.

(b) Reports and Records. Submit results of all testing of shotcrete samples to the CO. Submit preconstruction testing reports with the proposed shotcrete mix design. (See Subsection 556.07 for required preconstruction testing.) Submit field quality control test reports within two working days of performing the tests. Include the following information in the reports:

(1) Sample identification including mix design and test panel number and orientation.

(2) Date and time of sample preparation including curing conditions and sample dimensions.

(3) Date, time, and type of test.

(4) Complete test results including load and deformation data during testing, sketch of sample prior to and after testing, and any unusual occurrences observed.

(5) Names and signature of person performing the test.

(6) Location of steel reinforcement, if used, covered by shotcrete.

(7) Name of nozzleman.

(c) Product, Equipment Data, and Samples.

(1) Applicable manufacturers' instructions, recommendations, literature, performance, and test data for materials and mixing and application equipment.

(2) Representative samples of shotcrete materials, if request by the CO.

(3) Certification that shotcrete materials conform to the standards specified herein.

(d) Prepare and submit a summary of shotcrete production and application for each shift. Furnish the summary to the CO within 24 hours. Include the following information in the report:

(1) Quantity and location of shotcrete applied including sketches.

(2) Observations during production and application.

(3) Description of placement equipment.

(4) Batch number(s) if applicable.

566.04 Qualifications. The Contractor shall submit the following written documentation at least 20 calendar days prior to placing shotcrete:

(a) Project References. References from at least 3 projects of comparable nature completed in the last 2 years. References shall include project name, owner's name, and phone numbers.

(b) Nozzlemen Experience and Training. Describe the experience of each nozzleman. Nozzlemen shall have previous experience and training in the application of shotcrete on at least two projects of comparable nature. Nozzlemen shall demonstrate their ability to place shotcrete to meet the requirements of these specifications prior to production placement.

(c) Foreman Experience. Describe the experience of each shotcrete foreman. Foreman shall have direct shotcrete application experience on comparable projects.

(d) Testing Laboratory Certification. Provide documentation that testing laboratory complies with the requirement of ASTM C 1077 and has experience in performing the tests specified in this Section. The testing laboratory shall demonstrate the ability to perform the requisite tests, or be accredited by AASHTO to meet the requirements of ASTM C 1077.

566.05 Equipment.

For dry mix, provide a water supply system consisting of a job site storage tank, and a positive displacement pump capable of supplying water through a regulating valve accurately controllable by the nozzleman in sufficient amount and at a pressure recommended by the manufacturer of the delivery machine.

Use equipment for mixing shotcrete materials which is capable of handling and applying shotcrete containing the specified maximum size aggregate and admixtures. An air hose and blow pipe shall be available for use to clear dust and rebound during shotcrete application.

Use an air supply system capable of supplying the delivery machine and hose with air at the pressures and volumes recommended by the manufacturer of the machine. No air supply system shall be used that delivers air contaminated by oil or that is incapable of maintaining constant pressure.

Use a delivery machine capable of introducing materials to the delivery hose at a uniform rate with ejection from the nozzle at velocities that will secure adherence of material to the treated surface with minimum rebound and maximum density.

566.06 Shotcrete Mix.

(a) Mix Proportions. Proportion cement, aggregate, and admixtures to obtain the specified strengths, entrained air content, and set times specified, and required field performance. Submit mix proportions to the CO for acceptance. The wet mix process is required when air entrainment or chemical admixtures are used.

(b) Compressive Strength. Test in accordance with AASHTO T 24. The design mix and the production work, as represented by test cores, shall develop compressive strength values as required by the contract.

(c) Water. Use the amount of water required to produce shotcrete of suitable strength, consistency, quality, and uniformity with the minimum amount of rebound.

(d) Materials. Unless otherwise approved by the CO, use the same types and sources of materials as submitted with the mix proportions in the field trials and production work.

566.07 Preconstruction Testing.

(a) General. The purpose of preconstruction testing is to ascertain the compatibility of the proposed ingredients; to verify that the proposed mix design meets the strength and set time specified; and to demonstrate the capability of the equipment, workmanship, and materials to produce acceptable quality shotcrete under field conditions as determined by inspection and laboratory tests on samples taken from field trial test panels. Perform preconstruction field trials and laboratory testing in a manner that will allow demonstration of achievement of these objectives to be demonstrated.

(b) Field Trials. Conduct preconstruction field trials of shotcrete production and application prior to starting production shotcreting. Have each proposed nozzleman make the field trials on two vertical test panels. Construct test panels on wood forms at least 1 meter by 1 meter in size. Cure test panels in accordance with AASHTO T 23, except do not immerse the panels. Allow the CO the opportunity to witness all phases of the field trial work.

(c) Coring. Obtain six cores from each test panel to verify the shotcrete mix design requirements. Take cores from each test panel in accordance with AASHTO T 24 except that cores shall be 75 millimeters in diameter. The ends of the cores shall be trimmed to provide cylinders 75 millimeters long.

(d) Testing of Core Samples. Soak cores in water 40 hours prior to testing. Identify core specimens by mix designation and test panel number. Moist cure but do not immerse cores from the time they are taken until the time they are tested. Perform compressive strength tests on core samples in accordance with AASHTO T 24. Test three cores after curing for three days, and test three cores after curing for 28 days. All specified strength requirements will be satisfied before the shotcrete mix design will be considered for approval. Allow the CO the opportunity to witness the tests.

566.08 Proportioning and Mixing.

(a) Mix Design Acceptance. The CO will accept or reject the shotcrete mix design based on the results of the preconstruction field trails and testing. Do not use any shotcrete mix that has not been approved by the CO. Prior to approving any changes to an approved mix design, the CO may request additional preconstruction testing at no additional cost to the government.

(b) Proportioning Materials. Use the proportions of ingredients determined on the basis of the approved mix design.

566.09 Surface Preparation and Application of Shotcrete.

(a) Surface Preparation. Clean loose material, mud, rebound, and other foreign matter from all surfaces which are to receive shotcrete, whether rock or previously shotcreted. Apply shotcrete to moist, unfrozen surfaces only.

(b) Shotcrete Application Requirements.

(1) Use nozzlemen/operators whose qualifications have been approved and who have fabricated test panels from which shotcrete test results were obtained and found acceptable under these specifications.

(2) Hold the nozzle at a distance and position such that the stream of flowing material will impinge as nearly as possible at right angles to the receiving surface. Apply shotcrete in a circular fashion to build up the required layer thickness. Apply mixed material within 45 minutes after adding cement.

(3) Shotcrete shall flow from the nozzle in a steady uninterrupted flow. When flow becomes intermittent, direct the flow away from the work area until it becomes steady.

(4) Provide equipment which permits application of shotcrete to surfaces at an approximate range of 1 to 2 meters from the nozzle. The surface of each shotcrete layer shall be uniform and free of sags, drips, or runs.

(5) The maximum thickness of any individual shotcrete application is 50 millimeters. Build up layers as to achieve the minimum thickness. Install approved measuring pins to indicate the thickness of the shotcrete layer(s). Install pins on 2-meter centers longitudinally and transversely with no less than two pins per increment of surface area to receive the shotcrete.

(6) Remove laitance, loose material, and rebound. Rebound shall be promptly removed from the work areas.

(7) Taper construction joints over a distance of at least 0.3 meters to a thin edge. Thoroughly wet the surface of such joints before any adjacent section of shotcrete is placed. Do not use square construction joints.

(8) Construct shotcrete such that a dense and uniform mixture without rebound inclusions, segregation, or disassembly weakness to bond between layers results.

566.10 Protection and Curing.

(a) Protect and cure in accordance with ACI 506.2.

(b) Keep shotcrete surfaces moist and covered whenever ambient outside temperature at the exposed shotcrete sections below 0°C at any time during curing.

(c) Apply curing compound to exposed shotcrete surfaces. Apply in accordance with curing compound manufacturer's recommendations.

566.11 Field Quality Control.

(a) Weather Limitations. Do not place shotcrete in cold weather unless adequately protected when the ambient temperature is below 5°C and falling, or when shotcrete will be subjected to freezing temperature before obtaining a minimum strength of 5.2 MPa. The temperature of shotcrete when deposited shall not be less than 10°C nor more than 30°C.

Do not perform shotcrete operations during high winds and heavy rains.

(b) Production Test Panels. Prepare production test panels at the rate of one for every 500 square meters of shotcrete applied. Make test panels 1.5 meters by 1.5 meters. Apply the shotcrete 100 millimeters thick. Obtain six 75-millimeter diameter core specimens from each panel and determine the compressive strength of two of the specimens in accordance with AASHTO T 24 at three days, and two specimens at 28 days.

(c) In-Place Test Cores. Obtain in-place test cores from completed work at locations and times determined by the CO. Obtain two test cores for every 500 square meters of shotcrete placed. Obtain cores in accordance with AASHTO T 24. Cure core specimens in accordance with AASHTO T 23 until the specimens are tested. If any core fails to show adequate bond or shows obvious defects as determined by the CO, two additional cores shall be taken within 2 meters of the unsatisfactory core. If either of these additional cores fail to show adequate bond with the rock or show obvious defects, the shotcrete in the area surrounding the unsatisfactory cores will be considered to be defective shotcrete and the CO may require additional thickness of shotcrete, or may require removal and replacement with new shotcrete, at no additional cost to the government. Additional core specimens may be required at any time if, based on field observations, defective shotcrete is suspected. Determine the compressive strength of cores taken from the completed work in accordance with AASHTO T 24. Test one core at three days, and one core at 28 days for each set of two cores taken in every 500 square meters of shotcrete placed. Fill all core holes with shotcrete so as to be flush with the surrounding shotcrete surface, and to the satisfaction of the CO.

(d) Shotcrete System. If the CO determines that the Contractor's selected shotcreting system fails to provide satisfactory in-place shotcrete in accordance with these specifications, the Contractor shall change to another system.

566.12 Acceptance. Shotcrete will be accepted under Subsection 106.04.

Measurement

566.13 Shotcrete will not be measured for payment.

Section 601. – MINOR CONCRETE STRUCTURES

Material

601.02 Add the following:

Concrete coloring agents	711.05

601.03 Concrete Composition. Add the following:

(i) When colored concrete is required, submit preliminary samples of the colored concrete. Prepare a 1 meter by 1 meter by 100 millimeter panel for each acceptable mix that is to be colored. Finish and cure the panels in the same manner as the concrete will be finished and cured on the project.

Do not use precast units unless included in the plans or approved by the CO.

Payment

601.09 Add the following:

	Pay Item	Pay Unit
60105C	Concrete for pipe collar	Cubic meter

Section 602. – CULVERTS AND DRAINS

Material

602.02 Delete "Special grout backfill, 704.11" and substitute the following:

Lean concrete backfill	614

Add the following:

Precast Concrete Units	725.11

Construction Requirements

602.03 General. Delete the text and substitute the following:

Furnish culvert pipe with a wall thickness not less than that shown on the plans or determined from the fill-height tables included in the plans. Use the same material and coating on all contiguous pipe sections and special sections, such as elbows and branch connections. For culvert extensions, furnish the same material as the existing culvert.

The plans show the approximate size, location and length of culverts. Determine final size, location, skew, length, elevations, and grade according to Subsection 152.03(g). Do not order culvert material until the CO has accepted the final structure size, length, and alignment.

Perform excavation and backfill work under Section 209.

Add the following:

Do not use precast units unless included in the plans or approved by the CO. Plastic pipe is not approved for use on this project.

602.05 Laying Metal Pipe. Delete the second paragraph and substitute the following:

Join pipe sections together with a water tight coupling bands according to AASHTO M 36M or M 196M. Limit the use of of coupling bands with projections (dimples) to attaching prefabricated flared end sections.

At all pipe elbows within wall sections, add a concrete collar as per Plans,.

602.08 Acceptance. Add the following:

Concrete collars will be evaluated under Section 601.

Measurement

602.09 Add the following:

Measure concrete collars under Section 601.

Section 605. – UNDERDRAINS, SHEET DRAINS, AND PAVEMENT EDGE DRAINS

Construction Requirements

605.03 General. Add the following after the second paragraph:

Do not install drain material until the CO has accepted the final location and length.

Section 609. – CURB AND GUTTER

Payment

609.11 Add the following:

Pay Item		Pay Unit
60917	Timber curb	Meter

Section 613. – SIMULATED STONE MASONRY SURFACE

Description

613.01 Add the following:

The intent of this work is to duplicate the unique coloring, pattern, and surface texture of the existing natural dry-stack rock walls along the road in the Town of Georgetown. CO to determine rock wall location(s) to match.

This work includes furnishing and installing concrete form liners and furnishing and applying a color stain system to the concrete surfaces having a special texture (form liner) including MSE walls and headwalls and wingwalls of concrete box culverts.

(a) Delete the text and substitute the following:

Furnishing textured form liners for MSE retaining wall concrete faces and exposed vertical surfaces of headwalls and wingwalls of concrete box culverts.

Add the following:

(e) Providing Manufacturer's Technical Representatives prior to and during work performed under this section.

Material

613.02 Add the following:

Form liner release agent	725.30

The stain will be a water based styrene-acrylic coating which is commercially manufactured for use as a exterior concrete stain and approved by the form liner manufacturer. Approved colors are available through Milestones, Inc., 235 Monroe St., Hudson, WI. 54016. Phone (715) 381-9660.

Construction Requirements

613.03 Form Liner Fabrication. Delete the first two sentences and substitute the following:

Form liner pattern shall be Milestones pattern MS-1017 "Guanella Pass Dry Stack" as per Milestones, Inc., 235 Monroe St., Hudson, WI. 54016. Phone (715) 381-9660.

Add the following:

(a) Qualifications and Experience. Ensure the wall contractor (or subcontractor) has a minimum of five consecutive years experience constructing vertically formed simulated stone masonry.

Submit a list of three installations of simulated stone masonry surface work completed by the wall contractor (or subcontractor) within the last 5 years. Include the project name, project location, project address, and phone number of the owner or owner's representative.

Submit a minimum of three 8 inch x 10 inch color photographs of each installation referenced above. The photographs must show details of the form lined surfaces and overall quality of the work. The photographs will be used to evaluate the experience and ability of the wall contractor or subcontractor to construct simulated stone masonry. Submit photography taken at various distances from the textured surface to clearly show distinguishing characteristics and overall quality.

(b) Drawings, Submittals, and Test Sections.

(1) Preliminary Shop Drawings. Submit preliminary shop drawings illustrating the simulated stone masonry surface (box culvert headwalls/wingwalls) and simulated stone surfacing (MSE walls).

Include the following in the preliminary shop drawings:

- Plan view, elevation view, and details showing overall pattern.
- Individual form liner panel designs and pattern layouts
- Simulated stone pattern descriptions, dimensions and sequencing of form liner sections.
- Drawings of form liner panel layouts for the retaining wall and headwall/wingwall faces. Show an arrangement of form liner panels that provides a continuous simulated stone pattern without visual disruption or repetition. On the drawings, show representative views of completed form lined walls with each form liner panel outlined in a dark line, and completed form lined walls without each form liner panel outlined. Critical features include irregularities in simulated stone patterns such as rock clusters, rosettes, linear rocks, and mortar joints.
- Details showing typical cross sections of walls, joints, corners, simulated stone bulge, simulated stone size, working line, joint and bed depths, joint locations, and end, edge and other special conditions.

(2) Final Drawings. Following the approval of the preliminary shop drawings submit final drawings. Final drawings will consist of approved details from the preliminary shop drawings, and the types, quantities, widths, and lengths of form liner panels, and location and spacing of joints for all simulated stone masonry surfaces (box culvert headwalls/wingwalls) and simulated stone surfacing (MSE walls) required for the project.

Provide final drawings of all form liner patterns to the CO for approval prior to construction of the test wall.

613.04 Form Liner Installation. Add the following:

At least two weeks prior to scheduled test wall construction work, schedule a pre-installation meeting with a manufacturer's representative and the CO to review the requirements for form liner use and the requirements for construction of the test walls and subsequent production work.

Use form release agent that is compatible with the form liner and the color/stain application.

Provide a form liner Manufacturer's Technical Representative for on site technical supervision of the form liner installer during the initial form liner production work.

Install form liners to withstand anticipated concrete placement pressures without leakage causing physical or visual defects.

The form liners, when removed, shall not cause concrete surface deterioration or weakness in the substratum. Avoid creating defects in the finished concrete surface during form stripping and related construction activities.

Replace all form liner panels that do not perform as intended or are no longer repairable.

Attach form liners adjacent to each other with less than 13 mm seam; securely attach liner to forms per manufacturer’s recommendation. Blend form liner joints into the pattern and finish off the final concrete surface. Where form liners abut, carefully blend to match the balance of the stone pattern. Create no visible or horizontal seams or conspicuous form butt joint marks. Finished and textured pattern will be continuous without visual disruption or repetition. No visible pattern repetition will be apparent in the finished product. Work shall conform to the approved sample wall.

Coordinate wall ties with the liner and form; place form ties at thinnest points of liner (high points of finished wall); neatly patch the hole remaining after disengaging the protruding portion of the tie so that it will not be visible after applying the color stain to the finished concrete surface.

If form ties (wall ties) are used which result in a portion of the tie permanently embedded in the concrete, place the form tie holes in the high point of the stone joint. Design the ties so that all material in the device, to a depth of at least 25 mm back of the finished concrete surface, can be disengaged and removed without spalling or damaging the concrete and leaving only a neat hole that can be plugged with patching material. Finish form hole according to Section 522.

613.08 Color/Stain Application. Add the following at the end of the second paragraph:

Pressure wash just prior to staining application. Contain runoff water within the work area or as directed by the CO.

Delete the third sentence of the fifth paragraph.

Delete the seventh and ninth (last) paragraphs.

Add the following:

(a) Qualifications and Experience. Ensure the color/stain application is applied by a Color Application Artist who is an employee of the form liner manufacturer or an authorized representative of the form liner manufacturer, and who has experience with similar projects. Ensure the Color Application Artist has been trained in the form liner manufacturer's special techniques in order to achieve realistic simulated stone masonry surfaces.

Submit a list of three installations of simulated stone masonry surface work completed by the Color Application Artist within the last 5 years. Include the project name, project location, project address, and phone number of the owner or owner's representative.

Submit a minimum of three 8 inch x 10 inch color photographs of each installation referenced above. The photographs must show details of the color/stain application and overall quality of the work. The photographs will be used to evaluate the experience and ability of the Color Application Artist to achieve realistic simulated stone masonry surfaces. Submit photography taken at various distances from the colored/stained surface to clearly show distinguishing characteristics and overall quality.

At least two weeks prior to scheduled color/stain application work, schedule a pre-application meeting with a manufacturer's representative and the CO to review the requirements for the application of the color/stain on the test wall and subsequent production work.

Prepare, apply, cure, and store stain according to manufacturer’s specifications, with special attention given to the recommended temperature range.

Mix stain as per manufacturer’s specifications, in colors to achieve full natural color variations on finished surfaces and designed for exterior application on new or old concrete. The stain shall create a surface that is breathable (allowing water vapor transmission), and that resists deterioration from water, alkali, acid, mildew, mold and fungus discoloration, or sunlight.

Achieve the desired finish effect by applying at least eight individual colors of stain over another. Apply concrete stain base coat using an air or airless sprayer. Highlight coloration will be by hand or other suitable antiquing method.

Prior to approval of final coloration, CO will review and determine if a final wash color is needed to tone down the previous coloration.

Re-stain any areas lacking a uniform appearance so that they are consistent with the approved sample test wall.

Recessed areas in stone units will be darkened to increase the appearance of shadows and depth.

Approved colors are available through Milestones, Inc., 235 Monroe St., Hudson, WI. 54016. Phone (715) 381-9660.

Provide a color/stain Manufacturer's Technical Representative for on site technical supervision of the Color Application Artist during the initial color/stain application production work.

Repair any damage to the form liner and stained surfaces caused by adjacent earthwork operations or other construction activities. Provide temporary covering protection from overspray or splatter where stained areas are adjacent to exposed soil or paving or roadway stabilization operations.

613.09 Test Wall. Delete the text of the first paragraph and substitute the following:

Before production work on the simulated stone masonry and simulated stone surfacing, construct a 1.2 meter high by 0.3 meter by 4.5 meter long test wall for the MSE wall concrete form liner and a similar size test wall section for the box culvert headwall and wingwall concrete form liner. Brace the wall so it is safely supported during the construction, staining and approval process. Continue to brace the wall or store it in a safe and secure position during the duration of the project.

Delete the first and second sentence of the second paragraph and substitute the following:

Construct the test walls at the location as directed by the CO, using the same methods and procedures proposed for the production work. Test walls will be removed at the end of the project.

Demonstrate the following with the simulated stone masonry test wall and simulated stone surfacing test section:

(1) The textured form liner that will be used for the project
(2) The color/stain application that will be used for the project
(3) A vertical expansion joint which follows the simulated stone joints
(4) A vertical contraction joint which follows the simulated stone joints
(5) The method of continuing the simulated stone pattern around corners
(6) The method to be used to maintain cover between form liner and reinforcing steel
(7) The method to be used to attach the form liner to the forms
(8) Form tie type, application, and setback
(9) Method of separation when forms are removed (to avoid creating defects in finished surface)

Schedule work so that at least 4 weeks prior to production work, the approved test walls will have been cast, surface defects corrected, cured, and will have had the surface exposed to the sun for at least 28 days prior to the application of the color/stain.

Provide a form liner Manufacturer's Technical Representative for on site technical supervision of the form liner installer during the form liner test walls work.

Provide a color/stain Manufacturer's Technical Representative for on site technical supervision of the Color Application Artist during the color/stain application test walls work.

Form liner manufacturer will provide a 1.2 m x 2.4 m mock-up panel to be colored. Mock-up panel will be colored by staining contractor at the same time the test walls are colored. Mock-up panel will be moved to ensure quality and consistency throughout the project. Mock-up panel will be returned to the Government at the end of the project.

The approved simulated stone masonry test wall and simulated stone surfacing test section will become the quality and aesthetic standard for the project and may supercede criteria established in this Section.

613.11 Acceptance. Delete number and title of the subsection and substitute the following:

613.10 Acceptance.

Add the following:

Material for simulated stone surfacing will be evaluated under Subsections 106.02 and 106.03.

Construction of the simulated stone surfacing test section will be evaluated under Subsection 106.02.

Measurement

613.11 Add the following:

Measure simulated stone surfacing by the square meter.

Measure simulated stone surfacing test section including concrete and surface finish by the each.

Payment

613.12 Delete the text and substitute the following:

	Pay Item	**Pay Unit**
61301	Simulated stone masonry surface treatment (box culvert concrete form liner)	Square meter
61301A	Simulated stone surfacing (MSE wall concrete form liner)	Square meter
61302	Simulated stone masonry test wall	Each
61302A	Simulated stone surfacing test section	Each

Section 614. – LEAN CONCRETE BACKFILL

Construction Requirements

614.04 General. Delete the first sentence and substitute the following:

Do not place lean concrete backfill in contact with aluminum, aluminum-coated culverts.

Section 615. – SIDEWALKS, DRIVE PADS, AND PAVED MEDIANS

615.04 Portland Cement Concrete Sidewalks, Drive Pads and Medians.

(a) Joints.

(1) Expansion joints. Delete the text and substitute the following:

Construct at intervals not exceeding 6 meters. Use 19 millimeter thick preformed expansion joint filler for the full depth of the joints. When joints are to be sealed, use joint sealant conforming to subsection 712.01(a)(5).

(3) Construction joints. Add the following:

When joints are to be sealed, use joint sealant conforming to subsection 712.01(a)(5).

Payment

615.09 Add the following:

Pay Item		Pay Unit
61504B	Portland cement concrete wheelchair ramp	Square meter

Section 617. – GUARDRAIL

Description

617.01

(d) Terminal section types are designated as follows: Delete the text and substitute the following:

CRT	Cable releasing terminal
G4-BAT	Back slope anchor terminal
FAT-9	Flared anchor terminal, 9 meters long
FAT-6	Flared anchor terminal, 6 meters long
SBT-BAT	Back slope anchor terminal
Flared	Straight or parabolic flared W beam terminal
Tangent	Tangent W beam terminal

Construction Requirements

617.03 Posts. Delete the text and substitute the following:

Where pavement is within 1 meter of the guardrail, set posts before placing the pavement.

In gravel and macadam surface areas, set posts before placing stabilized aggregate or dust palliative.

Where it is not possible to maintain a 600 millimeter minimum distance between the back of the guardrail post and the top of a slope 1:2 or steeper, increase the post length to 2.4 meters.

Where an impenetrable object is encountered, use a short post. Treat field cuts for wood posts with two coats of preservative treatment applied with a brush or a sprayer. Do not place field cuts in contact with the ground. Anchor short posts in concrete. Backfill and compact the remaining hole with acceptable material.

Do not use long or short posts in terminal sections.

Drive posts into pilot holes that are punched or drilled. The dimensions of the pilot hole shall not exceed the dimensions of the post by more than 15 millimeters. Set posts plumb, backfill, and compact.

617.04 Rail Elements.

(b) Timber rail. Add the following after the second paragraph:

Field drill holes in the steel backing on curved sections or where required to correspond to the field cut wood rails at joints. Do not use a torch to cut holes.

617.05 Terminal Sections. Delete the third paragraph and substitute the following:

When flared or tangent terminals are required, submit drawings from the manufacturer for the terminals according to Subsection 104.03.

Measurement

617.10 Add the following:

Transition railing will be measured by the meter along the traffic face of the rail.

Payment

617.11 Add the following:

Pay Item		Pay Unit
61715	Guardrail, steel tube-backed timber (box culvert)	Meter

Section 624. – TOPSOIL

Description

624.01 Delete the text and substitute the following:

This work consists of placing Conserved Topsoil including alpine topsoil, topsoil and wetland topsoil.

Material

624.02 Add the following:

Wetland Topsoil	713.01 (c)
Alpine Topsoil (conserved)	713.01 (d)

Construction Requirements

624.03 Preparing Areas. Delete the text and substitute the following:

Due to the rocky conditions of the roadway slopes, non-conventional methods will be required to salvage and place conserved topsoil. Equipment capable of salvaging topsoil from small areas with confined access, of placing topsoil from small isolated stockpiles, and of placing topsoil on steep slopes will be required to perform the work in this section.

624.04 Placing Topsoil. Add the following at the end of the first paragraph:

Place topsoil according to the details shown on the plans and requirements in Section 626. No imported topsoil required for this project.

Delete the third paragraph and substitute the following:

Spread topsoil on designated fill and cut slopes, and areas disturbed by construction as designated by the CO.

When topsoil is to be placed on the tops of cuts or toes of fills, or on slopes steeper than 1:2, coordinate grading activities such that the material can either be placed as the slopes are being constructed, or stockpiled at the construction limits and placed following construction of these slopes.

Stockpile conserved topsoil from the area of new cuts in accordance with Subsection 204.05. Salvage existing on-site topsoil as directed by CO. Following construction of cut slopes, push or rake the conserved materials back over the rounded top of cut slope and worked into crevices in the cut slope as best practical to establish areas for revegetation. Manual methods may be required to obtain the workmanship desired.

Following construction of fill slopes, pull back the conserved topsoil from the area of new fills from stockpiles or windrows or haul from stockpiles and spread over the bottom portion of the fill slope to obtain additional rounding at the toe and blending with the natural ground, as shown in the plans. Take special care to avoid disturbance of vegetation, particularly trees, shrubs, and grasses during this work.

Collect wetland topsoil from the areas designated on the plans or as designated by the CO. Place wetland topsoil on the outside slope of roadside ditches next to existing wetlands and preferably near its original location. If immediate placement is not possible, stockpile wetland topsoil in windrows no higher than 1 meter and within 20 meters of its original location. Keep records of the date and source of each topsoil stockpile. Store and label wetland topsoil separately from other topsoils. Storage time is to be kept to a minimum.

Place all stockpiled topsoil before the end of each planting season. Alternative schedules for topsoil placement to be submitted to CO by September 1 for approval.

See Section 626 for salvage and placement of Alpine Topsoil.

Section 625. – TURF ESTABLISHMENT

Construction Requirements

625.03 Turf Establishment Seasons. Add the following:

Temporary seeding to be restricted to the season beginning after spring thaw and ending at consistent ground freeze. Permanent seeding of Sub-Alpine Seed Mix to begin September 1 and end when there is consistent ground freeze.

"Spring thaw" is defined as the earliest date in a calendar year in which seed can be buried 10 mm into the surface soil through normal hand broadcast and raking methods. "Consistent ground freeze" is to be defined as that time during the late summer or fall months in which the surface soil, due to freezing conditions, prevents burying seed 10 mm through hand broadcast and raking methods. Seed is not to be spread when the surface soil is in a frozen or crushed state, nor if there is snow on the ground.

Seeding accomplished outside of time periods listed above will be allowed only as approved by CO. Submit request in writing and agree to perform re-seeding, re-mulching and repair of areas which fail, at no additional cost to the Government.

625.04 Preparing Seedbed. Delete the third paragraph and substitute the following:

For CO review and approval, establish seeding test sections to adjust soil preparation, seeding, and soil stabilizer equipment to assure the specified rates. The CO may order equipment readjustments at any time.

Slope scaling and clearing and grubbing activities must be complete and accepted by CO prior to final application of Sub-Alpine seed mix. Scaled slopes may be allowed to stabilize over winter before permanent seeding is applied. Apply temporary seeding during this settling period.

625.06 Fertilizing. Add the following:

(c) Soil preparation. Spread fertilizer and humate on all disturbed areas to be seeded within the sub-alpine zone, except areas that are within 15 meters of a creek, wetland or pond. Method of incorporating humate and fertilizer (hydraulic or hand-broadcasted) will result in a uniform application of material. Present test application methods to CO for approval before application on areas to be seeded.

Humate applied at a rate of 680 kilograms per hectare.

Fertilizer applied at a rate of 950 kilograms per hectare.

625.07 Seeding. Add the following before the first sentence:

Weed Protection. Take all measures necessary to ensure all equipment and materials moved onto National Forest System land is free of soil, seeds, vegetative matter, or other debris that could contain or hold noxious weed seed.

Weed-free Equipment. Ensure equipment is adequately washed to remove weeds and toxic materials prior to arrival at project construction site. The Forest Service can request inspection of equipment prior to entering National Forest. Washing is to be completed before entering National Forest and repeated each time equipment returns to the job site. Washing will remove all noxious weeds, weed seed and materials harboring noxious weed or weed seed, including the removal of debris on vehicle undercarriages, wheel wells and equipment parts.

Weed-free Materials. Straw, hay, road fill, rip-rap, gravel and all materials provided for construction shall be certified as weed-free. Certified weed free mulch, (straw or hay) and seed will conform to the Colorado Weed-free certifications standards.

Portions of designated seeding areas may be seeded, as directed, prior to construction completion to take advantage of growing conditions.

It is estimated that several mobilizations of seeding operations will be required and will be included in the price of the work.

(b) Hydraulic method. Add the following:

For final seeding on cut and fill slopes or disturbed areas, use a one step process to apply seed, fertilizer, humate and slurry mixture that consists of the following proportionate quantities per hectare.

Water	as needed to provide slurry consistency
Wood fiber	as needed to provide slurry consistency
Seed	See section 713.04 Seed.
Fertilizer	See subsection 625.06 Fertilizer, (c) Soil preparation
Humate	See subsection 625.06 Fertilizer, (c) Soil preparation
Mulch Tackifier	91 kilograms per hectare

Apply the tracer material as needed to provide visible evidence of uniform application.

For slopes designated for Bonded Fiber Matrix, use a two-step process to first apply seed, fertilizer and humate with wood fiber and mulch tackifier, then follow with Bonded Fiber Matrix. See subsection 625.08 and 713.05 (h) for Bonded Fiber Matrix requirements.

Hydroseeding will be applied by experienced personnel and hydraulic equipment used for the application of slurry mixture. Hydroseeder will have built-in agitators that will keep all mixture elements mixed evenly until pumped from the tank. Pump pressure will be such as to maintain a continuous, non-fluctuating stream of seed slurry.

On slopes steeper than 2:1, apply the hydroseed mixture and Bonded Fiber Matrix from the top of slope downward, in 15 meter lifts of slope lengths, or as directed by CO. A maximum spray height of 5 meters above the spray nozzle will be allowed during hydro applications. A hand held wand will be used to apply seed slurry on areas with existing vegetation.

Add the following:

(c) Hand-broadcasted method. Seed by hand all areas inaccessible by hydraulic equipment, or at locations shown on plans or as directed by CO. Rake-in seed or cover with soil to a depth of 6 to 10 mm. Apply Bonded Fiber Matrix on hand broadcasted slopes as shown on plans or as directed by CO.

(d) Temporary Seeding. Spread temporary seed mix using hydraulic method on slopes that will not receive permanent Sub-alpine Seed Mix at the end of the growing season, including slopes that are settling after scaling procedures. Do not apply fertilizer or humate with temporary seeding. See Section 713 for Temporary Seed Mix.

625.08 Mulching.

(b) Hydraulic method. Add the following:

Hydraulic soil stabilizers are to be considered safe when properly applied according to Environmental Protection Agency (EPA) and other regulatory agencies to the applicator, adjacent workers and the environment.

In a separate application from the seed, use hydro-type equipment according to Subsection 625.07(b).

Delete the third paragraph and substitute the following:

Apply Bonded Fiber Matrix with a second application following closely behind the applications of hydroseeded or hand-broadcasted seed. Apply Bonded Fiber Matrix from two directions where possible to evenly distribute the material. Apply at the following rate:

Bonded Fiber Matrix: 3690 kilograms per hectare

625.10 Acceptance. Add the following:

See Sub-section 626.13 for seeding performance standards.

Measurement

625.11 Add the following:

Measure fertilizer, humate, Bonded Fiber Matrix, wood fiber water and seed by the hectare on the ground surface, as applied according to project requirements.

Payment

625.12 Add the following:

Pay Item		Pay Unit
62501B	Seeding, hydraulic method	Hectare
62504B	Mulching, hydraulic method	Hectare
62516	Fertilizer, hydraulic method	Hectare

Section 626. – PLANTS, TREES, SHRUBS, VINES, AND GROUNDCOVERS

Description

626.01 Delete the text and substitute the following:

This work consists of salvaging and furnishing, planting and establishing native trees, shrubs, willow stakes and alpine sod.

Material

626.02 Delete the text and substitute the following:

See Section 713 for material requirements.

Construction Requirements

626.04 Inspection and Delivering. Delete the text and substitute the following:

See Sub-section 713.06 for additional inspection and delivery information.

All plant and their containers, and planting supplies will be free of weed seed, as defined in Sub-section 713.04 and 713.06.

626.05 Protection and Temporary Storage. Delete the text and substitute the following:

See Subsection 713.06 for additional information.

Package plants to provide protection against climate and breakage during transit. When shipment is made by open vehicle, tie and cover plant materials to prevent wind damage and dehydration. Spray evergreen and deciduous trees in leaf with an anti-transparent, according to the manufacturer's instructions. When shipment is made by closed vehicle, carefully pack and adequately ventilate plants to prevent “sweating.”

Keep all plant material moist and exercise care to prevent damage to bark, branches, and root systems. Replace all damaged plants including plants with cracked or crushed root balls.

Protect nursery grown and salvaged plants delivered, but not scheduled for immediate planting, as follows:

(a) Cover the earth balls of salvaged material with mulch or other suitable material and keep moist.
(b) Provide all labor, tools, equipment, soil, nutrients, water and materials necessary for the maintenance of salvaged or nursery grown plants during the brief holding period.
(c) Holding period is to be no longer than 30 calendar days.

Install all plant material received on the project within 30 calendar days.

626.06 Excavation for Plant Pits and Beds. Delete the first two sentences and substitute the following:

Stake planting locations and submit locations and methods of planting to the CO for approval prior to plant installation. Mark plant locations with stakes or flags. Remove all weeds and other unsuitable material from the planting site. Excavate plant pits as follows:

Add the following:

Do not leave any planting holes open overnight.

(c) Alpine Revegetation for Old Trail, Road Edges and Parking Area. Remove 150 mm of compacted gravel on the parking area surface. Scarify surface and sub-surface gravel 150 mm to 200 mm deep on all restoration areas. Place alpine topsoil conserved from the Upper Summit Parking Area and Rock Borrow site 100mm deep on road, trail and parking area to be revegetated. Place alpine topsoil on planting areas and mix with scarified gravel. Provide a consistent depth of topsoil over planting area, with rough surface.

626.07 Setting Plants. Add the following at the end of the first paragraph:

Planting Seasons. Salvaging and planting evergreen trees, deciduous shrubs, willow stakes and alpine sod is to be done between June 1 and July 15. Container grown plants can be planted from May 15, or when ground has thawed, until September 15 or until first killing frost.

Complete slope scaling and topsoil placement before planting. Slopes to be settled and approved by the CO prior to planting trees, shrubs and willow stakes. Seeding will follow after planting is complete.

Delete the first sentence of the second paragraph and substitute the following:

For plants installed in Sub-alpine zone only, prepare backfill mix with existing soil, polyacrylamide and fungal fertilizer. See Sub-section 626.08. Do not add fertilizer or polyacrylamide to transplanted shrubs in Alpine zone.

Planting pits will be circular in outline with vertical sides. Pits will be at least two times greater in diameter than the root ball. Before a shrub or tree is placed in a plant pit, the pit shall be filled half full of water. Backfill is to be thoroughly worked and watered to eliminate air pockets.

Add the following:

(d) Emergent Plugs. This work will consist of removing plugs of emergent wetland plant material, including roots, from existing emergent wetlands, as directed.

Plugs will be collected from areas within project right-of-way, as directed by CO. Their removal will be dispersed throughout the existing wetland so as not to adversely impact wetland health and density. Plugs will not be stockpiled but will be transplanted directly to the Duck Creek Wetland Mitigation Site, as shown on the plans.

A minimum 1-meter length of a 100mm to 150mm diameter pipe will be used to push into and cut a plug of wetland plant material, scoring the root mat 200mm in depth. The plug will be pushed out of the pipe using a long piece of wood or other device that maintains the integrity of the emergent plug.

Alternative methods of creating Emergent Plugs will be accepted upon review and approval.

Plant emergent plugs immediately into moist or saturated soils. Plugs shall be spaced 0.5 to 1.0 meters apart in wetland mitigation area. The same length of pipe referred to in the collection methods, may be used to prepare holes to plant plugs. Spread fertilizer and polyacrylamide as described in Sub-section 626.08. Plug shall be tamped carefully with foot to match surrounding grade. If standing water is not present at planting site at time of planting, water plugs until adjacent soil is saturated.

(e) Plant Salvaged Trees and Shrubs in Sub-alpine Zone. Native evergreen trees and deciduous shrubs will be salvaged and placed on roadway cut and fill slopes or disturbed areas as shown on the plans or as directed. See Sub-section 713.06 for description of material to be salvaged.

Plants to be transplanted will be those flagged by CO within the project right of way, or as directed. Contractor will give the CO two weeks notice prior to transplanting trees. Transplanting will be accomplished within one day. Trees and shrubs will not be placed in holding beds.

It is assumed that trees and shrubs will be hand dug and transplanted the same day. Trees will range in height from 0.3 m to 1.0 m.

(f) Willow Staking. This work consists of harvesting live willow cuttings from older willow shrubs within the project right-of-way or designated collection areas and planting the cuttings in moist areas as shown on the plans or as directed by CO.

Willow stakes will be between 12 and 20 mm in diameter, and between 400mm and 900 in length with the bottom end cut at an angle, top end cut straight.

Store willow stakes in containers of water by submerging at least 2/3 of their length in water and placed in a cool, shaded location. Water to be free from harmful oil, chemicals, sprays or other materials. Store willow stakes longer than one week.

Do not plant willow stakes when ground is frozen. If soil conditions allow, insert stakes directly into soil to a depth of at least 150mm within the Alpine Zone or 300mm elsewhere. If necessary, use a planting bar or other tool to dig holes at least 200 mm deep in the planting area. Place one willow stake in each hole. Cut-off the remaining exposed length to be 50 to 75 mm above ground level.

If planted in riprap or within a rock buttress, backfill the hole with soil to within 75 mm of the rock surface. Fill the top 75 mm of the void with gravel collected from the project and compacted lightly.

Placement of willow stakes in areas below 3400 meters in elevation will be in areas that remain damp or are seasonally inundated such as wetlands or creek banks. Place willow stakes 1-meter apart. Along creek banks, the planting area most successful for willow stake establishment is only 1-2 meters wide and extends no more than approximately 600 mm from the ordinary high water line of the creek.

Apply water to the willow stake planting area until soil is saturated. Water the stakes sufficiently during the Plant Establishment Period to insure willow survival, health and growth.

(g) Plant Salvaged Alpine Sod. Collect alpine sod from the Upper Summit Parking Area and Rock Borrow site to provide sod pieces, complete with alpine plants and subsoil. Plant roots will be intact and without damage. Sod pieces to be no larger than 1-meter square, or what can be collected, transported and placed in one operation, without damage to the sod piece, plant roots, or foliage. Sod thickness to be between 75mm and 200mm.

Salvage alpine sod within three days prior to construction of the Upper Summit Parking Area and other sod reception areas, and after the areas are prepared for planting. Following scarification, rake the sod reception area smooth and spread 100mm depth of alpine topsoil. Place sod on top of alpine topsoil. Butt edges of sod, leaving no more than 25mm gap between sod pieces.

The CO will direct the collection and placement of alpine sod and topsoil. The CO may direct the Contractor to place certain pieces of sod (containing certain plant species) in potions of the receiving area best compatible with their long-term survival. Following sod placement, gaps between sod pieces will be filled (i.e. “grouted”) using alpine topsoil. Care will be taken not to bury green plant parts in the sod pieces. Once planting is complete, water the sod, topsoil and transplanted shrubs until soil and roots are saturated. Install temporary fence around new planting area to deflect human access.

If it is not possible to place the alpine sod or alpine topsoil immediately after collection, store sod and topsoil in a bare location protected from wind, traffic, construction equipment and materials, and within the Alpine Zone. CO to approve the storage of sod or topsoil; including quantities, method of storage, location and length of storage, prior to collection. Place sod on moistened burlap, one sod layer thick, and cover with heavy-duty mesh shade cloth. Stockpile alpine topsoil next to sod on barren ground and cover with shade cloth. Water alpine sod and topsoil daily in amounts sufficient to moisten plant roots, sod subsoil, and topsoil.

(h) Plant Salvaged Deciduous Shrubs and Evergreen Trees in Alpine Zone. Alpine willow shrubs and alpine spruce are to be collected from the Upper Parking Lot and planted in alpine restoration areas. Collection and planting will occur within one operation. Shrubs and trees to be collected, and their planting locations will be flagged or staked for CO approval prior to beginning construction of Upper Parking Lot. The Contractor will not damage existing revegetation during the collection and planting operation. The contractor may use suitable platform material over existing turf to prevent damage from machinery.

Shrubs and trees will be collected, with foliage and root ball undamaged and complete. See Section 713.06 Plant Material for additional requirements. Plant shrubs and trees in the same alignment as collected, inconsideration of wind and snow drift direction. Add fertilizer as specified in 626.08. Planting pits and root balls will be covered with alpine topsoil.

626.08 Fertilizing. Delete the text and substitute the following:

Mix fertilizer and polyacrylamide with existing soils to provide the backfill mixture for each container-grown and transplanted plants at the following rates:

(a) Emergent Plugs and 4-L container stock.

0.03 kilogram of polyacrylamide plant
0.03 kilogram of fertilizer per plant

(b) Shrubs and trees (transplanted and 20-L container stock).

0.1 kilogram of polyacrylamide per plant
0.09 kilogram of fertilizer per plant

626.09 Watering. Delete the first sentence and substitute the following:

After the tree or shrub is planted a basin will be built to hold at least 20 L of water. Construct a 75mm to 100mm high berm of soil in a horseshoe shape around shrubs and trees, on the down slope portion of each filled plant pit. The depth of saucer will not be below the top of the root system of the tree. The basin will be filled with water three times and allowed to stand each time until empty before refilling.

626.12 Mulching. Add the following:

(a) Wood Chip Mulch.

Planting areas under trees and shrubs within the Sub-Alpine Zone will be covered with wood chip mulch.

Wood chip is to be prepared by chipping spruce, pine or aspen trees removed during clearing and grubbing operations. Wood chip mulch will consist of shredded or stringy tree material, each piece no longer than 150mm and diameter less than 20mm. Blocky or square chips will not be accepted.

Submit 0.1 cubic meter sample to CO for approval prior to chipping operations. Wood chip mulch is to be capable of matting together to resist scattering by wind.

Place wood chip mulch in a layer 150 mm deep, in all tree and shrub saucers but will not come in contact with tree trunks.

626.13 Plant Establishment Period. Add the following:

The Plant Establishment Period will begin when all planting and seeding operations are complete, including clean up, and the CO has approved work and provided a Notice of Landscape Completion. The Plant Establishment Period lasts for one complete growing season.

Warrantee all planting and seeding materials and work for the Plant Establishment Period and do what is necessary to insure the health and successful establish of plants and seeding. This includes, but is not limited to the following:

- Weed control in compliance with the Noxious Weed Management Plan for the Arapaho and Roosevelt National Forest, or USFS policies in place.
- Water trees and shrubs.
- Replace dead, browsed or diseased plants within 30 days of notification.
- Repair mulch or water saucers.
- Repair areas damaged by erosion.

Contractor is responsible for protection against animal damage resulting in plant death or non-establishment.

The following watering schedule is recommended for healthy establishment of trees and shrubs:

- Shrubs to be watered twice per month at the rate of 4 gallons per shrub per watering for the months of May through September. In the Sub-alpine zone, shrubs will be watered once per month at the rate of 2 gallons per shrub for the periods from March to May and October to November.
- Trees to be watered twice per month at the rate of 10 gallons per tree per watering for the months of May through September. In the Sub-alpine zone, trees will be watered once per month at the rate of 10 gallons per tree for the periods from March to May and October to November.

The following performance standards will be held for the final acceptance of all planting and seeding at the end of the Plant Establishment Period:

- Survival of 80% of all transplanted and Contractor furnished shrubs, trees, willow stakes and alpine sod.
- Healthy, dense and well rooted stand of grasses and forbs on all seeded area. Bare spots to be no greater than 1 square meter.

Measurement

626.15 Add the following:

The quantities of Willow Staking, Emergent Plug, Container Stock (4 and 10 liter) and Remove and Replant Trees will be measured by the actual number planted, complete in place and accepted.

Wood chip mulch, fertilizer, polyacrylamide and temporary fencing (placed around alpine sod) will not be paid for separately but shall be included in the price to furnish and plant each plant.

Measure Salvage Sod (Alpine) by the square meter, complete in place and accepted by the CO.

All labor, equipment and materials necessary to collect, haul, plant, clean-up and establish plants in their new locations will not be measured and paid for separately but shall be included in the work.

Payment

626.16 Add the following:

	Pay Item	**Pay Unit**
62602	Remove and replant trees and shrubs	Each
62602C	Emergent plug	Each
62613A	Container stock, 4 liter	Each
62613B	Container stock, 20 liter	Each
62614	Willow staking	Each
62701B	Salvage Sod (Alpine)	Square Meter

Delete the second paragraph and substitute the following:

Partial payment for plants, including transplanted and container-grown plants, as follows:

- 75 percent of the bid price to be paid after initial planting and CO issues Notice of Landscape Completion.

- The remaining 25 percent of the bid price to be paid after final inspection and CO acceptance at end of Plant Establishment Period.

Section 633. – PERMANENT TRAFFIC CONTROL

Description

633.01 Delete the second paragraph and substitute the following:

Sign panels are designated as plywood, aluminum, steel, plastic, fiberglass reinforced plastic or cedar.

Delete the fourth paragraph and substitute the following:

Posts are designated as wood.

Construction Requirements

633.05 Panels. Delete the first sentence and substitute the following:

Use type III, VII, VIII, or IX retroreflective sheeting.

Measurement

633.09

(c) Delete the text and substitute the following:

A sign installation includes the support, posts, all signs (unless shown "by others"), foundations, hardware, staining, and boulders.

Payment

633.10 Add the following:

Pay Item	Pay Unit
63310 Installing government furnished sign	Each

Section 634. – PERMANENT PAVEMENT MARKINGS

Description

634.01 Delete the first sentence and substitute the following:

This work consists of applying permanent pavement markings and raised pavement markers on the completed pavement and face of curb.

Measurement

634.13 Measurement. Delete the first sentence and substitute the following:

Measure pavement markings by the meter, by the liter, by the square meter, by the kilometer, or each. When two coats of paint are required, measure each coat for payment.

Payment

634.14 Add the following:

Pay Item	Pay Unit
63406 Pavement markings, symbols	Each

Section 635. – TEMPORARY TRAFFIC CONTROL

Description

635.01 Add the following:

This work also includes providing the services of a Traffic & Safety Supervisor.

Construction Requirements

635.03 General Add the following to the first paragraph:

Use barricades, cones, tubular markers, drums, portable sign supports, vertical panels, truck mounted attenuators, and temporary crash cushions that meet crash testing requirements of NCHRP 350 or that have been accepted by the FHWA for nation-wide use. Submit a written certification that traffic control devices in use on the project meet crash-testing requirements. Information regarding NCHRP 350 and crash-tested FHWA accepted work zone traffic control devices can be found at:

http://safety.fhwa.dot.gov/fourthlevel/hardware/wzd.htm.

Add the following:

(i) Furnish temporary traffic control devices that meet the NCHRP Report 350, Recommended Procedures for Safety Performance and Evaluation of the Highway Features, crashworthiness standards.

635.05 Barricades. Delete the second sentence and substitute the following:

Use type III retroreflective sheeting.

635.06 Cones and Tubular Markers. Delete the third sentence and substitute the following:

Use type III or VI retroreflective sheeting.

635.07 Construction Signs. Delete the first sentence and substitute the following:

Use type III, VII, VIII, or IX retroreflective sheeting. Provide the same type of sheeting on all post-mounted construction signs that pertain to the project.

635.08 Drums. Delete the third sentence and substitute the following:

Use type III retroreflective sheeting.

Add the following Subsection:

635.08A Traffic & Safety Supervisor.

Perform services described in Subsection 156.08. Furnish all vehicles and incidentals necessary to perform the work described in 156.08.

635.09 Flaggers. Delete the first sentence and substitute the following:

Furnish flaggers certified by ATSSA, the National Safety Council, the International Municipal Signal Association or a state agency.

635.11 Temporary Concrete Barriers. Add the following:

Use barriers that meet all requirements of NCHRP 350 or have been accepted by the FHWA for nation-wide use.

Install R4-1 "DO NOT PASS" signs at the beginning of "no passing" zones and at 1 kilometer intervals within "no passing" zones.

Install R4-2 "PASS WITH CARE" signs at the end of "no passing" zones.

635.14 Vertical Panels. Delete the third sentence and substitute the following:

Use type III retroreflective sheeting.

635.18 Variable Message Sign. Delete the text and substitute the following:

Conform to the standards and guidance of MUTCD Section 6F.52, Portable Changeable Message Signs.

635.19 Temporary Crash Cushions. Delete the text and substitute the following:

Furnish and install an FHWA-approved temporary crash cushion conforming to the appropriate level of crashworthiness per NCHRP Report 350, *Recommended Procedures for the Safety Performance and Evaluation of the Highway Features.* Information regarding FHWA-approved crash cushions are available at:

http://safety.fhwa.dot.gov/programs/roadside_hardware.htm.

Measurement

635.26

(v) Add the following:

Measure only one time even if relocated or replaced.

(w) Delete the text.

Add the following:

(ab) Measure Traffic & Safety Supervisor by the Lump Sum.

Payment

635.27 Add the following:

Pay Item	Pay Unit
63543A Traffic and safety supervisor	Lump sum

Add the following Section:

Section 650. – LANDSCAPING LOGS

Description

650.01 This work consists of salvaging logs from trees removed during the clearing and grubbing activities; trimming, hauling and placing logs on slopes to be seeded and planted.

Construction Requirements

650.02 General. Landscaping logs shall be tagged and approved by the CO prior to beginning of clearing and grubbing. Logs shall be fresh fir, spruce or pine trees, root ball and 2/3 of the branches trimmed.

Landscape logs shall be hauled and placed within 300 meters of harvest locations. Logs shall be placed outside of roadway clear zone; 3 meters outside of the edge of road shoulder. Locations shall be staked and approved by CO prior to placement.

End of each log shall be buried 1/3 to 1/2 its length into the cut slope. The exposed end of log shall lie flat onto the ground.

Measurement

650.03 Landscape logs shall be measured by each in place and approved.

Payment

650.04 The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

Pay Item	Pay Unit
65001 Landscaping logs	Each

Add the following Section:

Section 662. – ROCKFALL FENCE SYSTEM

Description

662.01 This work consists of designing, furnishing and installing rockfall fence systems. Installation shall be at the locations designated on the Plans or established by the CO. The rockfall fence system shall be manufactured and assembled in accordance with the contract documents and the manufacturer's standards and requirements as follows:

The system shall be capable of absorbing impact design loads for a kinetic energy specified on the Plans and shall be able to absorb the ultimate impact loads without allowing the rock to pass. The system shall be designed with a sufficient safety factor above the design loading.

The rockfall fence system manufacturer shall be regularly engaged in designing and manufacturing rockfall protection systems, with a minimum of three years of documented experience with manufacturing of such systems used in a similar application and capacity. The manufacturer shall supply written evidence demonstrating certification of a quality assurance program.

The rockfall fence system product and installation within this section is manufactured by Brugg Cable System , Vancouver, WA, or equal. Products from different manufacturer may be proposed as an equal provider and shall meet the following minimum requirements:

Fence Type	Design Impact Energy
Low Impact	80 kJ
Medium Impact	200kJ

Rockfall fence systems shall be designed to withstand the Design Impact Energy (DIE) in the table and without allowing the rock to pass. The Contractor shall provide data to show that the fence system is capable of absorbing the DIE. The manufacturer shall design and prepare plans detailing the rockfall fence system and installation for the project. Transported materials shall be properly marked to identify the system components with manufacturer design plans.

Material

662.02 Conform to the following Subsections:

Foundation	209
Concrete	601
Rockfall fence	710.14

Construction Requirements

662.03 General. Rockfall fence systems shall be manufactured in accordance with the vendor's standards and requirements as follows:

(a) The manufacturer shall design the fence system and submit copies of the layout and detail design drawings to the CO within two weeks from the receipt of an order for comments and/or approval. The manufacturer shall refer to data in the Geotechnical Report. Fabrication of the system shall commence only after the manufacturer has received the final approval from the CO. The manufacturer shall include one-day installation supervision by a qualified Field Engineer to ensure the system is properly installed.

(b) The designed rockfall fence system shall have a demonstrated satisfactory performance in a similar application and capacity.

(c) The vender shall provide documentation to show that fence system design can absorb the required ultimate load.

662.04 Excavation and Preparation

(a) Perform all excavation and foundation preparation work in accordance with Section 209. The following shall also be performed:

(b) Scatter excess excavated material around the vicinity of the rockfall fence system to match the existing ground surface and to prevent the creation of jumping ramps for falling rocks.

(c) Perform foundation work for the columns and rock and soil anchors in accordance with the typical sections shown on the plans. Column spacing, centerline to centerline, shall be in accordance to the typical sections and shall not exceed ±75 mm.

(d) Perform concrete placement according to Section 601. The minimum concrete strength is 28 MPa at 28 days. The contractor shall determine the concrete consistency in the field by a slump test in accordance with ASTM C143 (AASHTO T119). After the concrete placement in the forms, the contractor shall maintain the concrete at a minimum temperature of 50°F for a period of 72 hours.

662.05 System Installation

(a) Erect the foundations, anchors, and columns in accordance with the design drawings. The columns shall not vary from the indicated pitch or from vertical by more than 50 mm from the top to bottom of the column and shall not deviate more than $\pm$ 75 mm from centerline to centerline of the columns.

(b) Install and fasten support ropes, with the factory installed thimbles and breaking elements to the column and through the cable guide assemblies with the supplied wire rope clips as indicated on the design drawings. Distance from the column to the braking elements shall not exceed 1.5 m. Support ropes shall not be fastened until the columns are properly set. Tension all ropes as necessary to eliminate slack, and tension the support ropes until there is no sag in the ropes.

(c) Place the wire rope nets on the net support ropes and seam together with seam rope. Attach the bottom of the nets to the bottom support rope in a similar manner. Use the wire rope clips to securely fasten the seam ropes to the net system as shown on the design drawings once the seaming is completed. Do not attach the nets to the cable guide assemblies or to the columns. Bottom support rope braking elements should be oriented vertically and tied to the ring nets using tie wire.

662.05 Shipping

(a) All materials shall be properly labeled and shipped by the manufacturer to the job site for the contractor to easily identify the system components with the manufacturer's design drawings to minimize installation time.

(b) The following spare parts are to be supplied by the manufacturer for the system:

(1) 3 each- Braking Element Replacement Kits
(2) 2 each- Replacement Ring Nets
(3) 2 each- Wire Rope Anchors
(4) 1 each- Structural Steel Column

Measurement

662.06. Rockfall barrier system will be measured and paid on a linear meter basis. Payment will be full compensation for all material including freight, supervision, design drawing preparation and spare parts; plus labor, equipment, tools, and other incidentals necessary to install the complete rockfall fence systems ready to use.

Payment

662.07. The accepted quantities, measured as provided above, will be paid at the contractor price per unit of measurement for the items below that are shown in the bid schedule. Payments will be full compensation for the work prescribed in this Section.

Pay Item	Pay Unit
66201 Rockfall fence system	Meter

Section 702. – ASPHALT MATERIAL

702.03 Emulsified Asphalt. Add the following at the end of the first paragraph:

When specified for chip seal application emulsion shall conform to Table 702-4. AASHTO T 59 will be followed for all test methods, except as noted.

Table 702-4
High Float Emulsion Specification

Emulsion Grade based on AASHTO M-140	**HFRS-2P (1)**		**HFMS-2P (1)**	
Tests on emulsion:	**Minimum**	**Maximum**	**Minimum**	**Maximum**
Viscosity, Saybolt Furol at 50°C, Sfs	50	450	50	450
Storage stability test, 24-hour, % (2)	---	1.0	---	1.0
Sieve test, % (1)	---	0.10	---	0.10
Demulsibility ,%	40	---	---	---
Residue by distillation, %	65	---	65	---
Oil distillate by volume of emulsion, %	---	3.0	---	3.0
Tests on residue from distillation test:				
Penetration, 25°C, 100 g, 5 sec	70	150	70	150
Ductility, 25°C, 5 cm/min, cm	75	---	75	---
Solubility in trichloroethylene, %	97.5	---	97.5	---
Elastic Recovery, 10°C (CPL-2211)				
Float test, 60°C, sec	1200	---	1200	---

(1) HFRS-2P and HFMS-2P will be an emulsion blend of polymerized asphalt, water, and emulsifiers. The asphalt cement will be polymerized prior to emulsification and will contain a minimum of three percent polymer by weight of asphalt cement.
(2) This test requirement on representative samples is waved if successful application of the material has been achieved in the field.

702.04 Application Temperatures. Delete Table 702-1, and substitute the following:

Table 702-1
Application Temperatures - Range ºC

Type and Grade Of Asphalt Material	Temperature Ranges Minimum - Maximum	
	Spraying Temperatures	Mixing Temperatures[1]
Cub-back asphalt-		
MC-30	30 - [2]	---
RC or MC-70	50 - [2]	---
RC or MC-250	75 - [2]	60 - 80[3]
RC or MC-800	95 - [2]	75 - 100[3]
RC or MC-3000	110 - [2]	80 – 115[3]
Emulsified asphalt-		
RS-1	20 - 60	---
RS-2	50 - 85	---
MS-1	20 - 70	20 - 70
MS-2, MS-2h	-	20 - 70
HFMS-1, 2, 2h, 2s	20 - 70	10 - 70
SS-1, 1h, CSS-1, 1h	20 - 70[4]	20 - 70
CRS-1	50 - 85	---
CRS-2	60 - 85	---
CMS-2, CMS-2h	40 - 70	50 - 60
Asphalt binder-		
All grades	185 max.	185 max.

[1] Temperatures of mix immediately after discharge.
[2] The maximum temperature at which fogging or foaming does not occur.
[3] Temperature may be above flash point. Take precautions to prevent fire or explosion.
[4] For fog seals and tack coats.

702.05 Material for Dampproofing and Waterproofing Concrete and Masonry Surfaces.

(d) Mortar. Delete the text and substitute the following:

Conform to Subsection 712.05(b).

Add the following:

702.11 Emulsified Petroleum Resin. Emulsified petroleum resin used as a prime coat shall conform to the following:

Property	AASHTO Test No.	Minimum	Maximum
Tests on Original Material [1]			
Saybolt Furol Viscosity, 25ºC, sec	T59	20	100
Sieve Test, %	T59	0.1	---
Residue by evaporation, % by weight	T59	60	---
Test on Residue			
Flash Point, COC, ºC	T48	200	---
Kinematic Viscosity @ 60ºC, cSt	T201	100	350

[1] Identify material as anionic or cationic at time of delivery.

Section 703. – AGGREGATE

703.02 Coarse Aggregate for Portland Cement Concrete.

(b) Delete the text and substitute the following:

Adherent coating, FLH T 512 or ASTM D 5711	1.0% max.
(c) Grading, AASHTO M 43	All sizes, except Nos. 8, 89, 9 or 10

703.05 Subbase, Base and Surface Course Aggregate.

(a) General.

(5) Delete the text and substitute the following:

Fractured faces, ASTM D 5821	50% min.

(b) Subbase or base aggregate.

(1) Gradation. Delete Table 703-2 and substitute the following:

Table 703-2
Target Value Range for Subbase and Base Gradation

Sieve Size	Percent by Mass Passing Designated Sieve (AASHTO T27 and T 11)				
	Grading Designation				
	A (Subbase)	B (Subbase)	C (Base)	D (Base)	E (Base)
63.0 mm	100 (1)				
50.0 mm	97-100 (1)	100 (1)	100 (1)		
37.5 mm		97-100 (1)			
31.5 mm					
25.0 mm	65-79 (6)		80-100 (6)	100 (1)	
19.0 mm			64-94 (6)	86-100 (6)	100 (1)
12.5 mm	45-59 (7)				
9.5 mm			40-69 (6)	51-82 (6)	62-90 (6)
4.75 mm	28-42 (6)	40-60 (8)	31-54 (6)	36-64 (6)	36-74 (6)
425µm	9-17 (4)			12-26 (4)	12-26 (4)
75µm	4.0-8.0 (3)	4.0-12.0 (4)	4.0-7.0 (3)	4.0-7.0 (3)	4.0-7.0 (3)

(1) Statistical procedures do not apply.
( ) Allowable deviations (+/-) from the target values

(c) Surface course aggregate. Add the following:

The requirement for the materials to have a minimum plasticity index of 4 will be waived if the minus 2 mm sieve fraction of the material has a natural cementation value greater than 1150 kPa determined according to FLH T 510.

(1) Gradation and plasticity index, AASHTO T 90. Delete Table 703-3 and substitute the following:

Table 703-3
Target Value Ranges for
Surface Course Gradation and Plasticity Index

Sieve Size	Percent by Mass Passing Designated Sieve (AASHTO T 27 and T 11)
25.0 mm	100 (1)
19.0 mm	*(1)
4.75 mm	*(7)
425 µm	*(5)
75 µm	9-16 (4)
Plasticity Index (PI)	8 (4)

(1) Statistical procedures do not apply.
( ) Allowable deviations (+/-) from the target values

703.09 Emulsified Asphalt Pavement Aggregate.

(a) Coarse aggregate.

(3) Delete the text and substitute the following:

Fractured faces, ASTM D 5821 75% min.

703.10 Asphalt Surface Treatment Aggregate. Delete lines (d) through (l) and substitute the following:

(d) Fractured faces, ASTM D 5821 90% min.

(e) Flat and elongated particles, ASTM D 4791 10% max.

(f) Durability index (coarse), AASHTO T 210 35% min.

(g) Durability index (fine), AASHTO T 210 35% min.

(h) Clay lumps and friable particles, AASHTO T 112 1.0% max.

Table 703-7 Delete Table 703-7 and substitute the following:

Table 703-7
Target Value Range for
Single and Multiple Course Treatment Aggregate Gradation

Sieve Size	Percent by Mass Passing Designated Sieve (AASHTO T27 and T 11)					
	Grading Designation					
	A	B	C	D	E	F
37.5 mm	100 (1)					
25.0 mm	80-90 (3)	100 (1)				
19.0 mm	0–35 (5)	80-90 (3)	100 (1)			
12.5 mm	0-8 (3)	0-35 (5)	80-90 (3)	100 (1)		
9.5 mm	---	0-12 (3)	0-35 (5)	80-90 (3)	100 (1)	100 (1)
4.75 mm	---	---	0-12 (3)	0-35 (5)	85-100 (3)	85-100 (1)
2.36m	---	---	---	0-12 (3)	0-23 (4)	---
75µm	0-1 (1)	0-1 (1)	0-1 (1)	0-1 (1)	0-1 (1)	0-10 (1)

(1) Statistical procedures do not apply.
( ) Allowable deviations (+/-) from the target values

703.17 Superpave Hot Asphalt Concrete Aggregate. Delete the text and substitute the following:

Furnish hard, durable particles or fragments of crushed stone, crushed slag, or crushed gravel conforming to the following:

(a) Los Angeles abrasion, AASHTO T 96	40% max.
(b) Sodium sulfate soundness loss of coarse and fine aggregate, 5 cycles, AASHTO T 104	12% max.
(c) Fractured faces, one or more, ASTM D 5821	90% min.
(d) Fine aggregate angularity, AASHTO T 304, method A	40% min.
(e) Flat and elongated particles, 1:3 ratio. +9.5 mm sieve, calculated by mass, weighted average, ASTM D4791	10% max.
(f) Sand equivalent AASHTO T 176, referee method	45 min.

(g) Gradation. Size, grade, and combine the aggregate fractions in the mix proportions that result in a composite blend between the control points for the appropriate nominal maximum size aggregate in Table 703-14. The nominal maximum size is one size greater than the first sieve to retain more than 10 percent of the combine aggregate. Test according to AASTHO T 11 and T 27.

Table 703-14
Superpave Gradation and Target Value Range

Sieve Size	Percent by Mass Passing Designated Sieve Grading Designation **12.5mm** (I)
25.0 mm	
19.0 mm	100
12.5 mm	90-100
9.5 mm	90 max
4.75 mm	*(6)
2.36 mm	28-58(6)
1.18 mm	
600µm	*(4)
300µm	*(3)
150µm	
75µm	2-10(2)

(I) Submit target values for applicable sieves
( ) Allowable deviations (+/-) from the target values

Add the following Subsection:

703.18 Shotcrete Aggregate. For fine aggregate, furnish rounded particles conforming to Subsection 703.01. For coarse aggregate, conform to AASHTO M 80 class B, except as amended or supplemented by the following:

(a) Los Angeles abrasion, AASHTO T 96	40% max.
(b) Adherent coating, FLH T 512	1.0% max.

Section 704. – SOIL

Add the following Subsection:

704.13 MSE Wall Fill Soils.

(a) Reinforced fill. Furnish sound, durable, granular soil free from organic matter or other deleterious material (such as shale or other soft particles with poor durability). Conform to the following:

(1) Quality requirements.

(i) Gradation	Table 704-6
(ii) Shear angle of internal friction, AASHTO T 236 (On the portion passing the 4.75-mm sieve)	34° min.

Note: Compact samples for AASHTO T 236 to 95 percent of the maximum density determined according to AASHTO T 99 method C.

(iii) Sodium sulfate soundness loss (5 cycles)	15% max.
(iv) Los Angeles abrasion, AASHTO T 96	50% max.
(v) Liquid limit, AASHTO T 89	30 max.

(2) Electrochemical requirements

(i) Resistivity, AASHTO T 288	3000 Ω-cm min.
(ii) pH, AASHTO T 289	5.0 to 10.0
(iii) Sulfate content, AASHTO T 290	200 ppm max.
(iv) Chloride content, AASHTO T 291	100 ppm max.

Notes:

(1) Tests for sulfate and chloride content are not required when pH is between 6.0 and 8.0 and the resistivity is greater than 5000 ohm centimeters.

(2) Electrochemical requirements are not applicable to geogrid-reinforced walls, refer to Subsection 720.01(k) for durability design requirements.

Table 704-6
Reinforced Fill Gradation

Sieve Size	Percent by Mass Passing Designated Sieve (AASHTO T 27 and T 11)
100 mm	100
75 mm	75 – 100
4.75 mm	30 – 75
75 µm	0 – 20

(b) Retained fill. Furnish sound, durable, granular soil free from organic matter or other deleterious material (such as shale or other soft particles with poor durability). Remove all rock particles and hard earth clods larger than 300-mm in the longest dimension.

(c) MSE Wall Facing Fill. Furnish sound, durable, and pervious granular soil free from organic matter or other deleterious material (such as shale or other soft particles with poor durability) conforming to the following:

Quality requirements.

(i) Gradation	Table 704-7
(ii) Sodium sulfate soundness loss (5 cycles)	15% max.
(iii) Los Angeles abrasion, AASHTO T 96	50% max.

Table 704-7
MSE Wall Facing Fill Gradation

Sieve Size	Percent by Mass Passing Designated Sieve (AASHTO T 27 and T 11)
100 mm	100
75 mm	75 – 100
37.5 mm	0 – 60
19 mm	0 – 5

Section 705. – ROCK

705.02 Riprap Rock. Delete the text and substitute the following:

Furnish hard, durable, angular rock that is resistant to weathering and water action and free of organic or other unsuitable material. Do not use shale, rock with shale seams, or other fissile or fissured rock that may break into smaller pieces in the process of handling and placing. Conform to the following:

(a) Apparent specific gravity, AASHTO T 85	2.50 min.
(b) Absorption, AASHTO T 85	4.2% max.
(c) Coarse durability index, AASHTO T 210	50 min.
(d) Gradation for the class specified	Table 705-1
(e) Los Angeles abrasion, AASHTO T 96	50% max.

Add the following subsection:

705.07 Rock for Rockery Walls.

(a) Rock Selection

Salvage rock will taken from the material source, rock scaling locations, and excavation of talus slopes for use in constructing rockery walls. Other sources may be approved by the CO, in conjunction with Clear Creek and Park County and the Forest Service during construction, provided the proposed source provides rock of equal specific gravity and is as resistant to weathering and water action as the existing talus rock found on the project.

Stockpile a sufficient number of rocks to provide a good selection for placement. Rocks which have spaces which do not match the spaces offered by the previous course of rock should be placed elsewhere to obtain a better fit. Rock should be generally cubical, tabular, or rectangular shape. Reject or use for filling large void spaces, rocks of basically rounded or tetrahedral form. Select rocks which do not exhibit significant cracks, seams, or foliation joints so that, once in-place, the individual rocks do not break, split, or crumble and thereby create a weak zone within the constructed wall.

(b) Rock Sizing

Typically, rocks used for rock wall construction shall be sized approximately as follows, with the longest dimension of any individual rock not exceeding three times the shortest dimension:

Rock Size	Rock Weight	Average Dimension
One Person	20 to 90 kilograms	0.300 to 0.450 meters
Two Person	90 to 300 kilograms	0.450 to 0.710 meters
Three Person	300 to 900 kilograms	0.710 to 0.900 meters
Four Person	900 to 1800 kilograms	0.900 to 1.200 meters
Five Person	1800 to 2700 kilograms	1.200 to 1.350 meters
Six Person	2700 to 3600 kilograms	1.350 to 1.500 meters

Section 706. – CONCRETE AND PLASTIC PIPE

706.08 Plastic Pipe.

(d) Corrugated polyethylene drainage tubing. Delete the title and text and substitute the following:

(d) Plastic pipe for Underdrains.

Polyethylene perforated or nonperforated corrugated pipe shall conform to AASHTO M 252.

Perforated or nonperforatted Polyvinyl Chloride Pipe-Smooth Interior, Smooth or Ribbed Exterior, shall conform to ASTM F 758 or ASTM F 949

Section 708. – PAINT

708.01 General.

(b) Volatile organic compound (VOC) content.

(1) Delete the text and substitute the following:

Clear (unpigmented) coatings 450 g/L max.

708.04 Paint for Steel Structures. Delete the text and substitute the following:

Conform to the following:

(a) Inorganic zinc primer AASHTO M 300 type II

(b) Vinyl wash primer SSPC no. 27

(c) Aluminum vinyl paint	SSPC no. 8
(d) White or colored vinyl paint	SSPC no. 9
(e) Aliphatic urethane coating	SSPC no. 36
(f) Latex primer for steel surfaces	SSPC no. 23
(g) Acrylic latex coating	SSPC no. 24
(h) Epoxy coating	SSPC no. 22
(i) Alkyd primer	SSPC no. 31
(j) Silicone alkyd coating	SSPC no. 21

Section 709. – REINFORCING STEEL AND WIRE ROPE

709.01 Reinforcing Steel.

(b) Reinforcing bars. Delete the text and substitute the following:

Furnish deformed, grade 420 bars conforming to AASHTO M 31M, M 42M, or M 53M.

(c) Epoxy coated reinforcing bars. Delete the first paragraph and substitute the following:

Furnish bars conforming to Subsection 709.01(b). Conform to AASHTO M 284M.

(d) Tie bars. Delete the text and substitute the following:

Furnish deformed, grade 420 bars conforming to AASHTO M 31M or M 42M, except do not use AASHTO M 42M steel for tie bars bent and restraightened during construction.

(e) Hook bolts. Delete the first sentence and substitute the following:

Furnish plain, grade 420 bars conforming to AASHTO M 31M or M 42M with M14 rolled threads or M16 cut threads.

Section 710. – FENCE AND GUARDRAIL

710.08 Steel-Backed Timber Rail. Delete the text and substitute the following:

Furnish timber conforming to AASHTO M 168. Fabricate the 150 by 250 millimeter timber rail, the 100 by 225 millimeter blockouts, and the posts from dry, well seasoned, and dressed rough sawn coast Douglas fir, southern pine, or other species having a stress grade of at least 10 megapascals. Refractory species such as larch and Rocky Mountain Douglas fir are not acceptable. Treat the timber rail, blockout elements, and posts according to AASHTO M 133.

Fabricate the steel backing elements from 9.5 millimeter structural steel conforming to ASTM A588. For fastener hardware, conform to AASHTO M 164M, type 3.

All timber members shall bear an approved ALSC (American Lumber Standards Committee) quality mark assuring treatment is in conformance with appropriate AWPA standards.

710.09 Guardrail Posts. Delete the text and substitute the following:

Conform to the AASHTO-AGC-ARTBA "Guide to Standardized Highway Barrier Hardware," 1995 edition.

Do not use a wood guardrail post that has a through check, shake, or end split in the same plane as, or a plane parallel to the bolt hole and extending from the top of the post to within 75 millimeters of the bolt hole.

For steel-backed timber rail posts, furnish 250 by 300 millimeter posts conforming to Subsection 710.08.

710.12 Crash Cushion Barrels. Delete the text.

Add the following Subsections:

710.13 Log Rails.

Use logs that are seasoned, straight, and sound No. 1 Grade Western Hemlock, Western Red Cedar, or Pine of the dimensions shown on the drawings. Logs that taper in excess of 30 millimeters will not be permitted. Remove all bark and at least 80% of the inner bark. Peeler marks or incision marks on visible portions of logs will not be allowed. Utilize logs that do not have seasoning checks, singular or any 2 opposite each other, that exceed 1/2 the thickness of the member. Incorporate logs that are free of knot clusters, but may contain sound, tight, well-spaced knots.

Incise that portion of the log which will be below ground. Make all dimensional cuts and holes in the timber members prior to pressure treatment. Treat all timber members with Copper Naphthenate preservative treatment conforming to AWPA C14. Preservative retention in the assay zone shall not be less than 1.2 kilograms per cubic meter. Assay only in the incised, below ground portion of the posts.

All timber members shall bear an approved ALSC (American Lumber Standards Committee) quality mark assuring treatment is in conformance with appropriate AWPA standards.

710.14 Rockfall Fence

(a) Wire Rope Netting: Nets shall be straight woven with continuous wire rope. Nets shall be braided with high strength corrosion resistant clips. Net wire shall be high tensile strength carbon steel with a nominal 3-mm diameter and a minimum breaking strength of 1,770 N/mm^2. The wire shall be coated with a minimum 200 g/m^2 of zinc/aluminum super coating.

(b) Wire Mesh: Nets shall be covered with chain link mesh material, which shall be attached to the wire rope netting and fastened with galvanized rings and/or galvanized tie wire on 600-mm centers horizontally and vertically. Chain link material shall be 9-gauge minimum, shall conform to AASHTO M181-90, and shall be zinc coated in accordance with A392-84, Class 1 Standards.

(c) Net Support Columns: Columns shall be fabricated from wide flange structural members meeting ASTM A36 for preformed steel shapes. Columns shall be galvanized with a minimum of one coat. Column foundation shall be of shear pin assembly instead of direct buried foundation. All steel shapes shall comply with ASTM A36-84 and bolts, nuts and washers to ASTM A325-86.

(d) Support Wire Ropes: All support ropes shall be manufactured from a minimum 16-mm diameter wire rope, with a minimum breaking strength of 16,800 kgs. All wire ropes shall meet the Federal Specification RR-W-410D or equivalent.

(e) Rock and Soil Anchors: Wire rope anchors shall be manufactured from 19-mm diameter rope with a minimum breaking strength of 24,000 kgs. Anchors shall have minimum pullout strength of 15 tonnes for Medium Impact fence and 10 tonnes for Low Impact fence and must be verified in the field. The verification test shall consist of a pullout test incorporating 20% of the total number of anchors. The pullout test load shall be 1.2 times the minimum pullout strength. If more than 25% of the tested anchors fail, all anchors shall be tested. Failed anchors shall be replaced by the contractor. Testing shall be performed using a temporary yoke or load frame. No part of the yoke or load frame shall bear within 1 m of the anchor.

(f) Miscellaneous Materials: All miscellaneous hardware such as wire rope clips, thimbles, bolts, shackles, etc. shall be hot dipped galvanized, and shall be supplied by the manufacturer with the system.

(g) Corrosion Protection: All materials shall be galvanized meeting the requirements of ASTM A641-92 for zinc coated carbon steel wire. The minimum weight of the coating shall be in accordance with Table 710-1 when tested in accordance with ASTM A90-91.

Wire Use	Nominal Wire Diameter	Minimum Weight of Coating
Lacing Wire	2.2 mm	230 ml/m^2
Mesh	3.05 mm	280 ml/m^2

Section 711. – CONCRETE CURING MATERIAL AND ADMIXTURES

711.03 Chemical Admixtures. Delete the text and substitute the following:

Furnish water-reducing, retarding, set-accelerating, and hydration stabilizing admixtures, or combinations thereof, conforming to AASHTO M 194. For hydration stabilizing admixtures, conform to AASHTO M 194, type B or D.

Add the following Subsection:

711.05 Concrete Coloring Agents. Coloring agents shall conform to ASTM C 979. Use only coloring agents composed of synthetic or natural inorganic iron oxides.

Section 712. – JOINT MATERIAL

712.01 Sealants, Fillers, Seals and Sleeves.

(a) Joint sealants and crack fillers. Add the following:

(5) Multi-component join sealant, conforming to TT-S-00227E, type 1, class A or ASTM C 920, type M, grad P, class 25, use T. Provide sealant matching the color of the adjacent sidewalk. Conform to the sealant manufacturer's recommendations for use of primers.

(6) Flexible cellular joint filler	ASTM D 1056, type 2, grade 4 or 5

(c) Preformed joint seals and sleeves. Delete the text and Table 712-1 and substitute the following:

(1) Paving applications. Conform to AASHTO M 220. Use a lubricant conforming to ASTM D 2835, which was manufactured within 9 months of use.

(2) Circular concrete sewer and culvert pipes using rubber gaskets. Furnish oil resistant gaskets conforming to AASHTO M 315M and the following:

(a) Minimum thickness:	Recommendation of drainage element manufacturer
(b) Tear resistance, N/mm, ASTM D624 (die B):	
(1) Ethylene propylene di monomer (EPDM)	40 N/mm min.
(2) Neoprene	20 N/mm min.

(3) Resilient connectors between reinforced concrete manhole structures and pipes. Conform to ASTM C 923M.

(4) Preformed flexible joint sealants for concrete pipe, manholes, and precast box sections. Conform to ASTM C 990M.

(e) Cold-poured sealer. Delete the title and text and substitute the following:

(e) Silicone joint sealant. Conform to ASTM D 5893 type NS.

(f) Low-modulus silicone joint sealant. Delete the text and substitute the following:

Conform to ASTM D 5893 type SL.

(g) Backer rod. Delete the text and substitute the following:

Conform to ASTM D 5249 type 1. Use a compatible sealant as recommended by the rod manufacturer. For size of backer rod, conform to Table 712-2.

712.03 Watertight Gaskets. Delete the text and substitute the following:

For ring gaskets for rigid pipe, conform to AASHTO M 198. For ring gaskets for flexible metal pipe, conform to ASTM C 361M. For continuous flat gaskets for flexible metal pipe with flat bands or bands with projects, conform to ASTM D 1056 grade 2C1 and use a gasket with a thickness 13 millimeters greater than the nominal depth of the pipe corrugations. For continuous flat gaskets for flexible metal pipe with corrugated bands, conform to ASTM D 1056 grade 2C3 and use a 9 millimeter thick gasket.

712.05 Mortar for Masonry Beds and Joints. Delete the text and substitute the following:

(a) Type I mortar. Furnish and proportion masonry mortar according to ASTM C 270 proportion specifications. Mortar may be preblended or mixed on site. Use only masonry cement mortar type M or S.

(b) Type II mortar. Furnish mortar and material for use in mortar conforming to the following:

(1) Cement

(a) Portland Cement	Subsection 701.01, type I, IA, II, IIA, III or IIIA
(b) Blended hydraulic cement	Subsection 701.01, type IS, IS-A, IP, IP-A, I(PM) or I(PM)-A
(c) Masonry cement	Subsection 701.01
(2) Fine aggregate	Subsection 703.01 or AASHTO M 45

(3) Lime — ASTM C 207, type S or SA. Type N or NA, if tests show it not to be detrimental to mortar soundness.

(4) Water — Subsection 725.01

(5) Air entraining admixture — Subsection 711.02

(6) Composition. Conform to the proportions for one of the mixes in Table 712-3. Uniformly mix with water to a spreading consistency.

(7) Compressive strength. AASHTO T 106 — 14 Mpa, 28-day min.

Table 712-3
Mortar Proportions by Volume

Mortar	Portland Cement	Hydraulic Cement	Masonry Cement	Lime	Aggregate	Air (%) [1]
Cement-Lime	1	---	---	¼ to ½	Not less than 2 ¼ and not more than 3 times total volume of cementous material	8-12
Masonry Cement	---	---	1	---		8-12
Hydraulic Cement	---	1	---	¼ to ½		8-12

[1] When air entrainment is required, determine air content per ASTM C 91 except use the same material and proportions used in construction.

Section 713. – ROADSIDE IMPROVEMENT MATERIAL

713.01 Topsoil. Add the following:

(c) Conserved Wetland Topsoil.

Conserved Wetland Topsoil consists of moist organic soil, including existing wetland vegetation and seeds, excavated from wetland areas shown on the plans and approved, or directed by the CO.

(d) Conserved Alpine Topsoil

Excess Alpine Sod and soil under sod disturbed by construction of the Upper Summit Parking Area, to be conserved and placed as described in contract or as directed. Alpine topsoil consists of soil, rocks under 0.15 M diameter, plant roots and foliage within 150 mm of ground surface.

713.03 Fertilizer. Add the following:

Soil preparation includes the incorporation of fungal fertilizer and humate on all areas to be seeded or planted, and fertilizer and polyacrylamide into backfill mixture for plants:

(a) Humate, conforming to the following description:

- Maximum 10% retained on a #50 mesh screen.
- pH of 3 to 5
- Maximum 20% inert ingredient.
- Minimum 80% organic matter with 40% humic acid.

(b) Fertilizer, conforming to the following description:

- 90% fungal biomass (mycelium)
- 10% potassium-magnesia with a grade of 7-2-3 or approved equal.

Provide a 0.1 cubic meter sample each of fertilizer, polyacrylamide and humate, packaged separately, to CO for approval a minimum of four weeks prior to use on project site.

Provide a Certificate of Compliance to CO to verify organic matter, pH and other ingredients and their weed-free condition. Materials to be 100% biodegradable and non-toxic to plants, fish and other wildlife.

713.04 Seed. Add the following:

Conform to the Federal Seed Act, the Federal Noxious Weed Act, and applicable State and local seed and noxious weed laws.

Add the following to the labels required for each seed container:

(g) seed origin
(h) kilograms of pure live seed (PLS) of each seed species
(i) total kilograms of PLS in each container

Furnish seed within unopened containers and reflects evidence of proper storage and handling. Remove from site or storage facilities any seed with indications of improper storage or handlings (damage from water, heat, chemicals and the like).

Seed to be collected within the Rocky Mountain region: Colorado, Utah, Wyoming, Idaho or Montana). Collect seed from similar elevations (3050 to 3560 meters above sea level) and similar environmental conditions as Guanella Pass (Sub-alpine and Alpine Life Zones).

The required seed species may be scarce during the seeding season for this project. Therefore, within four (4) weeks of project Notice to Proceed, provide a signed receipt from seed suppliers verifying the seed type, name, source of collection and quantities to be provided for this project.

Seed Supply Agreement(s) with seed collector/supplier(s) may be needed to provide the "Source Identified" seed for this project. If needed, fulfill this agreement within four (4) weeks of project Notice to Proceed to allow sufficient time for seed collection.

Before any substitutions of seed will be considered, provide to the CO written statements from three (3) designated sources verifying that seed specified for this project is not available. Requests to be submitted to CO twelve (12) weeks prior to seeding.

All seed used for permanent and temporary seeding on this project to be certified weed-free in accordance with Colorado Certification Standards. Seed to not contain any of the prohibited species seed, nor exceed the quantity limitations of restricted species seed as listed in the current Colorado Seed Act, part 7, Noxious Weed list; (part 7.1 Prohibited primary noxious weeds; and 7.2 Restricted secondary noxious weed).

COLORADO SEED ACT

Part 7. NOXIOUS WEED LIST.

7.1. Prohibited (primary) noxious weeds:

Anoda, spurred (*Anoda cristata*)
Bindweed, field (*Convolvulus arvensis*)
Bouncingbet (*Saponaria officinalis*)
Camelthorn (*Alhagi pseudalhagi*)
Chamomile, scentless (*Anthemis arvensis*)
Cinquefoil, sulfur (*Potentilla recta*)
Clematis, Chinese (*Clematis orientalis*)
Daisy, oxeye (*Chrysanthemum leucanthemum*)
Goatgrass, jointed (*Aegilops cylindrica*)
Halogeton (*Halogeton glomeratus*)
Horsenettle, Carolina (*Solanum carolinense*)
Horsenettle, white (*Solanum elaeagnifolium*)
Houndstongue (*Cynoglossum officinale*)
Johnsongrass (*Sorghum halepense*)
Knapweed, black (*Centaurea nigra*)
Knapweed, diffuse (*Centaurea diffusa*)
Knapweed, Russian (*Acroptilon repens*) syn. *Centaurea repens*)
Knapweed, spotted (*Centaurea maculosa*)
Knapweed, squarrose (*Centaurea virgata*)
Loosestrife, purple (*Lythrum salicaria*) and (*Lythrum virgatum*)
Mallow, Venice (*Hibiscus trionum*)
Medusahead (*Taeniatherum caput-medusae*)
Millet, wild proso (*Panicum miliaceum* subsp. *ruderale*)
Nutsedge, yellow (*Cyperus esculentus*)
Povertyweed, silverleaf (*Ambrosia tomentosa*) (syn. *Fraseria discolor*)
Povertyweed,woollyleaf (*Ambrosia grayi*) (syn.*Franseria tomentosa*)
Rocket, Dame's (*Hesperis matronalis*)
Rue, African (*Peganum harmala*)
Sage, Mediterranean (*Salvia aethiopis*)
Saltcedar (*Tamarix parviflora*) and (*Tamarix ramosissima*)
Skeletonweed, rush (*Chondrilla juncea*)
Sorghum almum (*Sorghum almum*)
Sowthistle, perennial (*Sonchus arvensis*)
Spurge, cypress (*Euphorbia cyparissias*)
Spurge, leafy (*Euphorbia esula*)
Spurge, myrtle (*Euphorbia myrsinites*)
St. Johnswort, common (*Hypericum perforatum*)
Starthistle, yellow (*Centaurea solstitialis*)
Tarweed, coast (*Madia sativa*)
Thistle, Canada (*Cirsium arvense*)
Thistle, musk (*Carduus nutans*)
Thistle, plumeless (*Carduus acanthoides*)
Thistle, Scotch (*Onopordum acanthium*) and (*Onopordum tauricum*)
Toadflax, dalmatian (*Linaria dalmatica*)
Toadflax, yellow (*Linaria vulgaris*)
Whitetop (*Cardaria draba*)
Whitetop, hairy (*Cardaria pubescens*)
Whitetop, tall (*Lepidium latifolium*)
Woad, Dyer's (*Isatis tinctoria*)

7.2 Restricted (secondary) noxious weeds

Effective January 1, 1999, the following limitations shall be imposed: Limitations in seeds per pound

Blueweed (*Helianthus ciliaris*) 200
Burdock, common (*Arctium minus*) 200
Butterprint or velvet leaf (*Abutilon theophrasti*) 10
Dock, curly (*Rumex crispus*) 50
Dodder (*Cuscuta* spp.) 20
Foxtail, giant (*Setaria faberi*)50
Groundcherry, purple (*Quincula lobata*) (syn. *Physalis lobata*) 50
Hemlock poison (*Conium maculatum*) 10
Henbane, black (*Hyoscyamus niger*) 10
Lettuce, blue (*Latuca tatarica* subsp. *pulchella*) (syn. *Latuca pulchella*) 200
Mustard, black (*Brassica nigra*) 30
Mustard, India (*Brassica juncea*) 30
Mustard, wild (*Sinapsis arvensis*) (syn. *Brassica kaber*) 30
Oat, wild (*Avena fatua*) 10 in barley, oats, wheat, rye and triticale 100 in other seeds
Plantain, buckhorn (*Plantago lanceolata*) 100
Povertyweed, mouse-ear (*Iva axillaris*) 200
Puncturevine (*Tribulus terrestris*) 50
Quackgrass (*Elytrigia repens*) (syn. *Agropyron repens*) 50
Sandbur, longspine (*Cenchrus longspinus*) 50
Thistle, bull (*Cirsium vulgare*) 10

No one lot of seed shall have more than five restricted weeds in the lot.

Test all seed for the following Project Restricted Species and certify it meets the limitations listed below. Seed that exceeds the limitations specified below will be rejected and replaced at the Contractor's expense.

Bromus tectorum (Cheatgrass)	Limit of Acceptance: 100 viable seeds per kilogram
Bromus inermis (Smooth brome)	Limit of Acceptance: 70 viable seeds per kilogram

Certify by supplier that each seed lot has no less that 60% pure live seed (PLS) and no more than 7% of inert matter. PLS tests to be current within one year from time of seeding. Quantities and techniques of seed testing per seed lot, to meet guidelines of the Society of Commercial Seed Technologies or the Association of Official Seed Analysts.

When purchasing seed from a commercial source, only "Certified Seed" (blue tagged) or "Source Identified" (yellow tagged) will be accepted. Require copies of seed container labels to be stored in the associated project files for CO review upon request.

If seed available on the market does not meet the minimum purity and germination percentages specified, compensate for a lesser percentage of purity or germination by furnishing sufficient additional seed to equal the specified product. Make product comparison based on PLS in kilograms stated on each seed bag. The formula used for determining the quantity of PLS is: Kilograms of Seed x (Purity x Germination = Kilograms of PLS.

Seeds to be free of any applied material such as fungicide or fertilizer.

Each seed lot may be tested by the Forest Service and the CO for noxious weeds prior to seeding. Provide CO with two (2) weeks notice before delivering seed in containers to the USFS Idaho Springs field office. Testing to be completed within 5 weeks. Remove seed that does not comply with project specifications within two weeks of notifications. Provide new seed for USFS testing with the same process stated above.

TEMPORARY SEED MIX

Botanical Name	**Common Name**	**Percent of Mixture**	**PLS rate Kg/ hectare**
GRASSES:			
Lolium-multiflorum	Winter Rye	100 %	30

SUB-ALPINE SEED MIX

Botanical Name	Common Name	Percent of Mixture	PLS rate Kg/ hectare
GRASSES:			
Ceratochloa marginatus	Mountain Brome	22 %	11.93
Deschampsia cespitosa	Tufted Hairgrass	17 %	.33
Elymus trachycaulus	Slender Wheatgrass	22 %	6.75
Festuca saximontana	Rocky Mountain Fescue	20 %	.75
Poa alpina	Alpine Bluegrass	5%	.24
Poa ampla	Big Bluegrass	6 %	.33

Table A provides list of acceptable species to substitute for unavailable grass seed.

Table A- Substitutes for grass species unavailable

Botanical Name	Common Name	Percent of Mixture	PLS rate Kg/ hectare
GRASSES:			
Calamagrostis pupurascens	Purple Reedgrass	1 %	.01
Trisetum spicatum	Spike trisetum	1 %	.05

Choose five forb species from Table B and three tree and shrub species from Table C to add to sub-alpine grass mix to hand-broadcast in Sub-alpine Zone in locations directed by C.O.

Table B: Forbs (choose 5)

Botanical Name	Common Name	Percent of Mixture	PLS rate Kg/hectare
Forbs:			
Arnica cordifolia	Heartleaf Arnica	1 %	.05
Aquilegia coerulea	Colorado Blue Columbine	1%	.13
Epilobium angustifolium	Fireweed	1%	.01
Eriogonum umbellatum	Sulphurflower	1%	.12
Erigeron speciosus	Showy Daisy	1%	.04
Geranium viscosissimum	Wild Geranium	1%	.75
Helenium hoopesii	Orange Sneezeweed	1%	.27
Heliomeris multiflora	Showy Goldeneye	1%	.05
Penstemon whippleanus	Whipple Beardtongue	1%	.08
Senecio atratus	Black-Tip Groundsel	1%	.04
Senecio eremophilus ssp. kingii	Cut-Leaf Groundsel	1%	.05
Senecio serra or S. triangularis	Serrate Groundsel or Arrowhead Groundsel	1%	.04
Thermopsis divaricarpa or T. montana	Golden Banner	1 %	1.81

Table C: Shrubs and Trees (choose 3)

Botanical Name	**Common Name**	**Percent of Mixture**	**PLS rate Kg/ hectare**
Shrubs and Trees:			
Distegia involucrata	Twinberry	1%	.12
Pinus aristata	Bristlecone Pine	1%	2.79
Picea engelmannii	Engelmann Spruce	1%	.49
Ribes arueum	Golden Currant	1%	.14
Ribes inerme	Gooseberry	1%	.13
Rubus idaeus	Raspberry	1%	.22
Sambucus racemosa	Redberry Elder	1%	.17

713.05 Mulch. Add the following:

(i) Mulch Tackifier. Furnish Guar gum based tackifiers consisting of a minimum of 95% guar gum (by weight). The remaining elements to consist of dispersing and cross-link additives. Mulch tackifier to be SuperTack manufactured by Rantec or equivalent as approved by CO.

The material used for mulch tackifier is not to contain any weed seed, mineral filler, recycled cellulose fibers, clays, or other substances which may inhibit germination or growth of plants. The materials are to be nontoxic to plants, fish and other wildlife and shall be 100% biodegradable.

713.06 Plant Material. Add the following:

(a) Quality of plant material. Add the following:

All plant propagation material and field collected plants collected outside of the project right-of-way must meet the following environmental conditions in order to be accepted by the CO:

(1) Annual Precipitation: 255mm to 635 mm.
(2) Elevation- 2100 to 3560 meters (7000-11,700 feet) above sea level.
(3) Sub-alpine to Alpine life zones.
(4) States: Colorado, Utah, Wyoming, Montana and Idaho.
(5) Hardiness Zones 2, 3, or 4. Hardiness Zones are defined in U.S.D.A. publications.

Contractor is responsible for obtaining all permits and approvals for access to public and private lands for the collections for plant material. Written evidence indicating such permission is to be submitted to the CO.

Nursery–grown Plant Material. Container stock plants to conform to the type, size and quantity specified. The growing medium, propagation methods, and cultural techniques employed to be such as to promote vigorous and healthy growth characteristic of the plant species.

All container material to have good foliage growth, be well-rooted and established in the container in which they are grown. Grow and establish container stock in the container long enough for the root system to have permeated and bonded the potting medium so that the root mass remains intact when removed from the container. No plants to be loose in the container. No weeds, roots or seed, within the container soil. No bare root or root-bound material will be accepted.

Grow all nursery-grown stock, including plants established from transplants and cuttings, in the nursery for at least two growing seasons.

The container to be non-dissolvable and sufficiently rigid to maintain the root ball shape during transit.

Field Collected Trees, Shrubs and Sod. Native trees and shrubs will be salvaged from within the project right-of-way limits and designated collection areas as necessary to meet the project revegetation requirements. Select plants from the most vigorous, well-branched and well proportioned samples of the species available at the time of salvage. CO to approve the collection areas, as well as the trees and shrubs to be collected prior to collection.

Plant species to be field collected include:

Sub-alpine Fir, *Abies lasiocarpa*
Engelman Spruce, *Picea engelmannii*
Aspen, *Populus tremuloides*
Willow, *Salix spp.*

The following criteria to be met for tree, shrub and willow stake collection:

- No multi-stemmed conifers.
- No diseased or damaged trees (dwarf mistletoe infections, beetle infestations, chlorotic etc.)
- Free of wounds to trunks or branches and dieback.
- Free of weeds in soil of root ball.
- Growth candles shall be extended, not closed or expanding.
- Conifers to have symmetrical crowns with evenly dispersed branches.
- Multi-stemmed aspen and willow are preferred.
- Deliver all trees with root ball 'balled and burlapped' and secured with cages.
- Anti-desiccant and insect sprays to be applied to all collected material within two days of collection.
- Root ball Dimensions:

Height of Tree or Shrub	Minimum Root Ball Diameter
300mm (1-ft.) height	406 mm (16 in.)
610mm (2-ft.) height	508 mm (20-in.)
900mm (3-ft.) height	610 (24-in.)
1400mm (4-ft, 6-in) height	660 mm (26-in.)

Plants to be dug, properly pruned, and prepared for transplanting in accordance with standard practice. Root pruning to be done as soon as possible at the beginning of the project, keep the root system moist and protect plants shall be protected from adverse conditions due to climate and transporting from the time they are dug to the actual planting.

All trees to be transplanted will, except during the transplanting season, be sprayed with an approved foliar fertilizer.

Alpine Sod salvage to occur within 3 days prior to construction of Upper Parking Lot. Decommissioning of the summit parking lot area must be complete at the same time of Upper Parking Lot construction so that the de-compacted surface is prepared to receive turf. Turf to be removed using a backhoe: thickness of sod pieces will be between 7.5 cm and 20 cm. Alpine Sod to be placed immediately. Following sod removal, remaining organic-enriched subsoil in amount sufficient to total 2x the volume of the removed sod will be removed and separately stored. Sub soil to be stored adjacent to sod and also covered with shade cloth to protect from wind.

Do not damage existing vegetation during the collection and hauling operation. Use suitable platform material over existing vegetation as needed to prevent damage from machinery or labor.

Failure to meet the above specifications will result in the rejection of plant material or, at the option of the CO, a negotiated reduced price for the item.

(b) Plant names. Add the following:

Each plant, prior to acceptance at the project site, will have a label affixed supplying the following information:

(1) Project Number-
(2) Genus, species, common name
(3) Height, or caliper mm designation
(4) Lot number- to relate to supplemental information

The following items to be documented in a legible format for each plant and made available to the CO. One set of complete documentation to be furnished to the CO one week (7 business days) prior to date plants are available for inspection.

A. Identification of plant source location
   i. State, County stand description (range, township, section on U.S.G.S. quadrangle map).
   ii. Elevation
   ii. Precipitation
B. Type of propagation material.
   i. VC = vegetative cutting
   ii. S = seed
   iii. SL = seedling
   iv. T = transplanted wilding

C. Number of times transplanted in nursery- represented by a "T" for each time. (i.e.- "2T"=twice transplanted).
D. Age/length of time in nursery.

Failure to provide the above information will result in the rejection of plant material.

Add the following:

(f) Storage

This consists of providing adequate facilities and care for the storage of plant material beyond the date plants are available for inspection and until plants are properly installed at the project.

This will include facilities to:

A. Store up to 1400 plants
B. Maintain and promote the quality and growth of the plant.
C. Protect against damage or deterioration.

Should repotting be necessary while under storage the CO's approval will be required. Cost of re-potting plants will be included in the cost for each bid item.

Maintain responsibility until final acceptance of plant material, planted and accepted at the end of Plant Establishment period.

Material that does not conform to any of the specifications in this contract, resulting from improper care during storage, shall be rejected.

Failure to meet specified source requirements will result in the rejection of plant material.

(g) Substitutions

Provide to the CO written statements from three designated sources verifying that the plants specified for the project are not available, in the event that any of the above plant species cannot be obtained. Requests for substitutions are to be submitted 12 weeks prior to planting. Written approval from the CO is required prior to collection of substitutes. Such approval, if granted, will be given within seven (7) calendar days of receipt of the written request.

713.07 Erosion Control Mats, Roving, and Geocell.

(a) Erosion control mats.

(2) Type 2 - Erosion control mats.

(b) Excelsior blanket. Delete the text and substitute the following:

Furnish a blanket of uniform thickness consisting of curled wood excelsior secured on the top side to a biodegradable, photodegradable extruded plastic mesh. Conform to the following:

(1) Excelsior fibers ≥ 150 mm length	80% min.
(2) Mesh size	25 mm by 50 mm
(3) Blanket mass/area	0.53±0.05 kg/m^2

713.16 Silt Fence. Delete the text and substitute the following:

Conform to AASHTO M 288.

Section 714. – GEOTEXTILE AND GEOCOMPOSITE DRAIN MATERIAL

714.02 Geocomposite Drains

(b) Geocomposite sheet drains. Add the following:

For MSE wall construction - Furnish a prefabricated sheet drain with a core or net that is encapsulated in a Type I-D (Subsection 714.01) non-woven geotextile. The sheet drain shall be capable of draining from both sides of the sheet. The drainage composite shall have a minimum flow rate of 1 liter per second per meter of width (5 gallons per minute per foot of width) when tested according to ASTM D 4716. Perform the test under the following test conditions:

(1) 300-millimeter long specimen
(2) Pressure of 100-kPa (14.5 psi)
(3) Gradient of 1.0
(4) 100-hour seating period
(5) Closed-cell foam rubber between platens and geocomposite

Section 717. – STRUCTURAL METAL

717.01 Structural Steel. Delete the text and substitute the following:

(a) Structural carbon steel. Structural carbon steel for riveted, bolted, or welded construction shall conform to ASTM A36M. In addition, steel for primary bridge members and fracture critical bridge members shall meet the supplementary requirements for Charpy V-notch test.

(b) High-strength low-alloy structural (HSLA) steel. High-strength, low-alloy structural steel, or steel acquiring enhanced atmospheric corrosion resistance for riveted, bolted, or welded construction, use steel conforming to ASTM A588M. In addition, steel for primary bridge members and fracture critical bridge members shall meet the supplementary requirements for Charpy V-notch test.

(c) Bolts and nuts. Conform to ASTM A 307.

(d) High-strength bolts, nuts, and washers. Conform to either AASHTO M 164M or AASHTO M 253M, as specified. Use Type 3 bolts in combination with unpainted weathering structural steel.

717.04 Castings.

(a) Steel castings. Delete the text and substitute the following:

Conform to AASHTO M 103M, grade 485-250.

717.06 Steel Pipe. Delete the text and substitute the following:

Furnish galvanized steel pipe conforming to ASTM A 53, type F, standard weight class, and plain ends for the designation specified in the contract.

717.10 Elastomeric Bearing Pads. Delete the title and text and substitute the following:

717.10 Bearings.

(a) Elastomeric bearings, plain or laminated. Conform the AASHTO M 251.

(b) Elastomeric bearings, high load rotational confined. Conform to ASTM D 5212.

(c) High lead rotational spherical bearings. Conform to ASTM D 5977.

717.11 Tetrafluoroethylene (TFE) Surfaces for Bearings. Delete the title and text and substitute the following:

717.11 Polytetrafluoroethylene (PTFE) Surfaces for Bearings. When PTFE surfaces are specified for bearings which are not listed in subsection 717.10, conform to the following:

(a) PTFE resin. Furnish virgin PTFE resin material conforming to ASTM D 4895 and the following:

(1) Specific gravity	2.13 to 2.19
(2) Melting point	328º C ± 1ºC

(b) Filler material. Furnish milled glass fibers, carbon, or other approved inert material.

(c) Adhesive material. Furnish epoxy resin adhesive conforming to FSS MMM-A-134, FEP film, or an approved equal.

(d) Unfilled PTFE sheet. Furnish unfilled PTFE sheet made from PTFE resin. Conform to the following:

(1) Tensile strength, ASTM D 638	19 MPa min.
(2) Elongation, ASTM D 638	200% min.

(e) Filled PTFE sheet. Furnish filled PTFE sheet made from PTFE resin uniformly blended with filler material. For filled PTFE sheets containing glass fibers or carbon, conform to Table 717-1.

(f) Fabric containing PTFE fibers. Furnish fabric made from oriental multi filament PTFE fluorocarbon and other fibers. Use PTFE fibers conforming to the following:

(1) Tensile strength, ASTM D 2256	165 MPa min.
(2) Elongation, ASTM D 2256	75% min.

Table 717-1
Filled Polytetrafluoroethylene Sheeting

Property	ASTM Method	15% Glass Fibers	25% Carbon
Mechanical:			
Min. Tensile strength	D 638	14 MPa	9 MPa
Min. Elongation	D 638	150%	75%
Physical:			
Min. Specific gravity	D 792	2.20	2.10
Melting point	D 638	327 ± 10ºC	327 ± 10ºC

(g) Interlocked bronze and filled PTFE components. Furnish a phosphor bronze plate conforming to AASHTO M 108 with an 0.25 millimeter thick porous bronze surface layer conforming to ASTM B 103M into which is impregnated a PTFE compound. Overlay the surface with compounded PTFE not less than 25 micrometers thick.

(h) PTFE metal composite. Furnish virgin PTFE molded on each side and completely through a 33 millimeter perforated stainless steel sheet conforming to ASTM A 240M type 304.

(i) Surface treatment. For epoxy bonding, factory treat one side of the PTFE sheet with a sodium naphthalene or sodium ammonia process.

(j) Stainless steel mating surface. Conform to ASTM A 240M type 304 and the following:

(1) Thickness	0.91 mm min.
(2) Surface finish	0.5µm root mean square max.

Polish or roll stainless steel mating surfaces as necessary to meet the specified friction properties.

717.16 Elastomeric Compression Joint Seals. Delete the text and substitute the following:

Conform to AASHTO M 297.

Section 718. – TRAFFIC SIGNING AND MARKING MATERIAL

718.04 Steel Panels. Delete the text of the first paragraph and substitute the following:

Furnish 2-millimeter continuous coat galvanized sheet steel blanks conforming to ASTM A 653M. Mill phosphatize the zinc coating (designation G 90) to a thickness of 1.1 ± 0.55 grams per square meter of surface area.

718.12 Delineator and Object Marker Retroreflectors.

(b) Type 2 (retroreflective sheeting). Delete the first sentence and substitute the following:

Furnish a fungus resistant type III, V, VII, VIII, or IX retroreflective sheeting with a class 1 or 2 adhesive backing conforming to ASTM D 4956.

718.13 Conventional Traffic Paint. Delete the text and substitute the following:

Conform to AASHTO M 248.

718.14 Waterborne Traffic Paint. Delete the text and substitute the following:

Furnish an acrylic water based ready-mixed paint for use on asphalt and hydraulic cement concrete pavements conforming to the following:

(a) Composition. Furnish a paint composed of resin solids of 100 percent acrylic polymer with the exact formulation determined by the manufacturer. Conform to the following:

(1) Pigment, % by mass, ASTM D 3723	45% to 55%
(2) Lead, chromium, cadmium, or barium ASTM D 3335 & D 3718	0%
(3) Volatile organic compounds, ASTM D 3960	150 g/L max.
(4) Mass of paint, ASTM D 1475	1.44 kg/L min.

(b) Viscosity. ASTM D 562 — 75-90 Krebs units

(c) Drying time:

(1) Dry to no pickup, ASTM D 711	10 minutes max.
(2) Drying to no track, 0.7 kg/L type 1 waterproofed glass beads, 0.38 ± 0.03-mm. Wet film thickness at 54ºC	90 seconds max.

(d) Flexibility. ASTM D 522, using the 6.4 mm — No cracking or cylindrical mandrel flaking

(e) Dry opacity. ASTM D 2805, contrast ratio at 7.85 m^2/L spreading rate — 0.96 min.

(f) Color.

(1) White, ASTM D 1729	Match FHWA standard highway white
(2) Yellow, ASTM D 1729	Match FHWA standard highway yellow

(g) Daylight reflectance. (Without glass beads)

(1) White, ASTM E 1347	84% relative to magnesium oxide standard
(2) Yellow, ASTM E 1347	55% relative to magnesium oxide standard

(h) Bleeding ratio. ASTM D 969. 0.96 min.

Determine reflective in accordance with ASTM D 1347 immediately after drying. Divide the average of 3 reflectance readings of the paint over the bleeding surface by the average of 3 readings over the non-bleeding surface to determine the bleeding ratio.

(i) Scrub resistance. ASTM D 2486 300 cycles min.

(j) Freeze-thaw stability. ASTM D 2243

(1) Change in viscosity	± 5 Krebs units max.
(2) Decrease in scrub resistance	-10% max.

(k) Storage stability. During a 12 month storage period, conform to the following:

(1) No excessive setting, caking, or increase in viscosity
(2) Readily stirred to a consistency for use in the striping equipment

718.15 Epoxy Markings. <u>Delete the text and substitute the following:</u>

Furnish a 2-component, 100 percent solids type system for hot-spray application conforming to the following:

(a) Pigments. Component A. Percent by mass.

(1) White:

(a) Titanium dioxide (TiO2), ASTM D 476, type II and type III	18% min.
(b) Epoxy resin	75 to 82%

(2) Yellow:

(a) Chrome yellow (PbCrO4), ASTM D 126, type III	23% min.
(b) Epoxy resin	70 to 77%

(3) Non-Lead Yellow:

(a) Titanium dioxide (TiO_2), ASTM D 476, type II and type III	14%
(b) Organic yellow	7 to 8%
(c) Epoxy resin	75 to 79%

(b) Epoxy content. Component A. Mass per epoxy equivalent, ASTM D 1652	Manufacturer's target value ± 50
(c) Amine value. Component B, ASTM D 2074	Manufacturer's target value ± 50
(d) Toxicity. Toxic or injurious fumes at application temperature	None

(e) Color. 0.38 millimeter film thickness specimen (cured)

(1) White, ASTM D 1729	Match FHWA standard highway white
(2) Yellow, ASTM D 1729	Match FHWA standard highway yellow

(f) Directional reflectance. (Without glass beads)

(1) White, ASTM E 1347	84% relative to magnesium oxide standard
(2) Yellow, ASTM E 1347	55% relative to magnesium oxide standard

(g) Drying time. 0.38 millimeter film thickness with beads.

(1) Laboratory, at 22ºC, ASTM D 711	30 minutes max. to no pick-up condition
(2) Field, at 25ºC, viewed from 15 meters	10 minutes max. to no-tracking condition

(h) Abrasion resistance. Wear index with a CS-17 wheel under a 1000 g load for 1000 cycles, ASTM D 4060	82 max.
(i) Hardness. Shore D hardness with 72 to 96-hour cure at 22ºC, ASTM D 2240	75 to 100

(j) Storage. When stored for up to 12 months, individual epoxy components shall not require mixing before use.

718.16 Polyester Markings. Delete the text and substitute the following:

Furnish a 2-component system conforming to the following:

(a) Directional reflectance. (Without glass beads)

(1) White, ASTM E 1347	84% relative to magnesium oxide standard
(2) Yellow, ASTM E 1347	55% relative to magnesium oxide standard

(b) Color:

(1) White, ASTM D 1729	Match FHWA standard highway white
(2) Yellow, ASTM D 1729	Match FHWA standard highway yellow

(c) Viscosity. Uncatalyzed polyester at -4ºC, ASTM D 562	70 to 90 Krebs units
(d) Bleeding. ASTM D 969	6 min.
(e) Drying time in field. Viewed from 15 meters	45 minutes max. to no-tracking condition

718.20 Raised Pavement Markers. Delete the text and substitute the following:

(a) Non-plowable, extended life, retroreflective, pavement markers. Conform to ASTM D 4280.

(b) Plowable, retroreflective, pavement markers. Conform to ASTM D 4383.

Section 720. – STRUCTURAL WALL AND STABILIZED EMBANKMENT MATERIAL

720.01 Mechanically Stabilized Earth Wall Material. Add the following:

(k) Geogrid reinforcement. Shall be a regular grid structure with apertures of sufficient size to allow interlocking with surrounding soil, rock, or earth. Geogrid shall be manufactured of high-density polyethylene, polypropylene, or polyester. Long-term tensile strength "Tal" and pullout capacity of geogrids shall be calculated according to FHWA publication No. FHWA-NHI-00-043, entitled "Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines." "Tal" must take into account reduction factors for creep, durability, and installation damage.

Section 722. – ANCHOR MATERIAL

722.02 Ground Anchors.

(e) Grout. Delete the text and substitute the following:

Furnish a pumpable mixture of portland cement, sand, water, and admixtures. Use type I, II, or III portland cement conforming to AASHTO M 85.

Chemical additives that control bleed or retard set may be used provided the additives conform to Subsection 711.03 and are mixed according to the manufacturer's recommendations.

For permanent ground anchors, furnish grout capable of reaching a cube strength (AASHTO T 106) of 25 megapascals in 7 days. For soil nails, furnish grout capable of reaching a cube strength of 10.5 megapascals in 3 days and 21 megapascals in 28 days.

Make grout cubes for testing from random batches of grout as directed. Normally, strength testing for permanent ground anchors will not be required as system performance will be measured by proof-testing each anchor. Grout cube testing will be required if admixtures are used or irregularities occur in anchor testing.

Add the following:

722.03 Soil Nails.

(a) Tendon. Furnish deformed bars conforming to one of the following:

(1) Deformed bars, grade 420 or 520	ASTM A 615
(2) Deformed bars, grade 1035	ASTM A 722

Provide new, straight, continuous, undamaged, bare, epoxy coated, or encapsulated bars.

(b) Coupler. Furnish couplers that are capable of developing the full ultimate tensile strength of the tendon as certified by the manufacturer.

(c) Fusion bonded epoxy coating. Apply epoxy coating conforming to ASTM A 775, with the exception of the bend test requirements. Electrostatically apply the coating to a minimum thickness of 0.3 millimeters. The coating at the wall anchorage end of epoxy-coated bars may be omitted over the length provided for threading the nut against the bearing plate.

(d) Encapsulation. Furnish corrugated polyethylene pipe conforming to AASHTO M 252 or corrugated polyvinyl chloride pipe conforming to ASTM D 1784, Class 13464-B.

Section 725. – MISCELLANEOUS MATERIAL

725.01 Water.

(b) Water for planting or care of vegetation: Add the following:

Water source to be from secured water right source, as approved by the CO.

725.02 Calcium Chloride and Magnesium Chloride. Delete the title and text and substitute the following:

725.02 Calcium Chloride, Calcium Chloride Flakes, and Magnesium Chloride.

(a) Calcium chloride liquid. Conform to AASHTO M 144 type L for the specified concentration.

(b) Calcium chloride flakes. Conform to AASHTO M 144 type S, grade 1,2, or 3, class A.

(c) Magnesium chloride. Furnish a brine solution conforming to the following:

(1) Magnesium chloride by mass	28% minimum
(2) Water by mass	72% maximum
(3) Specific gravity, AASHTO T 227	1.290 to 1.330

725.11 Precast Concrete Units. Delete the title and text and substitute the following:

725.11 Precast Concrete Units and Accessories.

(a) Reinforced concrete manholes sections. Conform to AASHTO M 199M.

(b) Concrete barrier. Conform to ASTM C 825.

(c) Reinforced concrete crib wall members. Conform to ASTM C 915.

(d) Underground concrete utility structures. Conform to ASTM C 858.

(e) Concrete water and waste water structures. Conform to ASTM C 913.

(f) Solid concrete interlocking paving units. Conform to ASTM C 936.

(g) Other precast concrete units not covered by the preceding requirements. Cast the units in substantial permanent steel forms. When reinforcing steel is required, conform to Section 709. Provide additional reinforcement as necessary for handling the units. Use concrete conforming to the following:

(1) 28-day strength, AASHTO T 22	25 MPa min.
(2) Air content by volume, when required	5% min.
(a) 9.5 mm max. size aggregate	5% min.
(b) >9.5 mm max. size aggregate	4% min.

Cure the units according to AASHTO M 170M.

Cast a sufficient number of concrete cylinders from each unit or lot of units to permit compression tests at 7, 14, and 28 days. Make at least 3 cylinders for each test. If the strength requirement is met at 7 or 14 days, the units can be certified for use 14 days from date of casting.

Do not use precast concrete units when:

(1) Cylinders that are properly sampled, cast, and cured, do not meet the strength requirement by an age of 28 days.

(2) Cracks, honeycombed, or patched areas are larger than 0.02 square meters.

725.19 Plastic Lining. Delete the text and substitute the following:

Furnish a film or fabric that is serviceable for the duration of the installation.

725.22 Grout. Add the following:

(f) Neat cement grout. Furnish a grout consisting of a mixture of cement, water, and admixtures. Do not exceed a water/cement ratio of 0.44. Fly ash, if used, shall not exceed 20% of the cement by weight. Admixtures to reduce water content, improve the flowability, control bleeding, or control shrinkage may be added according to the manufacturer's recommendations. Admixtures shall be free of chlorides, fluorides, sulphites, and nitrates.

Add the following Subsections:

725.29 Reinforcing Fibers. Use deformed steel or fibrillated polypropylene fibers conforming to ASTM C 1116.

725.30 Form Liner Release Agent. Compatible with form liner and color stain system to be applied to surface. Comply with form liner and color stain manufacturer’s recommendation.

SPECIAL CONTRACT REQUIREMENTS

for

CO PFH 80-1(1) & 2(2)
7th Street Bridge & Road Improvements
Pike and Arapahoe National Forests
Clear Creek and Park Counties, Colorado

Prepared by Carter :: Burgess

for

Department of Transportation
Federal Highway Administration
Central Federal Lands Highway Division

SPECIAL CONTRACT REQUIREMENTS

The following Special Contract Requirements amend and supplement the *Standard Specifications for Construction of Roads and Bridges, on Federal Highway Projects (FP-96),* U.S. Department of Transportation, Federal Highway Administration.

SI (METRIC) TO ENGLISH CONVERSION FACTORS (approximate)

To the table on page iv, amend the second and third lines of the MASS portion of the table as follows:

Symbol	When You Know	Multiply By	To Find	Symbol
kg	kilograms	2.2046	pounds	lb
Mg (or "t")	megagrams (or "metric ton")	1.1023	short tons (2000 lb)	T

Section 101. – TERMS, FORMAT, AND DEFINITIONS

101.02 Specifications Format. Delete the third and fourth paragraphs and substitute the following:

Division 150 consists of project contract requirements that are applicable to all contracts. Work under Division 150 is paid for directly or indirectly according to Subsection 109.05 and the Section ordering the work. When there is no pay item in the bid schedule, no direct payment is made.

Divisions 200 through 600 consist of construction contract requirements for specific items of work. Work under these Divisions is paid for directly or indirectly according to Subsection 109.05 and the Section ordering the work.

101.04 Definitions.

Suitable Material - Add the following:

Suitable material may necessitate drying, the addition of moisture, reduction in size, screening, or other common methods of manipulation prior to use. Suitable material includes the classification(s) of materials, resulting R-values and other characteristics, for which the project was designed.

Unsuitable Material - Delete the text and substitute the following:

Material which the CO determines to be unsuitable for use in the construction of foundations, embankments, or roadbeds. Unsuitable materials generally include muck and soils with high organic contents.

Section 102. – BID, AWARD, AND EXECUTION OF CONTRACT

102.03 Bid Guarantee.

(a) General. Delete the first sentence and substitute the following:

Submit a bid guarantee of 20 percent of the amount of the bid or $3 million, whichever is less.

102.06 Performance and Payment Bonds. Delete the first paragraph including lines (a), (b), and (c), and substitute the following:

FAR Clause 52.228-15 - Performance and Payment Bonds - Construction is supplemented as follows. Furnish a performance bond and a payment bond in the penal amounts of 100 percent of the original contract price.

Section 103. – SCOPE OF WORK

103.03 Value Engineering. Delete the second paragraph and substitute the following:

Before undertaking significant expenditures, provide the CO with a written description of the value engineering change proposal (VECP) concept. Within 14 days, the CO will inform the Contractor as to whether the concept appears to be viable or if the concept is unacceptable. If the CO indicates that the concept appears to be viable, prepare and submit the formal VECP proposal.

103.05 Partnering. Delete the last sentence of the fourth paragraph and substitute the following:

The Government's share will not exceed $5,000.

Section 104. – CONTROL OF WORK

104.03 Specifications and Drawings. Delete the text and substitute the following:

FAR Clause 52.236-21 - Specifications and Drawings for Construction is supplemented as follows:

(a) General. Prepare drawings as necessary to adequately construct the work. Drawings include, but are not limited to, layouts that show the relative position (vertical and horizontal, as appropriate) of work to be performed, fabrication details for manufactured items and assemblies, installation and erection procedures, details of post-tensioning and other systems, detailed trench and excavation procedures that conform to OSHA requirements, traffic control implementation drawings, and methods for performing work near existing structures or other areas to be protected. Show all the drawing dimensions in metric units according to the International System of Units (SI), IEEE/ASTM SI 10.

Limit drawings to a maximum size of 610 by 920 millimeters. Include on each drawing and calculation sheet, the project number, name, and other identification as shown in the contract.

Furnish 5 sets of drawings and supporting calculations for acceptance before performing work covered by the drawings. If drawings are returned for revision, correct and resubmit for acceptance. Allow 40 days per submission for railroad structures and 30 days per submission for all other structures. If drawings must be resubmitted, the time for acceptance starts over. Obtain prior written approval for changes or deviations from accepted drawings.

(b) Specific requirements for concrete and miscellaneous structures. Drawings will be reviewed in the order they are received. The review time as specified in (a) above is applied separately to each drawing submitted. The CO may request additional specific drawings for unique situations in order to clarify layout, construction details, or methodology.

(1) Furnish drawings for the following:

(a) Site-specific layouts for all wall types and gabion installations.
(b) Gabion and revet mattress details and installation procedures.
(c) Forms and falsework for reinforced concrete box culverts less than or equal to 1800 mm in height.
(d) Fabrication drawings for bridge railings and parapets.
(e) Fabrication drawings for pre-stressed members.
(f) Fabrication and installation drawings for expansion joint assemblies.
(g) Fabrication drawings for bearing assemblies.
(h) Construction joint location and concrete deck placement sequences not shown on the plans.
(i) Erection diagrams for Soil-Corrugated Metal Structure interaction systems (multi-plate structures).
(j) Structural steel fabrication drawings.
(k) Utility hangar details.
(l) Detour layouts.
(m) Fabrication and installation drawings for pre-cast items.

(2) Furnish drawings which bear the seal and signature of a professional engineer proficient in the pertinent design field for the following:

(a) Erection plans.
(b) Reinforced soil slopes details.
(c) MSE wall and crib wall details.
(d) Details and installation procedures for proprietary wall systems.
(e) Temporary bridge structures.
(f) All bridge forms except for railings, parapets, and components less than 1800 mm in height.
(g) Shoring systems and cofferdams greater than 1800 millimeters in height.
(h) All shoring systems that support traffic loadings.
(i) Forms and falsework for all structures greater than 1800 millimeters in height.

(j) Post-tensioning systems.
(k) Ground anchors, soil nail, and rock bolt assembly details, layout, and installation and testing procedures.
(l) Tie back wall details.
(m) Alternate retaining wall details.

(3) Furnish drawings which bear the seal and signature of a professional engineer proficient in forms and falsework design, and who is licensed in the state where the project will be constructed, for the following:

(a) Falsework for any structure with a span exceeding 5000 millimeters.
(b) Falsework for any structure with a height exceeding 4300 millimeters.
(c) Falsework for structures where traffic, other than workers involved in constructing the structure, will travel under the structure.

Section 105. – CONTROL OF MATERIAL

105.01 Source of Supply and Quality Requirements. Add the following:

Submit samples of materials for quality verification testing for materials required to conform to Sections 703, 704, and 705.

Materials containing petroleum-based solvents such as cutback asphalts and traffic paints may be restricted from use by local laws or ordinances in certain geographic areas. Upon presenting proof of such restrictions, alternate materials considered acceptable to the CO may be substituted for the materials specified in the contract.

(c) Contractor-located sources. Add the following at the end of the first paragraph:

For Contractor-located, non-commercial sources, secure environmental clearances according to Subsection 107.10.

105.04 Storing and Handling Material. Add the following after the third sentence of the second paragraph:

For Contractor-located, non-commercial staging, storing, and material handling areas, secure environmental clearances according to Subsection 107.10.

Add the following:

The Contractor will use selected areas of existing 7th Street, between Brownell Street and Clear Creek for staging areas and for storage of materials, stockpiles, etc. Coordinate staging areas with CO, the Town of Georgetown, and adjacent landowners. Private parking lots will not be used to store equipment or materials or park construction vehicles without written permission by the landowner.

Section 106. – ACCEPTANCE OF WORK

106.01 Conformity with Contract Requirements. Delete the fourth sentence of the fifth paragraph and substitute the following:

If Contractor testing and inspection are verified by the Government, the Contractor's results may be used by the Government to evaluate work for acceptance.

Add the following:

When removal, replacement, or corrective measures are required, obtain approval for the proposed method of performing the work.

Where sample/testing procedures make reference to AASHTO, ASTM, or other standards (designated as FLH T), the procedure as modified in the Materials Manual shall govern. Where the specifications make reference to AASHTO Test T11, "Procedure B - Washing Using a Wetting Agent" shall be the procedure followed.

Delete references made to AASHTO T-238 or T-239 and substitute with ASTM D 2922 and D3017 or AASHTO T-310.

Reference to the Materials Manual means the Federal Lands Highway "Field Materials Manual, U.S. Department of Transportation, Federal Highway Administration," Publication No. FHWA-FL-91-002, dated March 1991, revised March 1994, and all amendments and supplements thereto. Copies are available from the Materials Engineer, Federal Highway Administration, Central Federal Lands Highway Division, Materials Branch, P.O. Box 25246, Denver, Colorado 80225-0246, Telephone: (303) 716-2176.

106.03 Certification. Add the following after the first paragraph:

Other than references in or to the FAR or Federal Law, when this contract references certifications; certificates; or certified documents, equipment or individuals, these references are not certifications within the meaning of Section 4301 of Public Law 104-106, the National Defense Authorization Act for Fiscal Year 1996. These references simply refer to documentation of peripheral contract requirements required to be validated by an individual or organization having unique knowledge or qualifications to perform such validation.

Add the following after the second paragraph:

See Table 106-3 for Schedule for Full or Partial Acceptance by Material Certification. Submit certification and sample of material for testing as required.

(a) Production certification. Delete items (2) through (5) and substitute the following:

(2) Lot number or other means of cross-referencing to the manufacturer's inspection and testing system

(3) Substantiating evidence that the material conforms to the contract quality requirements as required by FAR 46.105(a)(4), including all of the following:

(a) Test results on material from the same lot and documentation of the inspection and testing system

(b) Manufacturer's statement that the material complies with all contract requirements

(c) Manufacturer's signature or other means of demonstrating accountability for the certification

106.05 Statistical Evaluation of Work and Determination of Pay Factor (Value of Work).

(b) Acceptance. Delete the last sentence of the second paragraph and substitute the following:

If a lot is concluded or terminated with fewer than five samples, the samples will be combined with those of an adjacent lot. In the event there is no adjacent lot, the material will be accepted according to Subsection 106.04.

Delete the third paragraph and substitute the following:

If the current pay factor of a lot falls below 0.90, terminate production. The current lot is terminated at this point and the material represented by the lot will be accepted as provided in the following paragraphs. After the Contractor has taken effective actions to improve the quality of the production, production may resume and a new lot will begin.

Table 106-3
Schedule For Full or Partial Acceptance by Materials Certification

Section	Description	Material	Material Property Or Specification	Frequency	
				Certification	Sample
402	Minor Hot Asphalt Concrete	Aggregate Asphalt Mix	Source quality, Gradation, Stability, and Grade	1 per mix	1 per source
635	Temporary Traffic Control	635 as applicable	As specified	1 per source	-----
701	Hydraulic Cement	Portland Cement, Blended Hydraulic Cement and Masonry Cement	AASHTO M 85, M 240, and ASTM C 91	1 per shipment	1 per 100 tons
702.02	Asphalt Material	Cut-back Asphalt	AASHTO M 81 or M 82 as applicable	1 per shipment	1 per shipment
702.08	Antistrip	As specified	As applicable	1 per shipment	-----
708	Paint	As specified	As applicable	1 per batch\lot	1 sample for quantities >100L
709	Reinforcing Steel and Wire Rope	As specified	As applicable	1 per shipment	For 709.01 & 709.03 submit 3, 1-meter bars of each size and grade of bar furnished. 709.02 submit 1, 2-meter length for each size furnished
710	Guardrail	As specified	As applicable	1 per shipment	-----
711	Concrete Curing Material and Admixtures	As specified	As applicable	1 per material source per material type	-----
712	Joint Material (all)	As specified	As applicable	1 per shipment	-----
713	Roadside Improvement Materials (all)	As specified	As applicable	1 per shipment	-----
714	Geotextile and Geocomposite Drain	As specified	As applicable	1 per shipment	1 per project per type
715	Piling	As specified	As applicable	1 per shipment	-----
716	Material for Timber Structures	Timber and Hardware	As applicable	1 per shipment	-----
717	Structural Metal	As specified	As applicable	1 per shipment	717.01(e) minimum 6 per shipment for each size used. 717.10 1 per project
718	Traffic Signing and Marking (all)	As specified	As applicable	1 per shipment	-----
721	Electrical Material (all)	As specified	As applicable	1 per shipment per material type	-----
722	Anchor Material	As specified	As applicable	1 per shipment per material type	-----
725	Miscellaneous materials	As specified	As applicable	1 per shipment per material type	-----

Section 107. – LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

107.01 Laws to be Observed. Add the following:

This project will be constructed within the requirements of the following permits.

(a) Section 404 permit. The U.S. Army Corps of Engineers has issued a Section 404 individual permit authorizing the discharge of fill material into waters of the United States. The contractor is required to comply with the terms and conditions of the permit. A copy of the permit and associated conditions is included in Appendix A.

(b) Section 401 certification. The Colorado Department of Health and Environment (CDPHE) has certified that the project will not violate water quality standards. The contractor is required to comply with the terms and conditions of the certification and ensure construction activities do not cause a violation of water quality standards. A copy of the certification and associated conditions is included in Appendix B.

(c) Colorado Discharge Permit System (CDPS). The Colorado Department of Public Health and Environment (CDPHE), acting as the regulating agency to implement the requirements of the National Pollutant Discharge Elimination System (NPDES) for the Environmental Protection Agency (EPA) requires construction projects disturbing 1 acre or more land to obtain coverage under the Storm Water General Permit (GP) for Colorado. The contractor is required to obtain coverage under Colorado Permit No. COR-30000 by submitting a complete State of Colorado GP Application to the CDPHE at least 10-days prior to the start of construction. As part of the process the contractor will certify that the Storm Water Management Plan (SWMP) has been developed and is complete. A copy of the GP, application, and guidance document for preparing a SWMP is included in Appendix C. In addition the contractor will pay the annual fee (approximately $450.00). The GP will expire at midnight, June 30, 2007. This permit may be combined with the overall Guanella Pass Road project permit. If continued coverage under this permit is required the Contractor must submit a renewal application at least 90 days prior to the expiration date.

Provide a copy of the permit with the Storm Water Management Plan (SWMP) to the Clear Creek County Planning Departments and the Town of Georgetown prior to construction as required in the Mineral Material Extraction Contracts.

(1) General. To comply with the General Permit, the Contractor and the CO shall jointly review and agree on the Contractor's Storm Water Management Plan (SWMP). The Contractor shall then file a Permit application and implement the SWMP during construction all as described in the following Special Contract Requirements.

Designate the erosion control/water quality supervisor in accordance with Subsection 157.03 who will be responsible for implementing the SWMP. The erosion control/water quality supervisor shall be familiar with the SWMP procedures and practices and shall ensure that emergency procedures and the SWMP are updated as needed and available for inspection.

The permit covers storm water from sand and gravel operations and asphalt and concrete plants located at the construction site. The contractor will include coverage of these facilities in the SWMP.

(2) Preparation of SWMP. The approved SWMP will describe and ensure the implementation of practices which will be used to reduce the pollutants in storm water discharges from construction activities, dedicated asphalt plants and concrete plants, and earthen material source sites to assure compliance with the terms and conditions of the General Permit.

The project plans contain erosion control details and quantities which shall become a part of the SWMP. At least three weeks prior to beginning construction, provide a draft SWMP for the project to the CO. Incorporate any revisions resulting from the CO's review. The CO and the Contractor shall then approve and sign the revised SWMP. When the SWMP is approved, it will be the document in force on the project.

Place the SMPP and all updates in a three-ring binder so that completed inspection forms and other records may be inserted. The Contractor shall maintain a current copy of the SWPMP and all associated records and forms at the job site throughout the duration of the project. The SWMP shall be available for public inspection and for the inspection and use of the CO.

Implement the SWMP as required throughout the construction period and maintain all related erosion control elements in proper working order. Do not perform clearing and grubbing or earthwork until the SWMP has been implemented.

Prior to construction, the Contractor and all subcontractors shall sign certifications (included in the SWMP) that they understand the requirements of the NPDES permit. All subcontractors shall comply with the requirements of the NPDES under the supervision of the Contractor.

The SWMP, including inspection forms and all data used to complete the General Permit application, shall be provided to the CO at the completion of the project. The Contractor shall retain his own records for a period of at least three years from the date the site is finally stabilized.

(3) State of Colorado Stormwater General Permit.

The Stormwater General Permit form may be downloaded at the following address:

http://www.cdphe.state.co.us/wq/PermitsUnit/SW%20Construction%20Application.pdf

All necessary information must be provided on the form. The General Permit must be submitted to the following address at least ten days prior to the start of construction, including clearing and grubbing:

Colorado Department of Public Health and Environment
Water Quality Control Division
WQCD-Permits
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530
Attention: Permits Unit

(4) Erosion Controls.

Implement soil erosion controls in accordance with the SWMP and Section 157.

(5) Controls for Other Pollutants.

Implement controls to eliminate the discharge of pollutants, other than erodible soil, into storm water such as pollutants from materials stored onsite. The work shall include the implementation of spill prevention and material management controls and practices to prevent the release of pollutants into storm water. These controls and practices shall be specified in the SWMP and shall include storage procedures for chemicals, construction materials and other pollution prevention measures.

Spill prevention, containment and counter-measures will be required if the volume of fuel in a single container exceeds 2500 liters, or if the total storage volume at any one site exceeds 5000 liters.

Assist in any efforts to clean up hazardous material spills as instructed by the CO or other authorities. Haul soil contaminated with smaller spills from the project site and dispose of according to applicable State and Federal laws.

Contact the CO immediately in the event of any spill of a hazardous material.

(6) "Good Housekeeping" Practices and Requirements.

The SWMP shall specify the Contractor's "good housekeeping" practices and requirements including vehicle wash-down areas, onsite and offsite tracking control, protection of equipment storage and maintenance areas, and sweeping of highways and roadways related to hauling activities.

The Contractor shall take sufficient precautions, considering all conditions, to prevent pollution of streams, lakes, and reservoirs with fuels, oil, bitumens, calcium chloride, magnesium chloride, Portland cement, fresh Portland cement concrete, raw sewage, muddy water, chemicals or other harmful materials. None of these materials shall be discharged into any channels leading to such streams, lakes or reservoirs.

To reduce the possibility and minimize the impacts of accidental spills or discharge, machinery service and refueling areas shall be located away from stream beds or washes.

Non-waste materials such as used cans, oils, machine and equipment parts, paint, hazardous materials, plastic and rubber parts, discarded metals, and building materials, shall be removed from the construction site and disposed of at an approved landfill.

Where the Contractor's working area encroaches on a running or intermittent stream, barriers shall be constructed and maintained between the working areas and the stream bed adequate to prevent the discharge of any contaminants.

Unless approved in writing by the CO, mechanical equipment shall not be operated in running streams. Fording of running streams with construction equipment will not be permitted. Temporary bridges or other structures, approved by the CO, shall be used whenever crossings are necessary.

Streams, lakes and reservoirs shall be immediately cleared of all work items, debris or other obstructions inadvertently placed thereby or resulting from construction operations.

(7) Inspections and Revisions to the SWMP.

For areas that receive less than 510 millimeters of annual rainfall, the CO and the Contractor shall perform a minimum of one inspection per month of the site. The inspection shall include disturbed areas that have not been finally stabilized, areas used for storage of materials, locations where vehicles enter or exit the site, and all of the erosion and sediment controls that are included in the SWMP. Where mean annual rainfall equals 510 millimeters or more, inspections shall be performed at least every seven calendar days. In addition, an inspection must be performed within 24 hours after each rainfall of greater than or equal to 13 millimeters. Monitor rainfall with a rain gauge accurate to the nearest 3 millimeters of rain.

Document the inspections on forms provided in the SWMP. The inspection forms shall be signed in accordance with the requirements of the SWMP and the EPA permit. The inspection forms shall be retained onsite in the SWMP notebook throughout the construction period.

It may be necessary to revise the SWMP during construction to make necessary improvements or revisions or to respond to unforeseen conditions noted during construction or site inspections. For that purpose, the SWMP shall specify the mechanism whereby revisions may be proposed by the Contractor or the CO and incorporated into the plan, including review and approval of minor changes. The CO and the Contractor shall jointly approve and sign each revision to the SWMP before implementation. Approved modifications shall be implemented within seven calendar days following the date of the inspection when deficiencies or necessary corrections were first noted.

(8) Notice of Inactivation.

File a Notice of Inactivation after 70% of the revegetation has been established. The permit will be active until the Notice of Inactivation is approved by the PHE. If 70% of the vegetation has **NOT** been established at the completion of the project file a Notice of Transfer and Acceptance of Terms of a Stormwater Discharge General Permit Certification to transfer the permit to the Town of Georgetown. The Town of Georgetown will then be responsible for completing the requirements of the permit until the Notice of Inactivation can be filed.

107.02 Protection and Restoration of Property and Landscape. Add the following at the end of the sixth paragraph:

Utilities along the project will be relocated during construction. Extensive coordination with utility companies will be required for the project. Delays and impacts to construction operations should be expected to allow time and room for the utility companies to complete relocations. Develop a construction schedule to show how construction operations will consider existing overhead and underground utilities and relocations. Comply with all regulations, requirements, and rules of Colorado Senate Bill 00-184 which concerns prevention of damage to underground facilities resulting from excavation. This regulation establishes requirements relating to plans and specifications, pre-excavation notification, duties of Contractors, duties of owners and operators, and penalties. At the preconstruction conference designate a contact person who will be responsible for coordinating all utility work with the utility companies. The person may not be the Superintendent. Contact the utility companies within a week of contract award to provide advance notice of construction schedule requirements. Notify the utility companies a minimum of 10 business days prior to requiring relocations. The notification should be in letter form and include a station to station listing of relocation needs for the following two weeks. Every effort will be made to complete the work within this time period, but it may not be possible in all circumstances. Survey control needed to relocate the utilities to proper horizontal and vertical location is expected to be established under the contract using the construction survey and staking hours.

The utility companies impacted under this contract are Qwest Communications, Xcel Energy, Comcast, and the Town of Georgetown. There are existing direct buried copper telephone lines, fiber optic lines, underground natural gas lines, sanitary sewer lines, water lines, underground electric, overhead electric, overhead communications, overhead television cable, and necessary appurtenances such as pedestals, manholes, valves etc. located along the roadway. A high voltage 115 kv electric transmission line is located within the project site. The approximate horizontal location of utilities are shown in the plans on the mainline plan and profile sheets and the cross-sections sheets. There is no information regarding vertical location.

Overhead relocations, manhole cover adjustments, sleeving of gas, sanitary sewer, and water have been identified. A section of natural gas line will need to be relocated. Overhead secondary electric, phone, and TV cable will be relocated underground to one house and at the creek crossing. The utility companies will provide all materials and perform all work necessary for relocating the existing utilities, except installing the conduit across the bridge and sleeving of utilities at the retaining wall and bridge abutment locations.

The contacts for the Town of Georgetown 7th Street Bridge and Road Improvements utility companies are:

Dan Lewis
Field Engineer
Qwest Communication
(303) 441-7142

Jonnye Knoll
Xcel Energy
303-445-4504

Brian Carlson
Town of Georgetown
303-569-2897

Comcast of Colorado XII, Inc.
6850 South Tucson Way
Englewood, CO 80112

107.06 Contractor's Responsibility for Work. Add the following:

Argentine Street and 7th Street convey stormwater through the Town of Georgetown into Clear Creek at the concrete swale to be removed at the bridge site. The intersection, and Clear Creek, are subject to flooding during storm and snowmelt events. Plan work scope and construction sequencing to accommodate and mitigate impacts from potential flooding.

107.10 Environmental Protection. Add the following at the end of the subsection:

Contractor-Selected, Non-Commercial Areas. Contractor-selected, non-commercial areas, include, but are not limited to material sources, disposal sites, waste areas, haul roads, and staging areas. (A commercial source is a current operating concern which has in the recent past provided same-type materials or services). These requirements do not apply for areas identified by the FHWA as having previously received clearance.

Prior to construction activities in contractor-selected, non-commercial areas, provide the following to the CO and the FHWA Environmental section (555 Zang Street, Lakewood, CO 80228/Fax 303-969-5903):

(1) A report with documentation, according to the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation, to determine if prehistoric or historic buildings, structures, sites, objects, or districts listed or eligible for listing in the National Register of Historic Places (NRHP) are present and if they will be affected by the proposed activity. Include information identifying the location, total land area, and type of activity proposed. The FHWA will review this documentation.

If NRHP listed or eligible sites are present and/or will be affected, the FHWA will coordinate with the State Historic Preservation Officer (SHPO) and other parties, which will require the following time frames:

(a) Coordination on eligibility and affects may require 45 days or longer.
(b) Coordination on mitigation of adverse effects may require 60 days or longer.

(2) Written documentation that such activities will not affect any "Waters of the U.S." as defined by the U.S. Army Corps of Engineers. Provide documentation by an individual capable of performing wetland delineations in accordance with the 1987 Corps of Engineers' manual. Documentation of effects to wetlands or other Waters of the U.S. will be submitted to the CO and to the FHWA Environment section for coordination with the Corps of Engineers. This coordination may require 45 days or longer. Substantial additional delays could result from wetland impacts.

(3) Written documentation that such activities will not affect any species protected under the Endangered Species Act (ESA). Provide documentation prepared by a biological specialist. The written documentation will include a "no affect", a "may affect-is not likely to adversely affect", or a "may affect-is likely to adversely affect", determination according to Section 7 of the Endangered Species Act. Submit the documentation to the CO and the FHWA Environmental section. If the determination is "may affect-is not likely to adversely affect" or "may affect-is likely to adversely affect", the FHWA will coordinate with the U.S. Fish and Wildlife Service (FWS), which will require the following time frames:

(a) "May affect-is not likely to adversely affect" may require 45 days or longer.
(b) "May affect-is likely to adversely affect" may require 150 days or longer.

Contract time will not be increased due to the submittal and approval process for the above three items.

Section 108. – PROSECUTION AND PROGRESS

108.01 Commencement, Prosecution, and Completion of the Work: Delete the second paragraph and substitute the following:

A preconstruction conference will be held after the contract is awarded and before beginning work. Seven days before the preconstruction conference, furnish three copies of the preliminary construction schedule according to Section 155.

Add the following:

Limit operations as follows:

(a) No construction activities will take place, at the project work site, prior to January 15, 2004.

(b) Follow the haul route through the Town of Georgetown to the project site: From I-70 interchange to Argentine Street, Argentine Street to Brownell Street, Brownell Street to 6th Street, 6th Street to Argentine Street (or Brownell Street to 7th Street).

(c) The Argentine Street and 7th Street intersection shall be kept open to local traffic except as necessary for drainage, bridge, and road construction from February 23, 2004 to April 30, 2004. Coordinate with adjacent landowners to allow access to private property along 7th Street and Argentine Street. Minimum of 24 hours notice to adjacent landowners is needed when construction will block or impede access to driveways or houses. Coordinate with local businesses on 7th Street and Argentine Street to allow safe public access during business hours. Areas outside of the immediate construction zone on 7th Street and Argentine Street are to remain open for public street parking on weekends. Businesses will not have their signs blocked from public view by construction equipment or staging of materials.

Schedule at least 2 non-work days out of every 14 calendar days. The selected non-work days do not need to be consecutive, but they must be scheduled. Provide at least 2 weeks notice before changing the scheduled days off.

Exemptions to scheduled days off may be granted by written approval from the CO for specific project operations and/or for periods of limited duration.

A Notice to Proceed must be issued before commencement of any work.

108.04 Failure to Complete Work on Time. Add the following to the second paragraph:

Work is to be substantially complete by May 15, 2004. The new 7th Street bridge, 7th Street from Brownell Street to Rose Street, and Argentine Street from 6th Street through the 7th Street intersection is to be substantially complete and open to public traffic by May 15, 2004.

Delete the contents of the Table 108-1 and substitute the following:

Original Contract Price		**Daily Charge**
From More Than	**To and Including**	
$ 0.00	$ 2,000,000.00	$ 600.00
2,000,000.00	5,000,000.00	1,600.00
5,000,000.00	and more	1,800.00

Section 109. – MEASUREMENT AND PAYMENT

109.01 Measurement Methods. Delete the first sentence and substitute the following:

Take or convert all measurement of work according to the International System of Units (SI), IEEE/ASTM SI 10.

Add the following after the third paragraph:

Submit measurement notes to the CO within 24 hours of performing the work. For on-going work, submit measurement notes weekly. When work is not complete, identify the measurement as being an interim measurement. Submit the final measurement when the installation is completed. Measurement notes form the basis of the Government's receiving report (see Subsection 109.08(d)). For lump sum items, submit documentation to support invoiced progress payment on a monthly basis.

Use an acceptable format for measurement records. As a minimum, include the following information in all records of measurement:

(a) Project name and number
(b) Contract item number
(c) Date the work was performed
(d) Location of the work
(e) Measured quantity
(f) Calculations made to arrive at the quantity
(g) Supporting sketch and/or details as needed to clearly define the work performed and the quantity measured.
(h) Names of persons measuring the work
(i) Identification as to whether the measurement is interim or final
(j) Signed certification statement by the persons taking the measurements, performing the calculations, and submitting them for payment that the measurement and calculations are correct to the best of their knowledge and that the quantity being measure is subject to direct payment for the identified item under the contract.

109.06 Pricing of Adjustments.

(a) Proposal.

(3) Cost or pricing data. Delete the third paragraph and substitute the following:

Submit with the cost or pricing data a written proposal for pricing the work according to (1) above. See Table 15-2 following FAR Subpart 15.4 for guidance.

109.08 Progress Payments. Delete the text and substitute the following:

FAR Clauses 52.232-5 - Payments under Fixed-Price Construction Contracts and 52.232-27 - Prompt Payment for Construction Contracts are supplemented as follows:

(a) General. Only invoice payments will be made under this contract. Invoice payments include progress payments made monthly as work is accomplished and the final payment made upon final acceptance. Only one progress payment will be made each month. No progress payment will be made in a month when the work accomplished results in a net payment of less than $1,000. Full or partial progress payment will be withheld until a construction schedule or schedule update is submitted to and accepted by the CO.

(b) Closing date and invoice submittal date. The closing date for progress payments will be designated by the CO. Include work performed after the closing date in the following month's invoice. Submit invoices to the designated billing office by the 7th day after the closing date. Invoices received by the designated billing office after the 16th day following the closing date will not be accepted for payment processing that month. Include late, unprocessed invoice submittals in the following month's invoice.

(c) Invoice requirements. Submit the invoice to the government's designated billing office. Include the following items in the invoice:

(1) The information required in FAR Clause 52.232-27(a)(2)(I) through (a)(2)(x).

(2) A tabulation of total quantities and unit prices of work accomplished or completed on each pay item as of the monthly closing date. Do not include any quantities unless field note documentation for those quantities was submitted by the closing date. Do not include any work involving material for which test reports required under Sections 153 or 154 or certifications required by Subsection 106.03 are past due as of the closing date.

(3) The certification required by FAR Clause 52.232-5(c) and, if applicable, the notice required by FAR Clause 52.232-5(d). Provide an original signature on the certification. Facsimiles are not acceptable.

(4) If applicable, a copy of the notices that are required by FAR Clause 52.232-27(e)(5) and (g).

(5) The amount included for work performed by each subcontractor under the contract.

(6) The total amount of each subcontract under the contract.

(7) The amounts previously paid to each subcontractor under the contract.

(8) Adjustments to the proposed total payment which relate to the quantity and quality of individual items of work. Adjustments for the following may be made by the Government after validation of the invoice.

(a) Retent resulting from a failure to maintain acceptable progress.
(b) Retent resulting from violations of the labor provisions.
(c) Retent pending completion of incomplete work, other "no pay" work, and verification of final quantities.
(d) Obligations to the Government such as excess testing cost or the cost of corrective work pursuant to FAR Clause 52.246-12(g).
(e) Liquidated damages for failure to complete work on time.

(d) Government's receiving report. The Government's receiving report will be developed using the measurement notes received and accepted by the CO. Within 4 days after the closing date, the CO will be available by appointment at the Government's designated billing office to advise the Contractor of quantities and unit prices appearing on the Government's receiving report.

(e) Processing progress payment requests. No payment will be made for work unless field note documentation for the work was provided by the closing date.

(1) Invoices received by the 7th day following the closing date.

(a) Proper invoices. If the invoice meets the requirements of Subsection 109.08(c), and the quantities and unit prices shown on the contractor's invoice agree with the corresponding quantities and unit prices shown on the Government's receiving report, the invoice will be paid.

(b) Defective invoices. If the invoice does not meet the requirements of Subsection 109.08(c), or if any of the quantities or unit prices shown on the contractor's invoice exceed the corresponding quantities and unit prices shown on the Government's receiving report, the invoice will be deemed defective and the Contractor so notified according to FAR Clause 52.232-27(a)(2). Defective invoices will not be corrected by the Government and will be returned to the Contractor within 7 days after the Government's designated billing office receives the invoice.

Revise and resubmit returned invoices by the 18th day following the closing date. The CO will evaluate the revised invoice. If the invoice still does not meet the requirements of Subsection 109.08(c), the Contractor will be so notified according to FAR Clause 52.232-27(a)(2), and no progress payment will be made that month. Correct the deficiencies and resubmit the invoice the following month.

If the revised invoice meets the requirements of Subsection 109.08(c), but still had quantities or unit prices exceeding the corresponding quantities and unit prices shown on the Government's receiving report, the Government's data for that item or work will be used. The Contractor's invoice, as revised by the Government's receiving report, will be forwarded for processing by the 23rd day following the closing date. The Contractor will be notified by the 23rd day following the closing date of the reasons for any changes to the invoice.

(2) Invoices received between the 8th and 16th day following the closing date.

(a) Proper invoices. If the invoice meets the requirements of Subsection 109.08(d), and the quantities and unit prices shown on the Contractor's invoice agree with the corresponding quantities and unit prices shown on the CO's receiving report, the invoice will be deemed proper and forwarded for processing within 7 days of receipt.

(b) Defective invoices. If the invoice does not meet the requirements of Subsection 109.08(d), the invoice will be deemed defective, the Contractor so notified according to FAR Clause 52.232-27(a)(2), and no progress payment will be made that month. Correct the deficiencies and resubmit the invoice the following month.

If the invoice meets the requirements of Subsection 109.08(d), but has quantities or unit prices exceeding the corresponding quantities and unit prices shown on the Government's receiving report, the Government's data for that item of work will be used. The Contractor's invoice, as revised by the Government's receiving report, will be forwarded for processing within 7 days of the Government's receipt of the invoice. The Contractor will be notified of the reasons for any changes to the invoice.

(f) Partial payments. Progress payments may include partial payment for material to be incorporated in the work, provided the material meets the requirements of the contract and is delivered on or in the vicinity of the project site or stored in acceptable storage places.

Partial payments for stockpiled manufactured material (aggregates) will be based on Contractor process control test results. If test results show the material to be out-of-specification, or in "reject" where statistical evaluation procedures are used, no payment for stockpiled materials will be made.

Partial payment for material does not constitute acceptance of such material for use in completing items of work. Partial payments will not be made for living or perishable material until incorporated into the project.

Partial payments for material will not exceed the lesser of:

(1) 80 percent of the contract bid price for the item, or

(2) 100 percent of amount supported by copies of invoices submitted.

The quantity paid will not exceed the corresponding quantity estimated in the contract.

109.09 Final Payment. Delete the first sentence and substitute the following:

FAR Clause 52.232-5, Payment under Fixed-Price Construction Contracts, and FAR Clause 52.232-27 - Prompt Payment for Construction Contracts are supplemented as follows:

Section 152. – CONSTRUCTION SURVEY AND STAKING

Description

152.01 Delete the first sentence and substitute the following:

Furnish technically qualified survey crews experienced in highway construction and capable of performing in a timely and accurate manner.

Construction Requirements

152.02 General. Delete the first paragraph and substitute the following:

The Government will furnish to the Contractor one copy of each of the following information:

- 3D coordinates and offset distance from centerline for subgrade and surface course finishing stakes at 20 meter intervals and miscellaneous intermediate stations.

- Slope stake books containing centerline grade and slope staking information at 20 meter station intervals and miscellaneous intermediate stations.

- Computer listings containing: horizontal alignment, vertical alignment, earthwork quantities, and staking details showing superelevation template data and slope information.

The Government will provide files for downloading 3D data. Following is the information that will be provided electronically:

- 3D coordinates of traverse control points and benchmarks.

- 3D coordinates of grade finishing stakes.

The Government will perform the following:

- Establish basic survey control points for vertical and horizontal control of the project.

- Set centerline stakes, take cross-sections, and set reference hubs at 20 meter intervals and miscellaneous intermediate stations.

Add the following to the fourth paragraph:

Protect all land survey monuments, property corners, USGS bench marks and USGS control points. Move and reference those which fall within the construction limits according to Subsection 107.02, Protection and Restoration of Property and Landscape. Coordinate the new locations with the CO.

Add the following to the first paragraph on page 67:

Use the procedures contained in the current "Location/Construction Surveying Guide" issued by the U.S. Department of Transportation, Central Federal Lands Highway Division, Lakewood, Colorado, as a guide to the work in this Section.

Delete the second sentence of the second paragraph and substitute the following:

Reestablish missing terrain cross-section reference hubs, control points, and stakes before slope staking begins.

Add the following:

Furnish a practicable schedule of staking activities with the construction schedule submitted according to Section 155. Include the dates and sequence of staking requirements.

152.03 Survey and Staking Requirements. Add the following before the first paragraph:

General. Construction survey and staking includes layout, controls, and measurement as necessary to construct the project. Perform the work listed below according to Subsection **152.03(a)** through **152.03(m)**:

- Control Points.
- Roadway Cross Sections
- Slope Stakes and References: Both sides of the road.
- Clearing and Grubbing Limits: Both sides of the road and for all parking areas.
- Centerline Reestablishment: 7th Street and Argentine Street.
- Grade Finishing Stakes: Top of subgrade and top of roadway aggregate.
- Drainage Structures: Flowlines, curbs, trench grates.
- Bridges and abutments.
- Retaining Walls.
- Miscellaneous survey and staking: Driveways, sidewalks.
- Intermediate Survey and Staking.

(b) Roadway cross-sections. Delete the text and substitute the following:

Take roadway cross-sections normal to centerline. When the centerline curve radius is less than or equal to 75 meters, take cross-sections at a maximum centerline spacing of 10 meters. When the centerline curve radius is greater than 75 meters, take cross-sections at a maximum centerline spacing of 20 meters. Take additional cross-sections at significant breaks in topography and at changes in the typical section. Ensure that, at a minimum, roadway cross-sections are taken at each cross-section station shown in the plans. Along each cross-section, measure and record points at breaks in topography, but no further apart than 5 meters. Space the points so that the maximum variation in vertical distance from a straight line between two consecutive points and the ground line does not exceed ± 0.2 meters. Measure and record points to at least the anticipated slope stake and reference locations. Reduce all cross-section distances to horizontal distances from centerline.

Submit the cross-sectional data in GEOPAK ASCII text format: station, offset, elevation, north coordinate, east coordinate, p-code text format. Include a file header that defines the data type of the column. (Contact Central Federal lands Survey Manager, at 303-716-2078 for more information on the format.) Include one shot per line in the submitted files showing the following data:

Station (nominal), offset from centerline, elevation, north coordinate, east coordinate, p-code (Feature code: RH for reference hub, CL for centerline).

Deliver all data to the CO after completing the roadway cross-section survey. Submit data to CO at least 10 days prior to anticipated construction. Do not begin embankment construction or excavation operations on the proposed site until the design profile has been verified. The CO will send the cross-sectional data to CFL Survey manager to review for survey sufficiency. If significant differences in terrain are found, the Design Engineer will modify the profile if necessary to match the new terrain. If the design profile is modified, new design data will be provided for only those locations where the design profile has been modified. (The Design Engineer will re-run all cross-sections using the new terrain to provide final earthwork quantities). It will be the Contractor's responsibility to re-catch slope stakes according to Subsection 152.03(c).

(e) Centerline reestablishment. Delete the text and substitute the following:

Reestablish centerline from instrument control points. The maximum spacing between centerline points is 10 meters when centerline curve radius is less than or equal to 75 meters. When the centerline curve radius is greater than 75 meters, the maximum distance between centerline points is 20 meters. Reestablish centerline as many times as necessary to construct the work.

(f) Grade finishing stakes. Delete the third paragraph and substitute the following:

The maximum longitudinal spacing between stakes is 10 meters when the centerline curve radius is less than or equal to 75 meters. When the centerline curve radius is greater than 75 meters, the maximum longitudinal spacing between stakes is 20 meters. The maximum transverse spacing between stakes is 10 meters. Reset grade finishing stakes as many times as necessary to construct the subgrade and each aggregate course. Use brushes or guard stakes at each stake.

(g) Drainage structures. Add the following:

Verify, in the field, the approximate location of each individual structure with the CO prior to surveying, designing, and staking culverts. Use the "Guide for Designing and Staking Culvert in the Field", dated January 9, 1996, issued by the U.S. Department of Transportation, Central Federal Lands Highway Division, Lakewood, CO, as a guide to the work in this section.

(5) Add the following:

Plot at a scale of 1:100.

Add the following:

(7) When the field design has been approved, set drainage structure survey stakes, reference stakes, and stake inlet and outlet ditches to make the structure, including end treatments (e.g., drop inlets) functional.

(8) Adjust slope stakes to provide for catch basins (and transitions into and out of catch basins) which correspond to the final culvert location and design. If the culvert was moved from location shown in the plans, review the slope stakes in the vicinity of the plan location and adjust the slope stakes to remove the planned catch basin.

(l) Miscellaneous survey and staking.

(3) Approach Roads. Add the following:

For approach roads that have a site-specific profile grade shown in the plans, set slope stakes and references, clearing and grubbing limits, re-establish centerline, and set grade finishing stakes according the applicable portions of Subsection 152.03 and the other requirements in Section 152.

Add the following:

(6) Re-establishing land survey monuments, property boundary monuments, and geodetic control monuments found within the construction limits.

(m) Intermediate surveying and staking. Delete the text of the third paragraph and substitute the following:

Remeasure quantities if it has been determined that any portion of the work is acceptable but has not been completed to the lines, grades, and dimensions shown on the plans or established by the CO.

152.03 Surveying and Staking Requirements. Delete Table 152-1 and substitute the following:

Table 152-1
Construction Survey and Staking Tolerances [7]

Staking Phase	Horizontal	Vertical
Existing Government network control points	±20 mm	±8 mm * √K [5]
Local supplemental control points set from existing Government network points	±10 mm	±3 mm * √N [6]
Centerline points [1] – (PC), (PT), (POT), and (POC) including references	±10 mm	±10 mm
Other centerline points	±50 mm	±50 mm
Cross-section points and slope stakes [2]	±50 mm	±50 mm
Slope stake references [2]	±50 mm	±50 mm
Culverts and minor drainage structures	±50 mm	±20 mm
Retaining walls and curb and gutter	±20 mm	±10 mm
Bridge substructures	±10 mm [3]	±10 mm
Bridge superstructures	±10 mm [3]	±10 mm
Clearing and grubbing limits	±500 mm	---
Roadway subgrade finish stakes [4]	±50 mm	±10 mm
Roadway finish grade stakes [4]	±50 mm	±10 mm

[1] Centerline points: PC – point of curve; PT – point of tangent; POT – point on curve.
[2] Take the cross-sections normal to the centerline ±1 degree.
[3] Bridge control is established as a local network and the tolerances are relative to that network.
[4] Includes paved ditches
[5] K is the distance in kilometers
[6] N is the number of instrument setups.
[7] At 95% confidence level. Tolerances are relative to existing Government network control points.

Section 153. – CONTRACTOR QUALITY CONTROL

Construction Requirements

153.02 Contractor Quality Control Plan.

(a) Process control testing. Add the following:

See Table 153-1 for schedule of minimum sampling and testing for process control. Where no minimums are specified, submit proposed tests to be performed and the proposed sampling and testing frequencies.

(b) Inspection/control procedures.

(3) Production phase. Add the following:

(d) Inspect materials or assemblies accepted under Subsection 106.03 to ensure that the work and materials comply with all contract requirements. Furnish the results of the inspection, along with the product certification or commercial certification as applicable, to the CO prior to incorporating the materials into the work.

(c) Description of records. Add the following:

Identify the format for reporting test results and the procedures to be used to maintain inspection records.

(d) Personnel qualifications.

(1) Delete the text and substitute the following:

Designate a Quality Control Supervisor (QCS) whose primary responsibility is managing the inspection system. The QCS shall not be the Contractor's Superintendent. Designate a QCS who is experienced to perform and supervise all sampling, testing, and inspection. The QCS shall monitor all phases of the work and identify deficiencies and take appropriate corrective action.

Add the following:

(3) Personnel assigned to sampling or testing shall have 1 year or more of recent job experience in the type of sampling and testing required by the contract, and the following:

(a) NICET Level II certification in highway materials, or State or industry certification-related sampling and testing equivalent to their intended responsibilities.

or

(b) Current or previous employment by an AASHTO accredited laboratory performing sampling and testing equivalent to their intended responsibilities.

(c) Demonstrated proficiency or successful testing of one or more proficiency samples may be substituted for basic qualifications pending verification of test results.

153.03 Testing. Delete the title and text and substitute the following:

153.03 Sampling and Testing. Perform the work required by Table 153-1 and by the acceptable Quality Control Plan.

(a) Sampling.

(1) Acceptance sampling. Acceptance sampling schedules and times or locations will be provided by the CO.

(2) Quality control sampling. Use a procedure for random sampling. Sample according to the acceptable Quality Control Plan. In addition, sample any material that appears defective or inconsistent with similar material being produced, unless such material is voluntarily removed and replaced or otherwise corrected.

(b) Testing. Furnish laboratory equipment which conforms to the applicable test requirements and is properly calibrated. Provide a certification stating the equipment conforms to requirements. The CO may require the Contractor to perform testing to demonstrate acceptable equipment and an acceptable level of technician competence.

Keep laboratory facilities clean and maintain equipment in proper working condition. Provide the CO unrestricted access to the laboratory for inspection and review.

153.04 Records. Add the following to the first paragraph:

When tests are on material being incorporated into the work, report test results within 24 hours.

Add the following to the second paragraph:

Detail inspection results including deficiencies observed and corrective actions taken.

153.05 Acceptance. Add the following:

If chronic deficiencies are noted in the Contractor's inspection or testing systems, the CO may order supplemental inspection and/or testing to be performed. The Government will charge to the Contractor all costs associated with such supplemental inspection or testing.

Measurement

153.06 Delete the text and substitute the following:

Contractor quality control will be subsidiary to the 15401 Contractor Testing Item.

Table 153-1
Schedule of Minimum Sampling and Testing For Process Control
(to be performed by the contractor)

Section(s): 204, 208, 209.

Material	Property or Characteristic	Test Method or Specification	Frequency	Sampling Point
Embankment Construction	Classification	AASTHO T 145	1 per material/type	Source of material
Composition of Roadbed in Cuts	Moisture/Density	AASHTO T 99 or AASTHO T 180 (minimum of 5 proctor points)	1 per material/type	Source of material
Bedding/Backfill for Structures and Culvert Pipe	Gradation and liquid limit	AASHTO T 11 AASHTO T 27 AASHTO T 89 AASHTO T 90	1 per material/type	Source of material
	In-place density and moisture content	AASHTO T 310	For embankment and composition of roadway in cuts: 2 per lift, but not less than 2 every 800 cubic meters. For structure and culvert backfill: 1 per 15 meters/lift Minimum 2 per lift	Compacted embankment, subgrade or backfill as applicable
	Classification and R-value	Tested by FHWA Central Lab	1 per 700 meters, or change in material type	Sample depth: 0-300 mm

Table 153-1
Schedule of Minimum Sampling and Testing For Process Control
(to be performed by the contractor)

Section(s): 301, 303, 304, 305, 306, 308.

Material	Property or Characteristic	Test Method or Specification	Frequency	Sampling Point
Subbase, Base Course Aggregate Stabilization and Aggregate Topsoil Courses	Gradation (301)	AASTHO T 11 AASTHO T 27	2 per day	Crusher belt
	Moisture/Density	AASHTO T 99 or AASTHO T 180 (minimum of 5 proctor points)	1 per source of material	Source of material
	In-place density and moisture content	AASHTO T 310	2 per lift at 300 meter intervals, alternating lanes	Compacted aggregate
	Plasticity index (aggregate surfacing only)	AASHTO T 90	2 per day	Crusher belt
	Gradation (304 materials processed in place)	AASHTO T 11 AASHTO T 27	1 per 300 meters	Processed material

Note: Density and Moisture calculations AASHTO T 310...Density corrections based on moisture for recycled materials containing asphalts, or aggregates containing MgCl or CaCl shall be made based on samples taken from each test site and oven-dried in the laboratory.

Table 153-1
Schedule of Minimum Sampling and Testing For Process Control
(to be performed by the contractor)

Section(s): 402, 403, 404, 405.

Material	Property or Characteristic	Test Method or Specification	Frequency	Sampling Point
Asphalt Concrete Pavement Open-Graded Asphalt Friction Course Asphalt Treated Base Course	Gradation	AASTHO T 11 AASHTO T 27	2 per day per stockpile	Crusher belt (during production) and Cold Feed or Hot Bins (as applicable during production of hot mix)
	Moisture content of aggregates	FLH T 509	1 per day	Cold Feed (during production of hot mix)
	Compaction	ASTM D2950	Test strip, first day of production to establish roller pattern: 12 per 500 meters, then 3 per 500 meters	In place, after compaction
	Placement temperature	Thermometer	As directed	Behind laydown machine
	Surface tolerance	Straight edge and FLH T 504	During and after compaction	See subsection 401.16

Table 153-1
Schedule of Minimum Sampling and Testing For Process Control
(to be performed by the contractor)

Section(s): 501, 552, 601.

Material	Property or Characteristic	Test Method or Specification	Frequency	Sampling Point
Concrete	Gradation and fineness modulus	AASTHO T 11 AASHTO T 27	1 per day	Aggregate, before batching
	Moisture	FLH T 509	1 per day/stockpile	Aggregate, before batching
	Slump	AASHTO T 119	1 per 25 cubic meters, minimum 1 per day	See note
	Air content	AASHTO T 152	1 per 25 cubic meters, minimum 1 per day	See note
	Unit weight	AASHTO T 121	1 per 25 cubic meters, minimum 1 per day	See note
	Temperature	Thermometer	1 per 25 cubic meters, minimum 1 per day	See note
	Making test specimens for compressive strength	AASHTO T 23	1 set per 25 cubic meters, minimum 1 set per day	At point of discharge

Note: If an extended set admixture is used for the sole purpose of extending discharge times, sampling and testing shall be performed by the contractor at point of batching and discharge location to ensure compliance with subsection 552.08.

Section 154. – CONTRACTOR SAMPLING AND TESTING

Description

154.01 Delete the second sentence and substitute the following:

When there is a pay item for Contractor testing included in the bid schedule, it also consists of testing and reporting required test results.

Construction Requirements

154.02 Sampling. Delete the second paragraph and substitute the following:

Sample and split samples according to AASHTO or other acceptable procedures. Allow the CO the opportunity to witness all sampling. Immediately perform splits on all samples. Deliver the Government's portion of the sample or split sample in an acceptable container suitable for shipment. Submit form 1600c for each sample to the CO and label all samples with the following information:

(a) Project number
(b) Source of material
(c) Item number
(d) Sample number
(e) Date sampled
(f) Time sampled
(g) Location sample taken
(h) Name of person sampling
(i) Name of person witnessing sampling
(j) Type of test required on sample

Sample according to the Sampling and Testing tables included at the end of each section.

154.03 Testing. Delete the first sentence and substitute the following:

When there is a pay item for Contractor testing included in the bid schedule, perform all tests required by the Sampling and Testing tables included at the end of each section.

Add the following:

Where Process Control Sampling and Testing frequencies as per Table 153-1 are identical to the Sampling and Testing Tables for all applicable work the Process Control Samples may be used for acceptance.

Add the following subsections:

154.03A Laboratory (Contractor-Furnished). Furnish a laboratory equipped with all necessary test equipment and accessories to satisfy the testing required by the contract. Services of a commercial laboratory equipped with all necessary test equipment and accessories to satisfy the testing required by the contract may be used (Refer to Appendix F, Laboratory Equipment List, for minimum equipment requirements).

Use equipment that is calibrated and meets the applicable testing requirements of the contract. Tag all necessary equipment indicating the date of last inspection, inspector, and calibration number.

The CO may check equipment to verify condition and calibration. Repair or replace equipment not meeting applicable requirements.

Submit documentation supporting the calibration of all necessary equipment prior to actual testing. Include the following:

(a) Description of the equipment calibrated or verified, including model number, serial number, or other acceptable identification.

(b) Identification of the individual performing the calibration or verification.

(c) Identification of the calibration or verification procedure used.

(d) The calibration number for each calibration.

154.04 Records. Add the following:

Report test results on forms containing all sample information required by Subsection 154.02. Label clearly all interim measurements used to determine the results. Attach work sheets used to determine test values to the test result forms when submitted.

154.05 Acceptance. Delete the text and substitute the following:

Contractor sampling and testing will be evaluated under Subsections 106.01, 106.02, and 106.04 based on Government verification testing.

Section 155. – SCHEDULES FOR CONSTRUCTION CONTRACTS

Construction Requirements

155.02 General. Add the following to the fourth paragraph:

No progress payment will be made for any work until a construction schedule is submitted to the CO and accepted by the CO.

155.05 Written Narrative. Add the following:

(j) List anticipated monthly and cumulative contract earnings (including, for schedule updates, any contract modifications) for each month from the beginning of construction operations through the completion of the work. Calculate and list each month's anticipated earnings through the close of business on the date provided by the CO as the cut-off date for monthly project pay estimates.

155.06 Schedule Updates. Add the following:

No progress payment will be made for any work until an updated construction schedule has been submitted to and accepted by the CO.

Allow 7 days after receipt for acceptance of the updated construction schedule or a return for revisions.

Section 156. – PUBLIC TRAFFIC

Construction Requirements

156.03 Accommodating Traffic During Work. Delete the last two sentences in the first paragraph and substitute the following:

Submit situation-specific traffic control implementation drawings and alternate traffic control proposals according to Subsection 104.03 for acceptance at least 14 days before intended use.

156.04 Maintaining Roadways During Work.

(a) Add the following:

Do not construct detours outside of the clearing limits or use alternate route detours without the approval of the CO.

(c) Delete the text and substitute the following:

Snow removal to facilitate the work is the Contractor's responsibility. Snow removal to provide public access is the responsibility of the maintaining agency and will be performed at the maintaining agency's discretion. Allow the maintaining agency access to perform snow removal.

156.05 Maintaining Roadways During Non-work Periods. Delete the second sentence and substitute the following:

Snow removal to provide public access is the responsibility of the maintaining agency.

156.06 Limitations on Construction Operations.

(d) Delete the first sentence and substitute the following:

For alternate one-way traffic control, provide a minimum lane width of 3 meters. For two-way traffic, provide a minimum roadway width of 6 meters.

(j) Delete the text and substitute the following:

For other than road closures specified under Subsection 108.01(c): Limit construction-caused delays to public traffic to a maximum of 30 minutes per passage through the project. For delays longer than 30 minutes, public notice will be given in advance through the local news media and by informational signs.

The road to businesses on 7th Street and Argentine Street will be kept open on weekends, without construction delays, from 6:00 p.m. Friday to 11:00 p.m. Sunday.

(k) Add the following:

Maintain existing guard posts (bollards) and boulders until removal is necessary for construction. Use a temporary barrier, or other appropriate shielding or warning device while the guard posts and boulders are absent. Limit the length of the area affected as directed by the CO. Install new guardrails and bridge rails as soon as possible to minimize risk to the public.

Section 157. – SOIL EROSION CONTROL

Construction Requirements

157.03 General. Delete the second paragraph and substitute the following:

Standard erosion control devices are provided in the contract. Detail site-specific measures for controlling erosion and submit to the CO for acceptance prior to implementation. Provide working drawings and associated data that do not exceed 610 by 920 millimeters in size. Allow 7 days for acceptance of the drawings or a return for corrections.
Include the following in the detailed design:

(a) Address contractual requirements for storm water runoff permits, environmental commitments, and other permit requirements here or in Subsection 107.01 or 107.10.

(b) Location of each proposed erosion control measure.

(c) Type of each erosion control measure.

(d) Quantities and estimated unit costs of proposed temporary erosion control devices to be implemented during construction.

(e) A schedule detailing coordination of erosion control measures with the various construction operations or stages. Include the furnishing, installation, maintaining, and removing of temporary devices and the installation of permanent erosion control features.

(f) A schedule outlining the proposed schedule of clearing and grubbing, excavation, embankment, and culvert operations such that the area of disturbed or erodible material is minimized. Schedule the work such that temporary and permanent erosion measures can be incorporated at the earliest practical time.

(g) Construction methods used in various items of work to minimize erosion.

Add the following:

At least 5 days prior to the preconstruction conference, designate in writing an Erosion Control Supervisor who is responsible for implementing the requirements of this Section. Do not designate the project superintendent as the Erosion Control Supervisor.

When temporary erosion control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as part of the work in a timely manner, provide temporary measures at no cost to the Government.

157.04 Controls and Limitations on Work. Delete paragraphs (c) and (d) and substitute the following:

(c) Unless a specific seeding season is identified in the contract, apply permanent turf establishment to the finished slopes and ditches within 14 days according to Sections 624 and 625.

(d) Apply temporary approved measures on disturbed areas within 14 days after last disturbance, except where the area will be redisturbed within 21 days after last disturbance or when initial stabilization is precluded by snow cover or frozen ground.

157.05 Filter Barriers. Add the following:

In some instances, the CO may direct that filter barriers remain in place after the project is complete. In this situation, the filter barrier will be removed by others.

Inspect silt fence and erosion control logs weekly and after every major storm; clean if necessary.

157.09 Diversions. Add the following:

Prepare and submit a temporary diversion plan to the CO for review and approval.

157.12 Inspection and Reporting. Add the following:

Monitor the turbidity of waters adjacent to the project. Take turbidity measurements using an HF-DRT 15CE turbidimeter or equivalent upstream of the project and 150 meters downstream of the area of the highest turbidity. If the measurements show an increase of 10 NTU or more, immediately suspend operations in the vicinity of the problem area and modify the erosion control measures to eliminate the cause of the high turbidity. Include turbidity readings, locations, and actions taken, if any, in inspection reports. Also provide documentation of meter calibration.

157.14 Acceptance. Add the following:

Soil erosion control will be evaluated under subsection 106.02 based on the demonstrated ability of the erosion control measures to result in minimal soil erosion, sedimentation and/or siltation, and turbidity increases within or adjacent to the project limits.

Payment

157.16 Add the following:

	Pay Item	Pay Unit
15725A	Temporary diversion channel	Lump sum
15734	Sediment Control log	Meter

Section 158. – WATERING FOR DUST CONTROL

Construction Requirements

158.03 General. Add the following:

Coordinate with the Town of Georgetown for a metered hydrant to use as a water supply for this 7th Street Bridge and Road Improvement work. Provide a water meter to attach to the Georgetown hydrant. Water will be provided by the Town of Georgetown at no cost.

Section 201. – CLEARING AND GRUBBING

Description

201.01 Delete the text and substitute the following:

This work consists of clearing and grubbing within the clearing limits designated by the CO based on the dimensions shown in the plans, adjusted to fit field conditions.

Section 203. – REMOVAL OF STRUCTURES AND OBSTRUCTIONS

Description

203.01 Delete the first sentence and substitute the following:

This work consists of salvaging of signs, removing and disposing of asphalt pavement, concrete curbs, driveways, sidewalks, wood bollards, projecting ends of timber retaining walls, and other obstructions.

Construction Requirements

203.05 Disposing of Material.

(a) Remove from project. Add the following:

Secure environmental clearances according to Subsection 107.10.

(b) Burn. Delete the text and substitute the following:

Burning is not allowed for the 7th Street Bridge and Road Improvements project.

(c) Bury. Delete the text and substitute the following:

Burying debris is not allowed for the 7th Street Bridge and Road Improvements project.

Payment

203.08 Add the following:

Pay Item	Pay Unit
20307 Sawcutting pavement	Meter

Section 204. – EXCAVATION AND EMBANKMENT

Description

204.02 Definitions.

(c) Embankment material.

(1) Rock. Delete the text and substitute the following:

Rock is material containing particles that are retained on the 75 mm sieve and having less than 40 percent passing the 4.75 mm sieve or less than 35 percent passing the 2 mm sieve.

Construction Requirements

204.11 Compaction.

(b) Earth embankment. Delete the first paragraph and substitute the following:

Classify the material according to AASHTO M 145. For material classified A-1 or A-2-4, determine the optimum moisture content and the maximum density according to AASHTO T 180 method D. For other material classifications, determine the optimum moisture content and the maximum density according to AASHTO T 99 method C.

204.14 Disposal of Unsuitable or Excess Material. Add the following:

Secure environmental clearances according to Subsection 107.10.

Section 208. – STRUCTURE EXCAVATION AND BACKFILL FOR SELECTED MAJOR STRUCTURES

Construction Requirements

208.04 General. Delete the last two sentences of the third paragraph and substitute the following:

Where support systems, shield systems, or other protective systems are to be used, design the shoring according to Section 562 and submit working drawings and construction details according to Subsection 104.03.

Shoring and bracing is anticipated for construction of bridge abutments and retaining walls to protect existing utility poles, wood cribbing retaining walls, underground natural gas, sanitary sewer, and water utilities.

Section 209. – STRUCTURE EXCAVATION AND BACKFILL

Construction Requirements

209.09 Bedding.

(b) Culverts. Delete the third sentence and substitute the following:

When no class is specified, use bedding material that conforms to class C and to Table 2 of AASHTO M 145 for Classifications A-1, A-2, or A-3 soils.

Add the following:

If lean concrete backfill is used, the bedding requirements for (2) Class B and (3) Class C are waived.

Section 251. – RIPRAP

Delete the text of this Section and substitute the following:

Description

251.01 This work consists of furnishing and placing riprap for bank protection, slope protection, drainage structures, and erosion control.

Riprap classes are designated as shown in Table 705-1.

Material

251.02 Conform to the following Subsections:

Geotextile type IVE	714.01
Riprap rock	705.02

Construction Requirements

251.03 General. Perform the work under Section 209. Dress the slope to produce a smooth surface. If earthwork geotextile is required, place according to Section 207.

251.04 Placed Riprap. Placed riprap is rock placed on a prepared surface to form a well-graded mass.

Place riprap to its full thickness in one operation to avoid displacing the underlying material. Do not place riprap material by methods that cause segregation or damage to the prepared surface. Place or rearrange individual rocks by mechanical or hand methods to obtain a dense uniform blanket with a reasonably smooth surface.

251.05 Placed Individual Boulders.

Place individual boulders, obtained from the existing landscape boulders at the edge of the parking lot, on the finished slopes as directed by the CO. Boulders shall vary in size. Place the boulders so that the largest face is down. Place the boulders randomly and orient to present a natural and pleasing effect.

Lay and securely place the boulders on firm beds, backfill as required, and compact with hand-operated compaction equipment.

Stake boulder locations, and obtain approval by the CO prior to installation.

251.07 Acceptance. Rock for riprap will be evaluated under Subsection 106.02 and 106.03.

Rock placement for riprap will be evaluated under Subsections 106.02 and 106.04.

Structure excavation and backfill will be evaluated under Section 209.

Geotextile will be evaluated under Section 207.

Measurement

251.08 Measure riprap by the cubic meter in place.

Payment

251.09 The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

Payment will be made under:

Pay Item		Pay Unit
25111	Placed individual boulders	Each

Section 308. – MINOR CRUSHED AGGREGATE

Construction Requirements

308.06 Acceptance Delete the second paragraph and substitute the following:

Construction of roadway aggregate courses will be evaluated under Subsection 106.02 and 106.04. Method 2 compaction will be evaluated under Section 106.04. During placement the Contractor will sample material from the windrow or roadbed after processing prior to compaction at the frequency shown in table 308-1. The samples will be submitted to the CO for verification. Materials which do not meet the approved certification will be considered unacceptable.

Delete Table 308-1 and substitute the following:

Table 308-1
Sampling and Testing

Material or Product	Property or Characteristic	Test Methods or Specifications	Frequency	Sampling Point
Crushed aggregate (1)	Moisture-Density	AASHTO T180 Method D	1 for each aggregate supplied.	Production output or stockpile.
	Gradation (2)	AASHTO T11 and T27	1 for each 1000 t.	From the windrow or roadbed after processing.
	In-place density and moisture content	AASHTO T310 or other approved procedures	1 for each 1000 t.	In-place completed compaction layer.

(1) Sampling and testing required for roadway aggregate.
(2) Use only sieves indicated for the specified gradation.

Section 402. – MINOR HOT ASPHALT CONCRETE

Description

402.01 Add the following:

This work also consists of constructing minor hot asphalt for patching sections of roadway damaged by construction operations outside of the project limits.

Construction Requirements

402.02 Composition of Mix (Job-Mix Formula). Delete the text and substitute the following:

Provide a hot asphalt concrete mix composed of crushed stone or gravel and asphalt binder mixed in an approved plant. Use an aggregate quality, gradation, and an asphalt binder grade conforming to those used locally in the construction of highways by either Federal or state agencies.

In addition to meeting the Federal or state agency specifications, the mix will conform to design parameters (a) or (b) for the type of mix specified in Table 402-1.

All approved mixes will meet design parameter (c) in Table 402-1.

Table 402-1
Minor Hot Asphalt Concrete Mix Requirements

Design Parameters	Specification
(a) Hveem (AASHTO T 246 and AASHTO T 247)	
(1) Stabilometer, minimum	35
(2) Percent Air Voids [1]	3 – 5
(b) Marshall (AASHTO T 245)	
(1) Stability, kN minimum	12.45
(2) Flow, 0.25 mm	8 - 16
(3) Percent Air Voids [1]	3 - 5
(4) Compaction, number of blows per side	75
(c) Moisture Susceptibility (AASHTO T 165 and T 167 or AASHTO T 283)	
(1) Retained strength, % minimum	70

[1] The percent of air voids are based on AASHTO T 166, AASHTO T 209 and AASHTO T 269.

For the proposed hot asphalt concrete mix, furnish a production certification meeting the mix requirements in Table 402-1, gradation specifications, test values, and a sample of loose mix to the CO three weeks prior to placement. Include copies of laboratory test reports indicating the properties of the aggregates, asphalt binder and additives that meet Federal or state agency specifications. Submit the maximum specific gravity (density) of the mix as determined by AASHTO T 209.

402.07 Compacting.

(a) Roadway paving. Delete the text and substitute the following:

Compact the mix to a minimum of 92 percent of maximum specific gravity (density). Determine density by nuclear gauge.

402.09 Acceptance. Delete the text and substitute the following:

Minor hot asphalt concrete mixture will be evaluated under Subsections 106.02, 106.03 and 106.04.

Minor hot asphalt concrete construction work will be evaluated under Subsections 106.02 and 106.04. See Table 402-2 for minimum sampling and testing requirements.

During placement the contractor will sample the loose mix according to Table 402-2. A split sample will be submitted to the CO for verification. Materials that do not meet the approved job mix formula will be considered unacceptable.

Delete Table 402-1 and substitute the following:

Table 402-2
Sampling and Testing

Material or Product	Property or Characteristic	Test Methods or Specifications	Frequency	Sampling Point
Minor Hot Asphalt Concrete Pavement	In-place Density	Nuclear gauge [1]	1 for each 750 m^2.	In Place after compaction.
	Asphalt Content	AASHTO T308, or other approved procedure	1 for each 750 t.	Behind laydown machine before rolling.
	Gradation [2]	AASHTO T308 and AASHTO T30, or other approved procedure [3]	1 for each 750 t.	Behind laydown machine before rolling.

[1] When directed, verify density by taking core samples from the compacted pavement according to AASHTO T230 method B. Fill and compact the sample holes with asphalt concrete mixture.
[2] Use only sieves indicated on the approved mix design for the specified gradation.
[3] Modify AASHTO T308, parts 8.2 and 10.2 to allow the use of FLH T515, Moisture Determination using a Microwave Oven.

Section 411. – ASPHALT PRIME COAT

Description

411.01 Delete the second paragraph and substitute the following:

Prime coat asphalt grade is designated as shown in AASHTO M 140 or AASHTO M 208 for emulsified asphalt; AASHTO M 81 or AASHTO M 82 for cut-back asphalt; or Subsection 702.11 for emulsified petroleum resin.

Material

411.02 Add the following:

Emulsified petroleum resin (concentrate) 702.11

Construction Requirements

411.06 Asphalt Application. Add the following:

Dilute emulsified petroleum resin with water in the ratio of 3 parts water to 1 part emulsified petroleum resin concentrate, and apply at a rate of 1.00 to 2.00 liters per square meter according to Subsection 409.08.

Measurement

411.08 Delete the first sentence of the second paragraph and substitute the following:

Measure prime coat asphalt by the metric ton or by the liter, without including water added for dilution. Measurement for payment will be for undiluted quantity only.

Section 412. – ASPHALT TACK COAT

Construction Requirements

412.06 Asphalt Application. Delete the first sentence of the second paragraph and substitute the following:

Apply the diluted emulsified asphalt according to Subsection 409.08 at a rate of 0.15 to 0.70 liters per square meter.

Measurement

412.08 Delete the text and substitute the following:

The quantity of emulsion indicated in the bid schedule is an undiluted quantity.

Water for diluting tack coat in accordance with Subsection 412.06 will not be measured for payment.

The load invoices supplied to the CO for payment shall indicate a breakdown of total emulsion and water added.

Section 552. – STRUCTURAL CONCRETE

Construction Requirements

552.03 Composition (Concrete Mix Design). Delete the first sentence of the first paragraph and Table 552-1 and substitute the following:

Design and produce concrete mixtures that conform to Tables 552-1 and 552-1A for the class of concrete specified.

Table 552-1
Composition of Concrete

Class of Concrete	Minimum Cement Content (kg/m^3)	Maximum W/C Ratio	Slump [1] (mm)
A	360	0.49	50 to 100
A(AE)	360	0.44	25 to 100
B	310	0.58	50 to 100
B(AE)	310	0.58	50 to 100
C	390	0.49	50 to 100
C(AE)	390	0.44	25 to 75
D(AE) [2]	360	0.40	25 to 75
E(AE) [3]	360	0.40	100 to 150 [4]
P	390	0.44	0 to 100
Seal	390	0.54	100 to 200

[1] Maximum slump is 200 millimeters if approved mix design includes a high-range water reducer. The maximum slump for any mix utilizing a water reducing agent may be adjusted pending mix design approval.
[2] Concrete with a water reducing and retarding admixture conforming to AASHTO M 194 type D.
[3] A latex modified concrete with 0.31 liters of modifier per kilogram of cement.
[4] Measure the slump 4 to 5 minutes after the concrete is discharged from the mixer.

Table 552-1A
Minimum Air Content for Air Entrained Concrete

Nominal Maximum Aggregate Size	Minimum Air Content [1]
50 mm	4.0
37.5 mm	4.5
25 mm	4.5
19 mm	5.0
12.5 mm	5.5

[1] See Subsection 552.03(t) for maximum air content.

(l) Dosage of admixtures. <u>Delete the text and substitute the following:</u>

When requested by the CO, provide a qualified person from the admixture manufacturer to help establish the proper dosage. Do not mix chemical admixtures together in a mix unless they are compatible. Furnish supporting documentation of compatibility from the manufacturers.

(1) Air-entraining admixtures. Entrained air may be obtained with either an air-entraining hydraulic cement or an air-entraining admixture.

(2) Set accelerating admixtures. Do not use chloride accelerators. Do not use set accelerating admixtures with class P (prestressed) concrete.

(3) Hydration stabilizing admixtures. Hydration stabilizing admixtures may be used to extend the allowable delivery time for concrete. Base the dosage on the time needed to delay the initial set of the concrete for delivery and discharge on the job. Include the design discharge time limit in the dosage submittal. The maximum allowable design discharge time is 3.50 hours.

Add the following:

Do not use precast units unless included in the plans or approved by the CO.

Integrally color all Structural Concrete with an approved color mixture manufactured by Davis Colors or approved equal. Use additive and sealers as recommended by manufacturer. Locations of colored concrete are indicated on the drawings. The approved colored concrete will be within 0.4 kilograms to 0.5 kilograms of color per 50 kilograms type 1 or 2 cement. The color will be by Davis Colors (2.1% of cement weight of pigment #5237) as approved by the CO.

At least two weeks prior to placing the concrete, prepare a test panel off the job site in a location within the Town of Georgetown determined by the CO. Submit the color and quantity of color used to produce the test panels to the CO for approval. Test panels will be 1m x 1m x 100mm and have an embedded lifting device. Test panels will show surface finish, color, and general appearance of acceptable work. Concrete provided for the tests panels will have the same amount of cement per cubic meter and the same aggregates and admixtures in the same proportions that will be used in the final mixes. Do not construct colored concrete prior to the approval of the test panels by the CO.

552.08 Delivery. Add the following after the second paragraph:

If a hydration stabilizing admixture is approved for use in the concrete mix, deliver and place the concrete within the approved design discharge time limit. Limit the slump loss to no more than 50 millimeters during the stabilization period. An approved and compatible hydration activator may be used at the discharge site to ensure proper placement and testing.

(a) Truck mixer/agitator. Delete Table 552-2 and substitute the following:

Table 552-2
Concrete Discharge Time Limits

Cement Type	Admixtures	Time Limit (hour)
Type I, IA, II, or IIA	None	1.00
Type I, IA, II, or IIA	AASHTO M 194, type B, D, or G	1.50
Type I, IA, II, or IIA	Hydration stabilizer	Approved design discharge time limit, 3.50 maximum
Type III	None	0.75
Type III	AASHTO M 194, type B, D, or G	1.25

Add the following:

Concrete discharge times noted in Table 552-2 may be extended to 3 hours provided an extended set admixture conforming to AASHTO M 194, Type B or D is incorporated into the plastic concrete at time of mixing. Determine dosage required to stabilize concrete using job site materials and field trial mixtures. The extended-set admixture shall provide the following benefits:

(1) Control the hydration of all cement minerals and gypsum.

(2) Control slump loss of the stabilized concrete to within 50 millimeters of initial slump after addition of extended set admixture.

(3) Provide setting time characteristics measured at the end of the stabilization period to within 1 hour of that of the untreated concrete mixture.

Include the dosage and type of extended-set admixture with proposed mix design. When requested, the admixture manufacturer shall provide the service of a qualified person to assist in establishing the proper dose of extended-set admixture and make dosage adjustments required to meet changing job site conditions.

552.09 Quality Control of Mix. Add the following after the first paragraph:

At least 2 weeks prior to the start of concrete placement operations, arrange a pre-concrete placing conference. Coordinate attendance with the CO and any applicable subcontractors. Be prepared to discuss and/or submit the following:

(1) Proposed concrete placement schedule.

(2) Review approved concrete mix design and determination of batch weights.

(3) Discuss Section 153, Contractor Quality Control, minimum frequency schedule for process control sampling and testing (to be performed by the Contractor).

(4) Discuss batching, mixing, placing, and curing requirements.

(5) Discuss Subsections 106.03, Certification, and 106.05, Statistical Evaluation of Work and Determination of Pay Factor (Value of Work).

(a) Mixing.

(7) Add the following:

(l) If a hydration stabilizing mixture is used, record the slump at the plant before adding the stabilizer.

(b) Delivery and sampling.

(3) Add the following after the last paragraph:

If hydration stabilizing admixture is used, determine the slump before placement. Reject all concrete with a slump loss of more than 50 millimeters as compared to the slump recorded at the batch plant before adding the stabilizer.

(4) Add the following after the last paragraph:

Furnish and maintain curing facilities for compressive cylinders meeting the requirements of AASHTO T 23. The facilities shall have capacity sufficient to cure 4 cylinders from each compressive strength sample set.

552.15 Curing Concrete. Add the following:

Cure slabs with integral color in accordance with instructions of the pigment manufacturer. Do not use polyethylene or paper sheeting.

552.16 Finishing Formed Concrete Surfaces. Add the following after the first paragraph:

Use an approved form release agent which will produce a minimum of staining, air holes, and hydration discoloration.

552.19 Acceptance. Delete the third sentence of the second paragraph and substitute the following:

Perform sampling and testing according to Table 552-7.

Section 554. – REINFORCING STEEL

Construction Requirements

554.05 Bending. Add the following to the first paragraph:

Do not shear reinforcing bars in bundles.

554.09 Splices. Add the following:

Mechanical splices, at locations where approved for use or at locations shown on the plans, may be made using the following devices:

(a) Vertical column/shaft reinforcement may be mechanically butt spliced using the **Bar-Lock MBT** coupler as produced by Splice Sleeve North America, or an approved alternative.

(b) Other reinforcement, including spirals, may be spliced using the **Bar- Lock MBT** coupler as produced by Splice Sleeve North America, the **OS** Splice Clip as produced by Splice Sleeve North America, or the **Quick-Wedge** as produced by Erico Concrete Construction Products, or an approved alternate.

Approval of an alternative splicing design will be based on technical data, including test results, and other necessary proof of satisfactory performance submitted by the manufacturer. Criteria for approval is as follows:

(a) The total slip of the reinforcing bars within the splice after loading in tension to 207 MPa and relaxing to 21 MPa shall not exceed 254 micrometers for bars No. 43 or smaller as measured between gage points clear of the splice.

(b) Acceptance on Washington DOT or Caltrans "Approved Products List" will be considered in reviewing submittal for use on this project.

Splice components shall have a clear coverage of not less than 40 mm measured from the surface of the concrete to the outside face of the splice component.

Provide 600 mm minimum distance between butt splices of adjacent bars as measured along the longitudinal axis of the shaft/column.

All splicing procedures shall be in accordance with the manufacturer's standard equipment, jigs, clamps, and other required accessories. Procedures used in making the mechanical butt splices shall be as recommended by the manufacturer and approved by the CO.
in Table 559-1:

Section 556. – BRIDGE RAILING

Description

556.01 Add the following at the end of the first sentence:

and terminal guardrail sections.

Construction Requirements

556.07 Timber Railing. Add the following:

(a) Posts. Where pavement is within 1 meter of the guardrail, set posts before placing the pavement.

Where it is not possible to maintain a 600 millimeter minimum distance between the back of the guardrail post and the top of a slope 1:2 or steeper, increase the post length to 2.4 meters.

Where an impenetrable object is encountered, use a short post. Treat field cuts for wood posts with two coats of preservative treatment applied with a brush or a sprayer. Do not place field cuts in contact with the ground. Anchor short posts in concrete. Backfill and compact the remaining hole with acceptable material.

Do not use long or short posts in terminal sections.

Drive posts into pilot holes that are punched or drilled. The dimensions of the pilot hole shall not exceed the dimensions of the post by more than 15 millimeters. Set posts plumb, backfill, and compact.

(b) Rail Elements. Construct according to subsection 617.04 and the following:

Field drill holes in the steel backing on curved sections or where required to correspond to the field cut wood rails at joints. Do not use a torch to cut holes.

Section 562. – FORMS AND FALSEWORK

Delete the title and text of this Section and substitute the following:

Section 562. – TEMPORARY WORKS

Description

562.01 This work consists of the design, construction, inspection, and removal of temporary works for the construction and repair of permanent structures. Temporary works includes all temporary facilities used in construction that do not become part of the permanent structure. Such temporary works include, but are not limited to, falsework, formwork, cofferdams, and excavation supports.

Material

562.02 Select material consistent with the safety and quality required by the design assumptions. Furnish manufactured devices complying with the *Certification Program for Bridge Temporary Works* (FHWA-RD-93-033).

Design Requirements

562.03 Design. Design and construct safe and adequate temporary works that will support all loads imposed and provide the necessary rigidity to produce in the final structure, the lines and grades shown on the plans. Design temporary works according to the *AASHTO Guide Design Specification for Bridge Temporary Works*. When a manufactured device is to be employed, ensure that the design load on the device is within the load rating recommended by the manufacturer. Design falsework and forms supporting deck slabs and overhangs on girder bridges so that there will be no differential settlement between the girders and the deck forms during placement of deck concrete.

562.04 Drawings. Prepare and submit drawings according to Subsection 104.03. Furnish design calculations and supporting data in sufficient detail to permit a structural and safety review of the proposed design. Show all information necessary to allow the design of all components to be checked independently. When manufactured devices are used as a part of the temporary works, provide catalog or equivalent data indicating the manufacturer's recommended safe load capacities of the devices.

When concrete placement is involved, indicate on the drawings the proposed sequence, rate of placement, direction of placement, and location of all construction joints. Show anticipated total settlements and/or deflections of the falsework and forms on the drawings. Include falsework footing settlements, joint take-up, and deflection of beams or girders.

Do not start construction of any temporary work for which drawings are required until the drawings have been accepted by the CO.

Construction Requirements

562.05 Foundations. Determine the allowable bearing capacity of the foundation material on which the supports for temporary works will rest. Perform load tests to verify proposed bearing capacity values that are in doubt, marginal or in other high risk situations.

Foundation support values shown in the contract for the permanent structure may be used in the design of falsework foundations provided foundations are at the same elevation and on the same soil as those of the permanent structure. If temporary works are to be supported on temporary fill, construct the fill according to Section 204 and verify the bearing capacity of the placed material.

Provide adequate site drainage and soil protection to ensure the integrity of the foundation material for the temporary works supports.

If piles are used, capacities may be estimated and later confirmed during construction using standard procedures based on the driving characteristics of the pile. In the absence of more sophisticated methods of determining pile capacity, use the dynamic formula according to Section 551 to determine ultimate pile capacity. The contractor may elect to use load tests to confirm the estimated capacities. Perform load tests to verify bearing capacity values that are in doubt, marginal or in other high risk situations.

Submit all foundation design calculations and other relevant foundation design data to the CO for acceptance.

562.06 Construction. Construct temporary works according to the accepted drawings. Use material and workmanship consistent with that assumed in the design of the temporary works.

Do not weld falsework members to any portion of the permanent structure unless it is shown on the accepted drawings.

Provide tell-tales with surveyed measurements, or other acceptable means, for accurate measurement of falsework settlement. Do not use the ground surface near falsework supports as a reference elevation. During concrete placement, record settlement to the nearest 2 millimeters. Anticipated compressive settlement and/or deflection of falsework shall not exceed 25 millimeters. For cast-in-place concrete structures, the calculated deflection of falsework flexural members shall not exceed 1/360 of their span regardless of whether or not the deflection is compensated by camber strips.

562.07 Maintenance and Inspection. Inspect and maintain temporary works in an acceptable condition throughout the period of use. Clearly mark the capacity of each manufactured device according to the *Certification Program for Bridge Temporary Works*.

In the presence of the CO, perform an in-depth inspection of the temporary works not more than 24 hours before beginning each concrete placement or before allowing people to enter a cofferdam or excavation support structure. Inspect other temporary works at least once a month to ensure they are functioning properly. Inspect shoring and load test support systems before loading.

Make inspections and certifications according to the *Certification Program for Bridge Temporary Works*. Furnish written results of the inspections to the CO before placing concrete, allowing people to enter a cofferdam or excavation support structure, or loading temporary works. Include a certification that the system meets the requirements of the contract and the drawings.

562.08 Removal. Remove temporary works in such a manner as to permit the structure to uniformly and gradually take the stresses due to its own mass.

Unless otherwise permitted, remove all temporary works upon completion of the work. Do not disturb or damage the finished work. Restore the area to its original or planned condition. Clean up all debris. The removed temporary works remain the property of the contractor.

562.09 Acceptance. Temporary works will be evaluated under Subsections 106.02, 106.03, and 106.04.

Measurement and Payment

562.10 Forms. See Subsection 109.05.

Do not measure temporary works for payment.

Section 601. – MINOR CONCRETE STRUCTURES

Material

601.02 Add the following:

Concrete coloring agents	711.05

601.03 Concrete Composition. Add the following:

(i) Test panel of colored concrete.

Construction Requirements

601.04 General. Add the following:

Integrally color all Minor Concrete with an approved color mixture manufactured by Davis Colors or approved equal. Use additive and sealers as recommended by manufacturer. The approved colored concrete will be within 0.4 kilograms to 0.5 kilograms of color per 50 kilograms type 1 or 2 cement. The color will be by Davis Colors (2.1% of cement weight of pigment #5237) as approved by the CO.

At least two weeks prior to placing the concrete, prepare a test panel off the job site in a location within the Town of Georgetown determined by the CO. Submit the color and quantity of color used to produce the test panel to the CO for approval. The test panel will be 1m x 1m x 100mm and have an embedded lifting device. The test panel will show surface of finish, color, joints, and general appearance of acceptable work. Concrete provided for the test panel will have the same amount of cement per cubic meter and the same aggregates and admixtures in the same proportions that will be used in the final mixes. Do not construct colored concrete prior to the approval of the test panel by the CO.

Do not use precast units unless included in the plans or approved by the CO.

601.06 Curing concrete. Add the following:

Curing compound will be as approved by the pigment manufacturer for use with colored concrete, or other approved material that will not cause stain or discoloration.

601.07 Acceptance. Add the following:

When compressive strength samples are taken to confirm the certification, the curing of concrete cylinders as specified in AASHTO T 23 is modified to allow curing of concrete for 28 days in waterproof molds without stripping the molds in the specified 24 ± 8 hours.

Section 602. – CULVERTS AND DRAINS

Material

602.02 Delete "Special grout backfill, 704.11" and substitute the following:

Lean concrete backfill	614

Add the following:

Precast Concrete Units	725.11

Section 604. – MANHOLES, INLETS, AND CATCH BASINS

Construction Requirements

604.04 Concrete Construction. Add the following:

Form concrete trenches and secure cast iron trench frames to formwork as per manufacturer's recommended installation instructions. Prior to pouring concrete, verify the space between frames to ensure the grates will fit properly and be within manufacturer tolerances. Prior to pouring concrete, verify final elevations and slopes. Trench drains which are out of tolerance for grate clearances and/or the cast iron grates rock within the frames or do not fit properly will be removed and replaced at no additional cost.

Payment

604.10 Add the following:

Pay Item		Pay Unit
60424B	Trench drain	Meter

Section 605. – UNDERDRAINS, SHEET DRAINS, AND PAVEMENT EDGE DRAINS

Construction Requirements

605.03 General. Add the following after the second paragraph:

Do not install drain material until the CO has accepted the final location and length.

Section 615. – SIDEWALKS, DRIVE PADS, AND PAVED MEDIANS

Construction Requirements

615.04 Portland Cement Concrete Sidewalks, Drive Pads and Medians.

(a) Joints.

(1) Expansion joints. Delete the text and substitute the following:

Construct at intervals not exceeding 6 meters. Use 19 millimeter thick preformed expansion joint filler for the full depth of the joints. When joints are to be sealed, use joint sealant conforming to subsection 712.01(a)(5).

(3) Construction joints. Add the following at the end of the paragraph:

When joints are to be sealed, use joint sealant conforming to subsection 712.01(a)(5).

Section 625. – TURF ESTABLISHMENT

Construction Requirements

625.03 Turf Establishment Seasons. Add the following:

"Spring thaw" shall be defined as the earliest date in a calendar year in which seed can be buried 10 mm into the surface soil through normal hand broadcast and raking methods.

"Consistent ground freeze" shall be defined as that time during the late summer or fall months in which the surface soil, due to freezing conditions, prevents burying seed 10 mm through hand broadcast and raking methods. Seed shall not be spread when the surface soil is in a frozen or crushed state, nor if there is snow on the ground.

Seeding accomplished outside of time periods listed above will be allowed only as approved by CO. Submit request in writing and agree to perform re-seeding, re-mulching and repair of areas which fail, at no additional cost to the Government.

Measurement

625.11 Add the following:

Measure fertilizer and seeding by the square meter on the ground surface.

Section 633. – PERMANENT TRAFFIC CONTROL

Description

633.01 Delete the second paragraph and substitute the following:

Sign panels are designated as plywood, aluminum, steel, plastic, fiberglass reinforced plastic or cedar.

Delete the fourth paragraph and substitute the following:

Posts are designated as wood, aluminum, galvanized steel, or corrosion resistant steel.

Construction Requirements

633.05 Panels. Delete the first sentence and substitute the following:

Use type III, VII, VIII, or IX retroreflective sheeting.

Section 635. – TEMPORARY TRAFFIC CONTROL

Construction Requirements

635.03 General Add the following to the first paragraph:

Use barricades, cones, tubular markers, drums, portable sign supports, vertical panels, truck mounted attenuators, and temporary crash cushions that meet crash testing requirements of NCHRP 350 or that have been accepted by the FHWA for nation-wide use. Submit a written certification that traffic control devices in use on the project meet crash-testing requirements. Information regarding NCHRP 350 and crash-tested FHWA accepted work zone traffic control devices can be found at:

http://safety.fhwa.dot.gov/fourthlevel/hardware/wzd.htm.

Add the following:

(i) Furnish temporary traffic control devices that meet the NCHRP Report 350, Recommended Procedures for Safety Performance and Evaluation of the Highway Features, crashworthiness standards.

635.05 Barricades. Delete the second sentence and substitute the following:

Use type III retroreflective sheeting.

635.06 Cones and Tubular Markers. Delete the third sentence and substitute the following:

Use type III or VI retroreflective sheeting.

635.07 Construction Signs. Delete the first sentence and substitute the following:

Use type III, VII, VIII, or IX retroreflective sheeting. Provide the same type of sheeting on all post-mounted construction signs that pertain to the project.

635.08 Drums. Delete the third sentence and substitute the following:

Use type III retroreflective sheeting.

635.09 Flaggers. Delete the first sentence and substitute the following:

Furnish flaggers certified by ATSSA, the National Safety Council, the International Municipal Signal Association or a state agency.

635.11 Temporary Concrete Barriers. Add the following:

Use barriers that meet all requirements of NCHRP 350 or have been accepted by the FHWA for nation-wide use.

635.14 Vertical Panels. Delete the third sentence and substitute the following:

Use type III retroreflective sheeting.

Section 702. – ASPHALT MATERIAL

702.04 Application Temperatures. Delete Table 702-1, and substitute the following:

Table 702-1
Application Temperatures - Range ºC

Type and Grade Of Asphalt Material	Temperature Ranges Minimum - Maximum	
	Spraying Temperatures	Mixing Temperatures[1]
Cub-back asphalt-		
MC-30	30 - [2]	---
RC or MC-70	50 - [2]	---
RC or MC-250	75 - [2]	60 - 80[3]
RC or MC-800	95 - [2]	75 - 100[3]
RC or MC-3000	110 - [2]	80 – 115[3]
Emulsified asphalt-		
RS-1	20 - 60	---
RS-2	50 - 85	---
MS-1	20 - 70	20 - 70
MS-2, MS-2h	-	20 - 70
HFMS-1, 2, 2h, 2s	20 - 70	10 - 70
SS-1, 1h, CSS-1, 1h	20 - 70[4]	20 - 70
CRS-1	50 - 85	---
CRS-2	60 - 85	---
CMS-2, CMS-2h	40 - 70	50 - 60
Asphalt binder-		
All grades	185 max.	185 max.

[1] Temperatures of mix immediately after discharge.
[2] The maximum temperature at which fogging or foaming does not occur.
[3] Temperature may be above flash point. Take precautions to prevent fire or explosion.
[4] For fog seals and tack coats.

Add the following subsections:

702.11 Granulated Rubber for Waterproofing.

Granulated rubber shall conform to the following:

(a) Free from fabric, wire, or other contaminating materials except that up to 4.0% of calcium carbonate may be included to prevent particles from sticking together.

(b) With one of the following gradations as the Contractor elects:

(1) When only ground, fully vulcanized tired rubber is used, at least 95% shall pass the 1.18 mm sieve and not more than 10% shall pass the 710µm sieve.

(2) If powdered, reclaimed devulcanized rubber is used, approximately 40% shall be added to 60% ground fully vulcanized tire rubber and the total blend shall meet the following gradation:

Sieve Size Passing	Percentage (by weight)
2.36 µm	100
600 µm	60-80
300 µm	15-40
150 µm	0-15

(c) With a certification from the supplier for each shipment of ground rubber that the material was tested and that it meets the specified material requirements, calcium carbonate content and gradation.

702.12 Emulsified Petroleum Resin. Emulsified petroleum resin used as a prime coat shall conform to the following:

Property	AASHTO Test No.	Minimum	Maximum
Tests on Original Material [(1)]			
Saybolt Furol Viscosity, 25ºC, sec	T59	20	100
Sieve Test, %	T59	0.1	---
Residue by evaporation, % by weight	T59	60	---
Test on Residue			
Flash Point, COC, ºC	T48	200	---
Kinematic Viscosity @ 60ºC, cSt	T201	100	350

[(1)] Identify material as anionic or cationic at time of delivery.

Section 703. – AGGREGATE

703.02 Coarse Aggregate for Portland Cement Concrete.

(b) Delete the text and substitute the following:

Adherent coating, FLH T 512 or ASTM D 5711	1.0% max.
(c) Grading, AASHTO M 43	All sizes, except Nos. 8, 89, 9 or 10

Section 704. – SOIL

704.10 Select Granular Backfill. Add the following:

Furnish sound, durable, granular material free from organic matter or other deleterious material. Conform to the following:

(a) Quality requirements. Delete the text and substitute the following:

(1) Gradation	Table 704-4
(2) Angle of internal friction on the portion passing the 2 mm sieve, AASHTO T 236	34° min.

Note: Compact samples for AASHTO T 236 to 95 percent of the maximum density determined according to AASHTO T 99 method C or D and corrected for oversized material according to AASHTO T 99, Note 7.

(3) Sodium sulfate soundness loss (5 cycles), AASHTO T 104	15% max.
(4) Liquid limit, AASHTO T 89	30 max.

Table 704-4
Select Granular Backfill Gradation

Sieve Size	Percent by Mass Passing Designated Sieve (AASHTO T 27 and T 11)
100 mm	100
75 mm	75 – 100
4.75 mm	30 - 75
0.075 mm	0 - 15

Section 705. – ROCK

705.02 Riprap Rock. Delete the text and substitute the following:

Furnish hard, durable, angular rock that is resistant to weathering and water action and free of organic or other unsuitable material. Do not use shale, rock with shale seams, or other fissile or fissured rock that may break into smaller pieces in the process of handling and placing. Verify on-site excavated rock is suitable for riprap.

Conform to the following:

(a) Apparent specific gravity, AASHTO T 85	2.50 min.
(b) Absorption, AASHTO T 85	4.2% max.
(c) Coarse durability index, AASHTO T 210	50 min.
(d) Gradation for the class specified	Table 705-1
(e) Los Angeles abrasion, AASHTO T 96	50% max.

Section 708. – PAINT

708.01 General.

(b) Volatile organic compound (VOC) content.

(1) Delete the text and substitute the following:

Clear (unpigmented) coatings	450 g/L max.

708.04 Paint for Steel Structures. Delete the text and substitute the following:

Conform to the following:

(a) Inorganic zinc primer	AASHTO M 300 type II
(b) Vinyl wash primer	SSPC no. 27
(c) Aluminum vinyl paint	SSPC no. 8
(d) White or colored vinyl paint	SSPC no. 9
(e) Aliphatic urethane coating	SSPC no. 36
(f) Latex primer for steel surfaces	SSPC no. 23
(g) Acrylic latex coating	SSPC no. 24
(h) Epoxy coating	SSPC no. 22
(i) Alkyd primer	SSPC no. 31
(j) Silicone alkyd coating	SSPC no. 21

Section 709. – REINFORCING STEEL AND WIRE ROPE

709.01 Reinforcing Steel.

(b) Reinforcing bars. Delete the text and substitute the following:

Furnish deformed, grade 420 bars conforming to AASHTO M 31M, M 42M, or M 53M.

(c) Epoxy coated reinforcing bars. Delete the first paragraph and substitute the following:

Furnish bars conforming to Subsection 709.01(b). Conform to AASHTO M 284M.

(d) Tie bars. Delete the text and substitute the following:

Furnish deformed, grade 420 bars conforming to AASHTO M 31M or M 42M, except do not use AASHTO M 42M steel for tie bars bent and restraightened during construction.

Section 711. – CONCRETE CURING MATERIAL AND ADMIXTURES

711.03 Chemical Admixtures. Delete the text and substitute the following:

Furnish water-reducing, retarding, set-accelerating, and hydration stabilizing admixtures, or combinations thereof, conforming to AASHTO M 194. For hydration stabilizing admixtures, conform to AASHTO M 194, type B or D.

Section 712. – JOINT MATERIAL

712.01 Sealants, Fillers, Seals and Sleeves.

(a) Joint sealants and crack fillers. Add the following:

(5) Multi-component join sealant, conforming to TT-S-00227E, type 1, class A or ASTM C 920, type M, grad P, class 25, use T. Provide sealant matching the color of the adjacent sidewalk. Conform to the sealant manufacturer's recommendations for use of primers.

(6) Flexible cellular joint filler ASTM D 1056, type 2, grade 4 or 5

(c) Preformed joint seals and sleeves. Delete the text and Table 712-1 and substitute the following:

(1) Paving applications. Conform to AASHTO M 220. Use a lubricant conforming to ASTM D 2835, which was manufactured within 9 months of use.

(e) Cold-poured sealer. Delete the title and text and substitute the following:

(e) Silicone joint sealant. Conform to ASTM D 5893 type NS.

(f) Low-modulus silicone joint sealant. Delete the text and substitute the following:

Conform to ASTM D 5893 type SL.

(g) Backer rod. Delete the text and substitute the following:

Conform to ASTM D 5249 type 1. Use a compatible sealant as recommended by the rod manufacturer. For size of backer rod, conform to Table 712-2.

712.03 Watertight Gaskets. Delete the text and substitute the following:

For ring gaskets for rigid pipe, conform to AASHTO M 198. For ring gaskets for flexible metal pipe, conform to ASTM C 361M. For continuous flat gaskets for flexible metal pipe with flat bands or bands with projects, conform to ASTM D 1056 grade 2C1 and use a gasket with a thickness 13 millimeters greater than the nominal depth of the pipe corrugations. For continuous flat gaskets for flexible metal pipe with corrugated bands, conform to ASTM D 1056 grade 2C3 and use a 9 millimeter thick gasket.

Section 713. – ROADSIDE IMPROVEMENT MATERIAL

713.01 Topsoil. Add the following:

Furnished topsoil shall consist of loose friable sandy loam free of subsoil, reuse, stumps, roots, rocks larger than 25 millimeters brush, noxious weed seed and reproductive vegetative plant parts such as, but not limited to, Knapweed, Purple Loosestrife, and Canadian Thistle, heavy clay, hard clods, toxic substances, or other material which would be detrimental to its use on the project.

713.04 Seed. Add the following to the labels required for each seed container:

- **(f)** seed origin
- **(g)** kilograms of pure live seed (PLS) of each seed species
- **(h)** total kilograms of PLS in each container

Add the following:

Conform to the Federal Seed Act, the Federal Noxious Weed Act, and applicable State and local seed and noxious weed laws.

Furnish seed that reflects evidence of proper storage and handling. Remove from site or storage facilities any seed with indications of improper storage or handling (damage from water, heat, chemicals and the like). Furnish seed that is of the latest season crops and within unopened containers.

Before any substitutions of seed will be considered, provide to the CO written statements from three designated sources verifying that the seed specified for this project is not available. Requests shall be submitted 6 weeks prior to seeding.

Provide certified weed-free seed in accordance with Colorado Certification Standards. Seed shall not contain any of the prohibited species seed, nor exceed the quantity limitations of restricted species seed as listed in the current Colorado Seed Act, part 7, Noxious Weed list; (part 7.1 Prohibited primary noxious weeds; and 7.2 Restricted secondary noxious weed).

Each seed lot shall be certified by the supplier to have no less that 60% pure live seed (PLS) and no more than 7% of inert matter. Seeds shall be free of any applied material such as fungicide or fertilizer.

When purchasing seed from a commercial source, only "Certified Seed" (blue tagged) or "Source Identified" (yellow tagged) will be required. Keep copies of seed container labels in the associated project files for CO review upon request.

If seed available on the market does not meet the minimum purity and germination percentages specified, the Contractor must compensate for a lesser percentage of purity or germination by furnishing sufficient additional seed to equal the specified product. Product comparison shall be made on the basis of PLS in kilograms stated on each seed bag. The formula used for determining the quantity of PLS shall be: Kilograms of Seed x (Purity x Germination) = Kilograms of PLS. The seeding rate is 22-27 kilograms per hectare.

HIGH ALTITUDE SEED MIX

Botanical Name	**Common Name**	**Percent of Mixture**
GRASSES:		
Agropyron cristatum Ephraim	Ephraim Crested Wheatgrass	30%
Lolium perenne	Perennial Ryegrass	20 %
Festuca glauca	Blue Fescue	20%
Poa compressa	Canada Bluegrass	15 %
Festuca rubra commutata	Chewings Fescue	10 %
	Wildflower Mix* See Below	5%
Totals		**100%**

WILDFLOWER Mix*		
Centaurea cyanus	Cornflower	11 %
Rudbeckia hirta	Blackeyed Susan	11 %
Gypsophila elegans	Baby's Breath	11 %
Dimorphotheca sinuata	African Daisy	10 %
Linum lewisii	Blue Flax	5 %
Alyssum maritimum	Sweet Alyssum	5 %
Eschsholtzia californica	California Poppy	5 %
Cheiranthus allionii	Wallflower	5 %
Ratibida columnaris	Prairie Coneflower	5 %
Coreopsis tinctoria	Plains Coreopsis	5 %
Chrysanthemum coronarium	Garland Chrysanthemum	4 %
Gaillardia aristata	Perennial Gaillardia	4 %
Gaillardia pulchella	Annual Gaillardia	3 %
Dianthus barbatus	Sweet William	3 %
Chrysanthemum maximum	Shasta Daisy	3 %
Papaver rhoeas	Corn Poppy	2 %
Silene armeria	Catchfly	2 %
Penstemon strictus	Rocky Mountain Penstemon	2 %
Linaria maroccana	Spurred Snapdragon	2 %
Echinacea pupurea	Purple Coneflower	2 %

713.16 Silt Fence. Delete the text and substitute the following:

Conform to AASHTO M 288.

Section 716. – MATERIAL FOR TIMBER STRUCTURES

716.03 Treated Structural Timber and Lumber. Add the following:

All structural glue-laminated timber members shall be preservative treated in accordance with AASHTO M 133, current AWPA Standards and relevant EPA regulations.

All structural members that are subject to direct pedestrian contact (traffic rail and all components of the pedestrian structure) and timber members attached to structural concrete as facing shall be treated with waterborne preservatives or oilborne preservatives in light petroleum solvent in accordance with AASHTO 13.3.2.

Section 717. – STRUCTURAL METAL

717.01 Structural Steel. Delete the text and substitute the following:

(a) Structural carbon steel. Structural carbon steel for riveted, bolted, or welded construction shall conform to ASTM A36M. In addition, steel for primary bridge members and fracture critical bridge members shall meet the supplementary requirements for Charpy V-notch test.

(b) High-strength low-alloy structural (HSLA) steel. High-strength, low-alloy structural steel, or steel acquiring enhanced atmospheric corrosion resistance for riveted, bolted, or welded construction, use steel conforming to ASTM A588M. In addition, steel for primary bridge members and fracture critical bridge members shall meet the supplementary requirements for Charpy V-notch test.

(c) Bolts and nuts. Conform to ASTM A 307.

(d) High-strength bolts, nuts, and washers. Conform to either AASHTO M 164M or AASHTO M 253M, as specified. Use Type 3 bolts in combination with unpainted weathering structural steel.

717.16 Elastomeric Compression Joint Seals. Delete the text and substitute the following:

Conform to AASHTO M 297.

Section 718. – TRAFFIC SIGNING AND MARKING MATERIAL

718.08 Signposts.

(b) Steel posts. Delete the text and substitute the following:

(1) U-channel steel posts. Furnish flanged, channel, galvanized steel posts conforming to ASTM A 499, grade 60, and the following:

(a) Dimensions of U cross section

(1) Width of opened end of U including flanges	75-90 mm
(2) Width of closed end of U	25-40 mm
(3) Depth of U	25-50 mm
(4) Thickness of steel	3-5 mm

(b) Punching. Starting 25 millimeters from the top and extending the full length of the post, drill or punch 10 millimeter holes on 25 millimeter centers along the centerline of the bottom of the U. Remove all burrs and sharp edges.

(c) Galvanizing after punching AASHTO M 111

(2) Square tubular steel posts. Furnish square tubular galvanized steel posts conforming to ASTM A 1011M, grade 55, or ASTM A 715, grade 60, and the following:

(a) Dimensions of cross section

(1) Outside dimensions	44.5 mm by 44.5 mm or 50.8 mm by 50.8 mm
(2) Wall thickness	2.1 mm
(3) Mass	2.5-3.0 kg/m

(b) Punching. Starting 25 millimeters from the top and extending the full length of the post, drill or punch 11 millimeter holes on 25 millimeter centers along the centerline of all four sides, in true alignment and opposite each other directly and diagonally. Remove all burrs and sharp edges.

(c) Galvanizing after punching (inside and outside of post) — ASTM A 635M, Z275

Add the following:

(d) Corrosion resistant steel posts. Furnish post and breakaway plates conforming to ASTM A 588 or ASTM A 242.

Section 725. – MISCELLANEOUS MATERIAL

725.01 Water.

(b) Water for planting or care of vegetation. Add the following:

Water source to be from secured water right source, as approved by the CO.

725.11 Precast Concrete Units. Delete the title and text and substitute the following:

725.11 Precast Concrete Units and Accessories.

(a) Reinforced concrete manholes sections. Conform to AASHTO M 199M.

(b) Concrete barrier. Conform to ASTM C 825.

(c) Reinforced concrete crib wall members. Conform to ASTM C 915.

(d) Underground concrete utility structures. Conform to ASTM C 858.

(e) Concrete water and waste water structures. Conform to ASTM C 913.

(f) Solid concrete interlocking paving units. Conform to ASTM C 936.

(g) Other precast concrete units not covered by the preceding requirements. Cast the units in substantial permanent steel forms. When reinforcing steel is required, conform to Section 709. Provide additional reinforcement as necessary for handling the units. Use concrete conforming to the following:

(1) 28-day strength, AASHTO T 22	48.3 MPa min.
(2) Air content by volume, when required	5% min.
(a) 9.5 mm max. size aggregate	5% min.
(b) >9.5 mm max. size aggregate	4% min.

Cure the units according to AASHTO M 170M.

Cast a sufficient number of concrete cylinders from each unit or lot of units to permit compression tests at 7, 14, and 28 days. Make at least 3 cylinders for each test. If the strength requirement is met at 7 or 14 days, the units can be certified for use 14 days from date of casting.

Do not use precast concrete units when:

- Cylinders that are properly sampled, cast, and cured, do not meet the strength requirement by an age of 28 days.
- Cracks, honeycombed, or patched areas are larger than 0.02 square meters.

725.19 Plastic Lining. Delete the text and substitute the following:

Furnish a film or fabric that is serviceable for the duration of the installation.

725.22 Grout. Add the following:

(f) Neat cement grout. Furnish a grout consisting of a mixture of cement, water, and admixtures. Do not exceed a water/cement ratio of 0.44. Fly ash, if used, shall not exceed 20% of the cement by weight. Admixtures to reduce water content, improve the flowability, control bleeding, or control shrinkage may be added according to the manufacturer's recommendations. Admixtures shall be free of chlorides, fluorides, sulphites, and nitrates.