CONTRACT INFORMATION
TABLE OF CONTENTS

CONTRACT NO. B-23737

This book shall be examined to determine that each sheet set out in the Contract Information Table of Contents, and the Special Provisions Table of Contents is attached, legible, and current.

PROPOSAL

TO THE
INDIANA DEPARTMENT OF TRANSPORTATION.

DATE OF LETTING: February 23, 1999

TIME OF LETTING: 10:00 AM EASTERN STANDARD

LOCATION OF LETTING: Auditorium, Government Center South
402 W. Washington Street, Indianapolis, Indiana
INDIANAPOLIS, INDIANA 46204

LOCATION OF DEPOSIT: N855 Government Center North
100 N. Senate Avenue
INDIANAPOLIS, INDIANA 46204

CONTRACT NUMBER: B -23737-B PROJECT NUMBER: 6964(003)
STRUCTURE NUMBER: PORTER 210

ROUTE: CR 475W
LOCATION: ON COUNTY ROAD 475W OVER NORFOLK SOUTHERN RAILROAD, 0.05 km SOUTH OF SR 130
DESCRIPTION: BRIDGE REPLACEMENT

LAPORTE DISTRICT COUNTY : PORTER

CONTRACT COMPLETION INFORMATION

CONTRACT DAYS: 140 WORK DAYS
DBE GOAL: A contract provision goal of 10 percent of the contract bid price has been established as the minimum amount for contracting to disadvantaged business enterprises.

STANDARD SPECIFICATIONS EFFECTIVE DATE IS 1995
SUPPLEMENTAL SPECIFICATIONS EFFECTIVE DATE IS JANUARY 1, 1999.
LIST OF APPROVED OR PREQUALIFIED MATERIALS EFFECTIVE DATE IS JANUARY 1, 1999.

SCHEDULE OF PAY ITEMS REVISED:
LETTING DATE:February 23, 1999

CONTRACT ID: B -23737-B

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
SECTION 0001 BRIDGE REPLACEMENT						
0001	105-01925 FIELD OFFICE, 51.1 m2	18.000 MOS		.		.
0002	105-06845 CONSTRUCTION ENGINEERING	LUMP	LUMP			.
0003	110-01001 MOBILIZATION AND DEMOBILIZATION	LUMP	LUMP			.
0004	201-52370 CLEARING RIGHT OF WAY	LUMP	LUMP			.
0005	202-51330 PRESENT STRUCTURE, REMOVE	LUMP	LUMP			.
0006	202-60820 SURFACE MILLING, ASPHALT	58.000 m2		.		.
0007	203-02000 EXCAVATION, COMMON	38,638.000 m3		.		.
0008	203-02070 BORROW , SPECIAL	27,830.000 m3		.		.
0009	203-02080 LINEAR GRADING	0.238 km		.		.
0010	204-02290 SETTLEMENT PLATE	2.000 EACH		.		.

SCHEDULE OF PAY ITEMS REVISED:
LETTING DATE:February 23, 1999

CONTRACT ID: B -23737-B

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0011	205-02229 TEMPORARY EROSION AND SEDIMENT CONTROL, STRAW BALE DITCH CHECK	28.000 m		.		.
0012	205-02231 TEMPORARY EROSION AND SEDIMENT CONTROL, RIPRAP DITCH CHECK	8.000 m		.		.
0013	205-02770 EROSION CONTROL BLANKET	5,165.000 m2		.		.
0014	206-51230 EXCAVATION, FOUNDATION, UNCLASSIFIED	1,535.000 m3		.		.
0015	211-02060 B BORROW FOR STRUCTURE BACKFILL	2,641.000 m3		.		.
0016	303-52308 COMPACTED AGGREGATE FOR BASE, 0, 53	1,009.000 Mg		.		.
0017	303-90466 SUBBALLAST , COMPACTED AGGREGATE	7,685.000 Mg		.		.
0018	402-05468 HMA BASE 25.0 mm, MAINLINE	3,149.000 Mg		.		.
0019	402-05474 HMA INTERMEDIATE 19.0 mm, MAINLINE	659.000 Mg		.		.
0020	402-05477 HMA SURFACE 9.5 mm, MAINLINE	334.000 Mg		.		.

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LETTING DATE:February 23, 1999

CONTRACT ID: B -23737-B

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0021	402-05481 HMA BASE 25.0 mm, SHOULDER	97.000 Mg		.		.
0022	404-05511 SEAL COAT, 2	1,415.000 m2		.		.
0023	405-05518 ASPHALT FOR PRIME COAT	2,903.000 m2		.		.
0024	406-05521 ASPHALT FOR TACK COAT	18,199.000 m2		.		.
0025	501-05090 CEMENT CONCRETE PAVEMENT, REINFORCED, 250 mm	171.000 m2		.		.
0026	601-01522 GUARDRAIL TRANSITION TYPE TGB	4.000 EACH		.		.
0027	601-01839 GUARDRAIL TERMINAL SYSTEM, W BEAM, CURVED, 6	1.000 EACH		.		.
0028	601-02103 GUARDRAIL, SHOP CURVED, W BEAM, 1.905 m SPACING	29.820 m		.		.
0029	601-05586 GUARDRAIL TERMINAL SYSTEM, W BEAM, CURVED, 9	1.000 EACH		.		.
0030	601-94689 GUARDRAIL END TREATMENT, OS	2.000 EACH		.		.
0031	601-99105 GUARDRAIL, W BEAM, 1.905 m SPACING	417.440 m		.		.

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CONTRACT ID: B -23737-B

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0032	602-06729 BARRIER DELINEATOR	24.000 EACH		.		.
0033	610-05527 HMA FOR APPROACHES	572.000 Mg		.		.
0034	611-06498 MAILBOX ASSEMBLY, DOUBLE	4.000 EACH		.		.
0035	615-06490 RIGHT OF WAY MARKER	4.000 EACH		.		.
0036	615-99189 PLAQUE, ALUMINUM	1.000 EACH		.		.
0037	616-02320 GEOTEXTILES	103.000 m2		.		.
0038	616-06405 RIPRAP, REVETMENT	47.000 Mg		.		.
0039	616-94426 GEOGRID , TYPE P1	7,965.000 m2		.		.
0040	616-94426 GEOGRID , TYPE P2	23,400.000 m2		.		.
0041	616-94426 GEOGRID , TYPE S1	7,525.000 m2		.		.
0042	621-01004 MOBILIZATION AND DEMOBILIZATION FOR SEEDING	2.000 EACH		.		.

SCHEDULE OF PAY ITEMS REVISED:
LETTING DATE:February 23, 1999

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0043	621-06545 FERTILIZER	1.800 Mg		.		.
0044	621-06548 SEED MIXTURE, CV	23.000 kg		.		.
0045	621-06553 SEED MIXTURE, R	385.000 kg		.		.
0046	621-06565 MULCHING MATERIAL	7.300 Mg		.		.
0047	621-06567 WATER	80.000 kL		.		.
0048	621-06574 SODDING	160.000 m2		.		.
0049	621-06575 SODDING, NURSERY	4,235.000 m2		.		.
0050	701-02139 PILE, STEEL SHELL, 9.53 mm, 356 mm	544.000 m		.		.
0051	702-51005 CONCRETE, A, SUBSTRUCTURE	26.400 m3		.		.
0052	703-51030 REINFORCING STEEL	2,439.000 kg		.		.
0053	703-51032 REINFORCING STEEL, EPOXY COATED	6,151.000 kg		.		.

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LETTING DATE:February 23, 1999

CONTRACT ID: B -23737-B

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0054	703-97936 THREADED TIE BAR ASSEMBLY, EPOXY COATED	72.000 EACH		.		.
0055	704-51002 CONCRETE, C, SUPERSTRUCTURE	16.000 m3		.		.
0056	706-05732 CONCRETE BRIDGE RAILING TRANSITION, TBC	4.000 EACH		.		.
0057	706-51020 CONCRETE, C, RAILING	12.400 m3		.		.
0058	707-01065 POST-TENSIONING TENDONS	LUMP	LUMP			.
0059	707-51045 CONCRETE STRUCTURAL MEMBERS	LUMP	LUMP			.
0060	709-51821 SURFACE SEAL	LUMP	LUMP			.
0061	714-93263 WALL PANEL MATERIALS	429.000 m2		.		.
0062	714-93264 WALL PANEL ERECTION	429.000 m2		.		.
0063	715-03149 PIPE, GROUP D, 375 mm	107.000 m		.		.
0064	715-03153 PIPE, GROUP D, 450 mm	20.000 m		.		.

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LETTING DATE:February 23, 1999

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0065	715-04629 PIPE ARM, 1 WAY	1.000 EACH		.		.
0066	715-04629 PIPE ARM, 3 WAY	1.000 EACH		.		.
0067	715-46010 PIPE END SECTION, 450 mm	12.000 EACH		.		.
0068	715-78430 PIPE ARM, 2 WAY	1.000 EACH		.		.
0069	722-51842 BRIDGE DECK OVERLAY	308.000 m2		.		.
0070	728-98377 MASONRY COATING	LUMP	LUMP			.
0071	731-05932 CONCRETE WALL CAP	86.000 m		.		.
0072	731-93947 LEVELING PAD, CONCRETE	78.000 m		.		.
0073	801-04308 ROAD CLOSURE SIGN ASSEMBLY	2.000 EACH		.		.
0074	801-06605 BARRICADE, IIIA	8.000 EACH		.		.
0075	801-06606 BARRICADE, IIIB	2.000 EACH		.		.

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CONTRACT ID: B -23737-B

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0076	801-06625 DETOUR ROUTE MARKER ASSEMBLY	4.000 EACH		.		.
0077	801-06640 CONSTRUCTION SIGN, A	22.000 EACH		.		.
0078	801-06644 TEMPORARY PAVEMENT MARKING, I, WHITE, 100 mm	575.000 m		.		.
0079	801-06645 CONSTRUCTION SIGN, B	2.000 EACH		.		.
0080	801-06775 MAINTAINING TRAFFIC	LUMP	LUMP			.
0081	802-76020 SIGN, SHEET, ENCLOSED LENS WITH LEGEND 2.03 mm THICKNESS	0.745 m2		.		.
0082	802-76025 SIGN, SHEET, ENCAPSULATED LENS WITH LEGEND, 2.03 mm THICKNESS	4.095 m2		.		.
0083	802-76035 SIGN, SHEET, ENCAPSULATED LENS WITH LEGEND 2.54 mm THICKNESS	0.520 m2		.		.
0084	802-76055 SIGN POST, A	63.975 m		.		.
0085	805-01815 SIGNAL SUPPORT FOUNDATION, 915mm X 3.7 m	2.000 EACH		.		.
0086	805-01879 SIGNAL SERVICE, INSTALL	1.000 EACH		.		.

SCHEDULE OF PAY ITEMS REVISED:
LETTING DATE:February 23, 1999

CONTRACT ID: B -23737-B

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0087	805-78010 CONTROLLER AND CABINET, FLASHER, SOLID STATE	1.000 EACH		.		.
0088	805-78190 TRAFFIC SIGNAL HEAD, 1 FACE, 305 mm AMBER	4.000 EACH		.		.
0089	805-78195 TRAFFIC SIGNAL HEAD, 1 FACE, 305 mm RED	1.000 EACH		.		.
0090	805-78415 SPAN, CATENARY, AND TETHER	1.000 EACH		.		.
0091	805-78420 DISCONNECT HANGER	1.000 EACH		.		.
0092	805-78467 SIGNAL CABLE, 3C 8GA.	30.000 m		.		.
0093	805-78485 SIGNAL CABLE, 5C 14GA.	50.000 m		.		.
0094	805-81032 SIGNAL STRAIN POLE, STEEL, 9.2m	2.000 EACH		.		.
0095	808-06713 LINE, PAINT, SOLID, WHITE, 100 mm	1,688.000 m		.		.
0096	808-06714 LINE, PAINT, SOLID, YELLOW, 100 mm	920.000 m		.		.
0097	808-74805 TRANSVERSE MARKINGS, EPOXY, STOP LINE, 600 mm	20.000 m		.		.

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LETTING DATE:February 23, 1999

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
	SECTION 0001 TOTAL					.
	TOTAL BID					.

Project BRS-RSG 6764 ( )
Ponten 210 Seavy Bridge

3460.02
B-23737

Metric Standard Drawing Index
Effective for Letting: (Jan 1/ 99 - April 30/ 99)

Contract:

TYPE	Source Ref.	CODE	PAGE	CODE MEANING	Effective Date	FHWA Approval
RD	205	TECD	01	Temporary Erosion Control Ditch	4/3/95	8/01/95
RD	205	TECD	02	Temporary Erosion Control Ditch	9/1/95	1/31/96
RD	501	CCPJ	01	Concrete Pavement Joints	9/1/97	9/01/97
RD	501	CCPJ	02	Concrete Pavement Joints	9/1/97	9/01/97
RD	501	CCPJ	03	Concrete Pavement Joints	9/1/97	9/01/97
RD	501	CCPJ	04	Concrete Pavement Joints	1/2/98	1/02/98
RD	501	CCPJ	07	Concrete Pavement Joints	9/1/97	9/01/97
RD	501	CCPJ	08	Concrete Pavement Joints	9/1/97	9/01/97
RD	601	BAGR	01	Bridge Approach Guardrail	9/1/98	9/01/98
RD	601	CWGS	01	Curved W-Beam Guardrail System	9/1/98	9/01/98
RD	601	CWGS	02	Curved W-Beam Guardrail System	9/1/98	9/01/98
RD	601	CWGS	03	Curved W-Beam Guardrail System	11/1/95	1/31/96
RD	601	CWGS	04	Curved W-Beam Guardrail System	4/3/95	8/01/95
RD	601	CWGS	05	Curved W-Beam Guardrail System	4/1/96	5/23/96
RD	601	CWGS	06	Curved W-Beam Guardrail System	4/3/95	8/01/95
RD	601	GRET	01	Guardrail End Treatment	11/1/95	1/31/96
RD	601	GRET	02	Guardrail End Treatment	11/1/95	1/31/96
RD	601	GRET	04	Guardrail End Treatment	4/3/95	8/01/95
RD	601	GRET	05	Guardrail End Treatment	11/1/95	1/31/96
RD	601	TBGC	01	Thrie-Beam Guardrail Components	4/1/96	5/23/96
RD	601	TBGC	02	Thrie-Beam Guardrail Components	4/1/96	5/23/96
RD	601	TPGP	01	Transition At Pier Type GP	9/1/98	9/01/98
RD	601	TPGP	02	Transition At Pier Type GP	9/1/98	9/01/98
RD	601	WBGA	01	W-Beam Guardrail Assemblies	1/4/99	1/04/99
RD	601	WBGA	02	W-Beam Guardrail Assemblies	1/4/99	1/04/99
RD	601	WBGA	03	W-Beam Guardrail Assemblies	9/1/98	9/01/98
RD	601	WBGC	01	W-Beam Guardrail Components	4/3/95	8/01/95
RD	601	WBGC	02	W-Beam Guardrail Components	1/2/96	11/14/96
RD	601	WBGC	03	W-Beam Guardrail Components	1/4/99	1/04/99
RD	610	DRIV	04	Drives	1/2/97	2/20/97
RD	610	DRIV	05	Drives	1/2/97	2/20/97
RD	610	DRIV	06	Drives	1/2/97	2/20/97
RD	610	DRIV	07	Drives	1/2/97	2/20/97
RD	610	DRIV	09	Drives	1/2/97	2/20/97
RD	610	PRAP	06	Public Road Approach	9/1/98	9/01/98
RD	610	PRAP	07	Public Road Approach	9/1/97	9/01/97
RD	610	PRAP	08	Public Road Approach	9/1/98	9/01/98
RD	610	PRAP	09	Public Road Approach	9/1/98	9/01/98
RD	611	MBAP	02	Mailbox Approach Plan	9/1/97	9/01/97
RD	611	MBAS	01	Mailbox Assembly	4/3/95	8/01/95
RD	611	MBAS	02	Mailbox Assembly	4/3/95	8/01/95
RD	611	MBAS	03	Mailbox Assembly	4/3/95	8/01/95
RD	611	MBAS	04	Mailbox Assembly	9/1/97	9/01/97
RD	615	RWPB	01	Right-of-Way Parking Barrier	9/1/97	9/01/97
BR	701	BPIL	04	Bridge Pilings	9/30/94	2/08/95
BR	703	BRST	01	Bridge Reinforcing Steel	9/1/97	9/01/97
BR	706	CBRT	01	Concrete Bridge Railing Transition	1/4/99	1/04/99
BR	706	CBRT	02	Concrete Bridge Railing Transition	9/1/98	9/01/98
BR	706	CBRT	03	Concrete Bridge Railing Transition	9/1/98	9/01/98
BR	706	CBRT	04	Concrete Bridge Railing Transition	9/1/98	9/01/98
BR	706	TTBC	01	Tranisiton Thrie Beam Common	9/1/98	9/01/98
BR	706	TTBC	02	Transition Thrie Beam Common	9/1/98	9/01/98
BR	706	TTBC	03	Transition Thrie Beam Common	9/1/98	9/01/98
BR	707	BEBP	02	Bridge Elastomeric Brg. Pads	1/3/95	2/08/95

Metric Standard Drawing Index
Effective for Letting: (Jan 1/ 99 - April 30/ 99)

B-23737

Contract:

TYPE	Source Ref.	CODE	PAGE	CODE MEANING	Effective Date	FHWA Approval
RD	715	BKFL	07	Backfill	1/2/98	1/02/98
RD	715	BKFL	08	Backfill	1/2/98	1/02/98
RD	715	BKFL	09	Backfill	1/2/98	1/02/98
RD	715	MPES	01	Metal Pipe End Section	1/2/98	1/02/98
RD	715	MPES	03	Metal Pipe End Section	1/2/98	1/02/98
RD	715	PHCL	01	Pipe Height of Cover Limits	1/2/98	1/02/98
RD	715	PHCL	02	Pipe Height of Cover Limits	1/2/98	1/02/98
RD	715	PHCL	09	Pipe Height of Cover Limits	1/2/98	1/02/98
RD	715	PHCL	10	Pipe Height of Cover Limits	1/2/98	1/02/98
RD	715	PHCL	17	Pipe Height of Cover Limits	1/2/98	1/02/98
RD	715	PHCL	18	Pipe Height of Cover Limits	1/2/98	1/02/98
RD	715	PHCL	19	Pipe Height of Cover Limits	1/2/98	1/02/98
RD	715	PHCL	20	Pipe Height of Cover Limits	1/2/98	1/02/98
RD	715	PHCL	21	Pipe Height of Cover Limits	1/2/98	1/02/98
RD	715	PIPE	01	Pipe	1/2/98	1/02/98
RD	715	PSLC	01	Pipe Service Life Criteria	1/2/98	1/02/98
RD	715	PSLC	03	Pipe Service Life Criteria	1/2/98	1/02/98
BR	724	BJTS	01	Bridge Joints	1/4/99	1/04/99
TC	801	TCDT	01	Traffic Control Detour	9/1/97	9/01/97
TC	801	TCDT	03	Traffic Control Detour	7/3/95	8/01/95
TC	801	TCDV	04	Traffic Control Devices	9/1/97	9/01/97
TC	801	TCDV	05	Traffic Control Devices	9/1/97	9/01/97
TC	801	TCDV	06	Traffic Control Devices	9/1/97	9/01/97
TC	801	TCDV	07	Traffic Control Devices	9/1/97	9/01/97
TC	801	TCDV	08	Traffic Control Devices	5/1/98	5/01/98
TC	801	TCLG	01	Traffic Control Legend	1/2/98	1/02/98
TC	801	TCSN	01	Traffic Control Signs	7/3/95	7/31/95
TC	801	TCSN	03	Traffic Control Signs	7/3/95	7/31/95
TC	801	TCSN	04	Traffic Control Signs	9/1/97	9/01/97
TC	801	TCSN	11	Traffic Control Signs	9/1/97	9/01/97
TC	801	TCSN	12	Traffic Control Signs	9/1/97	9/01/97
TC	801	TCSN	13	Traffic Control Signs	9/1/97	9/01/97
TR	802	SNGS	05	Sign Details	9/1/98	9/01/98
TR	802	SNGS	06	Sign Details	9/1/98	9/01/98
TR	802	SNGS	07	Sign Details	3/1/95	4/18/95
TR	802	SNGS	08	Sign Details	3/1/95	4/18/95
TR	802	SNGS	09	Sign Details	9/1/98	9/01/98
TR	802	SNGS	10	Sign Details	5/1/97	11/14/96
TR	802	SNPL	01	Sign Location	3/1/95	4/18/95
TR	805	SGCO	02	Signal Controller	9/1/98	9/01/98
TR	805	SGGR	01	Signal Ground Rod	9/1/98	9/01/98
TR	805	SGGR	02	Signal Ground Rod	9/1/98	9/01/98
TR	805	SGGR	03	Signal Ground Rod	3/1/95	4/18/95

PILE AND DRIVING EQUIPMENT DATA FORM B-23737

Contract No.: _____ Structure Name and/or No.: _____

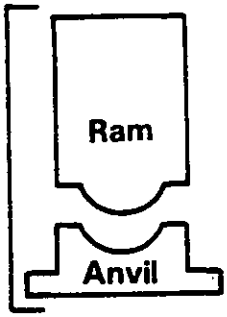
Project: _____

Pile Driving Contractor or Subcontractor: _____

County: _____

(Piles driven by)

Hammer Components



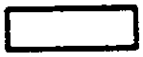
Hammer

Manufacturer: _____ Model: _____

Type: _____ Serial No.: _____

Rated Energy: _____ at _____ Length of Stroke

Modifications: _____



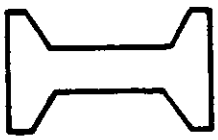
Capblock (Hammer Cushion)

Material: _____

Thickness _____ Area: _____

Modulus of Elasticity – E _____ (P.S.I.)

Coefficient of Restitution-e _____



Pile Cap — Helmet / Bonnet / Anvil Block / Drivehead — Weight: _____

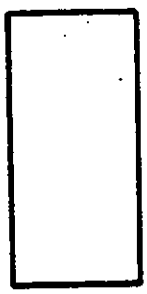
Pile Cushion

Cushion Material: _____

Thickness: _____ Area: _____

Modulus of Elasticity – E _____ (P.S.I.)

Coefficient of Restitution _____



Pile

Pile Type: _____

Length (In Leads) – _____

Weight/ft. _____

Wall Thickness: _____ Taper: _____

Cross Sectional Area _____ in^2

Design Pile Capacity: _____ (Tons)

Description of Splice: _____

Tip Treatment Description: _____

Note: If mandrel is used to drive the pile, attach separate manufacturer's detail sheet(s) including weight and dimensions.

Submitted By: _____ Date: _____

Telephone No.: _____

SPECIAL PROVISIONS
TABLE OF CONTENTS

LaPorte District

PAYMENT OF PREDETERMINED MINIMUM WAGE
WAGE DETERMINATION
(DAVIS-BACON ACT)
General Decision Number IN980001

Modification Number 13 of General Decision Number IN980001 with a publication date of November 27, 1998 shall apply to this contract.

The above referenced wage determination will be available at the Department's Technical Services Division website location: http://www.state.in.us/dot/TS/contract/.

Hard copies of the wage determination will be mailed to those Contractors requesting such by calling 1-317-232-5070 or 1-317-232-5072 or by faxing their request to 1-317-232-0676. They may also be obtained in Room 855, Indiana Government Center North, 100 North Senate Avenue, Indianapolis, IN.

If the wage determination is updated prior to 10 calendar days before the bid opening date, an addendum will be issued.

USE OF THE WORD BITUMINOUS

Wherever in these contract documents the word bituminous is used in reference to existing pavement, it shall be interpreted to be asphalt.

Wherever in these contract documents the word bituminous is used in reference to new pavement, it shall be interpreted to be HMA or CMA, whichever is applicable.

FHWA-1273

REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS

I. GENERAL

1. These contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

2. Except as otherwise provided for in each section, the contractor shall insert in each subcontract all of the stipulations contained in these Required Contract Provisions, and further require their inclusion in any lower tier subcontract or purchase order that may in turn be made. The Required Contract Provisions shall not be incorporated by reference in any case. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with these Required Contract Provisions.

3. A breach of any of the stipulations contained in these Required Contract Provisions shall be sufficient grounds for termination of the contract.

4. A breach of the following clauses of the Required Contract Provisions may also be grounds for debarment as provided in 29 CFR 5.12:

Section I, paragraph 2;
Section IV, paragraphs 1, 2, 3, 4, and 7;
Section V, paragraphs 1 and 2a through 2g.

5. Disputes arising out of the labor standards provisions of Section IV (except paragraph 5) and Section V of these Required Contract Provisions shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor (DOL) as set forth in 29 CFR 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the DOL, or the contractor's employees or their representatives.

6. **Selection of Labor:** During the performance of this contract, the contractor shall not:

a. discriminate against labor from any other State, possession, or territory of the United States (except for employment preference for Appalachian contracts, when applicable, as specified in Attachment A), or

b. employ convict labor for any purpose within the limits of the project unless it is labor performed by convicts who are on parole, supervised release, or probation.

II. NONDISCRIMINATION

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $10,000 or more.)

1. **Equal Employment Opportunity:** Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630 and 41 CFR 60) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The Equal Opportunity Construction Contract Specifications set forth under 41 CFR 60-4.3 and the provisions of the American Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the State highway agency (SHA) and the Federal Government in carrying out EEO obligations and in their review of his/her activities under the contract.

b. The contractor will accept as his operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, preapprenticeship, and/or on-the-job training."

2. **EEO Officer:** The contractor will designate and make known to the SHA contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active contractor program of EEO and who must be assigned adequate authority and responsibility to do so.

3. **Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minority group employees.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. **Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer". All such advertisements will be placed in publications having a large circulation among minority groups in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority group applicants. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the contractor's compliance with EEO contract provisions. (The DOL has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)

c. The contractor will encourage his present employees to refer minority group applicants for employment. Information and procedures with regard to referring minority group applicants will be discussed with employees.

5. **Personnel Actions:** Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with his obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of his avenues of appeal.

6. **Training and Promotion:**

a. The contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision.

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of minority group and women employees and will encourage eligible employees to apply for such training and promotion.

7. **Unions:** If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. Actions by the contractor either directly or through a contractor's association acting as agent will include the procedures set forth below:

a. The contractor will use best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.

b. The contractor will use best efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the SHA and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The DOL has held that it shall be no excuse that the union with which the contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the SHA.

8. **Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment.

a. The contractor shall notify all potential subcontractors and suppliers of his/her EEO obligations under this contract.

b. Disadvantaged business enterprises (DBE), as defined in 49 CFR 23, shall have equal opportunity to compete for and perform subcontracts which the contractor enters into pursuant to this contract. The contractor will use his best efforts to solicit bids from and to utilize DBE subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of DBE construction firms from SHA personnel.

c. The contractor will use his best efforts to ensure subcontractor compliance with their EEO obligations.

9. **Records and Reports:** The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the SHA and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women;

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees; and

(4) The progress and efforts being made in securing the services of DBE subcontractors or subcontractors with meaningful minority and female representation among their employees.

b. The contractors will submit an annual report to the SHA each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data.

III. NONSEGREGATED FACILITIES

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $10,000 or more.)

a. By submission of this bid, the execution of this contract or subcontract, or the consummation of this material supply agreement or purchase order, as appropriate, the bidder, Federal-aid construction contractor, subcontractor, material supplier, or vendor, as appropriate, certifies that the firm does not maintain or provide for its employees any segregated facilities at any of its establishments, and that the firm does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The firm agrees that a breach of this certification is a violation of the EEO provisions of this contract. The firm further certifies that no employee will be denied access to adequate facilities on the basis of sex or disability.

b. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, timeclocks, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are, in fact, segregated on the basis of race, color, religion, national origin, age or disability, because of habit, local custom, or otherwise. The only exception will be for the disabled when the demands for accessibility override (e.g. disabled parking).

c. The contractor agrees that it has obtained or will obtain identical certification from proposed subcontractors or material suppliers prior to award of subcontracts or consummation of material supply agreements of $10,000 or more and that it will retain such certifications in its files.

IV. PAYMENT OF PREDETERMINED MINIMUM WAGE

(Applicable to all Federal-aid construction contracts exceeding $2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural minor collectors, which are exempt.)

1. **General:**

a. All mechanics and laborers employed or working upon the site of the work will be paid unconditionally and not less often than once a week and without subsequent deduction or rebate on any account [except such payroll deductions as are permitted by regulations (29 CFR 3) issued by the Secretary of Labor under the Copeland Act (40 U.S.C. 276c)] the full amounts of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment. The payment shall be computed at wage rates not less than those contained in the wage determination of the Secretary of Labor (hereinafter "the wage determination") which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor or its subcontractors and such laborers and mechanics. The wage determination (including any additional classifications and wage rates conformed under paragraph 2 of this Section IV and the DOL poster (WH-1321) or Form FHWA-1495) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers. For the purpose of this Section, contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act (40 U.S.C. 276a) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of Section IV, paragraph 3b, hereof. Also, for the purpose of this Section, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in paragraphs 4 and 5 of this Section IV.

b. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein, provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed.

c. All rulings and interpretations of the Davis-Bacon Act and related acts contained in 29 CFR 1, 3, and 5 are herein incorporated by reference in this contract.

2. **Classification:**

a. The SHA contracting officer shall require that any class of laborers or mechanics employed under the contract, which is not listed in the wage determination, shall be classified in conformance with the wage determination.

b. The contracting officer shall approve an additional classification, wage rate and fringe benefits only when the following criteria have been met:

(1) the work to be performed by the additional classification requested is not performed by a classification in the wage determination;

(2) the additional classification is utilized in the area by the construction industry;

(3) the proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and

(4) with respect to helpers, when such a classification prevails in the area in which the work is performed.

c. If the contractor or subcontractors, as appropriate, the laborers and mechanics (if known) to be employed in the additional classification or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the DOL, Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, D.C. 20210. The Wage and Hour Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

d. In the event the contractor or subcontractors, as appropriate, the laborers or mechanics to be employed in the additional classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. Said Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary

e. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 2c or 2d of this Section IV shall be paid to all workers performing work in the additional classification from the first day on which work is performed in the classification.

3. **Payment of Fringe Benefits:**

a. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor or subcontractors, as appropriate, shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly case equivalent thereof.

b. If the contractor or subcontractor, as appropriate, does not make payments to a trustee or other third person, he/she may consider as a part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

4. **Apprentices and Trainees (Programs of the U.S. DOL) and Helpers:**

a. Apprentices:

(1) Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the DOL, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, or if a person is employed in his/her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State apprenticeship agency (where appropriate) to be eligible for probationary employment as an apprentice.

(2) The allowable ratio of apprentices to journeyman-level employees on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate listed in the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor or subcontractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman-level hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

(3) Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator for the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

(4) In the event the Bureau of Apprenticeship and Training, or a State apprenticeship agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor or subcontractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the comparable work performed by regular employees until an acceptable program is approved.

b. Trainees:

(1) Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the DOL, Employment and Training Administration.

(2) The ratio of trainees to journeyman-level employees on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

(3) Every trainee must be paid at not less than the rate specified in the approved program for his/her level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman-level wage rate on the wage determination which provides for less than full fringe benefits for apprentices, in which case such trainees shall receive the same fringe benefits as apprentices.

(4) In the event the Employment and Training Administration withdraws approval of a training program, the contractor or subcontractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Helpers:

Helpers will be permitted to work on a project if the helper classification is specified and defined on the applicable wage determination or is approved pursuant to the conformance procedure set forth in Section IV.2. Any worker listed on a payroll at a helper wage rate, who is not a helper under an approved definition, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed.

5. **Apprentices and Trainees (Programs of the U.S. DOT):**

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

6. **Withholding:**

The SHA shall upon its own action or upon written request of an authorized representative of the DOL withhold, or cause to be withheld, from the contractor or subcontractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements which is held by the same prime contractor, as much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the SHA contracting officer may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

7. **Overtime Requirements:**

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers, mechanics, watchmen, or guards (including apprentices, trainees, and helpers described in paragraphs 4 and 5 above) shall require or permit any laborer, mechanic, watchman, or guard in any workweek in which he/she is employed on such work, to work in excess of 40 hours in such workweek unless such laborer, mechanic, watchman, or guard receives compensation at a rate not less than one-and-one-half times his/her basic rate of pay for all hours worked in excess of 40 hours in such workweek.

8. **Violation:**

Liability for Unpaid Wages; Liquidated Damages: In the event of any violation of the clause set forth in paragraph 7 above, the contractor and any subcontractor responsible thereof shall be liable to the affected employee for his/her unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer, mechanic, watchman, or guard employed in violation of the clause set forth in paragraph 7, in the sum of $10 for each calendar day on which such employee was required or permitted to work in excess of the standard work week of 40 hours without payment of the overtime wages required by the clause set forth in paragraph 7.

9. **Withholding for Unpaid Wages and Liquidated Damages:**

The SHA shall upon its own action or upon written request of any authorized representative of the DOL withhold, or cause to be withheld, from any monies payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 8 above.

V. STATEMENTS AND PAYROLLS

(Applicable to all Federal-aid construction contracts exceeding $2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural collectors, which are exempt.)

1. **Compliance with Copeland Regulations (29 CFR 3):**

The contractor shall comply with the Copeland Regulations of the Secretary of Labor which are herein incorporated by reference.

2. **Payrolls and Payroll Records:**

a. Payrolls and basic records relating thereto shall be maintained by the contractor and each subcontractor during the course of the work and preserved for a period of 3 years from the date of completion of the contract for all laborers, mechanics, apprentices, trainees, watchmen, helpers, and guards working at the site of the work.

b. The payroll records shall contain the name, social security number, and address of each such employee; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalent thereof the types described in Section 1(b)(2)(B) of the Davis Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid. In addition, for Appalachian contracts, the payroll records shall contain a notation indicating whether the employee does, or does not, normally reside in the labor area as defined in Attachment A, paragraph 1. Whenever the Secretary of Labor, pursuant to Section IV, paragraph 3b, has found that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis Bacon Act, the contractor and each subcontractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, that the plan or program has been communicated in writing to the laborers or mechanics affected, and show the cost anticipated or the actual cost incurred in providing benefits. Contractors or subcontractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprentices and trainees, and ratios and wage rates prescribed in the applicable programs.

c. Each contractor and subcontractor shall furnish, each week in which any contract work is performed, to the SHA resident engineer a payroll of wages paid each of its employees (including apprentices, trainees, and helpers, described in Section IV, paragraphs 4 and 5, and watchmen and guards engaged on work during the preceding weekly payroll period). The payroll submitted shall set out accurately and completely all of the information required to be maintained under paragraph 2b of this Section V. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal stock number 029-005-0014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

d. Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his/her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) that the payroll for the payroll period contains the information required to be maintained under paragraph 2b of this Section V and that such information is correct and complete;

(2) that such laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in the Regulations, 29 CFR 3;

(3) that each laborer or mechanic has been paid not less that the applicable wage rate and fringe benefits or cash equivalent for the classification of worked performed, as specified in the applicable wage determination incorporated into the contract.

e. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 2d of this Section V.

f. The falsification of any of the above certifications may subject the contractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 231.

g. The contractor or subcontractor shall make the records required under paragraph 2b of this Section V available for inspection, copying, or transcription by authorized representatives of the SHA, the FHWA, or the DOL, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the SHA, the FHWA, the DOL, or all may, after written notice to the contractor, sponsor, applicant, or owner, take such actions as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

VI. RECORD OF MATERIALS, SUPPLIES, AND LABOR

1. On all Federal-aid contracts on the National Highway System, except those which provide solely for the installation of protective devices at railroad grade crossings, those which are constructed on a force account or direct labor basis, highway beautification contracts, and contracts for which the total final construction cost for roadway and bridge is less than $1,000,000 (23 CFR 635) the contractor shall:

a. Become familiar with the list of specific materials and supplies contained in Form FHWA-47, "Statement of Materials and Labor Used by Contractor of Highway Construction Involving Federal Funds," prior to the commencement of work under this contract.

b. Maintain a record of the total cost of all materials and supplies purchased for and incorporated in the work, and also of the quantities of those specific materials and supplies listed on Form FHWA-47, and in the units shown on Form FHWA-47.

c. Furnish, upon the completion of the contract, to the SHA resident engineer on Form FHWA-47 together with the data required in paragraph 1b relative to materials and supplies, a final labor summary of all contract work indicating the total hours worked and the total amount earned.

2. At the prime contractor's option, either a single report covering all contract work or separate reports for the contractor and for each subcontract shall be submitted.

VII. SUBLETTING OR ASSIGNING THE CONTRACT

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the State. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635).

a. "Its own organization" shall be construed to include only workers employed and paid directly by the prime contractor and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor, assignee, or agent of the prime contractor.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph 1 of Section VII is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the SHA contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the SHA contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the SHA has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

VIII. SAFETY: ACCIDENT PREVENTION

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the SHA contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

IX. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, the following notice shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

NOTICE TO ALL PERSONNEL ENGAGED ON FEDERAL-AID HIGHWAY PROJECTS

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined not more that $10,000 or imprisoned not more than 5 years or both."

X. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $100,000 or more.)

By submission of this bid or the execution of this contract, or subcontract, as appropriate, the bidder, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any facility that is or will be utilized in the performance of this contract, unless such contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Pub.L. 91-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Pub.L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 CFR 15) is not listed, on the date of contract award, on the U.S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 CFR 15.20.

2. That the firm agrees to comply and remain in compliance with all the requirements of Section 114 of the Clean Air Act and Section 308 of the Federal Water Pollution Control Act and all regulations and guidelines listed thereunder.

3. That the firm shall promptly notify the SHA of the receipt of any communication from the Director, Office of Federal Activities, EPA, indicating that a facility that is or will be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities.

4. That the firm agrees to include or cause to be included the requirements of paragraph 1 through 4 of this Section X in every nonexempt subcontract, and further agrees to take such action as the government may direct as a means of enforcing such requirements.

XI. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

1. **Instructions for Certification - Primary Covered Transactions:**
(Applicable to all Federal-aid contracts - 49 CFR 29)

a. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.

d. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is submitted for assistance in obtaining a copy of those regulations.

f. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the nonprocurement portion of the "Lists of Parties Excluded From Federal Procurement or Nonprocurement Programs" (Nonprocurement List) which is compiled by the General Services Administration.

i. 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 this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph f of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Primary Covered Transactions

1. The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a 3-year period preceding this proposal been convicted of or had a civil judgement 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) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 1b of this certification; and

d. Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

2. Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

2. **Instructions for Certification - Lower Tier Covered Transactions:**

(Applicable to all subcontracts, purchase orders and other lower tier transactions of $25,000 or more - 49 CFR 29)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "primary covered transaction," "participant," "person," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

h. 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 this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Covered Transactions:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XII. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

(Applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000 - 49 CFR 20)

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

3. The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

ATTACHMENT A - EMPLOYMENT PREFERENCE FOR APPALACHIAN CONTRACTS

(Applicable to Appalachian contracts only.)

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph 1c shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph 4 below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which he estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, he shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within 1 week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph 1c above.

5. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

DISADVANTAGED BUSINESS ENTERPRISE PROCEDURE

The Standard Specifications are revised as follows:

SECTION 103, AFTER LINE 4, INSERT AS FOLLOWS:

*(j) **Disadvantaged Business Enterprise Program Procedure.** The DBE Program, provided for herein, shall be in accordance with 49 CFR Part 23 as amended. A brief outline of the procedure to be followed is stated below.*

If a DBE goal has been established for the contract, the Contractor shall take good faith efforts to achieve established goals both prior to and after the bid opening. The Affirmative Action Certification shall be completed to indicate proposed DBE utilization or to state the reasons no DBEs are listed and submitted with the Proposal book. The only exception which may occur is if the Contractor is a certified DBE. Such exception is explained in 103.01(c). The Affirmative Action Certification and, if applicable, the reasons no DBEs are listed shall be submitted with the Proposal book.

If no DBEs are listed, the reasons shall include an explanation of what positive efforts have been taken to achieve the DBE goal. The explanation shall respond to the factors listed in 103.01(e). Submission of incomplete reasons with a blank Affirmative Action Certification will be considered a lack of good faith efforts and will result in the bid being rejected. An Affirmative Action Certification will be considered blank if no DBEs are listed and no positive reasons are stated. A signed Affirmative Action Certification with no DBEs listed and no reasons stated will be considered blank.

The award of the contract will be made to the lowest and best bidder when all other requirements have been met and good faith efforts have been taken toward meeting the DBE goal, if required, in accordance with the requirements herein. Achievement of the goal at the time of the bid opening will be considered evidence of good faith efforts.

If the apparent low bidder has achieved less than the DBE goal and has complied with the above requirements, the deficiency will be considered a technicality. The bidder shall have seven calendar days after notification to make necessary response in accordance with the Rules of Prequalification of Contractors and Bidding. The bidder's response may include certification of additional DBEs and shall include the statement as follows:

1. *A statement and supporting documentation evidencing good faith efforts taken prior to and after the bid opening and explaining why the goal was achieved within the seven days and not prior to the bid opening; or*

2. *A statement and supporting documentation evidencing good faith efforts taken prior to and after the bid opening and explaining why the goal was not achieved prior to the time of the bid opening or during the seven day period.*

3. *An explanation of what efforts were taken by the bidder to achieve the DBE goal. The explanation shall respond to each of the factors listed in 103.01(e). All affirmative actions taken to achieve the goals shall be identified.*

Submission of an incomplete statement may result in rejection of the bid. The statements and documentation evidencing good faith efforts taken after the bid opening will be waived by the Department if the Affirmative Action Certification identifying additional DBE utilization is submitted and verified to meet the DBE goal prior to expiration of the seven day period.

Failure to respond within the seven day period may result in the rejection of the bid, forfeiture of the bid bond, and the referral of the Contractor to the Prequalification Committee.

Responses shall be forwarded to the Department's Contracts Engineer. Good faith efforts of the Contractor will be reviewed for compliance with 103.01(e). The Commissioner will make a conditional determination as to the award of the contract and will send written notice to all bidders.

The Commissioners review of the Contractor's good faith efforts which results in a determination that good faith efforts were inadequate will result in either the rejection of all bids or award to the next eligible low bidder. The Contractor shall agree to waive all claims of whatever nature arising out of the Commissioner's decision.

An apparent low bidder who has not met the DBE goal and requirements for good efforts may be requested not to rebid on this contract during subsequent bid lettings, unless in the rebid it takes good faith efforts in accordance with 103.01(e).

The Commissioner's decision will be final unless within 15 calendar days of receipt of the Commissioner's determination a written objection is filed with the Commissioner with attention to the Contracts Engineer. Written objections shall contain a complete statement of all objections and a request for a hearing.

Upon receipt of an objection, the Commissioner will appoint an administrative law judge. The administrative law judge will set or arrange the administrative hearing. The hearing will be held in accordance with Indiana's Administrative Orders and Procedures Act. All bidders, along with those making written objection, will be notified of the date, time, and place of the hearing. A record of the hearing will be kept. The objector will bear the burden of proof to establish the factual basis for its objection. Prior to the hearing, the objector may have access to the data submitted to the Department and the DBE Certifications attached to the Proposal book. Nobody may see the Schedule of Pay Items. The objector shall be free to be represented by counsel, to subpoena witnesses, and to cross-examine witnesses.

Subsequent to the hearing, the administrative law judge will make written findings of fact and make written notice of the recommended order to the Commissioner and all persons who were parties to the hearing. The Commissioner will render a Final Order, if no objections are filed and the order meets the Commissioner's approval pursuant to IC 4-21.5-3-29(c).

An interested and affected person may, within 15 calendar days after receipt of the administrative law judge's recommendation or within such additional time as may be granted by the Department, file with the Commissioner its objections to the entry of the recommended determination. Written objections shall contain a complete statement of all objections and a request for a review of the administrative law judge's recommendation.

Upon receipt of an objection, the Department will proceed in accordance with the provisions of Indiana Code 4-21.5-3-29 et seq.

The Commissioner's decision will be the final order of the Department. Those parties objecting to the Commissioner's decision may seek legal remedies through judicial review.

If the Contractor fails to fulfill the affirmative action requirements of 103.01(d) for the Disadvantaged Business Enterprise Program, and the Affirmative Action Certification, sanctions for noncompliance may be enforced in accordance with the Contract Compliance Procedures incorporated in the 23 CFR 230A and D and the Department's Bidding Regulations. DBEs listed in the Affirmative Action Certification may be changed subject to the Department's approval in accordance with 103.01(c). Noncompliance may be referred to the Prequalification Committee.

EXECUTIVE ORDER 11246

The Standard Specifications are revised as follows:

SECTION 103, LINE 7, DELETE AND INSERT AS FOLLOWS:

103.03 ~~Blank~~ *Executive Order 11246: Notice of Requirements for Affirmative Action to Ensure Equal Employment Opportunity.* *This requirement will apply only to a federal aid contract. The Code of Federal Regulations 41 CFR 60-4.2(d) is amended by revising Paragraph 2 of the Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246), to read as follows:*

2. *The Contractor's or Bidder's attention is called to the Equal Opportunity Clause and the Standard Federal Equal Employment Opportunity Construction Contract Specifications set forth herein.*

(a) Timetables. *The timetables for minority and female participation for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:*

1. Minorities. *Immediately.*

2. Women. *April 1, 1980 to indefinite.*

The goals are shown in 103.03(j) and 103.03(k).

Contractors who are signatory to an area (Hometown) plan are covered by 103.03(b). All contractors, signatory or not to an area (Hometown) plan, will be covered by the minority goals as shown in 103.03(j).

These goals are applicable to all the Contractor's construction work, whether or not it is Federal or federally-assisted, performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed, in accordance with 41 CFR 60-4 as set out in Volume 45, No. 194 of the Federal Register dated October 3, 1980. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

(b) Area (Hometown) Plans. *Until further notice, the following goals and timetables for minority utilization shall be included in all Federal or federally-assisted construction contracts and subcontracts in excess of $10,000.00 to be performed in the respective covered areas. The goals are applicable to the Contractor's aggregate on-site construction workforce whether or not part of that workforce is performing work on a Federal or federally-assisted construction contract or subcontract.*

1. Cincinnati, Ohio Area. *Area Covered: Ohio counties of Clermont, Hamilton, and Warren; Kentucky counties of Boone, Campbell, and Kenton; and Indiana county of Dearborn. The minority hiring goal in Dearborn County, Indiana is 11 percent.*

2. Indianapolis, Indiana Area. *Area Covered: Marion County. The minority hiring goal in Marion County is 12.5 percent.*

(c) Written Notification. *The Contractor shall provide written notification to the Department within ten work days of award of any construction subcontract in excess of $10,000.00 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor, employer identification number, estimated dollar amount of the contract, estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.*

(d) 41 CFR 60-4.3 Equal Opportunity Clauses. *The equal opportunity clause published as 41 CFR 60-1.4(a) of this chapter is required to be included in, and is part of, all nonexempt Federal contracts and subcontracts, including construction contracts and subcontracts. The equal opportunity clause published at 41 CFR 60-1.4(b) is required to be included in, and is a part of, all nonexempt federally-assisted construction contracts and subcontracts. In addition to the clause described above, all Federal contracting officers, all applicants and all nonconstruction contractors, as applicable, shall include the specification set forth in this section in all Federal and federally-assisted construction contracts in excess of $10,000.00 to be performed in geographical areas designated by the Department pursuant to 41 CFR 60-4.6 of this part and in construction subcontracts in excess of $10,000.00 necessary in whole or in part to the performance of nonconstruction Federal contracts and subcontracts covered under the Executive Order.*

1. *As used in these specifications:*

   a. *"Covered area" means the geographical area described in the solicitation from which this contract resulted.*

   b. *"Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority.*

   c. *"Employer Identification Number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.*

   d. *"Minority" includes:*

      (1) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

      (2) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);

      (3) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands): and

      (4) American Indian or Alaskan Native original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification.

2. *Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000.00 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.*

3. *If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.*

4. *The Contractor shall implement the specific affirmative action standards provided in Paragraphs 7.a. through 7.p. of this specification. The goals set forth in the solicitation form which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization, the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.*

5. *Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.*

6. *In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.*

7. *The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:*

   a. *Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.*

   b. *Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organization when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.*

   c. *Maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source, or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.*

   d. *Provide immediate written notification to the Department when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.*

   e. *Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the source compiled under 7b above.*

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female, and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer, and vacation employment to minority and female youth both on the site and in other areas of the Contractor's workforce.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to see or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments, and other personnel practices, do not have discriminatory effect by continually monitoring all personnel and employment related activities to ensure than the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations under 7.a. through 7.p. of this specification. The efforts of a contractors' association, joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7.a. through 7.p. of this specification provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. *A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).*

10. *The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.*

11. *The Contractor shall not enter into any subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.*

12. *The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspensions, termination, and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.*

13. *The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in Paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, of these specifications, the Department will proceed in accordance with 41 CFR 60-4.8.*

14. *The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records.*

    Records shall at least include for each employee the name, address, telephone number, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g. mechanic, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. *Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g. those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).*

The notice set forth in 41 CFR 60-4.2 and the specifications set forth in 41 CFR 60-4.3 replace the New Form for Federal Equal Employment Opportunity Bid Conditions for Federal and Federally-Assisted Construction published as 41 CFR 32482 and commonly known as the Model Federal EEO Bid Conditions. The New Form shall not be used after the regulations in 41 CFR part 60-4 become effective.

(e) 41 CFR 60-4.5 Hometown Plans. *If the Contractor is participating, either individually or through an association, in an approved Hometown Plan (including heavy highway affirmative action plans) it shall comply with its affirmative action obligations under Executive Order 11246 by complying with its obligations under the Plan: Provided, that each contractor or subcontractor participating in an approved Plan is individually required to comply with the equal opportunity clause set forth in 41 CFR 60-1.4; to make a good faith effort to achieve the goals for each trade participating in the Plan in which it has employees; and that the overall good performance by other contractors or subcontractors toward a goal in an approved Plan does not excuse any covered contractor's or subcontractor's failure to take good faith efforts to achieve the Plan's goals and timetables. If the Contractor is not participating in an approved Hometown Plan it shall comply with the specifications set forth in 41 CFR 60-4.3 and with the goals and timetables for the appropriate area as listed in the Notice required by 41 CFR 60-4.2 with regard to that trade. For the purposes of 41 CFR 60-4, the Contractor is not participating in a Hometown Plan for a particular trade if it:*

1. *Ceases to be signatory to a Hometown Plan covering that trade.*

2. *Is signatory to a Hometown Plan for that trade but is not party to a collective bargaining agreement for that trade.*

3. *Is signatory to a Hometown Plan for that trade but is party to a collective bargaining agreement with labor organizations which are not or cease to be signatories to the same Hometown Plan for that trade.*

4. *Is signatory to a Hometown Plan for that trade and is party to a collective bargaining agreement with a labor organization for that trade but the two have not jointly executed a specific commitment in the Hometown Plan for that trade.*

5. *In participating in a Hometown Plan for that Trade which is no longer acceptable to the Office of Federal Contract Compliance Programs.*

6. *Is signatory to a Hometown Plan for that trade but is party to a collective bargaining agreement with a labor organization for that trade and the labor organization and the Contractor have failed to make a good faith effort to comply with their obligations under the Hometown Plan for that trade.*

7. *If the Contractor participates in Hometown Plans, it must be able to demonstrate its participation and document its compliance with the provisions of the Hometown Plan.*

(f) 41 CFR 60-4.6 Goals and Timetables. *The Department, from time to time, shall issue goals and timetables for minority and female utilization which shall be based on appropriate workforce, demographic or other relevant data and which shall cover construction projects, or construction contracts performed in specific geographical areas. The goals shall be applicable to each construction trade in a covered contractor's or subcontractor's entire workforce which is working in the area covered by the goals and timetables, shall be published as notices in the Federal Register, and shall be inserted by the contracting officers and applicants, as applicable, in the Notice required by 41 CFR 60-4.2.*

(g) 41 CFR 60-4.7 Effect on Other Regulations. *The regulations in this part are in addition to the regulations contained in this chapter which apply to construction contractors and subcontractors generally. So particularly, 41 CFR 60-1.4(a), (b), (c), (d), and (e); 60-1.5; 60-1.5; 60-1.7; 60-1.8; 60-1.26; 60-1.29; 60-1.30; 60-1.32; 60-1.42; 60-1.43; and 41 CFR part 60-3; part 60-20; part 60-30; part 60-40; and part 60-50.*

(h) 41 CFR 60-4.8 Show Cause Notice. *If an investigation or compliance review reveals that a construction contractor or subcontract has violated the Executive Order, any contract clause, specifications or the regulations in this chapter and if administrative enforcement is contemplated, the Department will issue to the Contractor or Subcontractor a notice to show cause which shall contain the items specified in Iil0-(iv) of 41 CFR 60-2.2(c)(1). If the Contractor does not show good cause within 30 days, or in the alternative, fails to enter an acceptable conciliation agreement which includes where appropriate, make up goals and timetables, back pay, and seniority relief for affected class members, the compliance agency shall follow the procedure described in 41 CFR 60-1.26(b), provided that where a conciliation agreement has been violated, no show cause notice is required prior to the initiation of enforcement proceedings.*

(i) 41 CFR 60-4.9 Incorporation by Operation of the Order. *By operation of the Order, the equal opportunity clause contained in 41 CFR 60-1.4, 41 CFR 60-4.2, and 41 CFR 60-4.3 shall be deemed to be a part of every solicitation or of every contract and subcontract, as appropriate, required by the Order and regulations in this chapter to include such clauses whether or not they are physically incorporated in such solicitation or contract and whether or not the contract is written.*

(j) Minority Hiring Goals by County.

COUNTY	*PCT.*	*COUNTY*	*PCT.*	*COUNTY*	*PCT.*
Adams	*4.4*	*Hendricks*	*12.5*	*Pike*	*3.5*
Allen	*4.4*	*Henry*	*3.9*	*Porter*	*20.9*
Bartholomew	*9.7*	*Howard*	*4.4*	*Posey*	*4.8*
Benton	*1.5*	*Huntington*	*4.4*	*Pulaski*	*18.4*
Blackford	*3.9*	*Jackson*	*9.7*	*Putnam*	*9.7*
Boone	*12.5*	*Jasper*	*18.4*	*Randolph*	*3.9*
Brown	*9.7*	*Jay*	*3.9*	*Ripley*	*9.2*
Carroll	*1.5*	*Jefferson*	*9.6*	*Rush*	*9.7*
Cass	*3.7*	*Jennings*	*9.7*	*St. Joseph*	*7.1*
Clark	*11.2*	*Johnson*	*12.5*	*Scott*	*9.6*
Clay	*3.1*	*Knox*	*3.5*	*Shelby*	*12.5*
Clinton	*1.5*	*Kosciusko*	*6.2*	*Spencer*	*3.5*
Crawford	*9.6*	*LaGrange*	*6.2*	*Starke*	*18.4*
Daviess	*9.7*	*Lake*	*20.9*	*Steuben*	*4.4*
Dearborn	*11.0*	*LaPorte*	*18.4*	*Sullivan*	*3.1*
Decatur	*9.7*	*Lawrence*	*9.7*	*Switzerland*	*9.2*
Dekalb	*4.4*	*Madison*	*4.9*	*Tippecanoe*	*2.7*
Delaware	*5.3*	*Marion*	*12.5*	*Tipton*	*4.4*
Dubois	*3.5*	*Marshall*	*7.1*	*Union*	*3.9*
Elkhart	*4.0*	*Martin*	*9.7*	*Vanderburgh*	*4.8*
Fayette	*3.9*	*Miami*	*3.7*	*Vermillion*	*3.1*
Floyd	*11.2*	*Monroe*	*3.1*	*Vigo*	*3.1*
Fountain	*1.5*	*Montgomery*	*1.5*	*Wabash*	*3.7*
Franklin	*9.2*	*Morgan*	*12.5*	*Warren*	*1.5*
Fulton	*6.2*	*Newton*	*18.4*	*Warrick*	*4.8*
Gibson	*4.8*	*Noble*	*4.4*	*Washington*	*9.6*
Grant	*3.7*	*Ohio*	*9.2*	*Wayne*	*3.9*
Greene	*9.7*	*Orange*	*9.6*	*Wells*	*4.4*
Hamilton	*12.5*	*Owen*	*9.7*	*White*	*1.5*
Hancock	*12.5*	*Parke*	*2.5*	*Whitley*	*4.4*
Harrison	*9.6*	*Perry*	*3.5*		

(k) Female Hiring Goal. *The female hiring goal is 6.9 percent throughout the State. Minority females may be counted both as a minority and as a female. Double counting will be permitted for reporting on Form CC-257.*

OWNERS' AND CONTRACTORS' PROTECTIVE LIABILITY INSURANCE
COVERAGE FOR OPERATIONS OF THE DESIGNATED CONTRACTOR

The Standard Specifications are revised as follows:

SECTION 103, DELETE LINES 8 THROUGH 146.

SECTION 103, AFTER LINE 147, INSERT AS FOLLOWS:

103.04 Insurance. *Prior to commencing work, the Contractor shall obtain and thereafter keep in force, the following insurance coverages provided by insurance companies acceptable to the Department and authorized to transact business under the laws of the State of Indiana. Certificates of insurance shall be filed with the Department. The Department may temporarily accept an insurance binder pending receipt of the certificate of insurance. When Railroad's Protective Liability insurance in accordance with 103.04(d) is required, the original policy shall be submitted to the railroad company with a copy transmitted to the Department. In addition, certificates of insurance shall be provided to the railroad, on forms satisfactory to the railroad, covering the Contractor's Commercial General Liability and Business Automobile Liability insurance.*

The Contractor may purchase insurance for the full limits required by 103.04(b), or 103.04(c) or by a combination of primary policies for lesser limits and remaining limits provided by a Commercial Umbrella Liability policy.

Proof of renewal shall be furnished 15 days or more in advance of the policy expiration. If subject to cancellation, the insurance company shall provide at least 30 days prior notice, and the insurer shall immediately notify the Department in writing at Room N855, 100 N. Senate Avenue, Indianapolis, IN 46204-2218 of such impending cancellation.

In the event of cancellation or expiration, all work on the contract shall be suspended except that necessary for traffic maintenance and the protection of life and property. No extension in the contract completion time or additional payment will be allowed on account of this requirement and contract time charges will continue.

Nothing contained herein shall modify the Contractor's obligation of indemnification and exculpation of the State and its representatives in accordance with 107.16.

(a) Worker's Compensation and Employer's Liability.

1. *Worker's compensation shall be provided according to the provisions of the Indiana Worker's Compensation and Occupation Diseases Act as amended.*

2. *A certificate from the Worker's Compensation Board of Indiana shall be furnished as evidence of compliance with the provisions of the Indiana Worker's Compensation and Occupational Diseases Act.*

*(b) **Commercial General Liability.** Required liability insurance coverage shall provide coverage for operations of the Contractor and operations of subcontractors. Coverages shall include premises-operations; independent contractors; products; completed operations; broad form property damage; hazards of explosion, collapse, and underground damage; and contractual liability. The general aggregate limit shall be endorsed so as to provide coverage for each contract as follows:*

1. General Aggregate Limit	*$2,000,000*
2. Products-Completed Operations Aggregate Limit	*$2,000,000*
3. Each Occurrence Limit	*$1,000,000*

*(c) **Business Automobile Liability.** This policy shall cover owned, non-owned, and hired vehicles. The combined single limit of liability for bodily injury and property damage liability per each accident shall be $1,000,000.*

*(d) **Railroad's Protective Liability.** When required, the Contractor shall carry, with respect to the operations performed and those performed by others, for and in behalf of each railroad company, Railroad Protective Liability insurance providing for a limit of not less than a combined single limit of $2,000,000 per occurrence for damages arising out of bodily injury, death, and property damage with an aggregate limit of $6,000,000 for the term of the policy.*

In addition, the limits specified in 103.04(b)3 shall be increased to $2,000,000.

*(e) **Owner's and Contractor's Protective Liability Insurance Coverage for Operations of Designated Contractor.** The named insured in this policy shall be the State of Indiana, c/o Indiana Department of Transportation, 100 N. Senate Avenue, Room N855, Indianapolis, Indiana 46204-2218. The named insured shall also be the County of Porter.*

The limits of coverage shall be not less than $1,000,000 for all damages arising out of bodily injury or death in one occurrence, and for all damages arising out of injury to or destruction of property in any one occurrence. Subject to the limit per occurrence, an aggregate limit for the contract of not less than $3,000,000 shall be provided during the policy period.

In addition to the limits specified herein, the policy and the binder shall also include the endorsements to the Owner's and Contractor's Protective Liability Insurance as follows:

1. *Wherever used in this policy, the term "named insured" shall include the Indiana Department of Transportation, its officers, and employees. If so specified in the contract, the term "named insured" shall also include a local governmental agency, its officers, and employees.*

2. *Wherever used in this policy, the term "general supervision" shall include on-site inspection, field engineering, field testing, and activities incidental thereto.*

3. *Exclusion (c) is amended to read as follows:*
(c) To bodily injury or property damage occurring after all work on the project to be performed by or on behalf of the State at the site of the covered operation has been completed, and the Contractor designated herein has been relieved of further maintenance, as set out in the final acceptance letter of the Indiana Department of Transportation.

4. *Not withstanding other terms or conditions, this policy provides the minimum insurance coverages as of the latest filing with the Indiana Department of Insurance by the Insurance Services Office with the endorsements and amendments specified by 103.04(e) of the Indiana Department of Transportation Standard Specifications. The policy is identified as the latest edition of form CG 00 09 as copyrighted by the Insurance Services Office, Inc.*

(f) Basis of Payment. *No direct payment will be made for insurance. The cost thereof shall be included in the costs of the pay items.*

GEOTECHNICAL EVALUATION REPORT

A geotechnical evaluation report for the contract is available for information purposes only. It may be reviewed in or purchased from the Contract Services Section.

PIPE STRUCTURE PAY ITEMS

The Standard Specifications are revised as follows:

SECTION 105, LINE 84, INSERT AS FOLLOWS:
regarded the same as Supplemental Specifications.

Plans will govern over descriptions of pay items listed in the Schedule of Pay Items only for work described in 715, 716, and 717. The pipe pay item descriptions which identify pipe by group will not show the specified materials to be used for such pay items. If materials information is shown on the plans, those materials shall be furnished and installed under the group pay items.

Notes on the plans which are not also

BASIS FOR USE OF APPROVED OR PREQUALIFIED MATERIALS

The Standard Specifications are revised as follows:

SECTION 106, AFTER LINE 47, INSERT AS FOLLOWS:

The basis for use of materials shown in the List of Approved or Prequalified Materials will be the Engineer's verification that the materials provided are included in the List of Approved or Prequalified Materials.

PROTECTION AND RESTORATION OF ESTABLISHED VEGETATION

The Standard Specifications are revised as follows:

SECTION 106, BEGIN LINE 158, DELETE AND INSERT AS FOLLOWS:

The portion of the right-of-way not required for public travel may be used for storage purposes and for placing the plant and equipment, subject to the requirements set out in 107.07 and ~~as approved~~ *only by written request.* ~~All additional space required, unless otherwise stipulated, shall be provided with no additional payment.~~ *Such written request will be subject to approval based on the Contractor's reasons, the amount of credit to be received by the Department, and the Contractor's procedure for re-establishing vegetation in the affected area to its original condition or better.* Except as provided in 105.07 and except where necessary for drainage, if storage limits are shown on the plans *and are approved*, the right-of-way within such storage limits will be available for construction operations and storage of materials. Private property shall not be used for storage purposes without written

SECTION 201, BEGIN LINE 14, DELETE AND INSERT AS FOLLOWS:

201.02 General. Right-of-way lines and construction ~~lines~~ *limits* will be established~~,~~. ~~and~~ ~~trees~~ *Trees*, shrubs, plants, *seeded or sodded shoulders, slopes,* ~~and~~ *or* other things to remain will be designated. All such designated ~~items~~ *vegetation* shall be preserved. *All areas outside the construction limits shall remain in their original condition.* ~~Any~~ *All* damage to natural terrain, ~~or to~~ vegetation, ~~or~~ objects designated to remain, *or areas outside the construction limits which have subsequently eroded,* shall be repaired~~,~~ *or* replaced~~, or otherwise compensated for, as determined, with no additional payment~~ *as directed.* Tree wound dressing required for cut or scarred

SECTION 201, AFTER LINE 143, INSERT AS FOLLOWS:

The costs of repair or replacement of terrain, vegetation, objects designated to remain, or areas outside the construction limits which have been damaged by the Contractor and have subsequently eroded shall be included in the cost of clearing right-of-way.

SECTION 303, BEGIN LINE 118, DELETE AND INSERT AS FOLLOWS:
~~Payment will not be made for material placed outside of a one to one slope from the specified surface edge.~~ *Excess shoulder aggregate will be permitted to remain in place on embankments only if a safety slope is being constructed. Such excess aggregate shall be covered with topsoil as specified.*

SECTION 303, BEGIN LINE 196, DELETE AND INSERT AS FOLLOWS:
The cost of compacting, placing, processing, excavating, backfilling, water, *material placed outside of a one to one slope from the specified surface edge, topsoil required to cover excess shoulder aggregate,* and
necessary incidentals shall be included in the costs of the pay items.

EQUAL EMPLOYMENT OPPORTUNITY TRAINEES

A total of 2,000 training hours are assigned to this contract.

The Standard Specifications are revised as follows:
SECTION 107, BEGIN LINE 95, DELETE AND INSERT AS FOLLOWS:
107.06 Equal Employment Opportunity Trainees. Equal Employment Opportunity trainees, will be required if the Equal Employment Opportunity Trainees ~~requirements~~ *hours* are shown in the Proposal book. The number of trainees required will be one trainee for each 1,000 hours shown. ~~in the Schedule of Pay Items for E.E.O. trainee. The unit price of $1.50 per hour shall be incorporated into the Schedule of Pay Items. The bid amount shall be incorporated into the total bid.~~ *The $1.50 per training hour will not be paid.*

As part of the Contractor's equal opportunity affirmative action program, training shall be provided as on-the-job training aimed at developing full journeymen in the type of trade of job classification involved.

~~Equal employment opportunity trainees will be paid for at the contract unit price of $1.50 per hour for the number of hours worked by such trainees in accordance with the Equal Employment Opportunity Trainees requirements.~~

If the Contractor subcontracts a portion of the work, it shall determine as to how many, if any, of the trainees are to be trained by the subcontractors, provided, however, that the Contractor shall retain the primary responsibility for meeting the training requirements imposed herein. The Contractor shall also ensure that these requirements are made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

The trainees shall be distributed among the work classifications on the basis of the Contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment. Prior to commencing construction, the Contractor shall submit to the Department for approval the number of trainees to be trained in each selected classification and training program to be used. Furthermore, the Contractor shall specify the starting time for training in each of the classifications. The Contractor will be credited for each trainee employed on the contract work who is currently enrolled or becomes enrolled in an approved program.

Training and upgrading of minorities and women toward journeymen status is the primary objective of this special provision. Accordingly, the Contractor shall make every effort to enroll minority and women trainees, for example, by conducting systematic and direct recruitment through public and private sources likely to yield such minority and women trainees to the extent that such persons are available within a reasonable area of recruitment. The Contractor will be responsible for demonstrating the steps taken in pursuance thereof, prior to a determination as to whether the Contractor is in compliance with this special provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employee shall be employed as a trainee in any classification in which he or she has successfully completed a training course leading to journeyman status or in which he or she has been employed as a journeyman. The Contractor shall satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used, the Contractor's records shall document its findings in each case.

The minimum length and type of training for each classification will be as established in the training program selected by the Contractor and approved by the Department. The Department and the FHWA will approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the Contractor and to qualify the requirement for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by such Bureau, and training programs approved but not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided they are being administered in a manner consistent with the equal employment obligations of the contract. Approval or acceptance of a training program shall be obtained from the State prior to commencing work on the classification covered by the program. Training shall be provided in the construction crafts rather than clerk-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the Department. Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

It is normally expected that a trainee shall begin his or her training on the project as soon as feasible after start of work utilizing the skill involved and shall remain on the project as long as training opportunities exist in his or her work classification or until he or she has completed the training program. It is not required that all trainees be on board for the entire length of the contract. The Contractor will have fulfilled its responsibilities under this special provision if it has provided acceptable training to the number of trainees specified. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

Trainees will be paid at least 60 percent of the appropriate minimum journeyman's rate paid by the Contractor for the first half of the training period, 75 percent for the third quarter of the training period, and 90 percent for the last quarter of the training period, unless apprentices or trainees in an approved existing program are enrolled as trainees on the project. In that case, the appropriate rates approved by the Departments of Labor or Transportation in connection with the existing program shall apply to all trainees being trained for the same classification who are covered by this special provision.

The Contractor shall furnish the trainee a copy of the program he or she shall follow in providing the training. The Contractor shall provide each trainee with a certification showing the type and length of training satisfactorily completed.

The Contractor will provide for the maintenance of records and furnish periodic reports documenting its performance in accordance with these requirements.

TRAFFIC CONTROL CHANGES AND ON-CALL MAINTENANCE OF TRAFFIC CONTROL DEVICES

The Standard Specifications are revised as follows:

SECTION 107, AFTER LINE 312, INSERT AS FOLLOWS:

The names and telephone numbers of the Superintendent and one other responsible employee shall be furnished. Such employees shall be on call or shall be available at night, on weekends, or during other non-working periods to repair or replace all traffic control devices which may become damaged or inoperative.

PROTECTION OF RAILWAY INTEREST

New County Road 475 West (Sedley Road) Overhead Bridge over NW

1. AUTHORITY OF RAILROAD ENGINEER AND STATE ENGINEER:

The authorized representative of the Railroad Company, hereinafter referred to as Railroad Engineer, shall have final authority in all matters affecting the safe maintenance of Railroad traffic of his Company including the adequacy of the foundations and structures supporting the Railroad tracks.

The authorized representative of the State, hereinafter referred to as the Engineer, shall have authority over all other matters as prescribed herein and in the Project Specifications.

2. NOTICE OF STARTING WORK:

A. The Contractor shall not commence any work on Railroad rights of way until he has complied with the following conditions:

1. Given the Railroad written notice, with copy to the Engineer who has been designated to be in charge of the work, at least fourteen days in advance of the date he proposes to begin work on Railroad rights of way. The notice shall include written procedures detailing the proposed work methods. The notice shall be sent to:

Mr. C.T. Goewey
Chief Engineer Bridges & Structures
Norfolk Southern Corporation
99 Spring Street, S.W.
Atlanta, Georgia 30303

2. Obtain written authorization from the Railroad to begin work on Railroad rights of way, such authorization may include an outline of specific conditions with which he must comply.

3. Obtain written approval from the Railroad of Railroad Protective Insurance coverage as required by paragraph 10 herein.

B. The Railroad's written authorization to proceed with the work shall include the name(s), addresses, and telephone numbers of the Railroad's representatives who are to be notified as hereinafter required. Where more than one representative is designated, the area of responsibility of each representative shall be specified.

3. INTERFERENCE WITH RAILROAD OPERATIONS:

All reasonable care and diligence shall be used in the work in order to avoid accidents, damage to, unnecessary delay to, or interference with the trains and other property of the railroad company. Work shall be conducted in a manner satisfactory to the Railroad Engineer. It shall be performed in such a manner and at such time as not to unnecessarily interfere with the movements of trains or railroad traffic. Work shall be held open to inspection by railroad company inspectors at all times. All public utility, railroad, and other companies having occasion to do work on and in connection with the project shall be cooperated with. Unnecessary use of railroad property shall be avoided outside the limits of the structure without written permission of the railroad company.

Any work to be performed by the Contractor which requires flagging service or inspection service (watchman) shall be deferred by the Contractor until the flagging protection required by the Railroad is available at the job site.

4. TRACK CLEARANCES:

A. The minimum track clearances to be maintained by the Contractor during construction are shown on the Project plans. However, before undertaking any work within Railroad right of way, or before placing any obstruction over any track, the Contractor shall:

1. Notify the Railroad's representative at least 72 hours in advance of the work.

2. Receive assurance from the Railroad's representative that arrangements have been made for flagging service as may be necessary.

3. Receive permission from the Railroad's representative to proceed with the work.

4. Ascertain that the Engineer has received copies of notice to the Railroad and of the Railroad's response thereto.

5. CONSTRUCTION PROCEDURES:

A. General:

Construction work on Railroad property shall be:

1. Subject to the inspection and approval of the Railroad.

2. In accord with any specific conditions which may be provided in writing by the Railroad.

In accord with these Special Provisions and the Standard Specifications.

B. Excavation:

The subgrade of an operated track shall be maintained with edge of berm at least 10'0" from centerline of track and not more than 24 inches below top of rail. The Contractor will not be required to make existing section meet this specification if substandard, in which case existing section will be maintained.

C. Excavation for Structures:

The Contractor will be required to take special precaution and care in connection with excavating and shoring pits, and in driving piles, for footings adjacent to tracks to provide adequate lateral support for the tracks and the loads which they carry, without disturbance of track alignment and surface, and to avoid obstructing track clearances with working equipment, tools or other material. The procedure for doing such work, including need of and plans for shoring, shall first be approved by the Railroad Engineer, but such approval shall not relieve the Contractor from liability. Before submission of plans to the Railroad Engineer for approval, such plans shall first be reviewed and approved by the State.

D. Protection From Falling Debris:

Whenever any operation may produce falling debris over Railroad property, including tracks and wires, the contractor shall submit plans to the Railroad Engineer, for review and approval, detailing the method of protection of the railroad track, wires and property from falling debris.

E. Blasting:

1. The Contractor shall obtain advance approval of the Railroad Engineer and the Engineer for use of explosive on or adjacent to Railroad property. If permission for use of explosives is granted, the Contractor will be required to comply with the following:

   (a) Blasting shall be done with light charges under the direct supervision of a responsible officer or employee of the Contractor.

   (b) Electric detonating fuses shall not be used because of the possibility of premature explosions resulting from operation of two-way train radios.

   (c) No blasting shall be done without the presence of an authorized representative of the Railroad. At least 72 hours advance notice to the person designated in the Railroad's notice of authorization to proceed (see paragraph 2B above) will be required to arrange for the presence of an authorized Railroad representative and such flagging as the Railroad may require.

   (d) Have at the job site adequate equipment, labor and materials and allow sufficient time to clean up debris resulting from the blasting without delay to trains, as well as correcting at his expense any track misalignment or other damage to Railroad property resulting from the blasting as directed by the Railway's authorized representative. If his actions result in delay of trains, the Contractor shall bear the entire cost thereof.

2. The Railroad representative will:

   (a) Determine the approximate location of trains and advise the Contractor the approximate amount of time available for the blasting operation and clean-up.

   (b) Have the authority to order discontinuance of blasting if, in his opinion, blasting is too hazardous or is not in accord with these special provisions.

F. Maintenance of Railroad Facilities:

1. The Contractor will be required to maintain all ditches and drainage structures free of silt or other obstructions which may result from his operations; to promptly repair eroded areas within Railroad rights of way and to repair any other damage to the property of the Railroad or its tenants.

2. All such maintenance and repair of damages due to the Contractor's operations shall be done at the Contractor's expense.

G. Storage of Materials and Equipment:

Materials and equipment shall not be stored where they will interfere with Railroad operations, nor on the rights of way of the Railroad company without first having obtained permission from the Railroad engineer, and such permission will be with the understanding that the Railroad Company will not be liable for damage to such material and equipment from any cause and that the Railroad Engineer may move or require the Contractor to move, at the Contractor's expense, such material and equipment.

All grading or construction machinery that is left parked near the track unattended by a watchman shall be effectively immobilized so that it cannot be moved by unauthorized persons. The Contractor shall protect, defend, indemnify and save Railroad, and any associated, controlled or affiliated corporation, harmless from and against all loss, costs, expenses, claim or liability for loss of or damage to property or the loss of life or personal injury, arising out of or incident to the Contractor's failure to immobilize grading or construction machinery.

H. Cleanup:

Upon completion of the work, the Contractor shall remove from within the limits of the Railroad rights of way, all machinery, equipment, surplus materials, falsework, rubbish or temporary buildings of the Contractor, and leave said rights of way in a neat condition satisfactory to the Chief Engineer of the Railroad or his authorized representative.

6. FLAGGING SERVICES:

A. When Required:

Under the terms of the agreement between the Department and the Railroad, the Railroad has sole authority to determine the need for flagging required to protect its operations. In general, the requirements of such services will be whenever the Contractor's men or equipment are, or are likely to be, working on the Railroad's right-of-way, or across, over, adjacent to, or under a track, or when such work has disturbed or is likely to disturb a railroad structure or the railroad roadbed or surface and alignment of any track to such extent that the movement of trains must be controlled by flagging. Normally, the Railroad will assign one flagman to a project; but in some cases, more than one may be necessary, such as yard limits where three- (3) flagmen may be required. However, if the Contractor works within distances that violate instructions given by the Railroad's authorized representative or performs work that has not been scheduled with the Railroad's authorized representative, a flagman or flagmen may be required full time until the project has been completed.

B. Scheduling and Notification:

(1) Not later than the time that approval is initially requested to begin work on Railroad right-of-way, Contractor shall furnish to the Railroad and the Department a schedule for all work required to complete the portion of the project within Railroad right-of-way and arrange for a job site meeting between the Contractor, the Department, and the Railroad's authorized representative. Flagman or Flagmen may not be provided until the job site meeting has been conducted and the Contractor's work scheduled.

(2) The Contractor will be required to give the Railroad representative at least 10 working days of advance written notice of intent to begin work within Railroad right-of-way in accordance with this special provision. Once begun, when such work is then suspended at any time, or for any reason, the Contractor will be required to give the Railroad representative at least 3 working days of advance notice before resuming work on Railroad right-of-way. Such notices shall include sufficient details of the proposed work to enable the Railroad representative to determine if flagging will be required. If such notice is in writing, the Contractor shall furnish the Highway Engineer a copy; if notice is given verbally it shall be confirmed in writing with copy to the Highway Engineer. If flagging is required, no work shall be undertaken until the flagman, or flagmen is present at the job site. It may take up to 30 days to obtain flagging initially from the Railroad. When flagging begins, the flagman is usually assigned by the Railroad to work at the project site on a continual basis until no longer needed and cannot be called for on a spot basis. If flagging becomes unnecessary and is suspended, it may take up to 30 days to again obtain from the Railroad. Due to Railroad labor agreements, it is necessary to give 5 working days notice before flagging service may be discontinued and responsibility for payment stopped.

(3) If, after the flagman is assigned to the project site, emergencies arise which require the flagman's presence elsewhere, then the Contractor shall delay work on Railroad right-of-way until such time as the flagman is again available. Any additional costs resulting from such delay shall be borne by the Contractor and not the Department or Railroad.

C. Payment:

(1) The Department will reimburse the Railroad Company directly for all cost of flagging which is required on account of construction of the grade separation project, within Railroad Company's right-of-way, which is shown in the project plans, or which is covered by an approved plan revision, supplemental agreement or change order. Any flagging cost deemed to be caused by acts of omission, carelessness, or negligence or unnecessary delays by the contractor will also be borne by the Department but will be deducted from progress or final payment made to the contractor. However, this deduction will be made only after written notification has been given the contractor by the highway engineer that these flagging costs have been determined to be the contractor's responsibility. The contractor will be required to reimburse the Railroad Company for any flagging required on account of WORK FOR THE BENEFIT OF THE CONTRACTOR. (See Paragraph 7) This includes the flagging required solely for protection of a temporary crossing constructed for the benefit of the contractor.

(2) The cost of flagging service is approximately: **$341.00** per day based on a 12 hour work day. This cost includes the base pay for the flagman, overhead, and includes an estimated $30 per diem charge for travel expenses, meals and lodging.

The charge to the Department by the Railroad will be the actual cost based on the rate of pay for the Railroad's employees who are available for flagging service at the time the service is required. Work by a flagman in excess of 8 hours per day or 40 hours per week but not more than 12 hours a day will result in overtime pay at 1.5 times the appropriate rate. Work by a flagman in excess of 12 hours per day will result in overtime pay at 2 times the appropriate rate. If work is performed on a holiday, the flagging rate is 2.5 times the normal rate. Railroad work involved in preparing and handling bills will also be charged to the Department. Charges to the Department by the Railroad shall be in accordance with applicable provisions of 23 CFR Part 140, Subpart I, Subchapter B and 23 CFR, Part 646, Subpart B, of the Federal Aid Policy Guide issued by the Federal Highway Administration on December 9, 1991, including all current amendments. Flagging costs are subject to change. The above estimates of flagging cost are provided for information only and are not binding in any way.

D. Verification:

(1) The Contractor and Department will review and sign the Railroad flagman's time sheet, attesting that the flagman was present during the time recorded. Flagmen may be removed by Railroad if form is not signed. If flagman is removed, the Contractor will not be allowed to re-enter the Railroad right-of-way until the issue is resolved. Any complaints concerning flagman or flagmen must be resolved in a timely manner. If need for flagman or flagmen is questioned, please contact the below named person. All verbal complaints must be confirmed in writing by the Contractor within 5 working days with copy to the Highway Engineer. All written correspondence should be addressed to:

Mr. C. T. Goewey
Chief Engineer Bridges & Structures
Norfolk Southern Corporation
99 Spring Street, S.W.
Atlanta, GA 30303

Attn.: Mr. Chris Bennett - Engr. Grade Separation Structures

Telephone: (404) 529-1641

(2) The Railroad flagman assigned to the project will be responsible for notifying the Project Engineer upon arrival at the job site on the first day (or as soon thereafter as possible) that flagging services begin and on the last day that he performs such services for each separate period that services are provided. The Project Engineer will document such notification in the project records. When requested, the Project Engineer will also sign the flagman's diary showing daily time spent and activity at the project site.

7. WORK FOR THE BENEFIT OF THE CONTRACTOR:

A. All temporary or permanent changes in wire lines or other facilities which are considered necessary to the project are shown on the plans; included in the force account agreement between the State and the Railroad or will be covered by appropriate revisions to same which will initiated and approved by the State and/or the Railroad.

B. Should the Contractor desire any changes in addition to the above, then he shall make separate arrangements with the Railroad for same to be accomplished at the Contractor's expense.

8. COOPERATION AND DELAYS:

A. It shall be the Contractor's responsibility to arrange a schedule with the Railroad for accomplishing stage construction involving work by the Railroad or tenants of the Railroad. In arranging his schedule he shall ascertain, from the Railroad, the lead time required for assembling crews and materials and shall make due allowance therefor.

B. No charge or claims of the contractor against either the Department or the Railroad Company will be allowed for hindrance or delay on account of railway traffic; any work done by the Railway Company or other delay incident to or necessary for safe maintenance of railway traffic or for any delays due to compliance with these special provisions.

9. TRAINMAN'S WALKWAYS:

Along the outer side of each exterior track of multiple operated track, and on each side of single operated track, an unobstructed continuous space suitable for trainman's use in walking along trains, extending to a line not less than 10' from centerline of track, shall be maintained. Any temporary impediments to walkways and track drainage encroachments or obstructions allowed during work hours while Railway's protective service is provided shall be removed before the close of each work day. If there is any excavation near the walkway, a handrail, with 10'-0" minimum clearance from centerline of track, shall be placed.

10. INSURANCE:

A. The Contractor will be required to carry insurance in accordance with 103.04 of the Standard Specifications. Note: In the event this project is awarded to a "joint venture" all insurance, except workman's compensation, shall be carried in the name of the joint venture.

Evidence of insurance as required above shall be furnished to the address shown below for review by the Department and transmittal to the Railroad:

Department:
Indiana Dept. of Transportation
Contracts Engineer - Rm. N855
Government Center North
100 North Senate Avenue
Indianapolis, IN 46204-2249

Railroad:
Mr. D. W. Fries
Risk Manager
Norfolk Southern Corporation
Three Commercial Place
Norfolk, VA 23510-2191

Trains will be operated at a maximum speed of **97 km/h (60 mph)** through the improvement. The number of trains through the improvement will be **55** freight trains daily and **0** passenger trains daily.

The named insured, description of the work and designation of the job site to be shown on the Policy are as follows:

(a) Named Insured: **Norfolk Southern Railway Company**

(b) Description and Designation: **Construction of new CR 475W (Sedley Road) overhead bridge over Norfolk Southern Railway, Northwest of Valparaiso and just south of S.R. 130, in the vicinity of Railway mile posts B-483.17 and PC-429.43, in Porter County, Indiana. Contract No. R-23737.**

B. If any part of the work is sublet, similar insurance and evidence thereof in the same amounts as required of the Prime Contractor, shall be provided by or in behalf of the subcontractor to cover his operations. Endorsements to the Prime Contractor's policies specifically naming subcontractors and describing their operations will be acceptable for this purpose.

C. All insurance herein before specified shall be carried until all work required to be performed under the terms of the contract has been satisfactorily completed within the limits of the rights of way of the Railroad as evidenced by the formal acceptance by the Department. Insuring Companies may cancel insurance by permission of the Department and Railroad or on thirty (30) days written notice to the Railroad and copied to the Indiana Department of Transportation at the same addresses shown in Par. A above.

11. FAILURE TO COMPLY:

In the event the Contractor violates or fails to comply with any of the requirements of these Special Provisions:

A. The Railroad Engineer may require that the Contractor vacate Railroad property.

B. The Engineer may withhold all monies due the Contractor on monthly statements.

Any such orders shall remain in effect until the Contractor has remedied the situation to the satisfaction of the Railroad Engineer and the Engineer.

12. PAYMENT FOR COST OF COMPLIANCE:

No separate payment will be made for any extra cost incurred on account of compliance with these special provisions. All such cost shall be included in prices bid for other items of the work as specified in the payment items.

Norfolk Southern Corporation
Clearance, Construction Excavation and Demolition Requirements.

A. Temporary Clearances

1. The following criteria shall govern the use of falsework and formwork above or adjacent to operated tracks.

a. A minimum vertical clearance of 22'-0" above top of highest rail shall be maintained at all times.

b. A minimum horizontal clearance of 13'-0" from centerline of tangent track or 14'-0" from centerline of curved track shall be maintained at all times. Additional horizontal clearance may be required in special cases to be safe for operating conditions. This additional clearance will be as determined by the Chief Engineer Bridges & Structures.

2. All proposed temporary clearances which are less than those listed above must be submitted to the Chief Engineer Bridges & Structures for approval prior to construction and must also be authorized by the regulatory body of the State if less than the legally prescribed clearances.

3. The temporary clearance requirements noted above shall also apply to all other physical obstructions including, but not limited to: stockpiled materials, parked equipment, placement or driving of piles, and bracing or other construction supports.

B. CONSTRUCTION EXCAVATION

1. Footings for all piers, columns, walls or other facilities shall be located and designed so that any temporary sheeting and shoring for support of adjacent track or tracks during construction will not be closer than 8'-6" from centerline of track. Edges of footings located no closer than 11'-0" from centerline of track should satisfy the minimum of 8'-6". Excavations will not be allowed closer than 8'-6" from centerline of track unless specifically approved by the Chief Engineer Bridges & Structures.

2. All plans and calculations for shoring shall be prepared and signed by a Registered Professional Engineer. The Engineer will be responsible for the accuracy for all controlling dimensions as well as the selection of soil design values, which will accurately reflect the actual field conditions.

3. The plans shall contain details of the shoring system showing sizes of all structural members, details of connection, and embedment depth. The plans shall include a plan view showing all the proposed excavations and distances from centerline of track to face of excavation. Plans shall show a section normal to the track showing the shoring location relative to the centerline of track and showing the height of sheeting and track elevation in relation to the bottom of excavation. The plans must be complete and accurately describe the nature of the work.

4. Plans and calculations covering all falsework, shoring, excavation supports, etc., adjacent to railroad tracks should be certified to be complete and satisfactory by the submitting public agency prior to being submitted to the Chief Engineer Bridges & Structures for review. Four (4) copies of plans and calculations should be submitted. A minimum of 30 days should be allowed for the Railroad's review of such plans. No excavation will be allowed until the plans and calculations are reviewed and approved by the Chief Engineer Bridges & Structures. All excavations on or adjacent to the Railroad right-of-way shall be reviewed by the Railroad before excavation begins.

5. Shoring located between 8'-6" and 14'-0" from the centerline of track should preferably be designed using interlocking sheeting. Soldier piles and lagging will be considered only when its use is specifically approved by the Chief Engineer Bridges & Structures. Consideration for the use of soldier piles and lagging will be made if the required penetration of steel sheet piling cannot be obtained and when dry, stable material will be encountered.

6. All excavations within the limit shown on Sheet 4, copy attached, shall be designed for Railroad live load surcharge. All shoring designed for Railroad live load surcharge shall be based on Cooper's E-80 live load. AREA Chapter 8, Part 20, Section C, Paragraph 2(b), refers to the Boussinesq equation as a method to determine lateral pressure values for Railroad surcharge loading. Attached is a chart and graph indicating the lateral pressures associated with various depths of excavation and distances from the centerline of track as determined by the Boussinesq equation that may be used as a guide. The use of the AREA Boussinesq equation is not the only method available to obtain lateral pressures for surcharge loading; however, pressure values significantly less than those determined by the Boussinesq equation do not adequately consider Railroad live load surcharge.

7. Railings shall be constructed (in accordance with plans approved by the Chief Engineer Bridges & Structures) around all excavations on Railroad's property. Walkways with railings shall be constructed (in accordance with plans approved by the Chief Engineer Bridges & Structures) over open excavations adjacent to the tracks located within the normal walkway. Railings shall not be closer than 10'-0" horizontally from centerline of track.

8. Approval of the excavation plan does not relieve the submitting agency and/or designer and/or contractor of ultimate responsibility and liability for the excavation plan.

9. Attention shall be given to the need to provide a walkway adjacent to switches and tracks where trainmen are required to work on the ground.

C. DEMOLITION OF EXISTING STRUCTURE

1. Railroad tracks and other property shall be protected from damage during demolition of the existing structure or replacement of the deck slab.

2. A demolition plan indicating the method of track protection, the sequence of demolition and ascribing the procedure and equipment to be used during demolition, shall be submitted to the Chief Engineer Bridges & Structures for review and approval.

3. All demolition plans and procedures shall be reviewed and approved by the Chief Engineer Bridges & Structures before demolition begins.

4. Approval of the demolition plan does not relieve the submitting agency and/or designer and or contractor of ultimate responsibility and liability for the demolition.

STATEMENTS ABOUT EXISTING CONDITIONS OF UTILITIES, ADDITIONAL RIGHT-OF-WAY, AND ENCROACHMENTS

The Standard Specifications are revised as follows:

SECTION 107, AFTER LINE 597, INSERT AS FOLLOWS:

107.25 Existing Conditions of Utilities, Additional Right-of-Way, and Encroachments. *Such existing conditions are as described below.*

(a) Utilities. *The status of all utility companies and organizations potentially involved with the work to be performed are described below.*

The facilities of Northern Indiana Public Service Co. exist within the project limits. Their facilities have been adjusted to accommodate construction. If questions arise, Ray N. Rochester of the utility may be contacted at 219-477-3251.

The facilities of GTE exist within the project limits. The utility will be able to complete its involvement with the contract when the Contractor has completed grading & staking in the location of Sedley Rd south of the railroad such that the utility may adjust its facilities. It is anticipated that the utility will take approximately 60 work days to adjust its facilities in such area, after above request has been met. If questions arise, Alison Buchanan of the utility may be contacted at 219-763-8250.

(b) Right-of-Way. *All additional right-of-way requirements for the contract have been cleared.*

(c) Encroachments. *There is no involvement of encroachments for the contract.*

(d) Other Noteworthy Conditions. *There are no other noteworthy conditions which may affect the prosecution and progress of the contract.*

(e) Preconstruction Conference Notification. *The Contractor shall provide notification during the preconstruction conference about known corrections to or omissions of the information presented in 107.25(a) through 107.25(d) above. Otherwise, notification shall be provided as required in 105.06. Notifications regarding such corrections or omissions shall not alleviate the Contractor's inquiry or interpretation obligations as contained in 120 IAC 3-6-6.*

ASBESTOS INSPECTION AND MITIGATION

DESCRIPTION. Prior to renovation or demolition and removal of a present structure, the Contractor shall provide for the thorough inspection of the structure where work will occur for the presence of asbestos, including both friable and non-friable forms of asbestos. All rules and regulations of the Indiana Department of Environmental Management (IDEM) shall be met with regard to the inspection of the structure, notification of renovation or demolition operations, and the removal and disposal of asbestos material. Persons who inspect, remove, or dispose of asbestos shall be accredited by holding a current certificate of accreditation issued by the Commissioner of IDEM.

If it is determined that asbestos is present and must be removed, an Extra Work Agreement will be negotiated for the removal of the asbestos.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT. The inspection of the existing structure for asbestos shall not be measured and will not be paid for directly, but the cost thereof shall be included in the cost of the removal of the present structure. In accordance with IDEM policy, the fee for demolition/ renovation notification will be assessed to the Owner by IDEM. The Owner will be responsible for the cost of the fee.

Should removal and disposal of asbestos be required, it will not be paid for as part of this Contract, but the costs thereof shall be included in an Extra Work Agreement yet to be negotiated between the Owner and the Contractor based upon the scope of disposal activities determined.

CLEARING RIGHT-OF-WAY

The Standard Specifications are revised as follows:

SECTION 201, AFTER LINE 148, INSERT AS FOLLOWS:

The initial payment for clearing right-of-way will be limited to 1.5 percent of the original total bid. If the contract lump sum price for clearing right-of-way is greater than 1.5 percent of the original total bid, the amount over 1.5 percent will be paid when the contract work is 50 percent complete, or when the clearing work is complete, whichever is later.

LINEAR GRADING

The Standard Specifications are revised as follows:

SECTION 203, AFTER LINE 829, INSERT AS FOLLOWS:

203.23.1 Linear Grading. *Linear grading shall consist of earth wedging at the outside edge of a shoulder once the pavement has been resurfaced, widened, or replaced. Linear grading shall also consist of earth wedging behind guardrail to obtain the required earth backup for the posts. Linear grading shall also consist of median earth filling required for paving and placement of concrete median barrier. These types of earthwork shall not require benching.*

SECTION 203, BEGIN LINE 981, DELETE AND INSERT AS FOLLOWS:

(c) Measurement on a Linear Basis. *If* ~~When either or both~~ the ~~plans and~~ contract provide*s* for a pay item for linear grading, the measurement for payment will be based on the length of roadway actually constructed to the lines, grades, and typical cross sections specified. All classes of excavation involved~~, including required borrow,~~ will not be measured for payment~~,~~. ~~but~~ *Such classes of excavation* will be considered as included in the pay item for linear grading per *station or* kilometer (mile) *as specified.*

SECTION 203, LINE 1061, INSERT AS FOLLOWS:

Items. *Linear grading will be paid for at the contract unit price per station or kilometer (mile), as shown in the Schedule of Pay Items.*

SECTION 203, LINE 1140, INSERT AS FOLLOWS:

Linear Grading . . . . . STA, *km (MILE)*

EXCESS EXCAVATED MATERIALS DISPOSAL SITE

The Standard Specifications are revised as follows:

SECTION 203, AFTER LINE 266, INSERT AS FOLLOWS:

Excess excavated materials may be required to be disposed of outside the right-of-way. The proposed disposal site shall be subject to approval in advance of use.

Prior to dumping of such excess soil materials in the proposed site, an archaeological records check for the area, and an archaeological reconnaissance, if determined necessary, shall be performed by a qualified archaeologist to determine if significant archaeological sites exist within the limits of the proposed disposal site. The results of the records check and field reconnaissance shall be submitted to the State Historic Officer in the Indiana Department of Natural Resources, Division of Historic Preservation and Archaeology for review and concurrence prior to the disposal of materials onto the site.

The Contractor shall perform this work in the same manner as the clearance and procurement of a site for borrow material.

B BORROW AND B BORROW FOR STRUCTURE BACKFILL

The Standard Specifications are revised as follows:

SECTION 211, BEGIN LINE 14, INSERT AS FOLLOWS:

blast furnace slag, granulated blast furnace slag, or other approved material. *The Contractor shall have the option of either providing this material from a CAPP source, or supplying the material from a pit with contractor gradation control. The Contractor has the following options for supplying B borrow or B borrow for structure backfill from a pit:*

(a) establish a CAPP Producer Yard at the pit site;

(b) Contractor has gradations performed at a recognized testing laboratory; or

(c) Contractor has gradations performed by a CAPP Certified Aggregate Technician.

The frequency of gradation control for the Contractor shall be one test per 2000 Mg (2,000 T) based on production samples into a stockpile or by over the scales measurement, with a minimum of two tests per contract (one in the beginning and one near the mid-point). The sampling and testing of the B borrow material shall be in accordance with applicable requirements of 904 for fine and coarse aggregates. The Contractor shall advise, in writing, the Engineer and the District Testing Engineer of the plan to measure the material.

SECTION 211, AFTER LINE 182, INSERT AS FOLLOWS:

The costs of the Contractor gradation control, including equipment; sampling; testing; and all incidentals, shall be included in the cost of the B borrow.

CRUSHED STONE FOR SUB-BALLAST

DEFINITION. The term "crushed stone" shall include those materials required to construct and/or supplement the track roadbed, paved roads, drainage structures, bedding, and/or parking areas roadway base. The crushed stone shall be installed to the planned or staked elevation when directed by the Engineer.

MATERIALS SIZE AND QUALITY. All crushed stone material shall have the approval of the Engineer. The material shall be tested for size and quality and it must conform to ASTM Standard Specifications for Soil Aggregate Subbase, Base and Courses Designation D-1241-6B, Table 1 - Gradation Requirements for Soil Aggregate Materials, Section 3 for Type 1 - Gradation - C, is which the U.S. Standard square sieve size and the percentage passing each are as follows:

Square Sieve Size		Percent Passing by Weight
50.80 mm	2 In.	100 Percent
25.40 mm	1 In.	90 - 100 Percent
9.51 mm	3/8 In.	50 - 85 Percent
4.76 mm	No. 4	35 - 65 Percent
2.00 mm	No. 10	25 - 50 Percent
420 micron	No. 40	15 - 30 Percent
74 micron	No. 200	5 - 15 Percent

As an alternate to the above specified material, the Contractor may substitute crushed limestone Coarse Aggregate No. 53 in accordance with INDOT Standard Specification Article 904.02. The U.S. Standard Sieve Size and the percentage passing each are as follows:

Sieve Size		Percent Passing by Weight
37.5 mm	1-1/2 In.	100 Percent
25 mm	1 In.	80 - 100 Percent
19 mm	.75 In.	70 - 90 Percent
12.5 mm	.50 In.	55 - 80 Percent
9.5 mm	.375 In.	
4.75 mm	No. 4	35 - 60 Percent
2.36 mm	No. 8	25 - 50 Percent
600 microns	No. 30	12 - 30 Percent
75 microns	No. 200	5 - 10 Percent

PREPARATION OF SUBGRADE. The upper 150 mm (6 in.) of all subgrade shall be compacted to a minimum of 100 percent of maximum dry density as determined in accordance with AASHTO T-99 as modified in Article 203.24.

INSTALLATION AND COMPACTING. The Contractor shall install the crushed stone materials on a prepared and finished subgrade. The crushed stone shall be installed in areas as shown on the plans and/or as directed by the Engineer. The final grade and thickness of the crushed stone materials shall be shown on the plans and/or directed by the Engineer.

The Contractor's spreading and compaction equipment must be approved by the Engineer prior to the equipment operations. No equipment which has been rejected and/or not approved by the Engineer shall be used on the job site.

The crushed stone material shall be applied in lifts or layers not exceeding 6 inches in thickness after compaction. Each lift or layer shall extend from shoulder to shoulder on the prepared subgrade and/or surface area.

The compacted-in-place density of the crushed stone materials must be equal to or greater than 100 percent standard proctor based on the compaction test requirements of ASTM Standard Specifications for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures using 2.49 kg (5.5 lb.) rammer and 305 mm (12 in.) drop, Designation D-698-78. The Engineer shall periodically have field density tests performed on the compacted-in-place crushed stone and any areas that do not meet the requirements after compaction shall be removed to subgrade elevation and reinstalled as directed by the Engineer.

MOISTURE CONTENT. The moisture content of the crushed stone material shall be controlled as necessary to obtain specified densities. Water shall be added to the materials when, in the opinion of the Engineer, added moisture is necessary to obtain desired density. If the crushed stone delivered is too wet in the opinion of the Engineer and accepted on the job site, the Engineer may order the Contractor to dry the crushed stone prior to compaction by working the materials by means of discing, harrowing, or other means to obtain a workable moisture content within the materials. If, in the opinion of the Engineer, the crushed stone delivered is too wet and acceptance of such materials is refused, the materials and costs shall be the sole responsibility of the Contractor.

METHOD OF MEASUREMENT. Compacted aggregate sub-ballast will be measured by the megagram (ton) in accordance with Article 109.01(b) of the Standard Specifications.

BASIS OF PAYMENT. The accepted quantities of compacted aggregate for sub-ballast will be paid for at the contract unit price per megagram (ton), complete and in place.

Payment will be made under:

Pay Item	Metric Pay Unit (English Pay Unit)
Compacted Aggregate for Sub-Ballast	. . . Mg (Ton)

The cost of compacting, placing, processing, excavating, backfilling, water and necessary incidentals shall be included in the cost of the pay item.

HMA REVISED

SECTION 305, BEGIN LINE 78, DELETE AND INSERT AS FOLLOWS:
accordance with these specifications for the kind of mixture used. If the mixture is not specified, the mixture shall be in accordance with ~~403 for hot asphalt concrete base 5 HV, or with 402 for hot asphalt emulsion base 5 HV~~ *402 for HMA Base 25.0 mm or HMA Intermediate 19.0 mm. Mixture adjustments in accordance with 904.02(a) will not apply. Mixtures will be sampled, tested, and accepted in accordance with 402.06(a) unless the mixtures are supplied in accordance with 401.08 as allowed in 402.03. When mixtures in accordance with 401.08 are supplied, all applicable requirements of 401.02 shall be met and acceptance will be in accordance with 402.06(b).*

Each course shall be compacted
by approved mechanical equipment such as rollers, rammers, or other acceptable means. In small inaccessible areas, hand tamping will be permitted. Rammers shall be capable of exerting a minimum compacting force equivalent to that exerted by the drive wheels of an approved ~~3~~ *three* wheel roller.

SECTION 305, BEGIN LINE 165, DELETE AND INSERT AS FOLLOWS:
these specifications for the kind of mixture used. If the mixture is not specified, the material shall be in accordance with ~~403 for hot asphalt concrete base 5 HV or with 402 for hot asphalt emulsion base 5 HV~~ *402 for HMA Base 25.0 mm or HMA Intermediate 19.0 mm. Mixture adjustments in accordance with 904.02(a) will not apply. Mixtures will be sampled, tested, and accepted in accordance with 402.06(a) unless the mixtures are supplied in accordance with 401.08 as allowed in 402.03. When mixtures in accordance with 401.08 are supplied, all applicable requirements of 401.02 shall be met and acceptance will be in accordance with 402.06(b).* Surface tolerances shall be in accordance with ~~the applicable provisions of 401.15~~ *402.16.*

SECTION 305, DELETE LINES 194 THROUGH 215.

SECTION 305, AFTER LINE 216, INSERT AS FOLLOWS:
305.10 Widening. *Widening shall be as shown on the plans or as specified. The subgrade in the widened area shall be compacted prior to the placing of the widening materials in accordance with 207. The outside face of the excavated area shall be left as nearly vertical as the nature of the material will permit and not wider than the outside limits of the widening section when forms are not used.*

(a) Widening with HMA Mixture. *The widened section shall consist of HMA mixture of the courses as shown on the typical section or as directed. The compacted depth of each course shall not exceed three times the maximum particle size as shown on the JMF. Except for surface mixtures, the course flush with the top of the existing surface shall be compacted with a three-wheel roller and a pneumatic tire roller.*

Widening with QC/QA-HMA mixtures shall be in accordance with 401 except density will be accepted in accordance with 401.16(c).

Widening with HMA mixtures shall be in accordance with 402. Mixtures will be sampled, tested, and accepted in accordance with 402.06(a) unless the mixtures are supplied in accordance with 401.08 are supplied, all applicable requirements of 401.02 shall be met and acceptance will be in accordance with 402.06(b).

SECTION 401, DELETE LINES 1 THROUGH 1788.

SECTION 401, BEGIN LINE 1, INSERT AS FOLLOWS:

SECTION 400 -- ASPHALT PAVEMENTS

SECTION 401 -- QUALITY CONTROL/QUALITY ASSURANCE, QC/QA, HOT MIX ASPHALT, HMA, PAVEMENT

401.01 Description. *This work shall consist of one or more courses of QC/QA HMA base, intermediate, or surface mixtures constructed on prepared foundations in accordance with 105.03.*

401.02 Quality Control. *The HMA shall be supplied from a certified HMA plant in accordance with ITM 582; Certified Hot Mix Asphalt Producer Program. The HMA shall be transported and placed according to a Quality Control Plan, QCP, prepared and submitted by the Contractor in accordance with ITM 803; Contractor Quality Control Plans for Hot Mix Asphalt Pavements. The QCP shall be submitted to the Engineer at least 15 days prior to commencing HMA paving operations.*

MATERIAL

401.03 Materials. *Materials shall be in accordance with the following:*

Asphalt Materials
PG Binder 902.01(a)
Coarse Aggregates 904.02
Base Mixtures - Class D or Higher
Intermediate Mixtures - Class C or Higher
** Surface Mixtures - Class B or Higher*
Fine Aggregates (sand, mineral fillers) 904.01

** Surface aggregate requirements are listed in 904.02(d).*

401.04 Design Mix Formula. *A design mix formula, DMF, shall be prepared in accordance with 401.05 and submitted in a format acceptable to the Engineer one week prior to use. The DMF shall state the maximum particle size in the mixture. Approval of the DMF will be based on the ESAL and mixture designation. A mixture number will be assigned by the Engineer. No mixture will be accepted until the DMF has been approved.*

401.05 Volumetric Mix Design. *The DMF shall be determined for each mixture from a volumetric mix design by a design laboratory on the approved mix design laboratory list. A volumetric mixture shall be designed in accordance with the respective AASHTO references as listed below.*

Standard Specification for Superpave Volumetric Mix Design . . . . . *AASHTO MP 2*

Standard Practice for Short and Long Term Aging of Hot Mix Asphalt (HMA) . . . . . *AASHTO PP 2*

Standard Practice for Volumetric Analysis of Compacted Hot Mix Asphalt (HMA) . . . . . *AASHTO PP 19*

Standard Practice for Designing Superpave HMA . . . . . *AASHTO PP 28*

Maximum Specific Gravity of Bituminous Paving Mixtures . . . . . *AASHTO T 209*

Resistance of Compacted Bituminous Mixture to Moisture Induced Damage . . . . . *AASHTO T 283*

Method for Preparing and Determining the Density of Hot Mix Asphalt (HMA) Specimens by Means of the SHRP Gyratory Compactor . . . . . *AASHTO TP 4*

The single percentage of aggregate passing each required sieve shall be within the limits of the following gradation tables.

(a) Gradation Table for Design ESAL Equal To or Greater Than 10,000,000.

SIEVE SIZE	*Nominal Maximum Particle Size - Control Point (Percent Passing)*				
	*37.5 mm	*25.0 mm	*19.0 mm	*12.5 mm	*9.5 mm
50.0 mm	100.0				
37.5 mm	90.0 - 100.0	100.0			
25.0 mm	< 90.0	90.0 - 100.0	100.0		
19.0 mm		< 90.0	90.0 - 100.0	100.0	
12.5 mm			< 90.0	90.0 - 100.0	100.0
9.5 mm				< 90.0	90.0 - 100.0
4.75 mm	≤ 34.7	≤ 39.5			< 90.0
2.36 mm	15.0 - 23.3	19.0 - 26.8	23.0 - 34.6	28.0 - 39.1	32.0 - 47.2
1.18 mm	≤ 15.5	≤ 18.1	≤ 22.3	≤ 25.6	≤ 31.6
600 µm	≤ 11.7	≤ 13.6	≤ 16.7	≤ 19.1	≤ 23.5
300 µm	≤ 10.0	≤ 11.4	≤ 13.7	≤ 15.5	≤ 18.7
75 µm	0.0 - 6.0	1.0 - 7.0	2.0 - 8.0	2.0 - 10.0	2.0 - 10.0

* *Nominal Maximum Particle size - One sieve size larger than the first sieve to retain more than 10 percent.*

(b) Gradation Table for Design ESAL Less Than 10,000,000.

	Nominal Maximum Particle Size - Control Point (Percent Passing)									
	**37.5 mm*		**25.0 mm*		**19.0 mm*		**12.5 mm*		**9.5 mm*	
SIEVE SIZE										
50.0 mm	*100.0*									
37.5 mm	*90.0 - 100.0*		*100.0*							
25.0 mm	*< 90.0*		*90.0 - 100.0*		*100.0*					
19.0 mm			*< 90.0*		*90.0 - 100.0*		*100.0*			
12.5 mm					*< 90.0*		*90.0 - 100.0*		*100.0*	
9.5 mm							*< 90.0*		*90.0 - 100.0*	
Note 1	*A*	*B*	*A*	*B*	*A*	*B*	*A*	*B*	*A*	*B*
4.75 mm	*≤ 34.7*	*≥ 34.7*	*≤ 39.5*	*≥ 39.5*					*< 90.0*	*< 90.0*
2.36 mm	*15.0 - 23.3*	*27.3 - 41.0*	*19.0 - 26.8*	*30.8 - 45.0*	*23.0 - 34.6*	*34.6 - 49.0*	*28.0 - 39.1*	*39.1 - 58.0*	*32.0 - 47.2*	*47.2 - 67.0*
1.18 mm	*≤ 15.5*	*≥ 21.5*	*≤ 18.1*	*≥ 24.1*	*≤ 22.3*	*≥ 28.3*	*≤ 25.6*	*≥ 31.6*	*≤ 31.6*	*≥ 37.6*
600 µm	*≤ 11.7*	*≥ 15.7*	*≤ 13.6*	*≥ 17.6*	*≤ 16.7*	*≥ 20.7*	*≤ 19.1*	*≥ 23.1*	*≤ 23.5*	*≥ 27.5*
300 µm	*≤ 10.0*	*≥ 10.0*	*≤ 11.4*	*≥ 11.4*	*≤ 13.7*	*≥ 13.7*	*≤ 15.5*	*≥ 15.5*	*≤ 18.7*	*≥ 18.7*
75 µm	*0.0 - 6.0*		*1.0 - 7.0*		*2.0 - 8.0*		*2.0 - 10.0*		*2.0 - 10.0*	

* *Nominal Maximum Particle size - One sieve size larger than the first sieve to retain more than 10 percent.*

NOTE 1: Either sub-column A or B shall be used consistently for 4.75 mm to 300 µm sieves.

Dust/Calculated Effective Binder Ratio shall be from 0.6 to 1.6. The optimum binder content shall produce 4.0 percent air voids at N_{des}. The optimum binder content shall produce 4.0 percent air voids at N_{des}. The design shall have at least four points, including a minimum of two points above and one point below the optimum. The amount of uncompacted mixture shall be determined in accordance with AASHTO T 209.

The mixture shall be tested for moisture susceptibility in accordance with AASHTO T 283 except that the loose mixture curing shall be replaced by short term aging for 2 h in accordance with AASHTO PP 2. The minimum tensile strength ratio, TSR, shall be 80 percent. The 150 mm (6 in.) mixture specimens shall be compacted in accordance with AASHTO TP 4. If anti-stripping additives are added to the mixture to be in accordance with the minimum TSR requirements, the dosage rate shall be submitted with the DMF.

Changes in the source or types of aggregates shall require a new DMF. A new DMF shall be submitted to the District Materials and Tests Engineer for approval one week prior to use.

Changes in the source of specified binders except for PG 58-28 or PG 64-22 shall require a new mix design.

The mixture design compaction temperature for the specimens shall be in accordance with the binder suppliers recommendations determined from a temperature - viscosity curve based on AASHTO TP 48.

Design criteria for each mixture shall be based on the ESAL shown in the contract documents and shall be as follows:

GYRATORY COMPACTION PROPERTIES					
ESAL	N_{ini}*	N_{des}*	N_{max}*	Max. %Gmm @ N_{ini}	Max. %Gmm @ N_{max}
< 300,000	7	68	104	91.5	98.0
< 1,000,000	7	76	117	90.5	98.0
< 3,000,000	7	86	134	89.5	98.0
< 10,000,000	8	96	152	89.0	98.0
< 30,000,000	8	109	174	89.0	98.0
< 100,000,000	9	126	204	89.0	98.0
≥ 100,000,000	9	142	233	89.0	98.0

* N_{ini}, N_{des}, N_{max} - definitions are included in AASHTO PP 28.

VOIDS IN MINERAL AGGREGATE (VMA) CRITERIA @ N_{des}	
Nominal Maximum Particle Size	*Minimum VMA, Percent*
9.5 mm	*15.0*
12.5 mm	*14.0*
19.0 mm	*13.0*
25.0 mm	*12.0*
37.5 mm	*11.0*

VOIDS FILLED WITH ASPHALT (VFA) CRITERIA @ N_{des}	
ESAL	*VFA, Percent*
< 300,000	*70 - 80*
< 1,000,000	*65 - 78*
< 3,000,000	*65 - 78*
< 10,000,000	*65 - 75**
≥ 10,000,000	*65 - 75**

* *VFA for 9.5 mm mixtures designed for ESAL ≥ 3,000,000 shall be 65 to 76 percent.*

401.06 Recycled Materials. *Recycled materials may consist of reclaimed asphalt pavement, RAP, or asphalt roofing shingles, ARS, or a blend of both. RAP shall be the product resulting from the cold milling or crushing of an existing HMA pavement. The RAP shall be processed so that 100 percent will pass the 50 mm (2 in.) sieve when entering the HMA plant. ARS shall consist of waste from a shingle manufacturing facility. No tear-off materials from roofs will be allowed. ARS shall be stockpiled separately from other materials. The coarse aggregate in the recycled materials shall pass the maximum size sieve for the mixture being produced.*

Recycled materials may be used as a substitute for a portion of the new materials required to produce HMA mixtures. When only RAP is used in the mixture, the RAP shall not exceed 25 percent by mass (weight) of the total mixture. When only ARS is used in the mixture, the ARS shall not exceed five percent by mass (weight) of the total mixture. For substitution or use, one percent of ARS is considered equal to five percent RAP. The percentages of recycled materials shall be as specified on the DMF.

Mainline surface mixtures shall not contain recycled materials.

The combined aggregate properties of a mixture with recycled materials shall be determined in accordance with ITM 584 and shall be in accordance with 904.01 and 904.02. Gradations of the combined aggregates shall be in accordance with 401.05.

Mixtures containing 15 percent or less RAP, shall use the same grade of binder as specified. The binder for mixtures containing greater than 15 and up to 25 percent RAP shall be reduced by one temperature classification, 6°C, for both the upper and lower temperature classifications.

401.07 Lots and Sublots. *Lots will be defined as 4000 Mg (4400 T) of base or intermediate mixtures or 2400 Mg (2800 T) of surface mixture. Lots will be further sub-divided into sublots not to exceed 1000 Mg (1100 T) of base or intermediate mixtures or 600 Mg (700 T) of surface mixture. Partial sublots of 100 Mg (100 T) or less will be added to the previous sublot. Partial sublots greater than 100 Mg (100 T) constitute a full sublot.*

401.08 Job Mix Formula. *The job mix formula, JMF, shall be developed by a certified HMA producer in accordance with ITM 582. The JMF for each mixture shall be submitted to the Engineer.*

401.09 Acceptance of Mixtures. *Acceptance of mixtures for binder content, coarse aggregate angularity and gradation for each lot will be based on tests performed by the Engineer. The Engineer will randomly select the location(s) within each sublot for sampling in accordance with the ITM 802.*

One random sample shall be obtained from each sublot from the pavement in accordance with ITM 580. The test results of the sublots will be averaged and shall meet the requirements for tolerances from the JMF for each sieve, coarse aggregate angularity, and binder content.

The maximum percent of moisture in the mixture shall not exceed 0.10 from plate samples.

The Engineer's acceptance test results will not be made available until a lot is completed and after the certified HMA plant's adjustment period.

ACCEPTANCE TOLERANCE FOR MIXTURES (±)										
MIXTURE	NUMBER OF TESTS	SIEVE SIZE								
		*37.5 mm	*25.0 mm	*19.0 mm	*12.5 mm	*9.5 mm	*4.75 mm	2.36 mm	600 µm	75 µm
BASE	1	-----	-----	-----	-----	-----	-----	10.0	6.0	2.0
	2	-----	-----	-----	-----	-----	-----	7.0	4.2	1.4
	3	-----	-----	-----	-----	-----	-----	5.8	3.5	1.2
	4	-----	-----	-----	-----	-----	-----	5.0	3.0	1.0
INTERMEDIATE	1	-----	-----	-----	-----	-----	-----	10.0	6.0	2.0
	2	-----	-----	-----	-----	-----	-----	7.0	4.2	1.4
	3	-----	-----	-----	-----	-----	-----	5.8	3.5	1.2
	4	-----	-----	-----	-----	-----	-----	5.0	3.0	1.0
SURFACE	1	-----	-----	-----	-----	-----	-----	8.0	4.0	1.0
	2	-----	-----	-----	-----	-----	-----	5.7	2.8	0.7
	3	-----	-----	-----	-----	-----	-----	4.6	2.3	0.6
	4	-----	-----	-----	-----	-----	-----	4.0	2.0	0.5

* *The acceptance tolerance for this sieve shall be the applicable composition limits specified in 401.05.*

ACCEPTANCE TOLERANCE FOR BINDER				
BASE, INTERMEDIATE, OR SURFACE MIXTURES				
Binder Content	Number of Tests			
	1	2	3	4
% Binder	0.7	0.5	0.4	0.3

Acceptance of mixtures for range will be determined using the results of sublot tests performed by the Engineer from each lot. If the range is not in accordance with the requirements, adjustment points will be assessed in accordance with 401.19(a).

ACCEPTANCE TOLERANCE FOR RANGE (±)			
SIEVE SIZE & BINDER CONTENT	*PERCENTAGE POINTS*		
	BASE	*INTERMEDIATE*	*SURFACE*
2.36 mm	*15.0*	*15.0*	*12.0*
600 µm	*9.0*	*9.0*	*6.0*
75 µm	*3.0*	*3.0*	*1.5*
% BINDER	*1.0*	*1.0*	*1.0*

Acceptance tolerance for coarse aggregate angularity shall be minus five percent of the value as shown on the JMF.

Acceptance tolerances for binder content, gradation, and coarse aggregate angularity will be as set out above for the number of tests performed. The acceptance tolerance for range will be as set out above for lots of more than one sublot. The range of binder shall be the difference between the highest sublot binder content and the lowest sublot binder content in one lot. The range of gradation shall be the difference between the highest sublot percent passing and the lowest sublot percent passing each required sieve in one lot.

Single test values and averages will be reported to the nearest 0.1 percent. Rounding will be in accordance with ASTM E 29.

Lot adjustment points will be assessed in accordance with 401.19(a) when the average or range for binder content, coarse aggregate angularity, or gradation are not met.

The Contractor may request an appeal of the Engineer's test results in accordance with 401.20.

CONSTRUCTION REQUIREMENTS

401.10 General. *Equipment for HMA operations shall be in accordance with 408.*

Fuel oil, kerosene, or solvents shall not be transported in open containers on equipment. Cleaning of equipment and small tools shall not be accomplished on the pavement or shoulder areas.

Segregation, flushing or bleeding of HMA mixtures will not be permitted. Corrective action shall be taken to prevent continuation of these conditions. Segregated, flushed or bleeding HMA mixtures shall be removed if directed. All areas showing an excess or deficiency of binder shall be removed and replaced.

All mixtures that become loose and broken, mixed with dirt, or is in any way defective shall be removed and replaced.

401.11 Preparation of Surfaces to be Overlaid. *The subgrade shall be shaped to the required grade and sections, free from all ruts, corrugations, or other irregularities, and uniformly compacted and approved in accordance with 207. Surfaces on which a mixture is placed shall be free from objectionable or foreign materials at the time of placement.*

Compacted aggregate bases and rubblized pavements shall be primed in accordance with 405. Portland cement concrete and asphalt surfaces shall be tacked in accordance with 406. Contact surfaces of curbing, gutters, manholes, and other structures shall be tacked in accordance with 406.

401.12 Process Control. *The Engineer and Contractor will jointly review the operations to ensure compliance with the QCP. Continuous violations of compliance with the QCP will result in suspension of paving operations.*

401.13 Weather Limitations. *HMA courses of 75 kg/m^2 (138 lb/sq yd) or less shall be placed when the ambient temperature and the temperature of the surface on which it is to be placed is 7°C (45°F) or above. No mixture shall be placed on a frozen subgrade.*

401.14 Spreading and Finishing. *The mixture shall be placed upon an approved surface by means of a paver or other mechanical devices in accordance with 408.03. Mixtures in areas inaccessible to mechanical devices may be placed by other methods.*

The temperature of each mixture at the time of spreading, shall not be more than 10°C (18°F) below the minimum mixing temperature as shown on the JMF.

HMA courses greater than 90 kg/m^2 (165 lb/sq yd) placed under traffic, shall be brought up even with each adjacent lane at the end of each work day. HMA courses less than or equal to 90 kg/m^2 (165 lb/sq yd) shall be brought forward concurrently, within practical limits, limiting the work in one lane to not more than one work day of production before moving back to bring forward the adjacent lane. Traffic shall not be allowed on Base C50.0 mm, Base C25.0 mm, or Intermediate C19.0 mm mixtures.

Hydraulic extensions on the paver will not be permitted for continuous paving operations. Fixed extensions or extendable screeds shall be used on courses greater than the nominal width of the paver except in areas where the paving widths vary. Hydraulic extensions may be used in tapers and added lanes less than 75 m (250 ft) in length.

Automatic slope and grade controls shall be required as outlined in the QCP.

HMA shoulders which are 2.4 m (8.0 ft) or more in width shall be placed with automatic paving equipment.

When laying mixtures with density controlled by 401.16(c), the speed of the paver shall not exceed 15 m (50 ft) per minute.

The rollers shall be operated to avoid shoving of the HMA and at speeds not to exceed 4.5 km/h (3 mph). However, vibratory rollers will be limited to 4 km/h (2.5 mph).

The finished depth of any course shall be a minimum of 1.5 times and a maximum of three times the maximum particle size as shown on the DMF.

***401.15 Joints.** Longitudinal joints in the surface shall be at the lanelines of the pavement. Longitudinal joints below the surface shall be offset from previously constructed joints by approximately 150 mm (6 in.), and be located within 300 mm (12 in.) of the lane line.*

Transverse joints shall be constructed by exposing a near vertical full depth face of the previous course. For areas inaccessible to rollers, other mechanical devices shall be used to achieve the required density.

If constructed under traffic, temporary transverse joints shall be feathered to provide a smooth transition to the driving surface.

***401.16 Density.** The type of density acceptance method for all QC/QA mainline mixtures shall be determined by the number of mainline ESAL. Density of the compacted mixture shall be accepted by using cores when the ESAL are equal to or greater than 3,000,000 in accordance with 401.16(a). Standard rolling pattern practices shall be used when the ESAL are less than 3,000,000 in accordance with 401.16(c).*

The type of density acceptance method for all QC/QA mixtures on shoulders, shall be determined by the number of mainline ESAL, except as follows:

(a) for total planned shoulder typical sections less than 180 kg/m^2 (330 lb/sq yd), density shall be controlled by 401.16(c);

(b) for total planned shoulder typical sections equal to or greater than 180 kg/m^2 (330 lb/sq yd), density of the first lift shall be controlled by 401.16(c);

(c) density testing of the top lift will not be taken within the area of formed shoulder corrugations.

The Engineer's acceptance test results will not be made available until a lot is completed.

Sublot and lot density values will be reported to the nearest 0.1 percent. Rounding will be in accordance with ASTM E 29.

(a) Mainline ESAL Equal To or Greater Than 3,000,000. *Acceptance for density for all QC/QA mixtures shall be based on cores cut from the compacted pavement and analysis of samples obtained in accordance with 401.09. Acceptance will be based on lots and sublots in accordance with 401.07. The Engineer will randomly select two locations in accordance with ITM 802, within each sublot for testing. The transverse core location will be located so that the edge of the core will be no closer than 75 mm (3 in.) from a confined edge or 150 mm (6 in.) from a non-confined edge of the course being placed.*

The Contractor shall obtain cores in the presence of the Engineer with a device that shall produce a uniform 150 mm (6 in.) diameter pavement sample. Sublot coring shall be completed prior to the random location being covered. Surface courses shall be cored within one work day of placement. Damaged core(s) shall be discarded and replaced with a core from a location selected by adding 0.3 m (1.0 ft) to the longitudinal location of the damaged core using the same transverse offset.

The Contractor and the Engineer shall mark the core to define the course to be tested. If the core indicates a course thickness of less than 1.5 times the maximum particle size, the core will be discarded and a core from a new random location will be selected for testing.

The Engineer will take immediate possession of the cores. If the Engineer's cores are subsequently damaged, additional coring within a specific sublot or sublots will be the responsibility of the Department. Subsequent core locations will be determined by subtracting 0.3 m (1.0 ft) from the random location using the same transverse offset. Appeal core(s) if required, will be taken within 0.3 m (1.0 ft) of the analyzed core(s) using the same transverse offset.

The density of the sublot for the mixture shall be expressed as the percentage of maximum specific gravity (%MSG) obtained by dividing the average bulk specific gravity for the sublot by the maximum specific gravity for the sublot, times 100. The Engineer will determine the bulk specific gravity of the cores in accordance with AASHTO T 166 or T 275, and the maximum specific gravity in accordance with AASHTO T 209 from plant produced materials.

The densities of the sublots will be averaged to determine the density of the lot.

Within one work day of coring operations the Contractor shall clean, dry, and refill the core holes with suitable materials. The Contractor's plan for refilling core holes shall be outlined in the QCP.

(b) Blank.

(c) Mainline ESAL Less Than 3,000,000. *Density requirements for the compacted mixture shall be controlled in accordance with 402.10 and 402.13.*

401.17 Shoulder Corrugations. *HMA shoulders shall have formed or milled corrugations, if specified in the plans.*

(a) Formed Corrugations. *Formed corrugations consist of formed depressions in newly constructed surface mixtures for shoulders. The corrugations shall be formed by means of a roller modified with a pipe welded to the drum and equipped with guides to maintain the proper offset and alignment of the strips or as approved by the Engineer. The roller shall be in accordance with 408.03(d).*

450

(b) Milled Corrugations. *Milled corrugations consist of cutting smooth strips in existing or newly constructed shoulders. The operation shall be conducted without affecting traffic operations, by means of a cutting machine that provides a series of smooth cuts without tearing or snagging. The equipment shall include guides to maintain uniformity and consistency in the alignment of the strips.*

The operation shall be coordinated such that milled materials do not encroach on pavement lanes carrying traffic and all milled materials are disposed of in accordance with 104.07.

460

401.18 Pavement Smoothness. *The pavement smoothness will be accepted by means of a profilograph, a 4.9 m (16 ft) long straightedge, or a 3 m (10 ft) long straightedge.*

The profilograph shall be used on all full width pavement lanes of 75 m (250 ft) or longe, where the HMA to be placed is 180 kg/m² (330 lb/sq yd) or greater, and having a design speed of greater than 70 km/h (45 mph), unless otherwise specified.

If a pay item, Profilograph, is included in the contract, the Contractor shall
470 *furnish, calibrate, and operate an approved profilograph in accordance with ITM 901. The profilogram produced shall become the property of the Department. The profilograph shall remain the property of the Contractor. When a profilograph is not included as a pay item, the Department will furnish, calibrate, and operate the profilograph.*

The 4.9 m (16 ft) long straightedge shall be used on all full width pavement lanes shorter than 75 m (250 ft), tapers, within 15 m (50 ft) of bridge ends, and within 15 m (50 ft) of an existing pavement which is being joined. It shall be used on resurface overlays of less than 180 kg/m² (330 lb/sq yd).

480 *The 3 m (10 ft) long straightedge shall be used for transverse slopes, approaches, and crossovers.*

Pavement smoothness requirements will not apply to single course overlay work unless it is preceded by milling. All wavelike irregularities and abrupt changes in profile of single course nonmilled surface caused by paving operations shall be corrected.

Each finished course of base and intermediate shall be subject to approval. The pavement smoothness shall be checked on the surface course and a new course placed immediately below the surface course at the locations as designated in ITM 901.

Pavement smoothness variations shall be corrected to comply with the smoothness requirements in the following table. If grinding of the intermediate course is used for pavement smoothness corrections, the grinding shall not precede the surface placement by more than 30 calendar days if open to traffic.

PAVEMENT SURFACE TOLERANCES	
Testing Method	*Specified Tolerance*
Profilograph *Design speeds greater than 70 km/h (45 mph)*	*30 mm/0.16 km (1.2 in./0.1 mi) profile index or less*
Design speeds 70 km/h (45 mph) or less	*41 mm/0.16 km (1.6 in./0.1 mi) profile index or less*
4.9 m (16 ft) Straightedge *All pavements*	*6 mm (1/4 in.) or less*
3 m (10 ft) Straightedge *Base & Intermediates* *Surface*	*6 mm (1/4 in.) or less* *3 mm (1/8 in.) or less*

When the profilograph is being used on a surface course, in addition to the requirements for the profile index, all areas having a high point deviation in excess of 8 mm (0.3 in.) shall be corrected. Courses underlying the surface course that are exposed by corrective actions shall be milled to 25 mm (1 in.) and replaced with surface materials. Verifying profilograph measurements will be taken only in the 0.16 km (0.1 mi) length where corrections have been performed to reduce the profile index.

When the profilograph is being used on a intermediate course, all areas having a high point deviation in excess of 8 mm (0.3 in.) shall be corrected. When the 4.9 m (16 ft) or 3.0 m (10 ft) straightedge is being used on a intermediate course, all areas having a high point deviation in excess of 6 mm (0.2 in.) shall be corrected.

401.19 Adjustment Points. *When test results for mixture properties, density, and smoothness exceed the allowable tolerances, adjustment points will be assessed. The adjustment points will be used to calculate a quality assurance adjustment quantity (q) for the lot.*

The adjustment for mixture properties and density are calculated as follows.

$$q = L \times U \times P/100$$

where:

q = *quality assurance adjustment quantity*
L = *lot quantity*
U = *unit price for the material, $/Mg ($/TON)*
P = *total adjustment points*

The quality assurance adjustment points for smoothness will be calculated in accordance with 401.19(c).

The total quality assurance adjustments is to be calculated as follows:

$$Q = Q_S + \Sigma (q_m + q_d)$$

where:

Q = *total quality assurance adjustment quantity*
Q_S = *quality assurance adjustment for smoothness as calculated in 401.19(c)*
q_m = *lot adjustments for mixtures*
q_d = *lot adjustments for density*

If the total adjustment points for a lot are greater than 15, the pavement will be evaluated by the Materials and Tests Division. If the Contractor is not required to remove the mixture, quality assurance adjustments of the lot will be assessed or other corrective actions as determined by the Materials and Tests Division.

***(a) Mixture.** When test results for the mixture furnished exceed the allowable tolerances, adjustment points will be assessed as follows:*

ADJUSTMENT POINTS FOR GRADATION

Adjustment Points	*SIEVE SIZE*								
	37.5 mm	*25.0 mm*	*19.0 mm*	*12.5 mm*	*9.5 mm*	*4.75 mm*	*2.36 mm*	*600 µm*	*75 µm*
For Each 0.1% up to 1.0% Out of Tolerance	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.3*
For Each 0.1% >1.0 Out of Tolerance	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.3*	*0.6*

Gradation adjustment points for the lot shall be the sum of points calculated for up to one percent out of tolerance and the points calculated for greater than one percent out of tolerance in accordance with 401.09.

Coarse aggregate angularity adjustment points for the lot shall be 0.2 points for each 0.1% out of tolerance in accordance with 401.09.

Binder content adjustment points for the lot shall be two points for each 0.1% above the tolerance or four points for each 0.1% below the tolerance in accordance with 401.09.

When test results for the mixture furnished exceed the allowable range in accordance with 401.09, adjustment points will be assessed as follows:

ADJUSTMENT POINTS FOR RANGE	
Sieve Size & Binder Content	*Adjustment Points (For Each 0.1% Out Of Range)*
2.36 mm	*0.1*
600 µm	*0.1*
75 µm	*0.1*
% Binder	*1.0*

For mixtures produced during a certified HMA plant's adjustment period, adjustment points will not be assessed if the mixture produced is in accordance with the following.

1. *The gradation complies with 401.05 with the allowable tolerance limits shown in 401.09.*

2. *The range for the binder content and gradation do not exceed the limits shown in 401.09.*

3. *The coarse aggregate angularity is in accordance with the minimum requirements of 904.02(c).*

4. *The binder content is within the tolerance requirements of 401.09.*

If the mixture is not in accordance with these requirements, adjustment points will be assessed in accordance with 401.09 for variations exceeding the requirements shown above.

***(b) Density.** When the density of the lot is outside the allowable tolerances, adjustment points will be assessed as follows:*

1. Mainline ESAL Equal To or Greater Than 3,000,000.

Pay Adjustments - Percent	*For Thickness of Base & Intermediate ≥ 37.5 mm (1.5 in.) and all Surfaces Mixes*	*For Thickness of Intermediate Mixes < 37.5 mm (1.5 in.)*
	Percentages are based on % MSG	
submitted to the Materials and Tests Division for disposition	*≥ 97.0*	*≥ 97.0*
1.0 points for each 0.1 % above 96.0	*96.0 - 96.9*	*96.0 - 96.9*
100	*92.0 - 95.9*	*91.0 - 95.9*
0.5 points for each 0.1 % below 92.0/91.0	*91.0 - 91.9*	*90.0 - 90.9*
0.5 + 0.4 points for each 0.1 % below 91.0/90.0	*90.0 - 90.9*	*89.0 - 89.9*
4.5 + 1.0 points for each 0.1 % below 90.0/89.0	*88.0 - 89.9 See Note 1*	*87.0 - 88.9 See Note 1*
submitted to the Materials and Tests Division for disposition	*≤ 87.9 See Note 1*	*≤ 86.9 See Note 1*

Note 1: If two consecutive lots fall within this range, the Contractor shall stop production of the mix, identify an action plan to address the deficiencies, and submit an addendum to the QCP.

2. Blank

(c) Smoothness. *When the pavement smoothness is tested with a profilograph, payment will be based on the profile index in accordance with the following table. Quality assurance adjustments for smoothness will apply to the planned typical section including the aggregate base, and the HMA base, intermediate, and surface courses. The quality assurance adjustment for each section will include the total area of each 0.16 km (0.1 mi) long section represented by the profile index calculated by the following formula:*

$$q_s = \frac{P}{100} \sum_{i=1}^{n} A \times \frac{S}{1000} \times U$$

where:

q_s = *quality assurance adjustment for smoothness for one section*
P = *adjustment points*
n = *number of layers*
A = *area of the section, m^2 (Syd)*
S = *spread rate for material, kg/m^2 (lb/syd)*
U = *unit price for the material, \$/Mg (\$/Ton)*

The quality assurance adjustment for smoothness, Q_S, for the contract will be the total of the quality assurance adjustments for smoothness, q_s, on each section.

ADJUSTMENT FOR SMOOTHNESS			
Design Speed Greater Than 70 km/h (45 mph)		*Design Speed Less Than Or Equal to 70 km/h (45 mph)*	
Final Profile Index mm per 0.16 km (in./0.1 mi)	*Adjustment Points*	*Final Profile Index mm per 0.16 km (in./0.1 mi)*	*Adjustment Points*
0 to 30 mm (0.0 to 1.2)	*None*	*0 to 41 mm (0.0 to 1.6)*	*None*
over 30 to 33 mm (1.2 to 1.3)	*2.0*	*over 41 to 46 mm (1.6 to 1.8)*	*2.0*
over 33 to 36 mm (1.3 to 1.4)	*4.0*	*over 46 to 51 mm (1.8 to 2.0)*	*4.0*
over 36 to 38 mm (1.4 to 1.5)	*8.0*	*over 51 to 56 mm (2.0 to 2.2)*	*8.0*
All pavement with a profile index greater than 38 mm (1.5) shall be corrected.		*All pavement with a profile index greater than 56 mm (2.2) shall be corrected.*	

401.20 Appeals. *If the Contractor does not agree with the acceptance test results, a request may be made in writing for additional tests for a sublot(s) or lot. The basis of the appeal shall include applicable QC test results showing acceptable quality results and shall be submitted within five calendar days of receipt of the Department's written results for that lot. All traffic control shall be supplied with no additional payment.*

(a) Mixture. *Upon approval for the additional testing, the Contractor shall take cores in accordance with ITM 580.*

(b) Density.

1. Mainline ESAL Equal To or Greater Than 3,000,000. *If an appeal is granted, additional cores shall be taken within five calendar days unless otherwise directed. Additional core locations will be within 0.3 m (1.0 ft) longitudinally of the cores tested using the same transverse offset. Each sublot density will be calculated using the average bulk specific gravity of the cores obtained for that sublot and the average MSG of the lot.*

The results of the appeal cores will replace the initial test results for a sublot(s) or lot and be used as the basis for acceptance in accordance with 401.16(a).

2. Blank

401.21 Method of Measurement. *HMA mixtures will be measured by the megagram (ton) of the type specified, in accordance with 109.01(b).*

HMA mass (weight) measured may vary from the proposal quantities because of possible variation in aggregate specific gravity. No adjustment in contract unit price will be made because of such variation, except for slag as provided in 904.02(a).

Milled shoulder corrugations will be measured by the meter (linear foot) of shoulder milled, measured parallel to the center line of the roadway. Formed shoulder corrugations will not be measured.

401.22 Basis of Payment. *The accepted quantities for this work will be paid for at the contract unit price per megagram (ton) for QC/QA-HMA, of the type specified, complete in place.*

Payment for furnishing, calibrating, and operating the profilograph, and furnishing profile information will be made at the contract lump sum price for profilograph.

Adjustments to the contract payment with respect to mixture, density, and smoothness for mixture produced will be included in a quality assurance adjustment pay item. The unit price for this pay item will be one dollar ($1.00) and the quantity will be in negative units of dollars. The quantity is the total calculated in accordance with 401.19. An extra work order developed in accordance with 109.05 will be prepared to reflect contract adjustments.

Milled corrugations will be paid for at the contract unit price per meter (linear foot), when specified.

Payment will be made under:

Pay Item	***Metric Pay Unit Symbol (English Pay Unit Symbol)***
*QC/QA-HMA Surface _*_ mm, Mainline . . . . . .*	*Mg (TON)*
*QC/QA-HMA Intermediate _*_ mm, Mainline . . . . . .*	*Mg (TON)*
*QC/QA-HMA Base _*_ mm, Mainline . . . . . .*	*Mg (TON)*

*QC/QA-HMA Surface _*_ mm, Shoulder . . . . . Mg (TON)*
*QC/QA-HMA Intermediate _*_ mm, Shoulder . . . . . Mg (TON)*
*QC/QA-HMA Base _*_ mm, Shoulder . . . . . Mg (TON)*
Quality Assurance Adjustment . . . . . DOL
Milled HMA Corrugations . . . . . m (LFT)
Profilograph . . . . . LS

** Nominal Maximum Particle Size*

Preparation of surfaces to be overlayed shall be included in the costs of other pay items.

Coring and refilling of the pavement holes shall be included in the costs of other pay items.

No payments will be made for additional anti-stripping additives, appeal coring or related traffic control expenditures for coring operations.

The cost of incorporating formed corrugations in HMA shoulders shall be included in the costs of other pay items.

Corrections for pavement smoothness shall be included in the costs of other pay items.

The price for profilograph will be full compensation regardless of how often the profilograph is used or how many profilograms are produced.

If QC/QA-HMA intermediate over QC/QA-HMA base mixtures are specified, QC/QA-HMA Intermediate 19.0 mm will be permitted as a substitute for the QC/QA-HMA intermediate and QC/QA-HMA base mixtures upon a written request by the Contractor. The request for the substitution shall be prepared in advance of the work. A computation will be made in order to obtain a unit price for the QC/QA-HMA Intermediate 19.0 mm. The quantity and amount for QC/QA-HMA Intermediate 19.0 mm shall equal the sum of the contract quantities and amounts shown for QC/QA-HMA Intermediate and QC/QA-HMA base mixtures. The unit price for QC/QA-HMA Intermediate 19.0 mm shall be equal to the sum of contract amounts divided by the sum of contract quantities. Payment for the QC/QA-HMA Intermediate 19.0 mm will be made at the unit price per megagram (ton) for QC/QA-HMA Intermediate 19.0 mm. No payment will be made for additional work or costs which may result due to this change.

SECTION 402, DELETE LINES 1 THROUGH 253.

SECTION 402, BEGIN LINE 1, INSERT AS FOLLOWS:

SECTION 402 -- HOT MIX ASPHALT, HMA, PAVEMENT

402.01 Description. *This work shall consist of one or more courses of HMA base, intermediate, or surface mixtures and miscellaneous courses for rumble strips, and wedge and leveling constructed on prepared foundations in accordance with 105.03.*

MATERIALS

402.02 Materials. *Materials shall be in accordance with the following:*

Asphalt Materials	
*PG Binder, PG 64-22, PG 58-28**	*902.01(a)*
*Asphalt Emulsions, AE-60, AE-90**	*902.01(b)*
Coarse Aggregates	*904.02*
Base Mixtures - Class D or Higher	
Intermediate Mixtures - Class C or Higher	
*** Surface Mixtures - Class B or Higher*	
Fine Aggregates (sand, mineral fillers)	*904.01*

** Only for use in mixtures containing greater than 15 percent RAP. Refer to 402.05.*

*** Surface aggregate requirements are listed in 904.02(d).*

402.03 Job Mix Formula. *The job mix formula, JMF, shall be prepared in accordance with 402.04 or shall be an approved JMF in accordance with 401.08 of the same gyratory compaction effort ESAL category or one category higher, and submitted in a format acceptable to the Engineer. The JMF shall state the maximum particle size in the mixture. Approval of the JMF will be based on the ESAL and mixture designation. A mixture number will be assigned by the Engineer. No mixture will be accepted until the JMF has been approved.*

All changes in the type or source of aggregate, or in the type of binder shall require the submittal of a new JMF for approval.

402.04 Mix Design Criteria. *The JMF shall be based on the limits shown in the following tables for the percent passing the 2.36 mm (No. 8) sieve and the percent of binder.*

The percent of aggregates passing sieves specified in the mixture composition tables below is a percentage of the total mass (weight) of aggregates. The percent of binder specified in the mixture composition tables below is a percentage of the total mass (weight) of mixture.

When 100% slag is used for the coarse aggregate, the binder content shall be increased 0.4 percent when using blast furnace slag, and decreased by 0.7 percent when using steel slag. When blending coarse aggregate slag, proportional changes in the binder content shall be made.

(a) Composition Limits for Base Mixtures.

Sieve Size	*Percent of Aggregates Passing Sieves Sizes*		
	Mixture		
	C50.0 mm	*C25.0 mm*	*25.0 mm*
63.0 mm (2.5 in.)	*100.0*		
37.5 mm (1.5 in.)	*45.0-75.0*	*100.0*	*100.0*
25.0 mm (1 in.)	*30.0-60.0*	*70.0-98.0*	*90.0-100.0*
19.0 mm (3/4 in.)	*20.0-50.0*	*50.0-85.0*	*< 90.0*
12.5 mm (1/2 in.)	*15.0-40.0*	*28.0-62.0*	
9.5 mm (3/8 in.)	*10.0-35.0*	*15.0-50.0*	
4.75 mm (No. 4)	*5.0-25.0*	*6.0-29.0*	
2.36 mm (No. 8)	*12.0 ± 6.0*	*12.0 ± 6.0*	*23.0 ± 6.0*
1.18 mm (No. 16)	*2.0-15.0*	*2.0-15.0*	
600 μm (No. 30)	*1.0-10.0*	*1.0-10.0*	
300 μm (No. 50)	*0.0-7.0*	*0.0-7.0*	
150 μm (No. 100)	*0.0-6.0*	*0.0-6.0*	
75 μm (No. 200)	*0.0-4.0*	*0.0-4.0*	*1.0-7.0*
Percent of Binder	*3.0*	*3.2*	*4.5*

(b) Composition Limits for Intermediate Mixtures.

Sieve Size	*Percent of Aggregates Passing Sieve Sizes*			
	Mixture			
	19.0 mm	*C19.0 mm*	*12.5 mm*	*9.5 mm*
25.0 mm (1 in.)	*100.0*	*100.0*		
19.0 mm (3/4 in.)	*90.0-99.0*	*70.0-98.0*	*100.0*	
12.5 mm (1/2 in.)	*< 90.0*	*40.0-68.0*	*90.0-100.0*	*100.0*
9.5 mm (3/8 in.)		*20.0-52.0*	*< 90.0*	*90.0-100.0*
4.75 mm (No. 4)		*10.0-20.0*		*< 90.0*
2.36 mm (No. 8)	*29.0 ± 6.0*	*12.0 ± 6.0*	*33.0 ± 6.0*	*39.0 ± 6.0*
1.18 mm (No. 16)		*2.0-15.0*		
600 μm (No. 30)		*1.0-10.0*		
300 μm (No. 50)		*0.0-7.0*		
150 μm (No. 100)		*0.0-6.0*		
75 μm (No. 200)	*2.0-8.0*	*0.0-4.0*	*2.0-10.0*	*2.0-10.0*
Percent of Binder	*4.8*	*3.2*	*4.9*	*5.1*

(c) Composition Limits for Surface Mixtures.

Sieve Size	Percent of Aggregates Passing Sieve Sizes			
	Mixture			
	19.0 mm	12.5 mm	9.5 mm	4.75 mm*
25.0 mm (1 in.)	100.0			
19.0 mm (3/4 in.)	90.0-100.0	100.0		
12.5 mm (1/2 in.)	< 90.0	90.0-100.0	100.0	
9.5 mm (3/8 in.)		< 90.0	90.0-100.0	100.0
4.75 mm (No. 4)			< 90.0	95.0-100.0
2.36 mm (No. 8)	42.0 ± 6.0	48.0 ± 6.0	57.0 ± 6.0	70.0-90.0
1.18 mm (No. 16)				40.0-68.0
600 µm (No. 30)				20.0-50.0
300 µm (No. 50)				7.0-30.0
150 µm (No. 100)				1.0-20.0
75 µm (No. 200)	2.0-6.0	2.0-6.0	2.0-6.0	0.0-5.0
Percent of Binder	5.5	5.7	6.1	7.0-8.0

* *The fineness modulus shall be greater than 2.80 as determined in accordance with ASTM C 136.*

(d) Composition Limits for HMA Rumble Strip Mixtures. *Rumble strip mixtures shall be in accordance with HMA Surface 9.5 mm or HMA Surface 4.75 mm. Mixture adjustments in accordance with 904.02(a) do not apply. Aggregate requirements of 904.02(d) do not apply.*

(e) Composition Limits for HMA Wedge and Leveling Mixtures. *The mixture shall consist of HMA mixes in accordance with 402.04(a), (b), or (c).*

402.05 Recycled Materials. *Recycled materials may consist of reclaimed asphalt pavement, RAP, or asphalt roofing shingles, ARS, or a blend of both. RAP shall be the product resulting from the cold milling or crushing of an existing HMA pavement. The RAP shall be processed so that 100 percent will pass the 50 mm (2 in.) sieve when entering the HMA plant. ARS shall consist of waste from a shingle manufacturing facility. No tear-off materials from roofs will be allowed. ARS shall be stockpiled separately from other materials. The coarse aggregate in the recycled materials shall pass the maximum size sieve for the mixture being produced.*

Recycled materials may be used as a substitute for a portion of the new materials required to produce HMA mixtures. When only RAP is used in the mixture, the RAP shall not exceed 25 percent by mass (weight) of the total mixture. When only ARS is used in the mixture, the ARS shall not exceed five percent by mass (weight) of the total mixture. For substitution or use, one percent of ARS is considered equal to five percent RAP. The percentages of recycled materials shall be as specified on the JMF.

Mainline surface mixtures shall not contain recycled materials.

The combined aggregate properties of a mixture with recycled materials shall be determined in accordance with ITM 584 and shall be in accordance with 904.01 and 904.02. Gradations of the combined aggregates shall be in accordance with 402.03.

Mixtures containing 15 percent or less RAP, the asphalt materials shall be PG 64-22 or AE-60. Mixtures containing greater than 15 and up to 25 percent RAP, the grade of asphalt material shall be PG 58-28 or AE-90.

402.06 Acceptance of Mixtures.

(a) Mainline and Shoulders. *Sampling of the HMA mixture will be in accordance with ITM 580 and performed where deemed necessary. Acceptance of the mixtures for binder content and gradations will be based on tests performed by the Engineer. Sampling and testing will be performed by the Engineer in accordance with the Frequency Manual.*

When admixtures in accordance with 401.08 are supplied as allowed in 402.03, gradation acceptance tolerances will be based on the following:

ACCEPTANCE TOLERANCE FOR MIXTURES (±)									
MIXTURE	SIEVE SIZE								
	*37.5 mm	*25.0 mm	*19.0 mm	*12.5 mm	*9.5 mm	*4.75 mm	2.36 mm	600 µm	75 µm
BASE							10.0	6.0	2.0
INTERMEDIATE							10.0	6.0	2.0
SURFACE							8.0	4.0	1.0

* *The acceptance tolerance for this sieve shall be the applicable composition limits specified in 401.05.*

Gradation test results which are outside the composition limits will be considered and adjudicated as a failed material in accordance with normal Department practice as listed in 105.03.

Asphalt test results which are more than ± 0.5 percent from the JMF will be considered as a failed material and adjudicated in accordance with normal Department practice as listed in 105.03.

(b) Wedge and Leveling, and Rumble Strips. *Sampling, testing, and acceptance of the material will be in accordance with 402.06(a) unless mixtures in accordance with 401.08 are supplied as allowed in 402.03. When mixtures in accordance with 401.08 are supplied, all applicable requirements of 401.02 shall be met.*

Acceptance of mixtures in accordance with 401.08 will be on the basis of a type D certification in accordance with 916.02(d). The test results shown on the certification shall be the quality control tests representing the material supplied. The testing frequency for the 401.08 mixtures will be in accordance with ITM 582.

402.07 Preparation of Mixtures. *Mixtures shall consist of coarse aggregate, fine aggregate, and asphalt material combined in proportions within the limits set out in the JMF.*

The mixture shall be prepared by a HMA mixing plant in accordance with 408.02. All aggregates shall be sufficiently dried such that foaming, flushing, or slumping does not occur in the mix. The maximum percent of moisture in the mixture shall not exceed 0.10 from plate samples.

The temperature of the finished mixture at the plant, except for mixtures designated as C mixtures, shall be within the following limits:

BINDER	*TEMPERATURE RANGES, °C (°F)*	
	Minimum	*Maximum*
PG Grade	*125° (260°)*	*150° (300°)*
AE Grade	*110° (230°)*	*150° (300°)*

The temperature of the finished mixture at the plant, for mixtures designated as C mixtures, shall be within the following limits:

*BINDER **	*TEMPERATURE RANGES, °C (°F)*	
	Minimum	*Maximum*
PG Grade	*95° (200°)*	*115° (250°)*
AE Grade	*80° (180°)*	*115° (250°)*

* *A draindown test in accordance with ITM 585 will be completed for Base C50.0 mm, Base C25.0 mm, and Intermediate C19.0 mm mixtures.*

Binder draindown shall not exceed 0.5 percent for Base C50.0 mm, Base C25.0 mm, and Intermediate C19.0 mm mixtures.

CONSTRUCTION REQUIREMENTS

402.08 General. *Equipment for HMA operations shall be in accordance with 408.*

Fuel oil, kerosene, or solvents shall not be transported in open containers on any equipment at any time. Cleaning of equipment and tools shall not be accomplished on the pavement or shoulder areas.

Segregation, flushing or bleeding of HMA mixtures will not be permitted. Corrective action shall be taken to prevent continuation of these conditions. Areas of segregation, flushing or bleeding shall be corrected, if directed. All areas showing an excess or deficiency of asphalt materials shall be removed and replaced.

All mixtures that become loose and broken, mixed with dirt, or is in any way defective shall be removed and replaced.

Mixture shall not be dispatched from the plant that cannot be spread and compacted before sundown of that day, unless otherwise permitted.

402.09 Preparation of Surfaces to be Overlaid. *The subgrade shall be shaped to the required grade and sections, free from all ruts, corrugations, or other irregularities, and uniformly compacted and approved in accordance with 207. Surfaces on which a mixture is placed shall be free from objectionable or foreign materials at the time of placement.*

Compacted aggregate bases and rubblized pavements shall be primed in accordance with 405. Portland cement concrete and asphalt surfaces shall be tacked in accordance with 406. Contact surfaces of curbing, gutters, manholes, and other structures shall be tacked in accordance with 406.

402.10 Weather Limitations. *HMA courses less than 60 kg/m^2 (110 lb/sq yd) are to be placed when the ambient and surface temperatures are 16°C (60°F) or above. HMA courses equal to or greater than 60 kg/m^2 (110 lb/sq yd) but less 120 kg/m^2 (220 lb/sq yd) are to be placed when the ambient and surface temperatures are 7°C (45°F) or above. HMA courses equal to or greater than 120 kg/m^2 (220 lb/sq yd) and HMA curbing are to be placed when the ambient and surface temperatures are 0°C (32°F) or above. No mixture shall be placed on a frozen subgrade. However, HMA courses may be placed at lower temperatures, provided the density of the HMA course is in accordance with 402.14.*

HMA base and intermediate courses open to traffic from December 1 through March 31 shall be sealed prior to suspension of work or within seven work days as directed by the Engineer. The seal coat shall be a type 1 seal coat in accordance with 404. Temperature requirements of 404.04 do not apply.

All partially completed sections of roadway that are 200 mm (8 in.) or less in thickness shall be proofrolled prior to the placement of additional materials the following spring. Proofrolling shall be accomplished in accordance with 203.26. The contact pressure shall be 480 to 550 kPa (70 to 80 psi). Soft yielding areas shall be removed and replaced.

402.11 Spreading and Finishing. *The mixture shall be placed upon an approved surface by means of laydown equipment in accordance with 408.03(c). Mixtures in areas inaccessible to laydown equipment or mechanical devices may be placed by other methods.*

The temperature of each mixture at the time of spreading, shall not be more than 10°C (18°F) below the minimum mixing temperature as shown in 402.07.

HMA courses greater than 90 kg/m^2 (165 lb/sq yd) placed under traffic, shall be brought up even with each adjacent lane at the end of each work day. HMA courses less than or equal to 90 kg/m^2 (165 lb/sq yd) shall be brought forward concurrently, within practical limits, limiting the work in one lane to not more than one work day of production before moving back to bring forward the adjacent lane. Traffic shall not be allowed on Base C50.0 mm, Base C25.0 mm, or Intermediate C19.0 mm mixtures.

Hydraulic extensions on the paver will not be permitted for continuous paving operations. Fixed extensions or extendable screeds shall be used on courses greater than the nominal width of the paver except in areas where the paving widths vary. Hydraulic extensions may be used on approaches, tapers, and added lanes less than 75 m (250 ft) in length.

HMA shoulders which are 2.4 m (8.0 ft) or more shall be placed with automatic paving equipment.

HMA mixtures in hauling equipment shall be protected by tarps from adverse weather conditions or foreign materials. Adverse weather conditions include but will not be limited to precipitation or temperatures below 7°C (45°F).

The speed of the paver shall not exceed 15 m (50 ft) per minute when spreading mixtures.

Automatic slope and grade controls shall be required except when placing mixtures on roadway approaches which are less than 60 m (200 ft) in length, less than 60 kg/m^2 (110 lb/sq yd) HMA courses, or on miscellaneous work. The use of automatic controls on other courses where use is impractical due to project conditions may be waived by the Engineer.

The finished depth of each course shall be a minimum of 1.5 times and a maximum of 3 times the maximum particle size in accordance with 402.04. The maximum particle size shall be the smallest sieve size that passes 100 percent of the aggregates. Scratch courses and feathering of mixtures may be less than the minimum depth requirements.

Rumble strips shall be spread so as to ensure uniformity of depth, width, texture, and the required spacing between strips. A tack coat in accordance with 406 shall be applied on the pavement surface prior to placing the mixture. The tack coat may be applied with a paint brush or other approved methods.

HMA mixtures for approaches or wedge and leveling with planned depths less than 75 mm (3 in.), may be constructed with multiple surface courses in accordance with 402.04.

***402.12 Joints.** Longitudinal joints in the surface shall be at the lanelines of the pavement. Longitudinal joints below the surface shall be offset from previously constructed joints by approximately 150 mm (6 in.), and be located within 300 mm (12 in.) of the laneline.*

Transverse joints shall be constructed by exposing a near vertical full depth face of the previous course.

If constructed under traffic, temporary transverse joints shall be feathered to provide a smooth transition to the driving surface.

***402.13 Compaction.** The HMA mixture shall be compacted with equipment in accordance with 408.03(d) immediately after the mixture has been spread and finished. Rollers shall not cause undue displacement, cracking, or shoving.*

A roller application is defined as one pass of the roller over the entire mat. Compaction operations shall be completed in accordance with one of the following options:

Number of Roller Applications				
Rollers	Courses $\leq$ 180 kg/m² (330 lb/sq yd)			Courses > 180 kg/m² (330 lb/ sq yd)
	Option 1	Option 2	Option 3	
Three Wheel*	2	---	4	4
Pneumatic Tire	2	4	---	4
Tandem	2	2	2	4

* *A three wheel roller is required on all HMA 4.75 mm surface course.*

Option 4: For courses $\leq$ 270 kg/m² (495 lb/sq yd), compaction may be completed utilizing vibratory rollers in accordance with the Department's Approved Equipment List - Vibratory Rollers.

A reduced number of applications on a course may be approved if detrimental results are being observed.

Compaction equipment shall be operated with the drive roll or wheels nearest the paver and at speeds not to exceed 4.5 km/h (3 mph). However, vibratory rollers will be limited to 4 km/h (2.5 mph). Rolling shall be continued until applications are completed and all roller marks are eliminated.

Compaction operations shall begin at the low side and proceed to the high side of the mat. The heaviest roller wheel shall overlap its previous pass by a minimum of 150 mm (6 in.).

Longitudinal joints shall be compacted by making the first pass to the paver with the compaction equipment on the hot mat about 150 mm (6 in.) from the longitudinal joint. On the return pass, the compaction equipment shall overlap the longitudinal joint 150 mm (6 in.) where possible.

All displacement of the HMA mixture shall be corrected at once by the use of lutes and/or the addition of fresh mixture as required. The line and grade of the edges of the HMA mixture shall not be displaced during rolling.

The wheels shall be kept properly moistened with water or water with detergent to prevent adhesion of the materials to the wheels.

Areas inaccessible to rollers shall be compacted thoroughly with hand tampers or other mechanical devices in accordance with 408.03(d)6 to achieve the required compaction. A trench roller, in accordance with 408.03(d)5, may be used to obtain compaction in depressed areas.

All rolling operations shall be completed before the temperature of mixtures with PG Binder drops below 80°C (180°F) or the temperature of mixtures with AE Binder drops below 60°C (145°F).

Vehicular traffic will not be permitted on a course until the mixture has cooled sufficiently to prevent distortions.

Rumble strips shall be compacted with vibratory compacting equipment in accordance with 408.03(d)6 unless otherwise stated.

402.14 Low Temperature Density Requirements. *Compaction for mixtures placed below the temperatures listed in 402.10, shall be controlled by air voids determined from cores cut from the compacted pavement placed during a low temperature period. Acceptance will be based on a minimum of two cores per section. Sections are defined as a maximum of 1000 Mg (1100 T) of HMA base or intermediate or 600 Mg (700 T) of HMA surface. The Engineer will randomly select locations in accordance with ITM 802. The transverse core location will be located so that the edge of the core will be no closer than 75 mm (3 in.) from a confined edge or 150 mm (6 in.) from a non-confined edge of the course being placed.*

For compaction of HMA during low temperature periods with quantities less than 100 Mg (104 T) per day, acceptance may be visual.

The Contractor shall obtain cores in the presence of the Engineer with a device that shall produce a uniform 150 mm (6 in) diameter pavement sample. Coring shall be completed prior to the random location being covered. The final HMA course shall be cored within one work day of placement. Damaged core(s) shall be discarded and replaced with a core from a location selected by adding 0.3 m (1.0 ft) to the longitudinal location of the damaged core using the same transverse offset.

The Contractor, in the presence of the Engineer, shall mark the core to define the course to be tested. If the defined area is less than 1.5 times the maximum particle size, the core will be discarded and a core from a new random location will be selected for testing.

The Engineer will take immediate possession of the cores. If the Engineer's cores are subsequently damaged, additional coring within a specific section will be the responsibility of the Department. Subsequent core locations will be determined by subtracting 0.3 m (1.0 ft) from the random location using the same transverse offset.

The percent air voids of a section for the mixture shall be expressed as:

$$AV\ \% = (1.0 - BSG/MSG) \times 100$$

where:

AV % = percent air voids
BSG = average bulk specific gravity
MSG = maximum specific gravity

The Engineer will determine the bulk specific gravity of the cores in accordance with AASHTO T 166 or AASHTO T 275, and the maximum specific gravity in accordance with AASHTO T 209 from the first mixture sample of the day. Air voids shall not be greater than 8 percent. Within one work day of coring operations, the Contractor shall clean, dry, refill, and compact the core holes with suitable materials.

402.15 Shoulder Corrugations. *HMA shoulders shall have formed or milled corrugations, if specified in the plans.*

(a) Formed Corrugations. *Formed corrugations consist of formed depressions in newly constructed surface mixtures for shoulders. The corrugations shall be formed by a roller modified with a pipe welded to the drum and equipped with guides to maintain the proper offset and alignment of the strips or as approved by the Engineer. The roller shall meet the requirements of 408.03(d).*

Density of the compacted HMA shoulders shall meet the requirements of 402.13.

(b) Milled Corrugations. *Milled corrugations consist of cutting smooth strips in existing or newly constructed shoulders. The operation shall be conducted without affecting traffic operations by a cutting machine that provides a series of smooth cuts without tearing or snagging. The equipment shall include guides to maintain uniformity and consistency in the alignment of the strips.*

The operation shall be coordinated such that milled materials do not encroach on pavement lanes carrying traffic and all milled materials are disposed of in accordance with 104.07.

402.16 Pavement Smoothness. *The pavement smoothness will be verified by means of a 4.9 m (16 ft) long straightedge on pavement lanes and a 3 m (10 ft) long straightedge for transverse slopes, approaches, and crossovers.*

Pavement smoothness requirements will not apply to single course overlay work unless it is preceded by milling. All wavelike irregularities and abrupt changes in profile of single course nonmilled surfaces caused by paving operations, shall be corrected.

Pavement smoothness tolerances shall be 6 mm (1/4 in.) except for surface courses checked with a 3 m (10 ft) straightedge the tolerances shall be 3 mm (1/8 in.). Areas outside the allowable tolerance may be corrected by grinding with a grooved type cutter. An alternate method for correcting the profile may be approved. Milling of the surface to correct variations will not be permitted.

402.17 Method of Measurement. *HMA mixtures will be measured by the megagram (ton) of the type specified, in accordance with 109.01(b).*

HMA rumble strips will be measured by the meter (linear foot) of each transverse strip, complete in place.

Milled shoulder corrugations will be measured in accordance with 401.21. Formed shoulder corrugations will not be measured.

402.18 Basis of Payment. *The accepted quantities for this work will be paid for at the contract unit price per megagram (ton) for HMA, of the type specified complete in place.*

HMA rumble strips will be paid for at the contract unit price per meter (linear foot), of each transverse strip complete in place.

The cost of milled shoulder corrugations will be paid for in accordance with 401.22.

Payment will be made under:

Pay Item	*Metric Pay Unit Symbol (English Pay Unit Symbol)*
HMA Surface _ mm, Mainline*	*Mg (TON)*
HMA Intermediate _ mm, Mainline*	*Mg (TON)*
HMA Base _ mm, Mainline*	*Mg (TON)*
HMA Surface _ mm, Shoulder*	*Mg (TON)*
HMA Intermediate _ mm, Shoulder*	*Mg (TON)*
HMA Base _ mm, Shoulder*	*Mg (TON)*
HMA Rumble Strips	*m (LFT)*
HMA Wedge and Level	*Mg (TON)*

** Nominal Maximum Particle Size*

Preparation of surfaces to be overlayed shall be included in the costs of other pay items.

No payment will be made for additional anti-stripping additives.

The cost of seal coat type 1 necessary for maintaining traffic on HMA base and intermediate courses from December 1 through March 31 shall be included in the costs of other pay items.

The cost of removing and replacing soft yielding areas discovered by proofrolling shall be included in the costs of other pay items.

No payment will be made for coring operations and related traffic control expenditures required in 402.14.

The cost of incorporating formed corrugations in HMA shoulders shall be included in the costs of other pay items.

Corrections for pavement smoothness including removal and replacement of pavement, shall be included in the costs of other pay items.

HMA mass (weight) measured may vary from the proposal quantities because of possible variation in aggregate specific gravity. No adjustment in contract unit price will be made because of such variation, except for slag as provided in 904.02(a).

The costs of furnishing all equipment, materials, placing and all incidentals related to HMA rumble strips, or HMA wedge and level mixtures shall be included in the cost of the specific pay item.

If HMA intermediate over HMA base mixtures are specified, HMA Intermediate 19.0 mm will be permitted as a substitute for the HMA intermediate and HMA base mixtures upon a written request by the Contractor. The request for the substitution shall be prepared in advance of the work. A computation will be made in order to obtain a unit price for the HMA Intermediate 19.0 mm. The quantity and amount for HMA Intermediate 19.0 mm shall equal the sum of the contract quantities and amounts shown for HMA intermediate and HMA base mixtures. The unit price for HMA Intermediate 19.0 mm shall be equal to the sum of contract amounts divided by the sum of contract quantities. Payment for the HMA Intermediate 19.0 mm will be made at the unit price per megagram (ton) for HMA Intermediate 19.0 mm. No payment will be made for additional work or costs which may result due to this change.

SECTION 403, DELETE LINES 1 THROUGH 375.

SECTION 403, AFTER LINE 1, INSERT AS FOLLOWS:

SECTION 403 – COLD MIX ASPHALT, CMA, PAVEMENT

403.01 Description. *This work shall consist of the construction of one or more courses of CMA base, intermediate, or surface for immediate use or stockpiled in accordance with 105.03.*

MATERIALS

403.02 Materials. *Materials shall be in accordance with the following:*

Asphalt Materials	
For Immediate Use,	
Asphalt Emulsion AE-150, AE-90	*902.01(b)*
For Stockpiling, Asphalt Emulsion, AE-150	*902.01(b)*
Coarse Aggregates	
Base, Class D or Higher	*904.02*
Intermediate, Class C or Higher	*904.02*
Surface, Class B or Higher	*904.02*
Fine Aggregates (sand, mineral filler)	*904.01*

CONSTRUCTION REQUIREMENTS

403.03 Weather Limitations. *CMA pavements shall not be placed on a wet surface, when the ambient temperature is below 4°C (40°F), or when other unsuitable conditions exist, unless approved by the Engineer.*

403.04 Equipment. *Mixing plant, hauling trucks, pavers, and rollers shall be in accordance with 408.*

403.05 Preparation of Mixtures. *The size of the aggregate and the grade of asphalt materials shall be as specified. The gradations and percent of asphalt shall be as follows:*

Composition Limits for CMA Mixtures						
Sieve Size	*Total Percent of Aggregates Passing Sieves Based on Total Mass (Weight) of Aggregates*					
	Size 2	*Size 5*	*Size 8*	*Size 9*	*Size 11*	*Size 5D*
63 mm (2.5 in)	*100*					
50 mm (2 in)	*95-100*					
37.5 mm (1.5 in)		*100*				*100*
25.0 mm (1 in)	*0-25*	*85-100*	*100*			*80-99*
19.0 mm (3/4 in)	*0-10*	*60-90*	*75-100*	*100*		*68-90*
12.5 mm (1/2 in)	*0-7*	*30-65*	*40-75*	*65-90*	*100*	*54-76*
9.5 mm (3/8 in)		*15-50*	*20-55*	*30-65*	*75-100*	*45-67*
4.75 mm (No. 4)		*0-20*	*0-20*	*0-20*	*10-35*	*30-50*
2.36 mm (No. 8)		*0-15*	*0-15*	*0-15*	*0-15*	*20-45*
600 μm (No.30)						*7-28*
75 μm (No.200)	*0-5*	*0-5*	*0-5*	*0-6*	*0-6*	*0-6*
Minimum Percent Crushed	*95*	*95*	*95*	*95*	*95*	*95*
*Percent of Asphalt**	*2.0-3.5*	*2.5-4.0*	*3.0-4.5*	*3.5-5.0*	*4.0-6.0*	*3.5-5.0*

* *Percent of asphalt shall be calculated on the basis of the total mass (weight) of the mixture, exclusive of water or solvent. When slag is used, the asphalt content will be adjusted to compensate for the specific gravity and surface area.*

The moisture condition of the aggregate shall be such that the aggregate is uniformly coated and satisfactorily retains the required amount of asphalt during the stockpiling, hauling, and spreading operations. Mixtures shall not be produced at temperatures exceeding 80°C (180°F).

403.06 Preparation of Subgrade or Base. *Mixtures for CMA base may be placed on an earth subgrade, on an existing pavement surface to be used as a base, or on a previously prepared base or subbase as specified, and shall conform to the lines, grades, and cross sections shown on the plans or as otherwise specified. If such material is to be laid on a newly prepared subgrade, then all applicable requirements of 207 shall apply.*

403.07 Spreading Mixture. *The CMA mixture shall be spread in accordance with 402.11.*

403.08 Curing. *All CMA mixtures shall be allowed to cure sufficiently to prevent undue distortions under the roller wheels.*

When a CMA mixture is allowed to cure under traffic, the surface shall be maintained and all damaged areas shall be satisfactorily repaired.

403.09 Compaction. *Compaction shall be in accordance with 402.13. Satisfactory means to confine the mixture within the required limits shall be in place during the compaction operation.*

403.10 Surface Tolerances. *The smoothness requirements for CMA pavements shall be in accordance with 402.16.*

403.11 Method of Measurement. *CMA pavement will be measured by the megagram (ton), of the type and size specified, in accordance with 109.01(b).*

403.12 Basis of Payment. *The accepted quantities of CMA pavement will be paid for at the contract unit price per megagram (ton), of the type and size specified, for the mixture.*

Payment will be made under:

Pay Item	*Metric Pay Unit Symbol (English Pay Unit Symbol)*
CMA Base ____ size	*Mg (TON)*
CMA Intermediate ____ size	*Mg (TON)*
CMA Surface ____ size	*Mg (TON)*

The cost of repairing damaged areas of mixture allowed to cure under traffic shall be included in the costs of the pay items

SECTION 404, DELETE LINES 1 THROUGH 175.

SECTION 404, AFTER LINE 1, INSERT AS FOLLOWS:

SECTION 404 – SEAL COAT

404.01 Description. *This work shall consist of one or more applications of asphalt material, each followed by an application of cover aggregate in accordance with 105.03.*

MATERIALS

404.02 Asphalt Material. *The type and grade of asphalt material shall in accordance with the following:*

Asphalt Emulsion, RS-2, AE-90, AE-150 or HFRS-2 . . . . . 902.01(b)

404.03 Cover Aggregate. *Aggregate shall be in accordance with the following requirements. When slag is used as an alternate to natural aggregate, adjustments will be made in accordance with 904.02(a), to compensate for differences in specific gravity.*

Coarse Aggregates, Class B or Higher
Size No. 8, 9, 11, or 12 . . . . . 904.02
Fine Aggregate
Size No. 23 or 24 . . . . . 904.01

The types of seal coats shall be as follows:

TYPE	APPLICATION	COVER AGGREGATE SIZE NO.	RATES OF APPLICATION PER SQUARE METER (SQUARE YARD)	
			AGGREGATE kg (lb)	ASPHALT MATERIAL LITER (GALLON) AT 16°C (60°F)
1*	Single	23,24	5.4-6.8 (12-15)	0.45-0.61 (0.12-0.16)
2	Single	12	6.4-7.7 (14-17)	1.09-1.25 (0.29-0.33)
3	Single	11	7.3-9.1 (16-20)	1.36-1.51 (0.36-0.40)
4	Single	9	12.7-14.5 (28-32)	2.38-2.57 (0.63-0.68)
5	Double	a. 11	7.3-9.1 (16-20)	1.36-1.51 (0.36-0.40)
		b. 12	7.3-8.6 (16-19)	1.25-1.40 (0.33-0.37)
6	Double	a. 9	12.7-14.5 (28-32)	2.38-2.57 (0.63-0.68)
		b. 11	8.2-10.0 (18-22)	1.55-1.74 (0.41-0.46)
7	Double	a. 8	12.7-14.5 (28-32)	2.38-2.57 (0.63-0.68)
		b. 11	8.2-10.0 (18-22)	1.55-1.74 (0.41-0.46)

* *Only AE-90 or AE-150 shall be used for seal coat, type 1.*

CONSTRUCTION REQUIREMENTS

404.04 Weather Limitations. *Asphalt material shall not be applied on a wet surface, or when other weather conditions would adversely affect the seal coats. Seal coats shall not be placed when the ambient or base temperature is below 4°C (40°F). If seal coats are placed when the ambient or base temperature is between 4°C (40°F) and 16°C (60°F), the cover aggregate shall be heated to between 49°C (120° F) and 66°C (150°F).*

404.05 Equipment. *A distributor, rotary power broom, pneumatic tire roller, and aggregate spreader in accordance with 408.03, shall be used.*

404.06 Preparation of Surface. *Surfaces to be sealed shall be brought to proper section and grade, compacted, cleaned as required, and approved. Aggregate surfaces to be sealed shall be primed in accordance with 406.*

404.07 Applying Asphalt Material. *Asphalt material shall be applied in a uniform continuous spread over the section to be treated. The quantity of asphalt material to be applied per square meter (square yard) shall be as directed.*

The asphalt material shall not be spread over a greater area than that which can be covered with the cover aggregate that is in trucks at the site. It shall not be spread more than 150 m (500 ft) ahead of the aggregate spreader.

The spread of the asphalt material shall be no wider than the width covered by the cover aggregate from the spreading device. Operations shall not proceed such that asphalt material is allowed to chill, set up, dry, or otherwise impair retention of the cover coat.

404.08 Application of Cover Aggregate. *Immediately following the application of the asphalt material, cover aggregate shall be spread in quantities as directed. Spreading shall be accomplished such that the tires of the trucks or aggregate spreader do not contact the uncovered and newly applied asphalt material.*

Rolling shall consist of at least three complete roller coverages and be completed within 30 min after the cover aggregate is applied. The rollers shall not be operated at speeds which will displace the cover aggregate from the asphalt material.

The seal coat shall be protected by the restriction of traffic or by controlling traffic speed until the asphalt material has cured or set sufficiently to hold the cover aggregate without displacement.

Excess cover aggregate shall be removed from the pavement surface by light brooming on the day following placement of the seal coat. The brooming shall not displace the imbedded cover aggregate.

404.09 Method of Measurement. *Asphalt material and cover aggregate will be measured by the megagram (ton). Seal coat will be measured by the square meter (square yard).*

If measurement of seal coat is made by the square meter (square yard), the quantity for each day's placement will be the least of the following:

110

(a) The measured square meters (square yards) within the specified limits.

(b) The calculated square meters (square yards) based on the amount of aggregate used, divided by the minimum amount of aggregate per square meter (square yard) specified in 404.03.

(c) The calculated square meters (square yards) based on the amount of asphalt material used, divided by the minimum amount of asphalt material per square meter (square yard) specified in 404.03.

120

404.10 Basis of Payment. *The accepted quantities of asphalt material and cover aggregate will be paid for at the contract unit price per megagram (ton). Seal coat will be paid for at the contract unit price per square meter (square yard) complete in place. If steel slag is used as a cover aggregate, and payment will be made per megagram (ton), the pay quantity will be adjusted in accordance with 904.02(a).*

If seal coat is paid for by the square meter (square yard) and if so directed, asphalt material in excess of the limits set out in 404.03 will be paid for at the Contractor's invoice price, plus 20 percent.

130

Payment will be made under:

Pay Item	***Metric Pay Unit Symbol (English Pay Unit Symbol)***
Asphalt for Seal Coat	*Mg (TON)*
Cover Aggregate, Seal Coat	*Mg (TON)*
Seal Coat, ____ (type)	*m2 (SYS)*

SECTION 405, DELETE LINES 1 THROUGH 199.

SECTION 405, AFTER LINE 1, INSERT AS FOLLOWS:

SECTION 405 -- PRIME COAT

405.01 Description. *This work shall consist of preparing and treating an existing or newly constructed aggregate surface with asphalt material and cover aggregate in accordance with 105.03.*

MATERIALS

405.02 Asphalt Material. *The type and grade of asphalt material shall be in* 10 *accordance with the following:*

Asphalt Emulsion, AE-P or AE-PL . . . . . 902.01(b)
Cut-Back Asphalt, MC-70 . . . . . 902.01(c)

405.03 Cover Aggregate. *Aggregate shall be in accordance with the following:*

Coarse Aggregate, Class B or Higher,
Size No. 12 . . . . . 904.02
Fine Aggregate, Size No. 23 or 24 . . . . . 904.01

CONSTRUCTION REQUIREMENTS

405.04 Weather Limitations. *Asphalt material shall not be applied on a wet surface, when the ambient temperature is below 10°C (50°F), or when other unsuitable conditions exist, unless approved by the Engineer.*

405.05 Equipment. *A distributor and aggregate spreader in accordance with 408.03 shall be used.*

405.06 Preparation of Surface. *The existing surface to be treated shall be shaped to the required grade and section; free from all ruts, corrugations, or other irregularities; uniformly compacted; and approved.*

405.07 Application of Asphalt Material. *The asphalt material shall be uniformly applied at the rate of 1.1 to 3.6 L/m² (0.25 to 0.80 gal. per sq yd) in a continuous spread over the section to be treated or as directed.*

When traffic is to be maintained within the limits of the section, approximately half of the width of the section shall be treated in one application. Complete coverage of the section shall be ensured. Treated areas shall not be opened to traffic until the asphalt material has been absorbed.

405.08 Cover Aggregate. *If the asphalt material fails to penetrate and the primed surface must be used by traffic, cover aggregate shall be spread to provide a dry surface.*

405.09 Method of Measurement. *Asphalt for prime coat will be measured by the megagram (ton), or by the square meter (square yard). Cover aggregate will be measured by the megagram (ton).*

405.10 Basis of Payment. *The accepted quantities of prime coat will be paid for at the contract unit price per megagram (ton), or per square meter (square yard) for asphalt for prime coat. The accepted quantities of cover aggregate will be paid for at the contract unit price per megagram (ton), complete in place.*

Payment will be made under:

Pay Item	*Metric Pay Unit Symbol (English Pay Unit Symbol)*
Asphalt for Prime Coat	*Mg (TON)*
	m2 (SYS)
Cover Aggregate, Prime Coat	*Mg (Ton)*

SECTION 406, DELETE LINES 1 THROUGH 161.

SECTION 406, AFTER LINE 1, INSERT AS FOLLOWS.

SECTION 406 -- TACK COAT

406.01 Description. *This work shall consist of preparing and treating an existing pavement or concrete surface with asphalt material in accordance with 105.03.*

MATERIALS

406.02 Asphalt Material. *The type and grade of asphalt material shall be in accordance with the following:*

Asphalt Emulsion, AE-T . . . . . 902.04(b)

CONSTRUCTION REQUIREMENTS

406.03 Equipment. *A distributor in accordance with 408.03(a) shall be used.*

406.04 Preparation of Surface. *The existing surface to be treated shall be free of foreign materials deemed detrimental by the Engineer.*

406.05 Application of Asphalt Material. *The asphalt material shall be uniformly applied at the rate of from 0.14 to 0.36 L/m^2 (0.03 to 0.08 gal. per sq yd), or as otherwise specified or directed.*

Tack coat shall not be applied to a wet surface. The rate of application, temperature, and areas to be treated shall be approved prior to application. Excessive tack coat shall be corrected to obtain an even distribution.

406.06 Method of Measurement. *Asphalt for tack coat will be measured by the megagram (ton) or by the square meter (square yard).*

406.07 Basis of Payment. *The accepted quantities of tack coat will be paid for at the contract unit price per megagram (ton), or per square meter (square yard) for asphalt for tack coat, complete in place.*

Payment will be made under:

Pay Item	*Metric Pay Unit Symbol (English Pay Unit Symbol)*
Asphalt for Tack Coat	*Mg (TON)* *m2 (SYS)*

SECTION 407, DELETE LINES 1 THROUGH 201.

SECTION 407, AFTER LINE 1, INSERT AS FOLLOWS:

SECTION 407 -- DUST PALATIVE

407.01 Description. *This work shall consist of preparing and treating an existing aggregate surface with asphalt material in accordance with 105.03.*

MATERIALS

407.02 Asphalt Material. *The type and grade of asphalt material shall be in accordance with the following:*

Asphalt Emulsion, AE-PL . . . . . *902.01(b)*

CONSTRUCTION REQUIREMENTS

407.03 Weather Limitations. *Asphalt material shall not be applied on a wet surface, when the ambient temperature is below 10°C (50°F), or when other unsuitable conditions exist, unless approved by the Engineer.*

407.04 Equipment. *A distributor in accordance with 408.03(a) shall be used.*

407.05 Preparation of Surface. *The surface to be treated shall be shaped to the required section, and be free from all ruts, corrugations, or other irregularities.*

407.06 Application of Asphalt Material. *The asphalt material shall be uniformly applied at the rate of 1.5 to 5 L/m^2 (0.25 to 1.00 gal. per sq yd) in a uniform continuous spread over the section to be treated or as directed.*

When traffic is to be maintained within the limits of the section, approximately half of the width of the section shall be treated in one application. Complete coverage of the section shall be ensured. Treated areas shall not be opened to traffic until the asphalt material has been absorbed.

407.07 Method of Measurement. *Asphalt for dust palative will be measured by the megagram (ton).*

407.08 Basis of Payment. *The accepted quantities of this work will be paid for at the contract unit price per megagram (ton) for asphalt for dust palative, complete in place.*

Payment will be made under:

Pay Item	*Metric Pay Unit Symbol (English Pay Unit Symbol)*
Asphalt for Dust Palative	*Mg (TON)*

SECTION 408, DELETE LINES 1 THROUGH 85.

SECTION 408, AFTER LINE 1, INSERT AS FOLLOWS:

SECTION 408 – EQUIPMENT

408.01 Production, Transportation, and Laydown of Asphalt Mixtures. *For production of asphalt mixtures, the Contractor shall provide all equipment necessary for the production, transportation, and laydown operations.*

408.02 Mixing Plant. *The mixing plant shall be capable of producing a uniform mixture.*

(a) HMA Mixing Plant.

1. Plant Inspection. *A plant inspection in accordance with 106.03 will be made by the Engineer annually, after a plant is moved, or as deemed necessary.*

2. Proportioning Systems. *All meters, scales, and other measuring devices shall be accurate to within ± 0.5 percent throughout their range unless otherwise approved.*

3. Material Storage.

a. Aggregates. *The aggregate storage area shall be well drained. All stockpiles shall be sufficiently separated and identified by signs or other approved methods.*

b. Asphalt. *The storage, circulation, and delivery system shall be equipped to maintain the asphalt materials utilizing the recommendations of the asphalt materials supplier. Each system shall be equipped with a sampling device to obtain a representative asphalt sample. An armored thermometer or pyrometer having a minimum range of 20°to 200°C (70° to 400° F), readable to 2°C (5°F), shall be installed in each storage tank. An open flame shall not come into direct contact with the tank being heated. All line valves shall have clear and permanent markings to indicate the open and closed positions. Each storage tank shall be labeled to identify the grade of asphalt.*

4. Aggregate Feed System. *The minimum number of compartments in the cold aggregate feed system shall be equal to the number of individual materials to be used in the mixture. The aggregate compartments shall be designed to prevent overflow of material from one compartment into another. The feeder of each compartment shall be capable of proportioning the aggregates. A scalper, or other device, shall be provided to remove oversize particles from the blended aggregates.*

*5. **Drier Unit.** The drier unit shall be capable of drying and heating aggregates. The unit shall be equipped with a device that continuously records the discharge temperature of the material. Daily recording charts shall be kept at the plant site and shall be accessible at all times until the project is accepted.*

*6. **Dust Collector.** The dust collector system shall comply with all applicable laws, ordinances, and regulations regarding emissions. If dust is to be returned into the HMA, the system shall return the materials at a constant rate during production.*

*7. **Mixing Unit.** The mixing unit shall be capable of producing uniformly coated and graded mixtures at the specified temperatures.*

*8. **Mix Load-out Scales.** Scales or automatic systems shall be in accordance with 109.01(b).*

For a contract with asphalt mixture quantities of 4500 Mg (5000 T) or more, a load, selected at random, will be checked on an independent commercial scale during the first day of production, and thereafter as directed. The gross mass (weight) of the check load and tare mass (weight) of the truck over the same scale, and the net mass (weight) of the mixture shall be recorded on a ticket which is attached to the print-out ticket and retained in the file of the Engineer. The net mass (weight) of mixture in the check load shall not vary from the total mass (weight) of mixture recorded on the printout tickets by more than 90 kg (200 lb) for loads up to 9 Mg (10 T); 135 kg (300 lb) for loads from 9 Mg to 13.6 Mg (10 to 15 T); or 180 kg (400 lb) for loads over 13.6 Mg (15 T). Results outside of these tolerances shall be investigated.

*9. **Hot Surge Bins.** A hot surge bin may be used to minimize interruptions during normal production.*

The bin(s) shall be equipped with a low-level indicator and cut-off system to stop the discharge when the mix falls below the top of the cone. The cut-off system may be automatic or manual. The manual system shall have an audio alarm to notify the operator when to stop the discharge. Approval in accordance with ITM 578 is required for surge bin(s) to be used for extended storage.

*10. **Sampling Point Requirements.** Adequate points shall be provided where required to sample materials for testing and acceptance.*

(b) CMA Mixing Plant.

The mixing plant shall be of sufficient capacity and coordination to adequately handle the proposed CMA construction. The mixing unit shall be a twin shaft pugmill or other approved mixer, including the drum type capable of producing a consistent uniform mixture. The outlet of the mixer shall be such that it prevents segregation of the material when discharged.

A HMA mixing plant in accordance with 408.02(a) may be utilized as a CMA mixing plant.

408.03 HMA Laydown Operations.

(a) Distributor. *The distributor shall be equipped, maintained, and operated to provide uniform heating and application rates as specified. The distributor shall have a volume measuring device and a thermometer to monitor the asphalt material.*

Distributors shall also be equipped with a power unit for the pump and with a full circulation spray bar with vertical controls.

(b) Hauling Equipment. *The mixtures shall be transported to the laydown operation in trucks that have tight, clean, and smooth beds.*

Truck beds may be treated with approved anti-adhesive agents. The truck beds shall be raised after application of non-foaming anti-adhesive agents to drain the liquids from the bed prior to HMA being loaded into the truck. An approved List of Anti-Adhesive Materials will be maintained by the Department.

Hauling equipment shall be equipped with a watertight cover to protect the mixture.

(c) Laydown Equipment.

1. Paver. *The paver shall be self-propelled, and equipped with a material receiving system, and equipped with heated and vibrating screeds. The paver may also include automatic slope and grade controls, extendable screeds and extendable augers.*

Automatic control devices shall be separated from the paver screeds, paver tracks or wheels and be capable of adjusting both sides of the screeds automatically to maintain a constant angle of attack in relation to the grade leveler device or grade line.

A grade leveling system may be used to activate the control devices on each HMA course, including matching lays. The leveling system shall be attached to the paver and operated parallel to the paver's line of travel.

Extendable screeds shall be rigid, heated, and vibrating, and be capable of maintaining the cross slope, and line and grade of the pavement, to produce uniform placement of the materials.

Auger extensions shall be used when required to distribute the HMA uniformly in front of the screed.

2. Widener. *A device capable of receiving, transferring, spreading, and striking off materials to the proper grade and slope.*

*3. **Other Mechanical Devices.** Inaccessible or short sections of HMA may be placed with specialty equipment approved by the Engineer.*

*(d) **Compaction Equipment.** Compaction equipment shall be self-propelled, steel wheel or pneumatic tire types, in good condition, and capable of reversing direction without backlashing. All roller wheels shall be equipped with scrapers to keep the wheels clean, have water spraying devices on the wheels, and steering devices capable of accurately guiding the roller.*

*1. **Tandem Roller.** A roller having two axles and a minimum mass (weight) of 9 Mg (10 T).*

*2. **Three Wheel Roller.** A roller having three wheels with a minimum bearing of 5.3 kg/mm (300 lb/in.) on the rear wheels. The crown of the wheels shall not exceed 63 mm (2.5 in.) in 5.5 m (18 ft).*

A tandem roller which has a drive wheel bearing of no less than 5.3 kg/mm (300 lb/in.) may be used in lieu of the three wheel roller.

*3. **Pneumatic Tire Roller.** A pneumatic tire roller shall have a minimum rolling width of 1.65 m (5.5 ft). The roller shall be equipped with compaction tires, minimum size 7:50 by 15, exerting a uniform, average contact pressure from 345 to 621 kPa (50 to 90 psi) uniformly over the pavement by adjusting ballast and tire inflation pressures. The wheels on at least one axle shall be fully oscillating vertically, and mounted as to prevent scuffing of the pavements during rolling or turning operations. Charts or tabulations showing the contact areas and pressures for the full range of tire inflation pressures and for the full range of tire loadings for each compactor shall be furnished to the Engineer.*

*4. **Vibratory Roller.** A vibratory roller shall be equipped with a variable amplitude system, a speed control device, and have a minimum vibration frequency of 2000 vibrations per minute. A reed tachometer shall be provided for verifying the frequency of vibrations. A list of approved vibratory rollers will be maintained by the Department.*

*5. **Trench Roller.** A trench roller shall have a compaction wheel bearing of no less than 5.3 kg/mm (300 lb/in.).*

*6. **Specialty Roller/Compactor.** Inaccessible or short sections of HMA may be compacted with specialty equipment approved by the Engineer.*

*(e) **Miscellaneous Equipment.***

*1. **Aggregate Spreader.** A spreader shall be self-propelled, pneumatic tired-motorized unit with a front loading hopper and a transportation system for distributing the aggregates uniformally across the pavement.*

*2. **Rotary Power Broom.** A motorized, pneumatic tired unit with rotary bristle broom head.*

(f) Smoothness Equipment.

*1. **Profilograph.** A profilograph is an instrument that very precisely measures the vertical irregularities of the pavement. The profilograph is constructed of a main frame approximately 7.5 m (25 ft) in length supported by wheeled carriages at either end to establish a reference plane for a rolling straight edge. At the midpoint of the main frame is a profile wheel that is mechanically linked to a strip chart recorder. As the profilograph is pushed down the pavement, irregularities/deviations of the profile wheel from the reference plane established by the profilograph are shown on the strip chart recorder. The profilograph records the irregularities/deviations, pavement profile, on a continuous paper chart referred to as the profilogram.*

*2. **Straightedge - 4.9 m (16 ft).** A 4.9 m (16 ft) straightedge shall be a rigid beam mounted on two solid wheels on axles 4.875 m (16 ft) apart. The straightedge has a mounted push bar to facilitate propelling the device along or across the pavement. Tolerance points are located at the 1/4, 1/2, and 3/4 points and may be composed of threaded bolts capable of being adjusted to the tolerance required.*

*3. **Straightedge - 3 m (10 ft).** A 3 m (10 ft) straightedge is the same as a 4.9 m straightedge except that the wheels are mounted 3.048 m (10 ft) apart. A handheld rigid beam may be substituted.*

SECTION 409, DELETE AND INSERT AS FOLLOWS:

SECTION 409 -- ~~TACK COAT~~ *Blank.*

SECTION 409, DELETE LINES 2 THROUGH 60.

SECTION 410, DELETE AND INSERT AS FOLLOWS:

SECTION 410 --~~DUST PALATIVE~~ *Blank.*

SECTION 410, DELETE LINES 2 THROUGH 56.

SECTION 610, BEGIN LINE 17, DELETE AND INSERT AS FOLLOWS:

610.02 Materials. Materials shall be in accordance with ~~400~~ *402*, 500, or 700, whichever is applicable. ~~Bituminous mixture~~ *HMA* for approaches may be that specified for mainline or ~~as specified elsewhere~~ *or HMA base, intermediate, or surface. Mixture adjustments in accordance with 904.02(a) will not apply to approaches. Mixtures will be sampled, tested, and accepted in accordance with 402.06(a) unless the mixtures are supplied in accordance with 401.08 as allowed in 402.03. When mixtures in accordance with 401.08 are supplied, all applicable requirements of 401.02 shall be met and acceptance will be in accordance with 402.06(b).*

SECTION 904, BEGIN LINE 270, DELETE AND INSERT AS FOLLOWS:

3. Absorption requirements apply only to aggregates used in portland cement concrete and ~~bituminous~~ *HMA* mixtures except they shall not apply to blast furnace slag. When crushed stone coarse aggregates from Category I sources consist of production from ledges whose absorptions differ by more than ~~2~~ *two* percentage points, the absorption test will be performed every ~~3~~ *three* months on each size of material proposed for use in portland cement concrete or ~~bituminous~~ *HMA* mixtures.

~~When a subsequent 3-month test does not agree within one percentage point of the previous test for a particular size of material, an absorption test will be performed on acceptance samples at a frequency sufficient to facilitate mix design revision and documentation.~~ *Materials having absorption values between 5.0 and 6.0 that pass AP testing may be used in portland cement concrete.* If variations in absorption preclude satisfactory production of portland cement concrete or ~~bituminous~~ *HMA* mixtures, independent stockpiles of materials will be sampled, tested, and approved prior to use.

4. Non-durable particles include soft particles as determined by ITM 206 and other particles which are structurally weak, such as soft sandstone, shale, limonite concretions, coal, weathered schist, cemented gravel, ocher, shells, wood, or other objectionable material. Determination of non-durable particles shall be made from the total *mass* (weight) of material retained on the 9.5 mm (3/8 in.) sieve.

Scratch Hardness Test shall not apply to crushed stone coarse aggregate.

5. The bulk specific gravity of chert shall be based on the saturated surface dry condition. The amount of chert less than 2.45 bulk specific gravity, shall be determined on the total *mass* (weight) of material retained on the 9.5 mm (3/8 in.) sieve for sizes 1 through 8, 53, and 91 and on the total mass (weight) of material retained on the 4.75 mm (No. 4) sieve for sizes 9 and 11.

6. Crushed particle requirements will apply to gravel coarse aggregates used in ~~bituminous~~ *HMA* mixtures, compacted aggregates, and ~~bituminous~~ *asphalt* seal coats except seal coats used on shoulders. Crushed particle requirements for ~~bituminous~~ *HMA* mixtures are set out in ~~401.02~~ *904.02(c)*. Determination of crushed particles shall be made ~~on material retained on the 4.75 mm (No. 4) sieve~~ *in accordance with ASTM D 5821.*

7. Air-cooled blast furnace slag and steel slag coarse aggregate shall be free of objectionable amounts of coke and iron.

8. *Brine freeze-and-thaw soundness requirements are subject to the conditions stated in note 2.*

9. *Freeze-and-thaw beam expansion shall be tested and retested in accordance with ITM 210.*

(c) ~~Blank~~ *Coarse Aggregate Angularity.* *The coarse aggregate shall not contain flat and elongated particles exceeding the maximum value for the appropriate ESAL category shown on the title sheet as follows:*

FLAT AND ELONGATED PARTICLES	
TRAFFIC, ESAL	*PERCENT, MAXIMUM*
< 300,000	-----
< 1,000,000	-----
< 3,000,000	*10*
< 10,000,000	*10*
< 30,000,000	*10*
<100,000,000	*10*
≥100,000,000	*10*

Flat and Elongated Particles . . . . . ASTM D 4791

The angularity value of the coarse aggregate shall meet or exceed the minimum values for the appropriate ESAL category shown on the title sheet and position within the pavement structure as follows:

COARSE AGGREGATE ANGULARITY		
TRAFFIC, ESAL	*DEPTH FROM SURFACE*	
	≤ 100 mm	*> 100 mm*
< 300,000	*55*	-----
< 1,000,000	*65*	-----
< 3,000,000	*75*	*50*
< 10,000,000	*85/80**	*60*
< 30,000,000	*95/90**	*80/75**
<100,000,000	*100/100**	*95/90**
≥100,000,000	*100/100**	*100/100**

** Denotes two faced crush requirements*

Coarse Aggregate Angularity . . . . . ASTM D 5821

(d) ~~Blank~~ *Surface Aggregate Requirements.* *The surface aggregate selection shall be based on the ESAL loadings for the project as following:*

COARSE AGGREGATE TYPES FOR HMA SURFACE MIXTURES (Note 1)			
Coarse Aggregate Type	*Traffic ESAL*		
	< 1,000,000	*< 3,000,000*	*≥ 3,000,000*
Air-Cooled Blast Furnace Slag	*Yes*	*Yes*	*Yes*
Steel Furnace Slag	*Yes*	*Yes*	*Yes*
Sandstone	*Yes*	*Yes*	*Yes*
Crushed Dolomite	*Yes*	*Yes*	*Note 2*
Crushed Stone	*Yes*	*No*	*No*
Gravel	*Yes*	*No*	*No*

Note: 1. Coarse aggregates for HMA shoulder surface mixtures may be any of the coarse aggregate types.

Note: 2. A maximum of 50 percent of course aggregate may be dolomite.

GUARDRAIL END TREATMENTS

The Standard Specifications are revised as follows:

SECTION 601, AFTER LINE 35, INSERT AS FOLLOWS:

The materials for guardrail end treatments shall be as follows:

(a) Guardrail End Treatment Type I. *The material for guardrail end treatment type I shall be in accordance with 910.09, 910.10, 910.11, and 910.12. The concrete anchor shall be class A in accordance with 702.*

(b) Guardrail End Treatment Type MS. *Guardrail end treatment type MS shall be the Combination Attenuating Terminal, including the transition section, as manufactured by the Syro Steel Company. The configuration of the unit shall be as crash tested and approved in accordance with FHWA requirements.*

(c) Guardrail End Treatment Type OS. *The Contractor will be permitted to use either the SENTRE guardrail end treatment as manufactured by Energy Absorption Systems, Inc., or the Combination Attenuating Terminal as manufactured by the Syro Steel Company, as guardrail end treatment type OS. The delineators and posts required for the SENTRE's redirecting cable shall be in accordance with 804. The configuration of the selected alternate shall be as crash tested and approved in accordance with FHWA requirements. If the Combination Attenuating Terminal unit is used, it shall include the transition section. If the SENTRE unit is used, it shall include the downstream guardrail tensioning cable section.*

SECTION 601, BEGIN LINE 85, INSERT AS FOLLOWS:
to terminate guardrail installations at the locations shown on the plans. The type of guardrail end treatment, the allowable alternates for each type of guardrail end treatment, and the grading requirements shall be *in accordance with the manufacturer's recommendations, and* as shown on the plans.

SECTION 601, AFTER LINE 88, INSERT AS FOLLOWS:
The assembly and installation of guardrail end treatments shall be at the locations shown on the plans and as follows:

(a) Guardrail End Treatment Type I. *Double facing will be required when it is used in conjunction with double faced guardrail.*

(b) Guardrail End Treatment Types MS and OS. *The assembly and installation of the guardrail end treatments type MS and OS shall be supervised or performed at all times by an installer trained and certified by the unit's manufacturer. A copy of the installer's certificate shall be presented to the Engineer prior to the start of work. The SENTRE end treatment will also require 3 type D-1 white delineators with posts equally spaced adjacently along the redirecting cable.*

The Contractor shall provide the Department with original copies of all necessary current manufacturer's installation manuals and shop drawings prior to beginning installation work. Shop drawings shall be a minimum of 560 mm by 865 mm (22 in. by 34 in.) in size. No installation work shall begin prior to the Department's receipt of these manuals and drawings. The manuals and drawings will remain the property of the Department.

In case of dispute regarding installation, the manufacturer shall provide a properly trained representative, directly employed by the manufacturer, to ensure that the installation is performed in accordance with the manufacturer's recommendations.

SECTION 601, BEGIN LINE 130, INSERT AS FOLLOWS:
terminal system will be measured per each, for the type specified. Grading at guardrail end treatments, concrete used in anchoring guardrail end treatments, *and type D-1 delineators required with guardrail end treatment type OS SENTRE unit* will not be measured for payment.

SECTION 601, AFTER LINE 181, INSERT AS FOLLOWS:
Grading at guardrail end treatments, double facing of guardrail end treatments, concrete used in anchoring guardrail end treatments, and type D-1 delineators required with guardrail end treatment OS SENTRE unit will not be paid for separately. The costs thereof shall be included in the cost of the guardrail end treatment.

SEEDING OUTSIDE CONSTRUCTION LIMITS

The Standard Specifications are revised as follows:

SECTION 621, AFTER LINE 385, INSERT AS FOLLOWS:

621.10.1 Seeding Disturbed Areas Outside Construction Limits. *Areas which have been disturbed by the Contractor and are outside the construction limits shall be seeded with seed mixture grass type 2 in accordance with 621.06(g)2, or seed mixture legume type 2 in accordance with 621.06(h)2, as directed.*

SECTION 621, AFTER LINE 468, INSERT AS FOLLOWS:

No payment will be made for seeding required in areas outside the construction limits which have been disturbed by the Contractor.

BITUMEN COATING FOR PILES

DESCRIPTION. The work shall consist of furnishing and applying bitumen coating and primer to steel pile surfaces in accordance with these specifications and in reasonably close conformance with the lines and at the locations shown on the plans or as directed.

MATERIALS. Bitumen coating shall be canal liner bitumen in accordance with ASTM D 2521. It shall have a softening point of 88°C to 93°C (190°F to 200°F), a penetration of 56 to 61 at 25°C (77°F), and a ductility in excess of 35 mm (1.38 in.) at 25°C (77°F).

Primer shall be in accordance with AASHTO M 116.

CONSTRUCTION REQUIREMENTS. All surfaces to be coated with bitumen shall be dry and thoroughly cleaned of dust and loose materials. Primer or bitumen shall not be applied in wet weather, nor when the ambient temperature is below 18°C (65°F).

Application of the prime coat shall be with a brush or other approved means and in a manner which thoroughly coats the surface of the piling with a continuous film of primer. The primer shall have set thoroughly before the bitumen coating is applied.

The bitumen shall be heated to 149°C (300°F) and applied at a temperature between 93°C and 149°C (200°F and 300°F) by means of one or more mop coats or other approved means. The average coating depth shall be 10 mm (3/8 in.). Whitewashing of the coating may be required during hot weather as directed to prevent running or sagging of the asphalt coating prior to driving of the pile.

Bitumen coated piles shall be protected from sunlight or heat immediately after the coating is applied. The bitumen coating shall not be exposed to damage or contamination during storage, hauling, or handling. Once the bitumen coating has been applied, dragging the piles on the ground or the use of cable wraps around the piles during handling will not be permitted. Pad eyes, or other suitable devices, shall be attached to the piles to be used for lifting and handling.

A nominal length of the pile shall be left uncoated as directed where field splices will be required. After completing the field splice, the splice area shall be brush coated or mop coated with a minimum of one coat of bitumen as directed.

METHOD OF MEASUREMENT. This work will not be measured for payment.

BASIS OF PAYMENT. No direct payment will be made for this work. The cost of this work shall be included in the cost of the piling specified. The cost of this work shall include the costs of furnishing all labor, materials, tools, equipment, and incidentals for applying the bitumen coating and primer. If the bitumen coating is damaged, it shall be reapplied as directed with no additional payment.

PREDRILLING 457mm DIAMETER PILE HOLES

DESCRIPTION. This work shall consist of predrilling 457mm diameter pile holes to the elevations and at the locations shown on the plans.

MATERIALS. The backfill for the pile holes shall be Bentonite slurry. The slurry shall be obtained from sources approved by the Design Engineer. The slurry shall be mixed, stored and transported using equipment made for these purposes. The density of the slurry shall be at least 1,202 kg/m3 (75 pounds per cubic foot) in accordance with ASTM D-4380.

CONSTRUCTION. The holes shall be drilled to the elevations shown on the plans. Immediately after driving the piles, the voids around the pile shall be filled with the Bentonite slurry.

METHOD OF MEASUREMENT. This work will not be measured for payment.

BASIS OF PAYMENT. No direct payment will be made for this work. The cost of this work shall be included in the cost of the piling specified. The cost of this work shall include the costs of furnishing all labor, materials, tools, equipment and incidentals for drilling and backfilling the piles.

PILE DRIVING

Attached is the Pile and Driving Equipment Data form as required by 701.04(a) in the Supplemental Specifications. The method for driving the piles will be by the formula specified in 701.06b.

REINFORCING BARS

The Standard Specifications are revised as follows:

SECTION 703, LINE 5, INSERT AS FOLLOWS:

the plans or as directed. *If the Contractor desires to substitute english dimensioned reinforcing bars for the metric dimensioned reinforcing bars shown on the plans, a written request shall be submitted to the Engineer. This substitution will be allowed providing the Contractor provides adequate documentation that metric dimensioned reinforcing bars are not available in sufficient quantities, due to the requirements of 106.01(c), and that the cross sectional area of the english dimensioned reinforcing bars is equal to or greater than the cross sectional area of the metric dimensioned reinforcing bars as shown on the plans. If the Contractor desires to revise the bar spacing or the method of splicing from that as shown on the plans, it shall submit revised detailed drawings and engineering calculations prepared by a professional engineer to the Engineer for approval. Placement of english dimensioned reinforcing bars shall not begin until written approval has been received by the Contractor.*

SECTION 703, LINE 136, INSERT AS FOLLOWS:

been used. *All costs associated with the substitution of english dimensioned reinforcing bars for metric dimensioned reinforcing bars including the engineering fees necessary to produce the revised detailed drawings and calculations to support a revised spacing or method of splicing request shall be included in the costs of the reinforcing steel.*

HIGH RANGE WATER REDUCERS
IN PRECAST PRESTRESSED CONCRETE STRUCTURAL MEMBERS

The Standard Specifications are revised as follows:

SECTION 707, BEGIN LINE 121, DELETE AND INSERT AS FOLLOWS:

(c) Concrete. Concrete shall be air entrained and in accordance with the applicable ~~provisions~~ *requirements* of 702.05. Water-reducing admixtures, ~~or~~ water-reducing and retarding admixtures, *or high range water reducing and retarding admixture systems* may be used. *Admixture and admixture systems shall be in accordance with 912.03. The use of either a type A or a type D chemical admixture shall be in accordance with 702.05 as specified for class C concrete. If a high range water reducing admixture system is to be used in portland cement concrete, the procedures for batching shall be consistent. The concrete shall be mixed until a uniform consistency is achieved.* Admixtures shall not contain chlorides which have been added

SECTION 707, LINE 128, INSERT AS FOLLOWS:

will not apply. Slump shall be no less than 50 mm (2 in.) nor more than 125 mm (5 in.). *Concrete with high range water reducing or a high range water reducing retarding admixture system shall be in accordance with the requirements as follows:*

1. *The slump shall be a minimum of 75 mm (3 in.) and a maximum of 150 mm (6 in.).*

2. *The amount of time from mixing to final placement and consolidation shall be a maximum of 30 minutes.*

3. *The concrete mixture shall not be retempered with additional amounts of high range water reducing or high range water reducing and retarding admixture after the initial mixing has been completed.*

GROUTING INSTRUCTION FOR PANEL JOINTS

DESCRIPTION. The beam shear-key joints shall be grouted with an epoxy grout as shown on the plans.

MATERIALS.

A. **EPOXY RESIN ADHESIVE:**

1. Component "A" shall be a modified epoxy resin of the epichlorohydrin bisphenol A type containing suitable viscosity control agents. It shall not contain butyl glycidyl ether.

2. Component "B" shall be primarily a reaction product of a selected amine blend with an epoxy resin of the epichlorohydrin bisphenol A type containing suitable viscosity control agents, pigments and accelerators.

3. The ratio of Component "A": Component "B" shall be 1:1 by volume.

4. The material shall not contain asbestos.

5. Performance Criteria:

   a. Properties of the mixed epoxy resin adhesive:

      1) Pot Life: 25 to 35 minutes
      2) Tack-Free Time to Touch (20 mil thickness): 3 to 5 hours.
      3) Initial Viscosity (Brookfield Viscometer, Spindle No. 3; Speed 100): 1,900 to 3,700 cps
      4) Color: Gray

   b. Properties of the mixed epoxy resin adhesive:

      1) Compressive Properties (ASTM D-695) at 28 Days

         a) Compressive Strength: 58 MPa (8,500 pounds per square inch) minimum
         b) Modulus of Elasticity: 26 x 10^3 MPa (3.75 x 10^5 pounds per square inch) minimum

      2) Tensile Properties (ASTM D-638) at 14 Days

         a) Tensile Strength: 27 MPa (4,000 pounds per square inch) minimum
         b) Elongation at Break: 1 to 3 percent
         c) Modulus of Elasticity: 19 x 10^3 MPa (2.75 x 10^5 pounds per square inch) minimum

      3) Flexural Properties (ASTM D-790) at 14 Days

         a) Flexural Strength (Modulus of Rupture): 43 MPa (6,300 pounds per square inch) minimum

         b) Tangent Modulus of Elasticity in Bending: 27 x 10^3 MPa (4.0 x 10^5 pounds per square inch) minimum

      4) Shear Strength (ASTM D-732) at 14 Days: 34 MPa (5,000 pounds per square inch) minimum

      5) Total Water Absorption (ASTM D-570) at 7 Days: 1.0 percent maximum (2 hour boil)

      6) Bond Strength (ASTM C-882)

         a) Plastic Concrete to Hardened Concrete at 14 Days (Moist Cure): 12 MPa (1,700 pounds per square inch) minimum
         b) Plastic Concrete to Steel at 14 Days (Moist Cure): 12 MPa (1,700 pounds per square inch) minimum

      7) Deflection Temperature (ASTM D-648) at 14 Days: 102° Fahrenheit minimum (fiber stress loading = 1.8 MPa [264 pounds per square inch])

8) The epoxy resin adhesive shall be in accordance with ASTM C-881, Type II, Grade 2, Class B and Class C.

9) The epoxy resin adhesive shall be approved by the U.S. Department of Agriculture.

NOTE: Tests above were performed with material and curing conditions at 71° Fahrenheit to 75° Fahrenheit and 45 to 55 percent relative humidity.

B. **DRY SILICA SAND:**

CONSTRUCTION REQUIREMENTS. Grout for the joints shall be a mixture of one part epoxy resin adhesive and 1½ parts dry silica sand.

The joint areas to be grouted shall be prepared by means of wire brushing to remove all laitance prior to erection. The joints shall be in a dry condition before placing the epoxy mortar.

BASIS OF PAYMENT. The cost for furnishing and applying this grouting into the panel shear-key joints will not be paid for directly, but shall be included in the Contract unit price, Concrete Structural Members.

PRECAST PRESTRESSED GIRDER AND DECK CONSTRUCTION

DESCRIPTION. This work consists of supplying, erecting and post-tensioning precast prestressed girders and precast deck panels for the bridge superstructure and casting of the closure pours and other items as required by the Contract.

The Contractor will be required to have personnel experienced in the manufacture and erection of this type of girder available during the entire period of superstructure construction. The Contractor may comply with this requirements either by engaging a consulting firm or supplying the expertise through his own firm. In either case, he shall submit evidence satisfactory to the Engineer that the expertise is available.

All work and materials shall be in accordance with applicable provisions of Section 707 of the Special Provisions unless otherwise specified herein, on the plans, or in the Supplemental Specifications. In addition, the following design and construction specifications apply:

1. ASTM A-416.
2. 1995 AASHTO "Standard Specifications for Highway Bridges," and subsequent, interim specifications.
3. ACI 318-89 and ACI 318 R-89.
4. AASHTO "Guide Specifications for Design and Construction of Segmental Concrete Bridges."
5. PTI Tentative specifications for Post-Tensioning Material, "Recommendations for Grouting Post-Tensioning Tendons."

Before the work begins, the Contractor shall furnish to the Engineer for review and approval his Quality Control Plan for assuring that the concrete meets these specifications. The Quality Control Plan submittal shall include the names, qualifications, and program responsibilities of those persons who will be administering and performing quality control as well as the type and a brief description of equipment to be used in mixing, handling, placing and forming concrete, and a brief description of the forming system and/or casting beds. The submittal shall outline the action proposed by the Contractor to ensure the furnishing of concrete that meets the requirements of the Standard Specification and these Special Provisions.

MATERIALS.

A. Concrete - General

1. All concrete shall conform to Section 702 of the Standard Specifications. The Contractor shall perform at his own expense, the work required to substantiate the mix designs. Concrete furnished for Class C and Special Class C Concrete shall meet the 28-day design strength shown on the plans regardless of the amount of cement or other materials which may be required.

2. Separate concrete mix designs shall be furnished for precast and cast-in-place portions of the superstructure as follows:

   Concrete for precast girders and precast deck panels shall be Class SL 48 MPa (7,000 pounds per square inch).

   Concrete for cast-in-place closure pours shall be Special Class C 38 MPa (5,500 pounds per square inch).

3. The absolute volume mix designs including admixtures shall be submitted to the Engineer. All mix designs and changes to mix designs must be approved by the Engineer prior to use.

4. For production quality control, at least six test cylinders, and more, if required by the Engineer, shall be from concrete representing each girder/deck panel or cast-in-place closure pour of the bridge. The 28-day test cylinders shall be cast as provided in AASHTO T23 and cured under the same conditions and methods as the sections they represent. The casting of concrete specimens shall be performed by the Engineer, however, the Contractor shall provide molds, equipment to sample, protection and proper storage of cast cylinders. Determination as to whether or not the concrete meets the requirements of 28-day compressive strength will be based upon the average of at least two test cylinders cast with the section as specified above and tested at 28 days. In the event that the cylinders do not yield the applicable design compressive strength at the end of the 28-day curing period, at least two cores from concrete in the girder or deck section represented by the failing cylinders shall be taken by the Contractor as soon as possible at the direction of the Engineer. These cores shall be soaked for 40 hours. The cores shall then be tested and, if their strengths average no less than 90 percent of the design strength, the girder or deck section will be accepted with regard to strength. If the average is below 90 percent of the design strength, the girder or deck section will be rejected with no further testing.

5. Cylinders will be tested by the Engineer for compressive strength of the concrete furnished. The Contractor shall set up and maintain for the Engineer's use a testing laboratory at the site of casting the girders and deck panels in order to perform the testing specified herein. The Contractor shall furnish approved testing equipment and materials for the required testing. Compressive strength testing shall be performed in accordance with the requirements of AASHTO T22. The taking and testing of concrete cores shall conform to AASHTO T24 requirements.

6. Payment for testing equipment will be incidental to the cost of the girders and panels.

7. If at any time during the progress of the work the concrete being furnished is, in the opinion of the Engineer, of improper consistency, below specified strength, or is otherwise unsuitable, the Engineer reserves the right to stop the work until suitable corrective measures are taken by the Contractor. No additional compensation will be paid to the Contractor because of work stoppage resulting from deficient concrete.

   a. **Aggregates**. Coarse aggregate No. 8 will be permitted in the concrete mixtures.

   b. **Cement**. All cement shall be obtained from one mill unless otherwise permitted by the Engineer. The cement used in the work shall be from the same source as that upon which the selection of concrete proportions was based. If cement from more than one mill is used, additional test batches will be required at the Contractor's expense.

   c. **Admixtures**. No admixture shall be added to the mix except as approved by the Engineer. Accelerating admixtures will not be permitted. If more than on liquid admixture is used, a certificate of compatibility shall be furnished by the manufacturer(s). Admixtures used in the work shall be the same as sued in establishing the mix design.

B. Semi-Lightweight Concrete, Class SL

1. Concrete Mix Requirements shall be as follows:

   a. The unit weight of the freshly mixed concrete shall be between 2,000 and 2,080 Kg/m^3 (125 to 130 pounds per cubic foot) and shall be measured in accordance with ASTM C-138.

   b. The minimum cement factor shall be 7.5 bags (418 Kg/m^3) (705 pounds per cubic yard).

   c. The air content shall be a minimum of 5 percent and a maximum of 8 percent.

   d. The water/cement ratio shall not exceed 0.40. This applies to the water added to the mix at the time of batching.

   e. Slump shall not exceed 5 inches except, at the option of the girder manufacturer, it may be increased to a maximum of 7 inches provided an adequate amount 0.283 to .566 Kg per 45 Kg of cement (10 to 20 ounces per 100 pounds of cement) of Type F or Type G high-range water reducer is used so as to not exceed a water/cement ratio of 0.40.

   f. The girder manufacturer shall make trial batches as necessary to ensure that the mix used will meet the requirements for air content, slump, cement content, water/cement ratio, plastic unit weight and compressive strength. The trial mixtures shall be made using ingredients to be used on the project. At least two independent trial batches using the same mix proportions and meeting all specification requirements shall be made before the mix design is approved. A report of test results for the above listed properties for all trial batches and for the mixture proportions intended for use shall be submitted to the Engineer for review before placement begins. Trial mixes shall be in accordance with ACE 211.2, "Recommended Practices for Selecting Properties for Structural Lightweight Concrete."

2. Other Requirements. Other requirements shall be as follows:

   a. Batching, mixing, hauling, placing, and curing of semi-lightweight concrete shall conform to all requirements for Concrete, Section 700 with special attention to the moisture content of the lightweight aggregate. Stockpiles of lightweight aggregates shall be continuously and uniformly sprinkled with water for a minimum of 10 hours by means of a sprinkler system approved by the Engineer. The occurrence of a steady rain of comparable intensity will permit the turning off of the sprinkler system, at the direction of the Engineer, until the rain ceases. At the end of the wetting period, or after the rain ceases, the stockpiles shall be allowed to drain for a period from three to six hours immediately prior to use unless otherwise determined by the Engineer. If the concrete is to be pumped, the lightweight aggregate stockpile shall be kept saturated with water for at least 48 hours before batching begins.

   b. After the specified curing has been completed, precast beams made of semi-lightweight concrete shall not be exposed to freezing temperatures for an additional 14 days.

C. Lightweight Aggregate. The lightweight aggregate shall meet the following requirements:

   a. Dry Rodded Unit Weight: 960 Kg/m^3 (60 lbs. per Cubic Foot) Maximum.

   b. Gradation (by weight): 9 mm (3/8 Inch) to No. 8 Requirements of AASHTO M-195)

   c. Finer than No. 200: 3.0 Percent (Maximum) Passing a No. 200 Sieve by Wet Analysis

   d. Wear: 50 Percent Maximum

   e. Soundness: 12 Percent Loss Maximum

   f. Friable Particles: 1.0 Percent Maximum

   g. Deleterious Particles: 1.0 Percent Maximum

   h. *Freeze/Thaw Resistance: 85 Percent Minimum Durability Factor and 0.05 Percent Maximum Length Change.

   *Freeze/Thaw resistance shall be tested in accordance with ASTM C666, Method B, except the beams shall be air dried for 14 days after required curing period at a temperature of 23° C (73.4 ±3° F) in a relative humidity of 50 ±5 percent.

D. Reinforcing Steel.

   1. Reinforcing bars (mild steel) for concrete shall meet the requirements of ASTM A-615M, Grade 400 and Section 703 of the Standard Specifications, except for measurement and payment. Where noted on the plans or otherwise specified, reinforcing bars shall be epoxy coated in accordance with the requirements of Article 909.01(b)9 of the Specifications. The use of prefabricated welded "cages" of reinforcing steel will be considered for approval upon the submission of complete details and procedures for welding and handling of the cages. Welding will be allowed only on bars used as "temperature" reinforcing. Welding on epoxy coated bars shall not be allowed. The use of welded wire fabric shall not be considered.

E. Ducts for Post-Tensioning Tendons.

1. Duct Size: Duct size and properties assumed in the design are shown on the plans. All ducts supplied shall be compatible with the assumed design values.

2. Duct: Ducts shall be corrugated galvanized semi-rigid conduit and may be fabricated with either welded or interlocked seams. Ducts shall be bent without crimping or flattening and shall have sufficient strength to maintain their correct alignment during placing of concrete. Wall thickness of metal ducts shall not be less than 28 gauge. Joints between sections of ducts shall be positive metallic connections which do not result in angle changes at the joints. Waterproof tape shall be used at all connections.

3. Vent and Grouting Pipes: All ducts and anchorage assemblies for post-tensioning shall be provided with pipes or other suitable connections at each end for the injection of grout after prestressing. Ducts over 60 m (200 feet) in length shall be vented at all the high points of the tendon profile. Vents shall be 12 mm (1/2 inch) minimum diameter standard pipe or suitable plastic pipe. All connections to ducts shall be made with metallic or plastic fasteners. Waterproof tape shall be used at all connections to vent and grouting pipes. Plastic components, if selected and approved, shall not react with the concrete or enhance corrosion of the prestressing steel and shall be free of water soluble chlorides. The vents shall be mortar tight, taped as necessary, and shall provide means for injection of grout through the vents and for positive sealing the vents. Ends of steel vents shall be removed at least 25 mm (1 inch) below the concrete deck surface after the grout has set. Ends of plastic vents shall be removed to the surface of the concrete after the grout has set. Grout injection pipes shall be fitted with positive mechanical shut-off valves. Vents and ejection pipes shall be fitted with valves, caps shall not be removed or opened until the grout has set.

F. Anchorage Assemblies

1. Structural steel for anchorage devices, distribution plates, and incidental parts required to be of steel shall conform to ASTM A-36M requirements and to the applicable requirements of Section 711 of the Standard Specifications unless otherwise approved. Anchor devices and distribution plates shall be free of the type recommended by the manufacturer of the prestressing system and as shown on the plans.

G. Prestressing Steel

1. Steel Wire Strand: Steel wire strand shall conform to the requirements of ASTM A-416, Grade 1861 (270), low relaxation type.

   a. Strands of more than one type or from more than one source shall not be used in any one tendon.

2. Sampling and Testing Prestressing Steel: Samples from each manufactured reel of steel strand to be used shall be furnished by the Contractor for testing by the Engineer. With each sample of prestressing strands furnished for testing, there shall be a certification stating the manufacturer's minimum guaranteed ultimate tensile strength and modulus of elasticity of the sample furnished.

a. All materials for testing shall be furnished by the Contractor at his expense in a timely manner as to allow the Engineer a maximum of two weeks to perform the test.

b. The Contractor shall have no claim for additional compensation in the event his work is delayed awaiting approval of the materials furnished for testing.

c. Each reel to be shipped to the site shall be assigned an individual lot number and shall be tagged in such a manner that each such lot can be accurately identified at the job site. Each lot of anchorage assembly to be installed at the site shall be likewise identified.

d. The following samples of materials and tendons selected by the Engineer from the prestressing steel at the plant or job site shall be furnished by the Contractor to the Engineer well in advance of anticipated use:

1) For strand: one, 1.5 m (5 foot) long sample shall be furnished for each reel.

2) For ducts: one, .60 m (2 foot) long sample of each size shall be furnished.

e. In the event of failure of a test sample to meet tensile or other specified requirements as determined from tests conducted by the State, the represented lot will be rejected unless, in the Engineer's judgment further sampling and testing or other investigation is warranted, and such further action should show to the Engineer's satisfaction that the samples were not truly representatives of the lot.

1) The release of any material by the Engineer shall not preclude subsequent rejection if the material is damaged in transit or later found to be defective.

SUBMITTALS.

A. General

1. Sufficiently in advance of the start of girder erection, so as to allow the State not less than a 30-calendar day review period, the Contractor shall submit to the State complete details, calculations as required, information and all applicable drawings of the method, materials, equipment, and procedures the Contractor proposes to use in constructing the superstructure. This submittal shall include the erection procedure. Shop drawings shall include applicable stressing instructions, falsework plans, bending diagrams, and placing drawings for reinforcing steel or any other supplementary plans or similar data required of the Contractor. The review period shall begin on the day the submittal is received in the office of the Department's designated Engineer.

a. Reinforcing bar and post-tensioning system shop drawings may be submitted as a partial submittal. Review time shall begin on the day the item submitted is received by the Engineer.

b. All submittals not approved and requiring resubmittal shall be subject to the above review time periods with the review time beginning anew for each such resubmittal.

3. Any deviation from approved materials and details will not be permitted unless details are resubmitted by the Contractor and approved in advance of use.

4. The approval of any proposed method, material or equipment shall not relieve the Contractor in any respect of full responsibility for successfully completing the work in accordance with the plans and specifications.

B. Design Calculations

1. Design calculations shall be submitted for falsework, forms, and other temporary construction which may be required and which will be subject to construction stresses.

2. Calculations shall also be submitted to show the required jacking force and elongation of tendons at time of tensioning, stresses in anchorages and distribution plates, stress-strain curves typical of the prestressing steel to be furnished, seating losses, and any temporary overstresses.

C. Shop Drawings

1. The Contractor will be required to submit five sets of checked detailed shop drawings for approval in accordance with the procedures outlined in Article 105.02 and Article 711.04 of the Standard Specifications. Drawings shall be approved prior to beginning work covered by the drawings. Certified mill test reports shall be furnished for all high tensile prestressing steel and other stressed steel parts. These shop drawings shall include, but not necessarily be limited to, the following:

   a. Fully and accurately dimensioned views showing the geometry of the girder and deck panel, including all projections, recesses, notches, openings, blockouts, etc.

   b. Details of mild steel reinforcing shall be clearly shown as to size, spacing and location including any special reinforcing required, but not shown on the plans.

   c. Reinforcing provided under anchorage plates shall be shown in detail.

   d. Size and type of ducts for all post-tensioning tendons and their horizontal and vertical profiles shall be clearly detailed. Duct supports and grout tubes and vents shall be shown including size, type and location.

   e. Details and locations of all items to be embedded in the girders such as inserts, lifting devices, post-tensioning hardware, etc., shall be shown.

   f. The relative positions of reinforcement steel, ducts and anchorages shall be shown so as to avoid conflicts. Clear horizontal opening between parallel embedded item shall not be less than 40 mm (1.5 inches).

   g. The details of the anchorage systems shall be shown.

   h. Description of method of curing, handling, transporting and erecting of the girders.

i. A table giving jacking sequence, jacking forces and initial elongation of the tendons at each stage of erection for all post-tensioning if other than on the plans.

j. Details of all temporary supports, falsework, struts, and bearing assemblies.

k. Details and a complete description of the post-tensioning system to be used. Prestressing details shall include method, sequence,procedure of prestressing, securing tendons, release procedures and equipment.

l. Each girder and deck panel shall be given an erection mark indicating its location and order in the erection sequence. Erection marks shall be shown on the Erection Plan.

m. The theoretical location of each girder as erected shall be furnished to the Engineer for his use in checking the erection of the superstructure.

n. The submittal shall also include information regarding the grout mix design, the method of mixing and placing the grout and the type and capacity of the equipment to be used.

TESTING BY CONTRACTOR.

A. In-Place Friction Test

1. In the event the theoretical elongation based on the E-modulus data provided by the manufacturer and using the calibrated jack force differs by more than 7 percent from the measured elongation, the Contractor shall perform an in-place friction test. The test procedure apparatus and methods used to perform the tests shall be proposed by the Contractor and be approved by the Engineer prior to the start of any post-tensioning.

2. Friction testing by the Contractor will not be paid for separately, but shall be incidental to the price paid for the superstructure.

PREPARATIONS FOR CASTING.

A. Preparing Forms

1. Concrete shall not be deposited in forms until all work connected with setting of the forms has been complete, all materials required to be embedded in the concrete have been placed and the Engineer has inspected and approved said forms and materials. Such work shall include the removal of all dirt, mortar and other foreign material from the forms.

2. Form accessories to be partially or wholly embedded in the concrete, such as ties and hangers, shall be of a commercially manufactured type. The use of wire ties or loops will not be permitted.

3. Anchor devices may be coast into the concrete for later use in supporting forms or lifting precast members provided the arrangement is approved by the Engineer. The use of driven or drilled types of anchorages for fastening forms or form supports to concrete will not be permitted.

4. Formwork shall be anchored to shores or other supporting members in a manner that will prevent settlement, distortion, or lateral movement of any part of the formwork system during concrete placement.

B. Duct Installation

1. All ducts for prestressing steel shall be securely fastened in place to prevent movement until concrete is placed and hardened. Ducts shall be supported at intervals not to exceed .900 mm (3 feet). Method and spacing of supports shall be shown on the working drawings. The tolerance on longitudinal duct locations shall be plus or minus 7 mm (1/4 inch) vertically or horizontally.

2. The minimum clear opening between longitudinal ducts shall be as shown on the plans.

3. After installation in the forms, the anchorages shall be sealed to prevent entry of water and debris.

4. Following each pour of concrete, the Contractor will be required to demonstrate that all ducts are free of water and are unobstructed and undamaged.

5. To obtain approval for moving a precast girder from the casting yard, the Contractor will be required to demonstrate that all ducts are clear, unobstructed, and undamaged.

6. Immediately prior to installing the prestressing steel, the Contractor shall again demonstrate to the satisfaction of the Engineer that all ducts are unobstructed and that they are free of water and debris.

C. Reinforcing Steel Installation

1. Reinforcing steel shall be fabricated and placed in accordance with the plans and as required herein. No reinforcing steel shall be cut and removed to permit proper alignment of prestressing ducts. Any bar that cannot be fabricated to clear the ducts shall be replaced by additional bars with adequate lap lengths and shall be submitted to the Engineer for approval. In the steel layer parallel to the nearest surface of concrete, bars shall not very from plan placement by more than 13 mm (1/2 inch) or 1/12 of the spacing between bars, whichever is greater. In the steel layer perpendicular to the nearest surface of concrete, bars shall not vary from plan placement by more than 7 mm (1/4 inch). Variations from these tolerance requirements may be approved by the Engineer in special circumstances.

CASTING PROCEDURE.

A. All materials, details, and procedures shall be as specified herein, noted on the plans, or directed by the Engineer. Casting of girders shall not begin until approval of the shop drawings, required computations, and the post-tensioning system has been given.

1. Inspection and Control

a. Before any concrete is placed, the preparations shall be thoroughly inspected and checked.

2. Concreting

a. All concrete shall be compacted and the mortar flushed to the surface of the forms by continuous working with approved high-frequency mechanical vibrators. Use of external vibrators in conjunction with 25 mm (1 inch) diameter internal vibrators may be required for the girders. Vibrating of concrete shall be done with care and in such a manner as to avoid displacement of reinforcement, ducts and other items from their intended position.

b. The sequence of placing concrete in girders and deck panels shall be subject to approval by the Engineer. Cold joints will not be permitted.

c. After the concrete in a girder has been placed and consolidated, the top surface of the concrete shall be given a Class 3 Finish in accordance with Article 702.21(c).

d. The top surface of the deck panels shall be finished in accordance with Article 707.06 and shall not deviate more than 4 mm (1/8 inch) from a straightedge 3000 mm (10 feet long) placed along the surface.

3. Form Removal and Curing

a. Side forms of girders and deck panels shall not be removed until the concrete has attained the compressive strength approved for handling, but in any case not less than 21 MPa (3,000 pounds per square inch) as evidenced by test cylinders made and cured in the same manner as the girder.

b. Precast girders and deck panels may be steam cured in accordance with Article 707.07 of the Standard Specifications except that curing shall continue until concrete has attained the compressive strength required on the plans for release of the pretensioned strand.

c. The area on the sides of the girders and panels which is to be in contact with field placed concrete or mortar shall be sandblasted or wire brushed to remove concrete laitance.

d. Methods, equipment and materials used in curing and finishing shall have prior approval of the Engineer. Inadequate or improper curing will be cause for rejection of a girder.

REJECTION OF GIRDER AND DECK PANELS.

A. It is recognized that defects can occur in the concrete during the casting and handling of the girders. However, it is intended that girders be cast and placed in the bridge without defects. Consequently, the repeated occurrence of a similar type defect will be cause for rejection of girders in which they occur unless the Engineer considers the defect repairable. The Engineer's judgment shall be final in the matter.

B. Upon removal from the casting bed of the first girder cast, the Engineer will inspect the girder. Defects will be identified and the Contractor shall propose to the Engineer in writing the measures he will take to eliminate those defects in the second girder to be cast. After the second girder is cast, the girder will be inspected again and the Contractor shall again prepare corrective and preventative measures as may be necessary. If other defects occur during subsequent casting of girders, the above procedure shall be repeated. Any defect occurring a third time will be cause for rejection of the girder in which it occurs.

C. The following are considered defects which constitute cause for rejection upon the third occurrence:

1. Any cracks which extend to the reinforcing steel. The crack depth shall be determined by a method satisfactory to the Engineer.

2. Rock pockets or honeycomb over 3,870 mm (6 square inches) in area and over 25 mm (1 inch) deep.

3. Any girder or panel having more than one honeycomb area per side or surface even though of smaller scope than defined above.

4. Any discontinuity of the concrete which would permit moisture to reach the reinforcing steel.

5. Edge or corner breakage exceeding 300 mm (12 inches) in length or over 25 mm (1 inch) in depth.

6. Extensive fine hairline cracks or checks.

D. In addition, any girder or deck panel may be rejected which contains a defect which in the opinion of the Engineer cannot be repaired to provide a girder of an acceptable quality. The Engineer's judgment shall be final in the matter.

E. The Engineer may approve written proposals for repairs to occasional, non-recurring and/or isolated defects within the following limits:

1. Isolated cracks not wider than .5 mm (0.2 inch) and not extending through the section, but otherwise considered repairable by the Engineer, may be repaired by the epoxy injection method upon approval by the Engineer of personnel, methods, materials and procedures.

2. An occasional rock pocket, honeycomb area, edge or corner break, or other similar void not deeper than 50 mm (2 inches) may be repaired subject to the Engineer's approval of methods, materials and procedures. Where patching of areas is permitted, all loose material shall be removed and the areas cut back. The sides of the cavity shall be shaped with faces having a minimum depth of 25 mm (1 inch) and as perpendicular to the surface of the area as possible.

3. Girders or panels having a void deeper than 50 mm (2 inches) located so as to completely expose a length of reinforcing bar.

TOLERANCES.

Girder or panel tolerances shall conform to the following:

Depth (Overall)	+ 6 mm (+1/4 Inch) - 6 mm (- 1/4 Inch)
Width	+ 6 mm (+1/4 Inch) - 6 mm (- 1/4 Inch)
Length of Beam	±3 mm (± 1/8 Inch) per 3,000 mm (10 feet) or 19 mm (3/4 Inch) whichever is greater
Exposed beam ends (deviation from square or designated skew)	
Horizontal	±6 mm (± 1/4 Inch)
Vertical	±3 mm (±1/8 Inch) per 300 mm (1 Foot) of beam height)
Side Inserts (spacing between centers of inserts and from the centers of inserts to the ends of the beams)	13 mm(±1/2 Inch)
Bearing plate (spacing from the centers of bearing plates to the centers of bearing plates)	±3 mm (± 1/8 Inch) per 3,000 mm (10 feet) or 13 mm (1/2 inch) whichever is greater.
Bearing plate (spacing from the centers of bearing plates to the ends of the beams	±6 mm (±1/4 Inch)
Bearing plate or bearing area deviation from a level plane)	± 3 mm (±1/8 Inch)
Stirrup Bars (longitudinal spacing, anchorage zone)	13 mm (±1/2 Inch)
Stirrup Bars (longitudinal spacing)	25 mm (±1 Inch)
End Stirrup Bars	Not more than 75 mm (3 Inches) from the end of the beam.
Horizontal alignment (deviation from a straight line parallel to the centerline of beam)	3 mm (1/8 Inch) per 3,000 mm (10 Feet)
Camber differential between adjacent panels	3 mm (1/8 Inch) per 3,000 mm (10 Feet) of Span to 9 mm (3/8 Inch) Maximum.
Center of Gravity of Strand Group	±6 mm (±1/4 Inch)
Strand Positioning (Girders)	± 6 mm (±1/4 Inch)
Strand Positioning (Panels)	± 3 mm (±1/8 Inch)
Position of Handling Devices - Longitudinal	150 mm(±6 Inches)

HANDLING STORING AND SHIPPING PRECAST GIRDERS AND DECK PANELS

A. Each girder or deck panel shall be marked with a unique identification at the time of form removal. This identification shall be used to identify each girder on shop plans, post-tensioning details and calculations, and any other document pertaining to the fabrication and erection of precast concrete girders.

B. Girders and deck panels shall not be moved from the casting yard until all requirements for curing have been met, 28-day strength requirements have been attained, and the Engineer's inspection has been completed.

C. The Contractor shall be responsible for proper handling lifting, storing, transporting and erection of all girders so that they may be placed in the structure without damage.

D. Girders shall be stored in a vertical position (deck panel in level position) at all times and shall be firmly supported and braced at the ends and at other locations as shown on the shop drawings. The members shall be lifted and/or moved in a manner to prevent torsion and other undue stress with lifting devices approved on the shop plans or by other methods approved by the Engineer in writing.

E. A full scale test of the lifting and temporary bracing hardware shall be performed to demonstrate the adequacy of this equipment prior to beginning any handling of the girders. Lifting devices and hooks shall be designed with a minimum factor of safety of three.

F. Prior to shipment, each girder shall be thoroughly inspected for damage by the Contractor. Upon arrival at the bridge site, each girder shall again be inspected for damage by the Contractor and any defects shall be reported to the Engineer.

ERECTION OF GIRDERS AND DECK PANELS

A. General

1. This work consists of erecting girders, placing cast-in-place closure joints, post-tensioning and grouting tendons, and providing temporary bracing as required to complete the superstructure.

2. The design and details of temporary bracing shall be submitted to the Engineer for approval. Construction methods which contemplate the reuse of temporary devices will be considered for approval, but each reuse shall be subject to approval by the Engineer.

B. Geometric Control

1. The Contractor shall be responsible for geometric control of construction so that the completed structure will conform to the lines, grades and dimensions shown on the plans. The Contractor shall furnish competent engineering and surveying personnel and equipment to establish and verify elevations, including setting forms for cast-in-place deck or deck panels.

2. The Contractor shall maintain a record of all surveys, check readings, adjustments and corrections, and shall daily file with the Engineer such data covering casting, erection and forming operations.

3. The Engineer reserves the right to stop work if at any time proper geometric control is, in his opinion, not being furnished by the Contractor.

C. Prestressing Supervision

1. The Contractor shall provide a representative of the supplier of the post-tensioning system to be used or other technician skilled in the application of the prestressing system who shall supervise or provide appropriate surveillance of the work and give the Engineer such pertinent information and assistance as required.

D. Prestressing Equipment

1. The Contractor shall provide all equipment necessary for the prestressing work.

2. All prestressing tendons shall be tensioned by the use of equipment allowing actual elongation to be measured directly and using a hydraulic ram equipped with an accurate method of determining the tensioning force applied using either a gauge measuring the internal hydraulic pressure in the ram or other means approved by the Engineer. Readings taken from any one of these gauges shall be converted to actual tensioning forces through the use of calibrated values taken from a calibration chart. All gauges shall be of sufficient size to allow accurate readings made of load increments of maximum one percent of the capacity of the ram.

3. Load cells, if used, shall be provided with an indicator by means of which the prestressing force in the tendon can be determined. The range of the load cell shall be such that the lower 10 percent of the manufacturer's rated capacity will not be used in determining the jacking stress.

4. The jacks for tensioning shall allow for measuring the true elongation 2 mm (±1/16 inch). The jacks shall be capable of slow release of stress to allow relaxation from over-stress to the proper seating force.

5. The Contractor shall calibrate and provide certified calibration charts for each hydraulic jack and its gauge or load cell to be used in the post-tensioning operation. The calibration charts shall be from an independent testing laboratory. Each jack and its gauge or load cell shall be calibrated as a unit. Jacks used on other projects after calibration shall not be accepted.

6. Recalibration of equipment will be required at any time it appears to the Engineer that the equipment is producing erratic results or stressing tolerances are not met. For each calibration, a calibrating chart, certified by the laboratory, shall be furnished to the Engineer.

E. Anchorages and Distribution Plates

1. All post-tensioned prestressing steel shall be secured at the ends by means of approved anchoring devices as shown on the plans and meeting the requirements herein.

2. Anchorage devices for the post-tensioning shall hold the prestressing steel at a load producing a stress not less than 95 percent of the guaranteed minimum tensile strength of the prestressing steel.

3. The load from the anchoring device shall be effectively distributed to the concrete by means of distribution plates.

4. Such distribution plates shall conform to the following:

   a. The final unit compressive stress on the concrete directly under the plate or assembly shall not exceed the requirements of ACI 318, including commentary on 318 regarding post-tensioning with the allowable stress being limited to the concrete strength at the time of prestressing.

   b. Bending stresses in the plates or assemblies induced by the pull of the prestressing steel shall not exceed the yield point of the material or cause visible distortion in the anchorage plate when 100 percent of the ultimate load is applied as determined by the Engineer.

   c. Materials and workmanship shall comply with applicable requirements set forth under specifications covering structural steel.

5. Steel distribution plates shall be placed inside the end surface of the member. All anchoring devices shall be recessed so that the ends of the prestressing steel and all parts of the anchoring devices may be embedded in concrete.

6. Following post-tensioning and grouting, recesses shall be filled with an approved non-shrink mortar so that all parts of the anchoring devices and ends of the prestressing steel are covered with at least 50 mm (2 inches) of mortar unless a greater embedment is called for on the plans.

7. Before filling recesses or otherwise providing encasement over anchoring devices, the surfaces of the concrete against which the grout is to be placed shall first be cleaned of all foreign and loose material, and otherwise prepared to conform with recommendations by the manufacturer of the mortar. An epoxy bonding agent shall be used to ensure that the mortar plug bonds to the blockout. A bonding agent with an extendible active life such as Weld-Crete shall be used.

8. Mortar for filling recesses or encasing anchoring devices shall meet the approval of the Engineer and shall be a type suitable for use with highly stressed steel.

F. Case of Prestressing Tendons

1. Tendons shall be installed in the ducts using methods approved by the Engineer.

2. All prestressing steel shall be protected against physical damage and rust and other results of corrosion at all times from manufacture to grouting or encasing in concrete. Prestressing steel that has sustained physical damage at any time shall be rejected. The development of visible rust or other results of corrosion shall be cause for rejection when ordered by the Engineer.

3. Prestressing steel tendons and anchorages shall be stored off the ground and shall be protected from the elements by storage under a shelter or as otherwise acceptable to the Engineer.

4. Prestressing steel shall be packaged in containers or other shipping forms for the protection of the steel against physical damage and corrosion during shipping and storage. A corrosion inhibitor which prevents rush or other results of corrosion shall be placed in the package or form, or when permitted by the Engineer, may be applied directly to the steel. The corrosion inhibitor shall have no deleterious effect on the steel or concrete or bond strength of steel to concrete. Packaging or forms damaged from any cause shall be immediately replaced or restored to original condition.

5. Should the Contractor elect to use a corrosion inhibitor carrier type packaging material, the material shall conform to the provisions of Federal Specification MIL-P-3420.

6. The shipping package or form shall be clearly marked with a statement that the package contains high-strength prestressing steel and that care should be used in handling. It should also state the type, kind and amount of corrosion inhibitor used including the date when placed, safety orders and instructions for use.

7. The development of rust or other results of corrosion may be cause for rejection as described below:

   a. If, when the package is opened, there is an even coating of rust, or rust film over the entire "pak," the "pak" shall be rejected.

   b. If one or more wires in a strand shows extensive rust throughout its length, the entire "pak" shall be rejected.

   c. Any section of strand or wire which contains clinging rust, pits or other faults shall be removed from the work.

8. Random areas of rust film which can be removed by light rubbing, leaving only light streaks or spots, but no pitting, will not be cause for rejection.

9. When acceptable prestressing steel for post-tensioning is installed in the ducts after completion of concrete curing, and if stressing and grouting are completed within 30 calendar days after the installation of the prestressing steel, rush which may form during said 30 days will not be cause for rejection of the steel.

   a. Prestressing steel installed, tensioned and grouted in this manner, all within 30 calendar days, will not require the use of a corrosion inhibitor in the duct following installation of the prestressing steel. Prestressing steel installed as about, but not grouted within 30 calendar days, shall be protected by a suitable rust inhibitor in the duct subject to approval of the Engineer.

   b. No welds or grounds for welding equipment shall be made on the prestressing steel or on the form after the prestressing steel has been installed.

G. Post-Tensioning Operations

1. The stressing of post-tensioning tendons shall be under the immediate supervision of the post-tensioning supervisor who shall exercise rigid control of the operations as necessary for full compliance with all requirements. As a minimum, the post-tensioning supervisor shall be present at the beginning of each different type of post-tensioning operation. If the post-tensioning supervisor determines that the Contractor's crew is thoroughly familiar with one type of operation, he may deliver a signed statement of competence for the crew to the Engineer. In such case, the presence of the post-tensioning supervisor shall not be required again until a different type of post-tensioning operation occurs. The statement shall list the names of the contractor's crew and crew leader. The stressing operations shall be overseen by the Contractor's crew leader who shall demonstrate competence in supervising the stressing operations and performing elongation measurements and calculations, and shall preferably be an Engineer. No stressing operations shall be performed without direct supervision of the post-tensioning supervisor or the Contractor's approved crew leader.

2. The tensioning process shall be conducted so that the tension being applied and the elongation will be measured in a sufficient number of intervals. A record shall be kept of gauge pressure readings and elongations at the end of each jacking operation and submitted to the Engineer for his approval.

3. The tendon force measured by gauge pressure shall agree within 7 percent with the jack force calculated and measured by elongation. When the measured elongation at the specified jacking stress varies by more than 7 percent from the theoretical elongation, the entire operation shall be checked and the source of error determined and remedied to the satisfaction of the Engineer before proceeding with the work.

4. The prestressing force may vary per tendon - ±7 percent. However, the total force at each section may not be less or more than the total prestressing force specified by ±3 percent.

5. The maximum temporary tensile stress (jacking stress) in prestressing steel shall not exceed 80 percent of the specified minimum ultimate tensile strength of the prestressing steel. The initial stress at the anchor shall not exceed 70 percent of the specified minimum ultimate tensile strength of the prestressing steel.

6. The tendons shall be stressed in increments of maximum 20 percent. After each increment, the pressure and tendon elongation shall be measured and recorded.

7. Loss of elongation due to anchor set shall be checked for agreement with the anticipated value used in the design calculations as shown on the plans. Excessive anchor set shall be deducted from the measured elongation and corrected if necessary to maintain ±7 percent agreement between elongation and stressing force.

8. After stressing and anchoring all tendons, and upon the Engineer's approval, projecting strand shall be trimmed by using rotating discs.

9. The friction coefficients used in calculating friction losses in tendons shall be those shown on the plans.

H. Correcting Defects Appearing After Post-Tensioning: Failure of individual wires in a seven-wire strand is acceptable provided the total area of wire failure is not more than 2 percent of the total cross-sectional area of tendons at any bridge cross section. Failure of an entire strand will be subject to structural review.

1. Fine hairline cracks or checks on the surface of the member which, as determined by the Engineer, do not extend to the planes of the nearest reinforcement, will be acceptable unless they are numerous and extensive. Diagonal cracks which indicate damage from torsion, longitudinal cracks that follow stressing tendons or any cracks which extend into the plane of the reinforcing steel and/or prestressed tendons will be subject to a structural review prior to acceptance. If found acceptable, the cracks shall be repaired by sealing the surface with epoxy and injection grouting cracks with epoxy adhesive. The color of the epoxy shall closely match the color of the concrete in the structure.

I. Grouting

1. General. Prestressing steel shall be bonded to the concrete by entirely filling the space between the duct and the tendon with grout. Grout and grouting of post-tensioned prestressed concrete shall conform to the following requirements:

2. Grout. The grout shall be a mixture of Portland cement and water, and shall include an approved expansive admixture. No sand shall be used in the grout mixture. Minimum compressive strength shall be 27 MPa (4,000 pounds per square inch) at 28-days as determined by ASTM C-109.

3. Portland Cement. Cement for grout shall meet the requirements of the Standard Specifications for Type I cement. Certificates of compliance will be acceptable to the State for cements to be used. The State reserves the right, however, to sample and test the cement before its use and at any time during the progress of the work.

4. Water. The water used in the grout should be potable, clean and free of injurious quantities of substances known to be harmful to Portland Cement, aggregate or prestressing steel.

5. Admixtures. The admixtures shall impart the properties of low water content, good flowability, and minimum of bleed and expansion properties. The expansion properties of the admixture shall produce a minimum confined expansion of the grout of 2 percent and a maximum of 10 percent. Its formulation shall contain no chemical in quantities that may have harmful effects on the prestressing steel or cement. Admixtures containing chlorides in excess of 0.25 percent by weight of admixture (assuming .5 Kg [1 pound] per sack of cement), fluorides, sulfites and nitrates shall not be used.

6. Mixing of the Material. Water should be added to the mixer first, followed by Portland Cement and the additive.

a. Mixing of the grout shall be of such duration as to obtain a uniform, thoroughly blended grout, without excessive temperature increase or loss of expansive properties to the admixture. The grout shall be continuously agitated until it is pumped into the duct.

b. No water may be added to the grout to increase the flowability if decreased by delayed use of the grout.

c. Proportions of material shall be based on tests made on the grout before grouting is begun. The water content shall be the minimum necessary for proper placement and shall not exceed a water-cement ratio of 0.45 (approximately 19 liters [5 gallons] of water per sack of cement).

d. The pumpability of the grout shall be determined by the Engineer in accordance with the U.S. Corps of Engineers Test Method CRD-C79. The afflux time of a grout sample immediately after mixing shall be not less than 11 seconds.

7. Equipment. The grouting equipment must be capable of continuous mechanical mixing which will produce a grout free of lumps and undispersed cement and be able to pump the mixed grout in a manner which will comply with all provisions of this recommended practice. Accessory equipment such as scales and liquid measures should be provided to accurately batch all materials. The pump should be able to produce an outlet pressure of at least 700 KPa (100 pounds per square inch) and shall have seals adequate to prevent introduction of oil, air or other foreign substances into the grout and also to prevent loss of grout or water.

a. A pressure gauge readable to 140 KPa (20 pounds per square inch) increments having a full-scale reading of not more than 2.0 MPa (300 pounds per square inch) must be placed at some point in the grout line between the pump outlet and the duct inlet. The system shall be provided with an effective control, either manual or automatic, to limit the build-up of excessive pressure.

b. The grouting equipment should contain a screen having clear openings of .2 mm (0.07 inch) maximum size to screen the grout prior to its introduction into the grout pump. This screen should be easily accessible for inspection and cleaning.

c. The grouting equipment shall utilize gravity feed to the pump inlet.

d. The grouting equipment shall be capable of continuously grouting the largest tendon on the project in no more than 20 minutes under normal conditions.

e. Standby water flushing equipment shall be provided which, in addition to and separate from the grouting equipment, has sufficient capacity to flush out any partially grouted enclosures, if necessary, due to blockage, breakdown of grouting equipment, or inability to maintain grout flow. It should be capable of developing a pressure of at least 1.72 MPa (250 pounds per square inch.)

8. Preparation of Ducts. All ducts shall be clean and free of water and deleterious materials that would impair bonding of the grout or interfere with grouting procedures.

9. Injection of Grout. The entire space between the duct and tendon shall be filled with grout in all post-tensioning ducts. Grouting shall, in general, be performed no later than 30 days after installing the tendon in the duct. See section herein regarding rust protection. In the case of project shutdown for either or other conditions, grouting or other tendon protection shall be completed as directed by the Engineer.

a. The grout should be pumped through the duct and be continuously wasted at the outlet until no visible slugs or other evidence of water or air are ejected. The outlet pipe shall then be closed and the pumping pressure held momentarily. The valve at the inlet shall then be closed while maintaining this pressure. Valves shall not be removed or opened until the grout has set.

b. In the event a duct becomes blocked from any cause, the Contractor shall be responsible to remove the blockage by flushing or by other means as may be approved.

10. Cold Weather. Ducts shall be kept free of water to avoid damage due to freezing.

11. Concrete Temperature. At the time of grouting, the temperature of the concrete shall be 7° C (45° F) or higher and maintained at this temperature until job-cured 50 mm (2 inch) cubes reach a minimum compressive strength of 5.52 MPa (800 pounds per square inch).

METHOD OF MEASUREMENT.

A. The completed and accepted post-tensioning tendons will be measured for payment as a lump sum unit. Partial payments will be allowed on monthly estimates based on the percentage of the total computed weight of permanent post-tensioning which has entered the completed structure and accepted.

BASIS OF PAYMENT.

A. Post-tensioning tendons will be paid for at the Contract lump sum price for post-tensioning tendons. Payment shall be full compensation for furnishing and stressing all permanent post-tensioning steel, anchorage assemblies, bar couplers, ducts and duct supports, grouting, reinforcing steel required to resist stresses imposed in the concrete by anchorage devices, testing of post-tensioning tendons, and for all labor, materials, tools, equipment and incidentals, necessary for completing the work in accordance with these Specifications.

B. Payment will be made under:

Pay Item	Pay Unit
Post-Tensioning Tendons	Lump Sum

PIPE MATERIAL SELECTION

Pipe materials used for culvert and sewer structures shall be as shown on the Pipe Material Sheet on the plans.

The materials listed on the Pipe Material Sheet shall be in accordance with the following:

CULVERT/SEWER PIPE MATERIAL STD. SPEC. REFERENCE

Reinforced Concrete Pipe	907.02
Reinforced Concrete Horizontal Elliptical Pipe	907.03
Non-Reinforced Concrete Pipe, Class 3	907.01
Corrugated Polyethylene Pipe, Type S	907.19
Ribbed Polyethylene Pipe	907.20
Smooth Wall Polyethylene Pipe	907.21
Profile Wall Polyvinyl Chloride Pipe	907.22
Smooth Wall Polyvinyl Chloride Pipe	907.23
Vitrified Clay Pipe, Extra Strength	907.08
Corrugated Steel Pipe/Pipe-Arch	
Fully Bituminous Coated & Lined	908.13
Zinc Coated	908.02
Aluminum Coated Type 2	908.02
Polymer Precoated Galvanized	908.08
Fiber Bonded Bituminous Coated	908.07
Corrugated Aluminum Alloy Pipe/Pipe-Arch	908.04
Structural Plate Aluminum Alloy Pipe/Pipe-Arch	908.09
Structural Plate Steel Pipe/Pipe-Arch	908.09

If drain tile pay items shown in the Schedule of Pay Items do not include a specific material, the drain tile shall be in accordance with the following:

DRAIN TILE MATERIAL	STD. SPEC. REFERENCE
Clay Pipe	907.08
Corrugated Polyethylene Drainage Tubing	907.17
Corrugated Polyethylene Pipe, Type S	907.19
Corrugated Polyethylene Pipe, Type SP	907.19
Drain Tile	907.11
Non-Reinforced Concrete Pipe	907.01
Perforated Clay Pipe	907.09
Perforated Polyvinyl Chloride Semicircular Pipe	907.18
Profile Wall Polyvinyl Chloride Pipe	907.22

If end bent drain pipe pay items shown in the Schedule of Pay Items do not include a specific material, the end bent drain shall be perforated smooth wall polyvinyl chloride pipe in accordance with 907.23.

PIPE BACKFILL METHODS

Where the plans refer to Method A backfill, Method 1 backfill shall be used. Where the plans refer to Method B backfill, Method 2 backfill shall be used.

PIPE MATERIAL ABBREVIATIONS

The following pipe material abbreviations have been used:

ABBREVIATIONS	PIPE MATERIAL
CSP	Corrugated Steel Pipe
CSPA	Corrugated Steel Pipe-Arch
FBC&L	Fully Bituminous Coated & Lined
ZC	Zinc Coated
ACT2	Aluminum Coated Type 2
PPG	Polymer Precoated Galvanized
FBBC	Fiber Bonded Bituminous Coated
CAAP	Corrugated Aluminum Alloy Pipe
CAAPA	Corrugated Aluminum Alloy Pipe-Arch
SPSP	Structural Plate Steel Pipe
SPSPA	Structural Plate Steel Pipe-Arch
SPAAP	Structural Plate Aluminum Alloy Pipe
SPAAPA	Structural Plate Aluminum Alloy Pipe-Arch

HIGH RANGE WATER REDUCING ADMIXTURE SYSTEM FOR MICROSILICA MODIFIED CONCRETE

DESCRIPTION. An approved high range water reducing or high range water reducing retarding chemical mixture system shall be used in the microsilica modified concrete overlay and modified Class C bridge deck patching concrete.

The modified Class C deck patching concrete shall be Class C structural concrete per Section 702, and have a water/cement ratio of 0.400. Use of an approved high range water reducing admixture system is required with the modified Class C concrete.

The system shall contain an air entraining agent (AEA) and either a Type F or Type G chemical admixture. The AEA shall be in accordance with Article 912.03 and shall be a neutralized Vinsol resin or a natural tall oil. The Type F (high range water reducing) or Type G (high range water reducing retarding) chemical admixture shall be certified according to Article 912.03(c), except that subsequent annual certification is not required. An example of such a system which has demonstrated satisfactory field performance utilized admixtures DAREX II (AEA) and DARACEM-100 (Type F and Type G chemical admixture) as manufactured by W. R. Grace and Company.

MASONRY COATING

The Standard Specifications are revised as follows:

SECTION 728, BEGIN LINE 1, INSERT AS FOLLOWS:

SECTION 728 – MASONRY COATING

728.01 Description. *This work shall consist of the preparation of the concrete surfaces, cleaning such surfaces by means of sandblasting, and furnishing and applying masonry coating as described herein. The masonry coating shall be applied to all concrete surfaces shown on the plans or as directed.*

MATERIALS

728.02 Materials. *Materials shall be in accordance with 909.13.*

CONSTRUCTION REQUIREMENTS

728.03 Surface Preparation. *The surfaces to be masonry coated shall be given a class 1 finish in accordance with 702.21(a). Such surfaces shall then be sealed with a concrete sealer in accordance with 709. Air pockets of up to 6 mm (1/4 in.) in width and depth will not require grouting prior to application of the masonry coating. Air pockets larger than 6 mm (1/4 in.) in width and depth shall be filled with a grout mix composed of one part portland cement, two parts screened and washed sand graded to pass the 1.18 mm (No. 16) sieve with not more than 5 percent retained on the 600 μm (No. 30) sieve, and sufficient water to produce a thick liquid mix. The grout shall be applied to fill the air pockets and voids by using burlap pads, float sponges or other acceptable methods. As soon as the grout has taken its initial set, the surface shall be brushed to remove all loose grout, leaving the surface smooth and free of air pockets and voids. Prior to the application of the masonry coating, regardless of whether the concrete surface has been previously sealed, the surface to be coated shall be lightly sandblasted to remove flaking coatings, dirt, oil and other substances deleterious to the applied finish coating. Overblasting, exposing additional air pockets, or disfiguring the surface shall be prevented. Final cleaning shall be done with compressed air. The air compressor shall be equipped with suitable separators, traps, or filters which shall remove water, oil, grease, or other substances from the air line.*

Prior to application of the finish coating, the surfaces shall have been prepared in accordance with the manufacturer's recommendations and shall be in a condition consistent with the manufacturer's requirements.

728.04 Application. *The application, including equipment used, shall be in accordance with the manufacturer's recommendations. The material shall be applied by qualified personnel experienced in the work.*

The material shall be thoroughly mixed in its original container. If skins have formed, the material will be rejected. The material shall not be thinned. The masonry coating may be applied over a damp, but not wet, surface. It shall be applied at a uniform film thickness at a rate of 1.1 ± 0.1 m²/L (45 ± 5 sft/gal.) or as recommended by the manufacturer and approved by the Engineer. In either case, the application rate shall be sufficient to produce a uniform color and texture. The material shall be applied only when the ambient temperature is between 7°C (45°F) and rising, and 38°C (100°F). It shall not be applied onto frozen surfaces or if rain is imminent. If rain occurs on a freshly applied surface, recoating may be required based on the extent of rain damage.

The material shall not be applied if dusty conditions exist in the vicinity of the surfaces to be coated. When dust conditions are beyond the control of the contractor, or are generated off-site, application shall not take place until more favorable conditions exist. The application of the masonry coating shall be scheduled as one of the final finishing operations to minimize construction generated dust. A wet edge shall be maintained at all times to prevent lap marks. Stopping and starting in the middle of a section of concrete will not be permitted. If applying the coating with a roller, the material shall initially be applied in vertical strokes, cross rolled for even film and appearance, then finished with vertical strokes.

After application, the coating shall be dry to the touch within 48 hours. The coating shall achieve a final cure within two to three weeks under ideal conditions.

***728.05 Finishing.** The coating material in the finished state shall be capable of accommodating the thermal and elastic expansion ranges of the substrate without cracking.*

The texture of the completed finish coat shall be generally similar to that of rubbed concrete. The completed finish coat shall be tightly bonded to the structure to present a uniform appearance and texture. If necessary, additional coats shall be applied to produce the desired surface texture and uniformity.

Coatings shall be entirely removed from the structure upon their failure to positively adhere without chipping, flaking or peeling, or attaining the desired surface appearance. The finish coat shall be reapplied after proper surface preparation until the desired finished product is achieved. The average thickness of the completed finish coat shall not exceed 3 mm (1/8 in.).

The manufacturer shall submit, for each batch of material used, the product analysis data as follows:

(a) Mass per liter (Weight per gallon).
(b) Viscosity in Kreb units.
(c) Mass percent pigment.
(d) Mass percent vehicle solids.
(e) Infrared spectra of vehicle solution.

90 ***728.06 Method of Measurement.*** *Only those measurements necessary to verify application rates will be made.*

728.07 Basis of Payment. *Masonry coating used on concrete bridge railing or bridge concrete median barrier will be paid for at the contract lump sum price for masonry coating. Concrete sealer will be paid for in accordance with 709.08.*

Payment will be made under:

Pay Item	*Pay Unit Symbol*
100	
Masonry Coating	*LS*
Surface Seal	*LS*

The cost of masonry coating used on roadway concrete median barrier shall be included in the cost of such median barrier. The cost of surface preparation, furnishing and applying the material, labor, equipment, and necessary incidentals shall be included in the cost of this work.

SECTION 909, AFTER LINE 692, INSERT AS FOLLOWS:

909.13 Masonry Coating Material. *Masonry coating material shall be a commercial product designed specifically for coating concrete. The material shall be suitable for application on damp concrete, or concrete which is not fully cured. Only one coating material shall be used on an individual structure. It shall be delivered to the project site in sealed containers bearing the manufacturer's original labels. The brand, color, and type shall be clearly marked on each container. All material shall be from the same lot or batch unless otherwise authorized. A copy of the manufacturer's printed instructions shall be made available.*

730 *The coating material shall be stored in airtight, upright containers. The containers shall be stored in a dry enclosure where the temperature is above 7°C (45°F) and less than 38°C (100°F). Material which has been subjected to freezing will be rejected.*

The masonry coating shall have a shelf life of not less than 12 months.

The color of the applied masonry coating shall be in accordance with Federal Color Standard No. 595a. Such color shall match the color identification number shown on the plans.

740 ***(a) Material Testing.*** *All testing shall be performed by a qualified commercial testing laboratory acceptable to the Division of Materials and Tests.*

The applied finish coating shall be subjected to and shall satisfy the requirements of the tests listed below, prior to use on a structure. The masonry coating manufacturer shall certify that the coating is compatible with the sealer used on the concrete surface,

*1. **Freeze-Thaw Tests.** The applied finish coating shall be subjected to freeze-thaw cycle tests as follows:*

a. Three concrete specimens, not less than 100 mm by 150 mm by 150 mm (4 in. by 6 in. by 6 in.), of the mix design for the structure shall be cast and cured. Fourteen days moist curing with a drying period at room temperature, 16°C to 27°C (60°F to 80°F), for 24 hours will be required before the specimens are coated with the applied finish. There shall be noexcessive oil on specimen forms.

The finish coating shall be applied to the sides of specimens at a spreading of 1.2 ± 0.2 m²/l (50 ± 10 sft/gal). Brush application will be permitted. Cementitious coatings shall be cured at room temperature and 50 percent relative humidity for 24 hours, at room temperature and 90 percent relative humidity for 48 hours, at room temperature and 50 percent relative humidity for four days for a total curing time of seven days. Other coatings shall be cured at room temperature for 48 hours after the completing of curing.

b. The specimens shall be immersed in water at room temperature for three hours, then removed.

c. The specimens shall be placed in cold storage at -26°C (-15°F) for one hour, then removed.

d. The specimens shall be thawed at room temperature for one hour.

e. Steps c. and d. above shall be repeated for a total of 50 cycles. At the end of 50 cycles, the specimens shall show no visible defects.

*2. **Accelerated Weathering.** The applied finish coating shall be subjected to a 5,000 hour exposure test in a Twin-Carbon-Arc-Weatherometer, ASTM G 23, Type D, at an operating temperature of 63°C (145°F). The test shall be made at 20 minute cycles consisting of 17 minutes of light and 3 minutes of water spray plus light. At the end of the exposure test, the exposed samples shall show no chipping, flaking, or peeling. The panels for this test shall be prepared by means of applying the coating at a spreading rate of 1.2 ± 0.2 m²/l (50 ± 10 sft/gal.) to both sides and edges. Panels shall be cut from asbestos cement shingles in accordance with Federal Specification SS-S-346, Type I. Curing time shall be in accordance with 908.12(b)1.*

*3. **Fungus Growth Resistance.** The applied finish coating shall pass a fungus resistance test in accordance with Federal Specification TT-P-29g. Fungus growth shall not be indicated after a minimum incubation period of 21 days.*

*4. **Abrasion Resistance.** The applied finish coating shall pass the 3,000 liter sand abrasion test in accordance with Method 6191 Abrasion Resistance - Falling Sand, Federal Test Method Standard 141a. The specimens for this test shall be prepared by means of applying the coating to a cleaned steel panel at a spreading rate of 1.2 ± 0.2 m²/l (50 ± 10 sft/gal.). The specimens shall be cured at room temperature for 21 days.*

*5. **Impact Resistance.** The coating shall be applied to a concrete panel prepared in accordance with Federal Test Method Standard 141a, Method 2051, at a spreading rate of 1.2 ± 0.2 m²/l (50 ± 10 sft/gal.), and permitted to cure for 21 days a room temperature. The test shall then be run using the Gardner Mandrel Impact Tester in accordance with ASTM D 2794 using a 13 mm (½ in.) indenter with an impact load of 2.7 joules (24 in.·lbs). The coating shall shown no chipping under this impact load.*

*6. **Salt-Spray Resistance Test.** A concrete specimen shall be coated at the rate of 1.2 ± 0.2 m²/l (50 ± 10 sft) and cured for 21 days at room temperature. The coated specimen shall be exposed to a 5 percent salt solution in accordance with ASTM B 117 for 300 hours where the atmospheric temperature is maintained at 32°C ± 1°C (90°F ± 2°F). At the end of 300 hours of exposure, the coating shall shown no ill effects, loss of adhesion, or deterioration.*

*7. **Flexibility Test.** A sheet metal specimen shall be coated with the applied finish coating at a rate of 1.1 ± 0.2 m²/l (45 ± 10 sft/gal.) and permitted to cure for 48 hours at room temperature. The coated specimen shall be bent 180 degrees over a 25 mm (1 in.) diameter mandrel. After bending, the coating shall show no breaking.*

*(b) **Certification.** Before material is applied, a type B certification in accordance with 916 shall be furnished attesting that the commercial product furnished is in accordance with the same formula as that previously subject to the tests specified below and approved. Copies of the test reports shall be attached to the certification. Reports for tests made more than four years prior to shipment to the contract will not be accepted.*

A service record shall be supplied which shows that the finish coating material has a satisfactory service record on sealed concrete surfaces for a period of not less than five years prior to the date of submission of the service record. The finish coating shall also have shown satisfactory service characteristics without peeling, chipping, flaking, or nonuniform change in texture or color. A specific structure for the specific product shall be named for the service record.

SECTION 916, AFTER LINE 65, INSERT AS FOLLOWS:

Masonry Coating Material 909.13

MECHANICALLY STABILIZED EARTH RETAINING WALLS

The Standard Specifications are revised as follows:

SECTION 105, AFTER LINE 48, INSERT AS FOLLOWS:

When constructing a mechanically stabilized earth retaining wall, the Contractor shall perform the necessary work to verify that the foundation is at the correct elevation, that the wall is constructed to the correct alignment, and that the work is in accordance with the specified tolerances. The checking of alignments and tolerances shall include verifying that the plumbness of the face panels is in accordance with 731.10 over the entire height of the wall. Alignment shall be checked at each layer of panels after the backfill behind the panels has been compacted, and the results shall be recorded.

SECTION 731, BEGIN LINE 1, INSERT AS FOLLOWS:

SECTION 731 - MECHANICALLY STABILIZED EARTH RETAINING WALLS

731.01 Description. *This work shall consist of furnishing materials and placement of mechanically stabilized earth walls constructed in accordance 105.03.*

731.02 General Design Requirements. *The mechanically stabilized earth wall shall consist of a non-structural leveling pad, concrete face panels, and ground reinforcement elements mechanically connected to each panel. Ground reinforcement shall have sufficient strength, frictional resistance, and quantity as required by design.*

The approved proprietary mechanically stabilized earth retaining walls are Reinforced Earth by the Reinforced Earth Company, Retained Earth by the V.S.L. Corporation, and Hilfiker Soil Embankment Wall Systems by Hilfiker Texas Corporation. The quantities shown in the Schedule of Pay Items will be the same for all mechanically stabilized earth wall systems. The proposed mechanically stabilized earth wall system shall not be indicated when preparing the bid. All mechanically stabilized earth walls shall be built in accordance with the approved plans and panel shop drawings for one of the approved mechanically stabilized earth retaining wall systems, based on the requirements herein. The recommendations of the wall system suppliers shall not override the minimum performance requirements shown herein. Other systems offered by the approved supplier shall not be submitted.

If the wall manufacturer needs additional information to complete the design, the Contractor shall be responsible for obtaining such information.

All appurtenances behind, in front of, under, mounted upon, or passing through the wall such as drainage structures, utilities, or other appurtenances shown on the plans shall be accounted for in the stability design of the wall.

The mechanically stabilized earth wall design shall follow the general dimensions of the wall envelope shown on the plans. The plans will locate the leveling pad at or below the theoretical leveling pad. The top of the face panel shall be at or above the top of the panel elevation shown on the plans.

Where coping or barrier is utilized, the wall face panel shall extend up into the coping or barrier a minimum of 50 mm (2 in.). The top of the face panels may be level or sloped to meet the top of the face panel line noted. Cast-in-place concrete will not be an acceptable replacement for panel areas noted by the wall envelope.

Where walls or wall sections intersect with an included angle of 130 degrees or less, a vertical corner element separate from the standard panel face shall abut and interact with the opposing standard panels. The corner element shall have ground reinforcement connected specifically to that panel and shall be designed to preclude lateral spread of the intersecting panels.

The face panels shall be designed to accommodate differential settlement of 1 m in 100 m (1 ft in 100 ft). Where shown on the plans, slip joints to accommodate excessive or differential settlement shall be included.

731.03 Design Criteria. *The design by the proprietary manufacturer shall consider the internal and the external stability of the wall mass including the bearing pressure, overturning, sliding, and stability of temporary construction slopes. The design shall be in accordance with the Design, Construction, and Commentary divisions of the AASHTO Standard Specifications for Highway Bridges, unless specified otherwise herein. The analysis of settlement, bearing capacity, and overall slope stability will be the responsibility of the Department.*

The theoretical failure plane within the soil mass shall be analyzed so that the soil stabilizing component extends sufficiently beyond the failure plane to stabilize the material. External loads which affect the internal stability such as those applied through piling, bridge footings, traffic, and slope surcharge, shall be accounted for in the design. The size of all structural elements shall be determined such that the design load stresses do not exceed the allowable stresses found in the AASHTO Standard Specifications for Highway Bridges, unless otherwise shown on the plans.

The maximum allowable yield stress for reinforcement shall be 450 MPa (65,000 psi).

The maximum standard panel size shall be 3 m^2 (32 sq ft).

The ϕ angle for the internal design of the volume shall be assumed to be 34 degrees. Before construction begins, the B borrow for structure backfill selected shall be subject to approval to show accordance with this frictional requirement. Test compliance with the requirement shall be the responsibility of the Contractor. The wall supplier shall be furnished a copy of the testing results for the backfill. The friction angle of the foundation soils shall be assumed to be 30 degrees. The ϕ angle of the backfill behind the mechanically stabilized earth mass shall be assumed to be 30 degrees. Granular fill will not be necessary for the embankment.

The wall shall be defined by the wall envelope shown on the plans. For design purposes, the height of wall H shall be measured from the theoretical top of the leveling pad to the top of the wall. For a level surcharge situation, the top of the wall shall be measured to the top of the coping or to the gutter line of the traffic barrier. The top of the wall shall be the theoretical top of the face panels only when a coping or barrier is not used. For an abutment face, the design height H shall be defined as the height measured from the top of the leveling pad to the top of the roadway surface. For a wall with a sloping surcharge the top of the wall shall be measured at a point 0.3H back from the face where the design height is H' and the actual wall height is H.

For aesthetic considerations and to make differential settlement unnoticeable, the panels shall be erected such that the horizontal site line is discontinuous at every other panel. This shall be accomplished by starting erection with the lower panel level of each wall by alternating full height and half height panels. Panels above the lowest level shall be of a standard size except as required to top out the wall to be in accordance with the plan elevations.

The connections of the ground reinforcing steel to the panels shall be in two elevations for standard panels. The connections shall not be more than 750 mm (30 in.) apart vertically. To prevent out-of-plane rotation, standard face panels shall be connected to ground reinforcement on at least 3 different points in 2 different planes. However, preapproved systems utilizing a horizontal stabilizing leg to prevent rotation shall only require ground reinforcement attachments in one plane. Partial panels shall have 3 different connection points, but only one plane shall be attached to ground reinforcement. Panels which are located at the top of the wall shall not be attached to the coping or the traffic barrier.

The ground reinforcement shall be the same length from the bottom to the top of each wall section whether bar mats, grids, or strips are used. Differing ground reinforcement elements shall be clearly marked for ease of construction. This element may be used individually or in a prefabricated grouping. The minimum length of the ground reinforcement shall be 2.5 m (8 ft) or 0.7H for a wall without sloping surcharges, 0.7H' for a wall with sloping surcharges, or in accordance with the AASHTO Standard Specifications for Highway Bridges for an abutment on a spread footing.

The ground reinforcement for the mechanically stabilized earth volume shall be sized using the lesser of the allowable forces for each specific connection and each specific reinforcing element. The connection's allowable force shall be taken as 2/3 of the connection test load at the allowable pullout deformation limit of 13 mm (1/2 in.) or one half of the ultimate load, whichever is less.

The ground reinforcement length shall be as required for internal design or as shown on the plans. The length shall exceed the minimum noted as required for design consideration. One hundred percent of the ground reinforcement which is designed and placed in the reinforced earth volume shall extend to and shall be connected to the face panels.

For mats, grids, or strip steel, the minimum zinc coating thickness shall be 0.64 L/m² (2 oz/sq ft). Such thickness shall be assumed to be 86 μm for purpose of calculation of reduced structural section.

The actual applied bearing pressures under the stabilized mass for each reinforcement length shall be clearly indicated on the shop drawings and shall be equal to or less than the maximum allowable soil pressure shown on the plans. Passive pressure in front of the wall mass will be assumed to be zero for design purposes.

731.04 Submittals. *The Contractor shall submit one copy of the design computations for approval. If the computations are computer generated, one sample set of hand calculations, for one wall location, shall also be submitted. The Contractor shall then submit 8 sets of design drawings for approval after the design computations are approved and before beginning construction.*

(a) The design drawings shall include all details, dimensions, quantities and cross-sections necessary to construct the wall and shall include but shall not be limited to the following:

1. *A plan and elevation sheet or sheets for each wall*
2. *An elevation view of the wall which shall include the elevation at the top of the wall at all horizontal and vertical break points at least every 15 m (50 ft) along the face of the wall, all steps in the leveling pads, the designation as to the type of panel, the length of soil reinforcing systems, the distance along the face of the wall to where changes in length of the soil reinforcing systems occur, and an indication of the original and final ground lines and maximum bearing pressures*
3. *A plan view of the wall that indicates the offsets from the construction centerline to the face of the wall at all changes in horizontal alignment. A plan view and elevation view which detail the placing position and connection of all steel ground reinforcing elements in areas where piling, utility, or other structures are near the wall.*
4. *A typical cross section or cross sections showing elevation relationship between ground conditions and proposed grades*
5. *All general notes required for constructing the wall*
6. *All horizontal and vertical curve data affecting the wall*
7. *A listing of the summary of quantities on the elevation sheet for each wall*

(b) All panel details shall show all dimensions necessary to construct the element, all reinforcing steel in the element, and the location of soil reinforcing system devices embedded in the panels.

(c) Clearly indicated details for construction of walls around drainage facilities.

(d) All details of the architectural treatment.

(e) The details for diverting strips or mesh around obstructions such as piles, catch basins, and other utilities shall be submitted for approval.

(f) The details for each connection between the concrete panel and the mesh or strip.

If the work is on a Department-maintained route, the Department will check the shop drawings. A consultant, if utilized, or the Department, if a consultant is not utilized, will check the design calculations and design drawings.

If the work is not on a Department-maintained route, the appropriate local public agency will check the shop drawings, design calculations, and detail drawings.

MATERIALS

731.05 Materials. *The Contractor shall make arrangements to purchase the materials described herein, including concrete face panels, retaining strips or mesh, tie strips, fasteners, joint materials, and all necessary incidentals, from an approved mechanically stabilized earth wall system manufacturer. The Contractor shall make arrangements with the Chief of the Division of Materials and Tests for all required offsite testing. Materials not in accordance with the requirements herein shall not be used without written approval.*

Materials shall be in accordance with the following:

Coarse Aggregate, Size No. 23	*904.01*
Concrete Admixtures	*912.03*
Fine Aggregate	*904.01*
Fine Aggregate, Class A, Size No. 91 or 8	*904.03*
Fly Ash	*901.02*
Portland Cement	*901.01(b)*
Reinforcing Steel	*910.01*
Water	*913.01*

(a) Concrete Face Panels. *Concrete shall be in accordance with the applicable requirements of 702. Concrete shall have a compressive strength at 28 days in accordance with 731.05(a)7.*

Retarding agents, accelerating agents, or additives containing chloride shall not be used without approval. Air-entraining and slump requirements shall be in accordance with 702.05.

Ground reinforcement connecting hardware and rebar lifting devices shall be set in place and secured prior to beginning casting, in accordance with the dimensions and tolerances shown on the plans.

1. Testing and Inspection. *Acceptability of the panels will be determined on the basis of compressive strength tests and visual inspection. The panels shall be considered acceptable regardless of curing age when compressive test results indicate that the compressive strength is in accordance with 28-day requirements. Panels utilizing type I or II cement shall be considered acceptable for placement in the wall when 7-day initial strengths exceed 85 percent of the 28-day requirements. Panels utilizing type III cement shall be considered acceptable for placement in the wall prior to 28 days only when compressive strength test results indicate that the strength exceeds the 28-day requirements.*

2. Casting. *The panels shall be cast on a flat area, with the front face of the form at the bottom, and the back face at the upper part. Tie strip guides shall be set on the rear face. The concrete in each unit shall be placed without interruption and shall be consolidated by the use of an approved vibrator, supplemented by such hand tamping as may be necessary to force the concrete into the corners of the forms and prevent the formation of stone pockets of cleavage planes. Clear form oil of one manufacture shall be used throughout the casting operation.*

3. Curing. *The panels shall be cured for a sufficient length of time such that the concrete develops the specified compressive strength. A production lot which is not in accordance with the Compressive Strength requirements will be rejected.*

4. Removal of Forms. *The forms shall remain in place until they may be removed without damage to the unit.*

5. Concrete Finish. *Unless otherwise shown on the plans or specified elsewhere herein, the concrete surface for the front panel face shall have a surface finish produced from contact with the form. The rear face of the panel shall be roughly screeded to eliminate open pockets of aggregate and surface distortions in excess of 6 mm (¼ in.).*

6. Tolerances. *All panels shall be manufactured within the tolerances as follows:*

a. Panel Dimensions. *Lateral position of tie strips shall be within 25 mm (1 in.). All other dimensions shall be within 5 mm (3/16 in.).*

*b. **Panel Squareness.** Squareness, as determined by the difference between the 2 diagonals, shall not exceed 13 mm (½ in.).*

*c. **Panel Surface Finish.** Surface defects on smooth formed surfaces measured on a length of 1.5 m (5 ft) shall not exceed 3 mm (1/8 in.). Surface defects on textured finished surfaces measured on a length of 1.5 m (5 ft) shall not exceed 5 mm (5/16 in.).*

*7. **Compressive Strength.** Acceptance of the concrete panels with respect to compressive strength will be determined on the basis of production lots. A production lot will be defined as a group of panels which is represented by a single compressive strength sample and shall consist of either 40 panels or a single day's production, whichever is less.*

During the production of the concrete panels, the Department will randomly sample the concrete in accordance with AASHTO T 141. A single compressive strength sample, consisting of a minimum of 4 cylinders, shall be randomly selected for each production lot.

Cylinders for compressive strength tests shall be prepared in accordance with AASHTO T 23 on specimens of 150 mm x 300 mm (6 in. x 12 in.). For each compressive strength sample, a minimum of 2 cylinders will be cured in the same manner as the panels and tested at approximately 7 days. The average compressive strength of these cylinders, when tested in accordance with AASHTO T 22, will provide a test result which will determine the initial strength of the concrete. In addition, 2 cylinders will be cured in accordance with AASHTO T 23 and tested at 28 days. The average compressive strength of these 2 cylinders, when tested in accordance with AASHTO T 22, will provide a compressive strength test result which will determine the compressive strength of the production lot.

If the initial strength test results indicate a compressive strength in excess of 27,500 kPa (4,000 psi), then these results will be utilized as the compressive strength test results for that production lot. The requirement for testing at 28 days will be waived for that particular production lot.

Acceptance of a production lot will be made if the compressive strength test result is greater than or equal to 27,500 kPa (4,000 psi). If the compressive strength test result is less than 27,500 kPa (4,000 psi), the manufacturer will be permitted to retest the production lot. Such retest shall be made on 4 cores taken from the panels within the production lot. Cores shall be obtained and tested in accordance with AASHTO T 24. The panels to be retested will be selected by the Department. The retest shall be done in the presence of the Department and with no additional payment.

*8. **Rejection.** Units shall be subject to rejection due to failure to be in accordance with the requirements specified above. In addition, the following defects may be sufficient cause for rejection:*

a. Defects which indicate imperfect molding

b. Defects which indicate honeycombed or open texture concrete

c. Defects in the physical characteristics of the concrete, such as broken or chipped concrete, or color variations or dunnage marks on the front face due to excessive form oil or other reasons.

The Engineer will determine whether spalled, honeycombed, chipped, or otherwise defective concrete shall be repaired or be cause for rejection. Repair of concrete, if permitted, shall be done in a satisfactory manner. Repair to concrete surfaces which are to be exposed to view after completion of construction shall be subject to approval.

9. Marking. *The date of manufacture, the production lot number, and the place mark shall be clearly scribed on the rear face of each panel.*

10. Handling, Storage, and Shipping. *All panels shall be handled, stored, and shipped so as to eliminate the danger of chipping, cracks, fractures, and excessive bending stresses. Panels in storage shall be supported on firm blocking located immediately adjacent to tie strips to avoid bending the tie strips.*

(b) Concrete Leveling Pad. *Concrete for the leveling pad shall be Class A and shall be in accordance with the applicable requirements of 702.*

(c) Concrete Coping. *Concrete for the coping shall be class A and shall be in accordance with the applicable requirements of 702. Reinforcing steel in the coping shall be in accordance with the applicable requirements of 703. The coping or traffic barrier may be either precast or cast in place.*

(d) Reinforcing Mesh, Clevis Connector, and Connector Bar. *The reinforcing grid shall be shop fabricated of cold drawn steel wire in accordance with ASTM A 82 and shall be welded into the finished mesh fabric in accordance with ASTM A 185. Galvanization shall be in accordance with ASTM A 123.*

Clevis connectors, if used, shall be attached to the alignment templates using the bars provided with the forms. The vertical and horizontal alignment of the connectors shall be +3 mm (+1/8 in.). The holes inside the loops shall be free of all concrete and debris, loose or otherwise.

The clevis connector shall be fabricated of cold drawn steel wire in accordance with ASTM A 82 and welded in accordance with ASTM A 884. Loops shall be galvanized in accordance with ASTM A 153 Class B-3 or ASTM A 123.

The connector bar, if used, shall be fabricated of cold drawn steel wire in accordance with ASTM A 884 and galvanized in accordance with ASTM A 123.

*(e) **Ground Reinforcement.** The ground reinforcement may be a deformed steel strip or a welded wire grid. The grid or strip used shall be consistent with that used in the pullout test and shall be consistent throughout the project.*

The grid shall consist of not less than 2 longitudinal wires, perpendicular to the wall, welded to equally spaced cross ribs capable of developing passive pressure with the fill. The deformed strip shall be of constant width. The strip thickness shall vary only from the standard underformed section to the standard deformed section as required to produce the pullout resistance.

Longitudinal and transverse wires shall be of the same diameter.

The face panel edges shall be configured to conceal the joints. All horizontal and vertical joints shall be covered with a joint cover to prevent backfill leakage while passing water.

Reinforcing strips shall be hot rolled from bars to the required shape and dimensions. Their physical and mechanical properties shall be in accordance with ASTM A 572M Grade 450 (A 572 Grade 65). Tie strips shall be shop fabricated with hot rolled steel in accordance with the minimum requirements of ASTM A 709M Grade 345 (A 570 Grade 50). Galvanization for reinforcing strips and tie strips shall be in accordance with ASTM A 123. All reinforcing strips and tie strips shall be inspected to ensure that they are true to size and free from defects which may impair their strength and durability.

*(f) **Reinforcing Steel.** Mill certificates for reinforcing steel as shown on the plans shall be furnished for approval. All reinforcing steel shall be in accordance with ASTM A 709M Grade 400 (A 615 Grade 60).*

*(g) **Fasteners.** Fasteners shall consist of 13 mm (½ in.) diameter, hexagonal cap screw bolts and nuts, which shall be galvanized and in accordance with ASTM A 325M (A 325).*

*(h) **Alignment Pins.** The rods used to align the face panels during construction shall be 19 mm (3/4 in.) diameter, 300 mm (12 in.) long. The rods shall be either mild steel, polyvinyl chloride, or fiberglass. A sample shall be submitted prior to use to the Division of Materials and Tests.*

*(i) **Joint Materials.** Bearing pads shall be rubber, neoprene, polyvinyl chloride, or polyethylene, and of the type and grade recommended by the supplier of the mechanically stabilized earth wall materials.*

The joint cover shall be either a non-woven needle punch polyester geotextile or a woven monofilament polypropylene. The joint cover shall be attached to the rear face of the panels with a suitable adhesive.

Horizontal and vertical joints shall be provided between adjacent face panels to prevent concrete-to-concrete contact and chipping when differential settlement occurs. The horizontal and vertical joints shall contain compression blocks, pins, or other approved means as recommended by the manufacturer to provide a uniform joint. Panels without an uninterrupted vertical joint shall have a minimum joint thickness of 19 mm (3/4 in.).

(j) Backfill Material. *All backfill material used in the mechanically stabilized earth wall structure volume, as shown on the plans, shall be B borrow for structure backfill in accordance with 211. In addition to the requirements of 211, the backfill material shall have a minimum resistivity of 3000 Ω cm at 100 percent saturation when tested in accordance with AASHTO T 288. The pH of the backfill material shall be in the range of 5 to 10 as determined in accordance with AASHTO T 289. The maximum soluble salt content of the reinforced backfill material shall not exceed 100 ppm chlorides and 200 ppm sulfates as determined in accordance with AASHTO T 291 and AASHTO T 290, respectively. If the minimum resistivity exceeds 5000 Ω cm at 100 percent saturation, the requirement of testing for chlorides and sulfates may be waived.*

The Contractor shall furnish a type A certification in accordance with 916 for the reinforced backfill materials. One copy of all test results performed by the Contractor, which are necessary to ensure compliance with the specifications, shall also be furnished. Backfill which is not in accordance with this specification shall not be used without the written consent of both the Engineer and the wall supplier.

CONSTRUCTION REQUIREMENTS

731.06 General Requirements. *The wall supplier shall provide technical instruction, shall provide guidance in pre-construction activities including the preconstruction conference, and shall provide on-site technical assistance to the Contractor during construction. All instructions from the supplier shall be closely followed by the Contractor, unless otherwise directed in writing.*

731.07 Blank.

731.08 Foundation Preparation. *The foundation for the structure shall be graded level for a width equal to or exceeding the length of the reinforcing strips or as shown on the plans. Prior to wall construction, the foundation, if not in rock, shall be compacted as directed. The base of the wall excavation shall be proofrolled with a heavy vibratory roller. If unsuitable foundation material is encountered, it shall be removed and replaced with well compacted B borrow.*

At each foundation level, an unreinforced concrete leveling pad shall be provided as shown on the plans. The leveling pad shall be cured a minimum of 12 h before placement of concrete face panels.

731.09 Retaining Wall Excavation. *This work shall consist of the excavation of material whose removal is necessary for the construction of the mechanically stabilized earth walls in accordance with the plans, the requirements herein, or as directed. Excavation shall include the construction and subsequent removal of all necessary bracing, shoring, sheeting; and cribbing and all pumping, bailing, and draining.*

Prior to starting excavation operations at the wall site, all necessary clearing and grubbing at the site shall have been performed in accordance with 201.03. The Contractor shall clear and grub the area for the excavation in accordance with the limits shown on the plans. All timber, stumps, and debris shall be disposed of in accordance with 201.04 or 201.05.

The Contractor shall notify the Engineer a sufficient time before beginning the excavation so that measurements may be taken of the undisturbed ground.

Where necessary for safety, the excavation shall be shored or braced in accordance with State and local safety standards. Excavation and related work shall be performed such that no portion of the wall is endangered by subsequent operations.

Where excavation for the wall is adjacent to a traveled way, the method for shoring, sheeting, or bracing the excavation opening shall have been approved before beginning the excavation. The Contractor shall submit 5 copies of drawings in accordance with 206.09 showing details of the proposed method of excavation protection.

After the excavation for each wall location has been performed, the Contractor shall notify the Engineer. No concrete leveling pad shall be placed until the Engineer has approved the depth of the excavation and the character of the foundation material and has given permission to proceed.

All sheeting and bracing shall be removed as the random backfilling progresses.

All material for random backfill shall be subject to approval and shall be free from large or frozen lumps, wood, or other undesirable material. All backfill shall be compacted in accordance with 203.

731.10 Wall Erection. *Concrete face panels shall be placed vertically with the aid of a light crane. For erection, panels shall be handled by means of a lifting device set into the upper edge of the panels. Panels shall be placed in successive horizontal lifts in the sequence shown on the plans as backfill placement proceeds. As backfill material is placed behind the panels, the panels shall be maintained in vertical position by means of temporary wooden wedges placed in the joint at the junction of the 2 adjacent panels on the external side of the wall. External bracing will be required for the initial lift.*

Panels accidentally placed in contact with the earth or covered by standing water shall have face discoloration removed by means of a chemical wash. Panels shall be stored on blocking to avoid touching the ground or being covered by standing water.

Plumbness, vertical tolerances, and horizontal alignment tolerances shall not exceed 20 mm (3/4 in.) when measured with a 3 m (10 ft) straightedge. The maximum allowable offset in panel joints shall be 20 mm (3/4 in.). The overall plumbness from top to bottom to the wall shall not exceed 12 mm per 3 m (½ in. per 10 ft) of wall height.

Reinforcing strips shall be placed normal to the face of the wall, unless otherwise shown on the plans or as directed. Prior to placement of the reinforcing strips, backfill shall be compacted in accordance with the Backfill Placement requirements below.

731.11 Backfill Placement. *Backfill placement shall closely follow erection of each course of panels. Backfill shall be placed so as to avoid damage or disturbance to the wall materials or misalignment of the concrete face panels. Wall materials which become damaged or disturbed during backfill placement shall be either removed and replaced or corrected as directed. All misalignment or distortion of the concrete face panels due to placement of backfill outside the limits described herein shall be corrected as directed.*

The work shall also include B borrow backfilling above a theoretical 1:1 slope behind the ground reinforcement in accordance with the details shown on the plans and the disposal of surplus of unsuitable excavated materials as permitted.

B borrow for structure backfill shall be compacted to 95 percent of the maximum dry density in accordance with 203.23.

The moisture content of the backfill material prior to and during compaction shall be uniformly distributed throughout each layer. Backfill material shall have a placement moisture content between optimum and -3 of the Optimum Moisture Content. Backfill material with a placement moisture content in excess of the Optimum Moisture Content shall be removed and reworked until the moisture content is uniformly acceptable through the entire lift.

The maximum loose lift thickness shall not exceed 200 mm (8 in.) except that lifts 0.9 m (3 ft) from the wall or closer shall not exceed 125 mm (5 in.) in loose thickness. This lift thickness shall be decreased if necessary, to obtain the specified density.

Compaction within 0.9 m (3 ft) of the back face of the concrete face panels shall be achieved by means of a minimum of 3 passes with a lightweight mechanical tamper, roller, or vibratory system.

At the end of each day's operation, the last level of backfill shall be sloped away from the concrete face panels. In addition, surface runoff from adjacent areas shall not be permitted to enter the wall construction site.

Cutting or altering of the basic structural section of either the strip or grid at the site will be prohibited, unless the cutting is preplanned and detailed on the approved design drawings. Cutting shall only be considered if adequate additional steel is provided to produce the required ground reinforcement strength shown in the approved calculations. If the grid or strip is shortened in the field, the cut ends shall be covered with a galvanized paint or Bitumastic 50 coal tar to prevent corrosion of the metal.

731.12 Method of Measurement. *Concrete face panels and wall erection will be measured by the square meter (square foot) of wall surface area. Cast-in-place concrete for the leveling pad will be measured by the meter (linear foot). B borrow for structure backfill will be measured in accordance with 211.09.*

The pay quantities for concrete face panels, wall erection, and concrete leveling pad will not be measured on the basis of the details shown on the plans as prepared by the mechanically stabilized earth wall company. Such pay quantities will be based on the neat line limits of the wall envelope shown on the plans. No field measurements will be made. The wall envelope limits will be considered to be the vertical distance from the top of the leveling pad to the top of the coping, and the horizontal distance from the beginning to the end of the leveling pad.

731.13 Stockpiled Concrete Face Panels. *Partial payment will be made for panels stockpiled on the project site or at the Contractor's approved storage location. Such partial payment will be the delivered cost of the wall panels, as verified by invoices which include freight charges. Such invoices shall be furnished by the Contractor. The payment will not exceed 75 percent of the contract unit price for concrete face panels. Prior to authorizing partial payment, verification will be obtained that all required inspection has been made and that the panels are acceptable. Stockpiled ground reinforcement will not be paid for separately.*

731.14 Basis of Payment. *Concrete face panels and wall erection will be paid for at the contract unit price per square meter (square foot). The concrete leveling pad, complete and in place, will be paid for at the contract unit price per meter (linear foot) for leveling pad. B borrow for structure backfill will be paid for at the contract unit price per cubic meter (cubic yard) in accordance with 211.10.*

Payment will be made under:

Pay Item	*Metric Pay Unit Symbol (English Pay Unit Symbol)*
B Borrow for Structure Backfill	*m3 (CYS)*
Face Panels, Concrete	*m2 (SFT)*
Leveling Pad, Concrete	*m (LFT)*
Wall Erection	*m2 (SFT)*

The costs of all mechanically stabilized earth wall materials including concrete face panels, reinforcing strips, tie strips, fasteners, joint materials, coping, repair or replacement of face panels damaged or removed due to backfill placement, and incidentals shall be included in the cost of concrete face panels. The costs of all labor and materials required to prepare the wall foundation, place the reinforcing strips, and erect the concrete face panels shall be included in the cost of wall erection. Excavation will not be paid for separately. The cost of all excavation required shall be included in the costs of other pay items.

GEOSYNTHETICS FOR EARTH SLOPE
RETENTION SYSTEM

DESCRIPTION. This work shall include finishing and installing geogrid reinforcement and erosion control blanket to the lines, grades and orientation shown on the plans or as directed by the Engineer. The geogrids and blanket shall be of the type shown on the plans and as detailed herein. Topsoil and special borrow which includes those limits shown on the plans for the mechanically-stabilized earth slope retention system shall be paid for under Section 203.

MATERIALS.

A. **PHYSICAL PROPERTIES**

1. Geogrid Reinforcement

a. The geogrid shall be a regular network of integrally-connected polymer elements with aperture geometry sufficient to permit mechanical interlock with the special borrow and topsoil. The geogrid shall be dimensionally stable and able to retain its geometry under construction stresses. The geogrid shall also be resistant to ultraviolet degradation and to all forms of chemical and biological degradation encountered in the special borrow and topsoil.

b. Geogrids shall meet the following minimum tensile properties. Test methods with the GRI prefix refer to standard practice of the Geosynthetic Research Institute. No preloading is permitted in determination of tensile strength.

Property	Method	TYPE P1	TYPE P2	TYPE S1
Tensile Strength, 5 Percent Strain (kN/m)	GRI GG1-87	64.93	29.18	--
Tensile Strength, Ultimate (kN/m)	GRI GG1-87	131.31	64.19	17.50 (MD) 30.64 (CMD)
Tensile Strength, Long-Term Design Strength (kN/m)	As Defined below (T_A)	54.26	26.52	7.23

2. Long-Term Design Tensile Strength

a. The long-term design strength (T_A) shall be defined by the following:

$$T_A = \frac{T_{ULT}}{FS_{CR} x FS_{ID} x FS_{DU} x FS_{JNT}}$$

3. Ultimate Tensile Strength, T_{ULT}

   a. The ultimate tensile strength shall be the minimum average roll value as tested per GRI GG1-87.

4. Partial Factor of Safety for Creep Deformation, FS_{CR}

   a. This value is the ratio of T_{ULT} to the creep limited strength determined in accordance with ASTM D-5262. The test results shall be extrapolated for a 100-year design life per GRI GG4. Creep performance testing at a designated temperature is limited to one order of magnitude in extrapolation. Elevated temperature testing for a minimum 10,000 hr and extrapolation to a minimum 100,000 hr is required. Creep testing shall be performed on representative samples of the product and not on a single component of the geogrid. Default values for FS_{cr} shall not be accepted. The minimum value permitted shall be 2.00.

5. Partial Factor of Safety for Installation Damage, FS_{ID}

   a. This value shall be determined from construction damage tests consistent with GRI GG4a or GRI GG4b. The backfill and compaction methods used for testing shall be equal to or more severe than those for the proposed construction. If testing according to this criteria has not been conducted, a default value of 2.0 shall be used. The minimum value permitted shall be 1.10 for high density polyethylene, 1.10 for polypropylene and 1.40 for polyethylene terephthalate.

6. Partial Factor of Safety for Durability, FS_{DU}

   a. This value is a partial factor of safety considering chemical and biological degradation. It shall be defined by the equation:

$$FS_{DU} = \frac{I}{L+R}$$

   where R is the strength reduction ratio of the 50 degree Celsius incubation test at 120 days as determined by Test Method U.S. EPA 9090. The incubation fluid shall have a pH of 12 or higher. Strength shall be determined by GRI GG1 on the longitudinal rib. If testing according to this criteria has not been conducted, a default value of 2.60 shall be used. The minimum value permitted for specific polymer types is as follows:

High Density Polyethylene	1.10
Polyethylene Terephthalate	2.00
Polypropylene	1.25

7. Partial Factor of Safety for Joint Strength, FS_{JNT}

a. This value is a partial factor of safety which shall be considered when separate lengths of geogrids are con-nected together or overlapped in the direction of the primary reinforcement. The value of FS_{JNT} shall be taken as the ratio of the unjointed specimen strength to the jointed specimen strength. Testing shall be conducted in accordance with GRI GG1-87 for mechanically-connected joints and GRI GG5 for overlap joints. Sustained tension test of 1,000 hr minimum duration shall also be conducted on mechanically-connected joints in accordance with GRI GG4. The loading shall not be less than the long-term design tensile strength. Default values for FS_{JNT} shall not be accepted. The minimum value permit-ted shall be 1.00 if there is no reduction in strength of the jointed specimen or if no joints are used.

8. Soil-Reinforcement Interaction

a. The geogrid shall develop a minimum long-term inter-action coefficient of 0.70 in a fine-grained soil having not less than 50 percent passing the No. 200 U.S. Standard sieve. The value shall be determined in accordance with GRI GG5.

9. Erosion Control Blanket

a. The erosion control blanket shall consist of a web of polyolefin fibers between two high-strength, biaxiallyoriented nets and bound securely together by parallel stitching with polyolefin thread. Every component of the blanket shall be stabilized against ultraviolet degradation and inert to chemicals encountered in a natural soil environment. The erosion blanket shall also conform to the following physical property requirements:

Property	Method	Value
Thickness	ASTM D 1777	10.16 (Min)
Weight (oz/m)	ASTM D 3776	10.9 (Min)
Specific Gravity	ASTM D 1505	0.91
Groundcover Factor (%)[1]	Light Projection Test	65 (Min)
Tensile Strength (kN/m)[2]	ASTM D 1682 (51mm Strip)[3]	2.55 x 1.60
Elongation (%)[2]	ASTM D 1682 (51mm Strip)[3]	40
Tensile Strength[2] at 15% Elongation (kN/m)	ASTM D 1682 (51mm Strip)[3]	1.31 x 1.31
Flexibility (mg.cm)[2]	ASTM D 1388	10,000 (Min)
Ultraviolet Stability % Strength Retained after 1000 hours	ASTM D 4355	80 (Min)
Color		Green

NOTES: [1] Groundcover Factor represents "% shade" from light projection test
[2] Values apply to both machine and counter-machine directions
[3] Machine direction specimen for 51mm strip tests includes one machine direction polyolefin stitch line centered within its width and extending the full length of the specimen.

10. Certification and Testing

a. The Contractor shall submit certified test data, measured in full accordance with the test methods and standards specified to cover each shipment of material. Upon request of the Engineer, the Contractor shall provide documented test results from an independent testing laboratory for any of the criteria specified. No extra payment will be made for testing.

11. Defects
    a. During shipment and storage, the geogrid and blanket shall be protected from temperatures greater than 140 degrees F, mud, dirt, dust and debris. The manufacturer's recommendations regarding protection from direct sunlight shall be followed. The geogrid and blanket shall be rejected if it has defects, tears, punctures, flaws, deterioration, or damage incurred during manufacturing, transportation, or storage. If approved by the Engineer, torn or punctured sections may be repaired by placing a patch over the damaged area.

CONSTRUCTION METHODS

A. **INSTALLATION**

1. The geogrid shall be placed horizontally at the elevations and orientations shown on the plans. The vertical position of each layer shall be maintained within 50 millimeters. Correct orientation (roll direction) of the geogrid shall be verified by the Contractor. Types P1 and P2 geogrid shall have their roll direction perpendicular to the slope face and no overlap is required between adjacent rolls. Type S1 geogrid shall have its roll direction parallel to the slope face with overlaps not less than 150 millimeters in the roll direction and no overlaps across the roll.

2. The geogrid shall be secured in place to prevent movement during fill operations. The geogrid shall be secured with staples, pins, sandbags, fill, or as directed by the Engineer.

3. Prior to placement of the blanket, the slope shall be hydro-seeded. After hydro-seeding the slope, the blanket shall be placed and stapled to a smooth-graded, firm surface approved by the Engineer. Staples shall be placed as shown on plans and additional staples shall be installed as necessary to achieve complete contact with the topsoil and special borrow. Anchoring terminal ends of the blanket shall be accomplished through use of anchor trenches. The blanket in the trenches shall be anchored to the soil on maximum 450-millimeter centers. The blanket shall be anchored, overlapped and otherwise constructed to ensure performance until vegetation is well established. Anchors shall have, as shown on the plans, a minimum of 305 millimeters in length and shall be parallel and continuous with the toe and top of the slope. The trenches shall be backfilled with topsoil to final grade and compacted as necessary to maintain stability of the blanket in the anchor trench and ensure that vegetation is well established.

B. **CONNECTIONS AND OVERLAPS**

1. The geogrid shall be placed in continuous strips in the direction specified. If the Contractor is unable to complete the required continuous length, Types P1 and P2 will be permitted to be jointed with the approval of the Engineer. Not more than one joint per length of geogrid shall be permitted. Joints shall be made by a mechanical connection of an overlap. Mechanical connections shall use a polymer bar or sewing with Kevlar thread. Bar connections shall be placed as a minimum on the second row of apertures from the end of the roll and shall be held taut during fill placement. Overlap connections shall be not less than 1.52 meters in length, with not less than 100 millimeters separating the two layers.

2. Joints shall be set back not less than 4.57 meters behind the finished slope surface. Joints shall be staggered not less than 3 meters between adjacent rolls or between consecutive layers.

C. SPECIAL BORROW AND TOPSOIL

1. Placement of the special borrow and topsoil shall conform to all applicable requirements of Sections 203 and 914, respectively. The special borrow shall be a natural granular material with a minimum angle of internal friction of 32 degrees. The special borrow is anticipated to consist of a dune sand, and slags shall be excluded. Test results verifying the angle of internal friction shall be provided to the Owner no less than one month prior to the construction of the earth slope retention system. No extra payment will be made for testing, and topsoil shall be included in the pay item for special borrow.

2. Special borrow shall have a pH in the range of 3 to 9. Testing of the special borrow with respect to pH may not be required. At the Engineer's discretion, when fill potentially corrosive to the geogrid is suspected, the Engineer may elect to perform his/her own pH testing in accordance with ASTM G-51. Special borrow having a pH outside the acceptable ranges shall be rejected.

3. The special borrow and topsoil shall be placed, spread and compacted in a manner that prevents the development of wrinkles or movement of the geogrid. Tracked construction equipment shall not be operated directly upon the geogrid. A minimum special borrow or topsoil thickness of 150 millimeters is required prior to operation of tracked vehicles over the geogrid. Turning of tracked vehicles shall kept to a minimum to prevent tracks from displacing the special borrow and topsoil and damaging the geogrid. Rubber-tired equipment may pass over the geogrid at slow speeds; less than 16km/hr. Sudden braking and sharp turning shall be avoided. Damaged geogrids shall be replaced or repaired at no cost to the Owner.

D ON-SITE REPRESENTATIVE

1. The Contractor shall provide an experienced and qualified representative of the geogrid and blanket manufacturers on site at the initiation of the project. The representatives shall be available at least three working days unless excused by the Engineer.

METHOD OF MEASUREMENT

Measurement of the geogrid by type and blanket shall be by square meters and shall be computed on the total area of geogrid and blanket shown on the plans, exclusive of the area of any overlaps. Topsoil and special borrow shall be measured by the cubic yard volume shown on the plans.

BASIS OF PAYMENT

The accepted quantities of geogrid by type and blanket shall be paid for per square meter in place. Special borrow and topsoil shall be paid for per cubic meter in place. Payment shall be made under:

Description	Unit	Section
Geogrid, Type P1	SM	Special
Geogrid, Type P2	SM	Special
Geogrid, Type S1	SM	Special
Erosion Control Blanket	SM	Special
Special Borrow	CM	203

CERTIFICATION FOR CATEGORY 1 TEMPORARY TRAFFIC CONTROL DEVICES

The Contractor shall certify that the following temporary traffic control devices to be used do not exceed the maximum values shown in the table below, and are considered crashworthy at Test Level 3 in accordance with National Cooperative Highway Research Program Report No. 350.

Device	Composition	Maximum Mass (Weight)	Maximum Height
Single Piece Traffic cones	Rubber	9 kg (20 lb)	920 mm (36 in.)
	Plastic	9 kg (20 lb)	1220 mm (48 in.)
Tubular Markers	Rubber	6 kg (13 lb)	920 mm (36 in.)
	Plastic	6 kg (13 lb)	920 mm (36 in.)
Single Piece Drums	High Density Plastic	35 kg (77 lb)	920 mm (36 in.)
	Low Density Plastic	35 kg (77 lb)	920 mm (36 in.)
Delineators	Plastic, Fiberglass	N/A	1220 mm (48 in.)

No lights, signs, flags, or other auxiliary attachments are included with the devices listed above. Reflective sheeting or reflective buttons are included on delineators. Maximum masses (weights), including ballast, do not exceed the values shown in the table. "Single piece" refers to the construction of the body of the drum exclusive of a separate base, if any.

A form will be provided at the pre-construction conference for the Contractor to complete and return to the Engineer prior to the placement of the above traffic control devices.

MICROSILICA CONCRETE BRIDGE DECK OVERLAY

The Standard Specifications are revised as follows:

SECTION 733, BEGIN LINE 1, INSERT AS FOLLOWS:

SECTION 733 – MICROSILICA CONCRETE BRIDGE DECK OVERLAY

733.01 Description. *This work shall consist of the construction of a microsilica concrete overlay as shown on the plans on an existing deck or new concrete deck. This work shall be in accordance with the requirements described herein and the applicable requirements of 722.*

MATERIALS

733.02 Materials. *Materials shall be in accordance with the following:*

Microsilica Admixtures . . . . . 912.03(c)
Microsilica Concrete 912.05

The air-entraining, type A, and type D admixtures shall be certified in accordance with 913.03(c). The high range water reducing admixtures shall be certified prior to use.

The certification shall state the chloride content, whether or not chloride is added as an ingredient of manufacture, and that the admixture is in accordance with ASTM C 494, Type F.

The high range water reducing admixture certification shall be furnished to the Materials and Tests Division.

CONSTRUCTION REQUIREMENTS

733.03 Shipping and Storage. *Shipping and storage shall be in accordance with 702.04.*

733.04 Proportioning. *Proportioning shall be in accordance with 702.05, except that high range water reducers shall be used in place of or in addition to water reducing admixtures.*

The product manufacturers of the microsilica admixture and of the high range water reducing admixture system shall have a representative at the project site during the initial project site placement of the microsilica concrete bridge deck overlay.

733.05 Batching. *The aggregate and cement shall be added first. The mix water shall then be added at a continuous, uniform rate. The air-entraining admixture shall be simultaneously added with the first portion of the mix water. The type A or type D chemical admixture shall be added simultaneously with the remainder of the mix water. The high range water reducing admixture shall then be added. The concrete shall then be mixed until a uniform consistency is achieved. The microsilica shall be added as recommended by the supplier. Batching shall otherwise be in accordance with 702.06.*

733.06 Mixing. *Mixing shall be in accordance with 702.07, except that concrete shall be ready-mixed. Additional water may not be added at the project site or in transit to increase slump. If additional slump is required at the project site, a high water range reducer shall be added as required to increase the slump.*

733.07 Ready-Mixed Concrete. *Ready-mixed concrete shall be in accordance with 702.09.*

*733.08 **Construction Joints.** Construction joints will not be permitted in the overlay unless otherwise directed.*

*733.09 **Preparation of Bridge Floor.** Preparation shall be in accordance with 722.05.*

*733.10 **Patching of Bridge Floor.** The bridge floor shall be patched as described below.*

*(a) **Full Depth Patching.** The material used for full depth patching shall be either bridge deck patching concrete or microsilica concrete. The surfaces of the prepared cavities shall be thoroughly soaked for a minimum of 12 h. The cavities shall then be filled with the microsilica concrete to the level of the adjacent deck surface. No bond coat will be required.*

*(b) **Partial Depth Patching.** The material used for partial depth patching shall be microsilica concrete. The patching material shall be consolidated by means of internal vibration at time of placement. The prepared cavity surfaces shall be thoroughly soaked for a minimum of 12 h. The cavities shall then be filled with microsilica concrete at the time that the overlay is placed.*

*733.11 **Placing.** After the surface has been cleaned and immediately before placing the overlay material, the surface shall be thoroughly soaked for a minimum of 12 h. The surface shall not be permitted to dry before placing the overlay material. There shall be no standing water at the time of placement. No bond coat will be required before placing the overlay material. The microsilica concrete overlay shall be placed to an elevation*
approximately 13 mm (1/2 in.) above final grade.

*733.12 **Finishing.** Evaporation retardant shall be applied in accordance with the manufacturer's recommendations immediately after screeding. Such retardant shall be reapplied when the surface is disturbed, such as during tining, prior to final cure.*

The evaporation retardant shall be one of the products shown in the LIst of Approved or Prequalified Materials. Certification shall be in accordance with 912.03(d)2.

*733.13 **Texturing.** Texturing shall be in accordance with 722.09.*

*733.14 **Curing.** The minimum curing time shall be 7 calendar days. After texturing, the plastic film which forms on the surface of the overlay shall be protected from shrinkage cracking with a single layer of well-drained wet burlap. This layer of wet burlap shall be placed as soon as the overlay surface will support it without deformation, but within 30 minutes after screeding. Approximately 1 h after placing the first layer of wet burlap, a second layer shall be placed. The entire covering shall be maintained in a wet condition for a minimum of 96 hours through the use of soaker hoses. Polyethylene film may be used in lieu of the second layer of wet burlap. After the 7 calendar days have elapsed, all layers of covering material shall be removed.*

If the ambient temperature falls below 10°C (50°F) during the curing period, the time that the temperature is below 10°C (50°F) shall not be considered as part of the total 7 calendar days curing period.

Immediately after the end of the wet cure period, the surface shall be checked for cracks.

If cracks are found to be greater than 0.5 mm (0.02 in.) in width, the cracks shall be sealed by means of gravity feeding such cracks with an approved low viscosity epoxy sealant. The sealant shall be ponded over the crack by the use of dams or routing of the crack surface.

If it is determined by sounding or coring that adequate bonding between the class C concrete with microsilica and the bridge deck has not been attained, the deficient areas shall be removed and replaced as directed.

733.15 Method of Measurement. *This work will be measured in accordance with 722.13.*

733.16 Basis of Payment. *This work will be paid for in accordance with 722.14.*

SECTION 912, AFTER LINE 58, DELETE AND INSERT AS FOLLOWS:

(c) Microsilica Admixtures for Concrete. *The microsilica admixture shall be one of the products shown in the List of Approved or Prequalified Materials.*

~~(c)~~ ***(d)*** **Certification.** Prior to furnishing admixtures, each manufacturer shall

SECTION 912, AFTER LINE 160, INSERT AS FOLLOWS:

912.05 Microsilica Concrete. *The material shall be class C concrete in accordance with 702 and the requirements as follows:*

(a) 390 kg (658 lb) of cement shall be used per cubic meter (cubic yard) of concrete. Class F of C Fly Ash may be used as a partial replacement for portland cement. The maximum cement reduction shall be 10% and the min. replacement ratio by weight of Fly Ash to cement shall be 1.25:1.0.

(b) 30 kg (50 lb) of microsilica shall be used per cubic meter (cubic yard) of concrete and shall be included in the total amount of cementitious material.

(c) The maximum water-cement ratio shall be 0.400 and the minimum shall be 0.370.

(d) The coarse aggregate shall be size No. 11.

(e) Entrained air, by volume, shall be 6.5 ± 1.5 percent at the time of placement. The admixture shall be a tall oil or a vinsol resin based air entraining agent.

(f) Sufficient high range water reducing admixture shall be used to transform a 25 to 50 mm (1 to 2 in.) slump mix to a 125 to 200 mm (5 to 8 in.) slump mix.

The Contractor shall submit the mix design for approval. The Contractor shall obtain a written statement from the manufacturer of the microsilica admixture indicating satisfaction with the compatibility of all admixtures used.

All concrete for the key at the end of the bridge slab, and all partial depth patches shall be the same material as the bridge deck overlay material. Such concrete shall be poured monolithically with the overlay.

Milling will not be required on the top surface of deck. Sandblasting of deck just prior to placement of the overlay will be required.

APPROVED MICROSILICA ADMIXTURES FOR CONCRETE

1. SIKA CORPORATION. The microsilica admixture shall be Sikacrete 950 as manufactured by Sika Corporation, 2930 Switzer Road, Columbus, OH 43219.

2. W.R. GRACE AND COMPANY. The microsilica admixture shall be Force 10000 as manufactured by W.R. Grace and Company, 6051 West 65th Street, Chicago, IL 60638.

3. ELCHEM MATERIALS, INC. The microsilica admixture shall EMSAC F-100 or EMSAC F-100T as manufactured by Elchem Materials, Inc., 10 Parkway View Drive, Pittsburgh, PA 15205.

4. MASTER BUILDERS TECHNOLOGIES. The microsilica admixture shall be MBSF as manufactured by Master Builders Technologies, 3715 Bargetown Road, Room 124, Louisville, KY 40218.

APPROVED MICROSILICA EVAPORATION RETARDANTS

1. MASTER BUILDERS TECHNOLOGIES. The evaporation retardant shall be Confilm as manufactured by Master Builders Technologies, 3715 Bargetown Road, Room 214, Louisville, KY 40218.

2. SIKA CORPORATION. The evaporation retardant shall be Sika-Film as manufactured by Sika Corporation, 2930 Switzer Road, Columbus, OH 43219.

3. EUCLID CHEMICAL COMPANY. The evaporation retardant shall be Eucobar as manufactured by Euclid Chemical Company, 19218 Redwood Road, Cleveland, OH 44110.

4. VEXCON CHEMICALS. The evaporation retardant shall be Certi-Vex Envioassist as manufactured by Vexcon Chemicals, 7240 State Road, Philadelphia, PA 19135.

RESETTING TRAFFIC SIGNS

The existing traffic signs that are located within the project limits which are not specifically called out on the plans shall be reset as directed by the Engineer. The number of signs will not be measured directly. The cost of all materials, equipment, labor and incidentals shall not be paid for directly, but included in the cost of other items.

MISCELLANEOUS EQUIPMENT FOR FLASHERS

The Contractor shall furnish and install all necessary miscellaneous equipment required to make a completed and operating installation of the flashers in accordance with the plans, specifications and accepted good practice of the industry. This equipment shall consist of, but shall not necessarily be limited to, that as follows:

Intercepts
Span Hangers
Signal Weatherheads
Balance Adjusters
Pinnacle Assemblies
Padlocks
Ground Rods
Ground Field Connector
Thermo Weld Grounding Connection
Post Top Slipfitters
Post Top Slipfitters for Cabinets
Messenger Cable, 6 mm (1/4 Inch)
Servi-Clips, 10 mm (3/8 Inch)
Crosby Clamps, 10 mm (3/8 Inch)
Conduit Bushings, 25 mm (1 Inch)
Conduit Straps, 25 mm (1 Inch)
Conduit Lock Nuts, 25 mm (1 Inch)
Conduit Ground Bushings, 25 mm (1 Inch)
Weatherheads, 25 mm (1 Inch)
Close Nipples, 25 mm (1 Inch)
Ground Couplings, 50 mm (2 Inches)
Conduit Ground Bushings, 50 mm (2 Inches)
Weatherheads, 50 mm (2 Inches)
Close Nipples, 50 mm (2 Inches)
Bolt Clamps, 50 mm (2 Inches)
Condulets, 50 mm (2 Inches)
Conduit Bends, 90 Degree
Bare Wire, No. 6
Stranded Coded Wire, 1c/14, 6 Colors; Shall not be used as Loop Cable
Stranded Coded Wire, 1c/14, White; Shall not be used as Loop Cable
Lamps, 60 Watt
Lamps, 116 Watt
Lamps, 150 Watt
Highway Yellow Enamel
Anchor Bolt Skirting

All other nonsalvageable materials necessary for proper installation.

This miscellaneous equipment will not be paid for separately. The cost thereof shall be included in the costs of other pay items.

REMOVE FROM CONTRACT — MAIL WITHIN SEVEN (7) DAYS

State Form 46606 (4-94)

Indiana Department of Transportation

Contractor Evaluation of Plans and Contract Documents

Estimator's Rating

District _____

County/City/Town _____

Contract No. _____

Designer _____

INSTRUCTIONS

All bidders will complete this form (front and back). The information provided will help the Department determine if the plan and documents were biddable. Each bidder should check the appropriate boxes, make any necessary comments and return to:

Walter Land
Quality Management Engineer
Indiana Department of Transportation
100 N. Senate Avenue, Room N642
Indianapolis, IN 46204-2216

Subcontractors and suppliers, who are not bidding directly, should mail their "Estimator's Rating" directly or fax to Walter Land (317) 233-4929.

The Department agrees that the information provided on this form is not a part of the contract document and is for the Department's information only, and the Department or its agents will not use any of the statements, answers, or any other information on this form against the Contractor: (1) when reviewing or considering any claim for additional compensation, (2) during litigation (specifically, it is not an admission or an admission against interest), (3) at any administrative hearing, or (4) for any other purpose whatsoever.

FOR OFFICE USE ONLY

DISTRIBUTION: ***Check Appropriate Boxes***

- ☐ COMMISSIONER, INDOT
- ☐ CHIEF ENGINEER, INDOT
- ☐ DEPUTY CHIEF ENGINEER, INDOT
- ☐ CHIEF, DESIGN, INDOT
- ☐ CONSULTANT
- ☐ COUNTY COMMISSIONER / MAYOR
- ☐ COUNTY/CITY/TOWN ENGINEER
- ☐ OTHER _____

Evaluation pertains to: ☐ Roadway Plans ☐ Bridge Plans ☐ Both ☐ Traffic

Were the special provisions clear and in sufficient detail? If no, which special provisions were inadequate and what additional information whould have been included?

☐ Yes ☐ No

Were the plans clear with sufficient detail. If no, what details were lacking or omitted?

☐ Yes ☐ No

Did the detail or content of the plans and special provisions require you to include contingencies in your bid? If yes, what contingencies were required?

☐ Yes ☐ No

Were the quantities reliable? If no, which items varied from your take-off?

☐ Yes ☐ No

Did the pay items used reflect the scope of work to be performed? If no, which pay items did you question?

☐ Yes ☐ No

Were the locations of the pay items adequately shown on the plans or in plan schedules? If no, which pay items were not shown and where could they have been shown more appropriately?

☐ Yes ☐ No

Did the contract allow sufficient time for fabrication or procurement of specialized material? If no, what material(s)?

☐ Yes ☐ No ☐ N/A

Did the plans or contract provisions require you to obtain specialized equipment which you do not own or is not readily available on a rental basis? If yes, what equipment?

☐ Yes ☐ No

Other comments. (Please include an additional sheet if necessary.)

BID PLANS AND DOCUMENTS RATING: ☐ **Poor** ☐ **Fair** ☐ **Good** ☐ **Very Good**

_____ _____

Firm Name **Date**

_____

Phone Number

INDIANA DEPARTMENT OF TRANSPORTATION
100 North Senate Avenue
Indianapolis, Indiana 46204

Letting of February 23, 1999 February 17, 1999

NOTICE OF REVISION NO. 1

TO CONTRACT NO. B-23737-B

This is to advise you that pages 2, 7, 8 and 9 of the Schedule of Pay Items have been revised and are included herewith. Page 10 of the Schedule of Pay Items has been eliminated. Line Nos. 0014 and 0015 have been changed. Line No. 0070 has been deleted.

Be further advised that since there is no longer any Masonary Coating in this contract, the special provision "Masonary Coating" on pages 127-131 has been deleted. The special provision "Revised Undercut and Backfill Material for the MSE Abutment Walls" has been added. Page 156 of the Special Provisions is herewith attached.

Construction Plan pages No. 4 and 5, attached herewith, have been added.

Please substitute the attached sheets for the like numbered sheets that now appear in your copy of the bidding document.

Should you desire to submit a bid, please do so on the basis of the information set out above.

The acknowledgment below should be signed only by prequalified bidders and returned immediately upon receipt by facsimile transmission through FAX No. 317-232-0676. If no FAX is available, the acknowledgment should be returned by mail to Mr. Wayne Wiese, Contracts Engineer, N855 Indiana Government Center, North, 100 N. Senate Avenue, Indianapolis, IN 46204-2249.

Wayne H. Wiese
Contract Services Manager

WHW/EDM/BLB/cls

- ACKNOWLEDGMENT OF RECEIPT OF REVISION -

DATE _____

CO. NAME _____

BY _____

BEFORE SUBMITTING BIDDING DOCUMENT, PLEASE BE SURE TO INSERT ALL APPROPRIATE SIGNED REVISION ACKNOWLEDGEMENTS.

SCHEDULE OF PAY ITEMS REVISED: FEB 17 1999

LETTING DATE: February 23, 1999

CONTRACT ID: B -23737-B

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0011	205-02229 TEMPORARY EROSION AND SEDIMENT CONTROL, STRAW BALE DITCH CHECK	28.000 m		.		.
0012	205-02231 TEMPORARY EROSION AND SEDIMENT CONTROL, RIPRAP DITCH CHECK	8.000 m		.		.
0013	205-02770 EROSION CONTROL BLANKET	5,165.000 m2		.		.
0014	206-51230 EXCAVATION, FOUNDATION, UNCLASSIFIED	1,201.000 m3		.		.
0015	211-02060 B BORROW FOR STRUCTURE BACKFILL	2,844.000 m3		.		.
0016	303-52308 COMPACTED AGGREGATE FOR BASE, 0, 53	1,009.000 Mg		.		.
0017	303-90466 SUBBALLAST , COMPACTED AGGREGATE	7,685.000 Mg		.		.
0018	402-05468 HMA BASE 25.0 mm, MAINLINE	3,149.000 Mg		.		.
0019	402-05474 HMA INTERMEDIATE 19.0 mm, MAINLINE	659.000 Mg		.		.
0020	402-05477 HMA SURFACE 9.5 mm, MAINLINE	334.000 Mg		.		.

SCHEDULE OF PAY ITEMS REVISED: FEB 17 1999

LETTING DATE:February 23, 1999

CONTRACT ID: B -23737-B

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0065	715-04629 PIPE ARM, 1 WAY	1.000 EACH	.		.	
0066	715-04629 PIPE ARM, 3 WAY	1.000 EACH	.		.	
0067	715-46010 PIPE END SECTION, 450 mm	12.000 EACH	.		.	
0068	715-78430 PIPE ARM, 2 WAY	1.000 EACH	.		.	
0069	722-51842 BRIDGE DECK OVERLAY	308.000 m2	.		.	
0071	731-05932 CONCRETE WALL CAP	86.000 m	.		.	
0072	731-93947 LEVELING PAD, CONCRETE	78.000 m	.		.	
0073	801-04308 ROAD CLOSURE SIGN ASSEMBLY	2.000 EACH	.		.	
0074	801-06605 BARRICADE, IIIA	8.000 EACH	.		.	
0075	801-06606 BARRICADE, IIIB	2.000 EACH	.		.	
0076	801-06625 DETOUR ROUTE MARKER ASSEMBLY	4.000 EACH	.		.	

SCHEDULE OF PAY ITEMS REVISED: FEB 17 1999
LETTING DATE: February 23, 1999

CONTRACT ID: B -23737-B

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0077	801-06640 CONSTRUCTION SIGN, A	22.000 EACH		.		.
0078	801-06644 TEMPORARY PAVEMENT MARKING, I, WHITE, 100 mm	575.000 m		.		.
0079	801-06645 CONSTRUCTION SIGN, B	2.000 EACH		.		.
0080	801-06775 MAINTAINING TRAFFIC	LUMP	LUMP			.
0081	802-76020 SIGN, SHEET, ENCLOSED LENS WITH LEGEND 2.03 mm THICKNESS	0.745 m2		.		.
0082	802-76025 SIGN, SHEET, ENCAPSULATED LENS WITH LEGEND, 2.03 mm THICKNESS	4.095 m2		.		.
0083	802-76035 SIGN, SHEET, ENCAPSULATED LENS WITH LEGEND 2.54 mm THICKNESS	0.520 m2		.		.
0084	802-76055 SIGN POST, A	63.975 m		.		.
0085	805-01815 SIGNAL SUPPORT FOUNDATION, 915mm X 3.7 m	2.000 EACH		.		.
0086	805-01879 SIGNAL SERVICE, INSTALL	1.000 EACH		.		.
0087	805-78010 CONTROLLER AND CABINET, FLASHER, SOLID STATE	1.000 EACH		.		.

SCHEDULE OF PAY ITEMS REVISED: FEB 17 1999
LETTING DATE:February 23, 1999

CONTRACT ID: B -23737-B

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0088	805-78190 TRAFFIC SIGNAL HEAD, 1 FACE, 305 mm AMBER	4.000 EACH		.		.
0089	805-78195 TRAFFIC SIGNAL HEAD, 1 FACE, 305 mm RED	1.000 EACH		.		.
0090	805-78415 SPAN, CATENARY, AND TETHER	1.000 EACH		.		.
0091	805-78420 DISCONNECT HANGER	1.000 EACH		.		.
0092	805-78467 SIGNAL CABLE, 3C 8GA.	30.000 m		.		.
0093	805-78485 SIGNAL CABLE, 5C 14GA.	50.000 m		.		.
0094	805-81032 SIGNAL STRAIN POLE, STEEL, 9.2m	2.000 EACH		.		.
0095	808-06713 LINE, PAINT, SOLID, WHITE, 100 mm	1,688.000 m		.		.
0096	808-06714 LINE, PAINT, SOLID, YELLOW, 100 mm	920.000 m		.		.
0097	808-74805 TRANSVERSE MARKINGS, EPOXY, STOP LINE, 600 mm	20.000 m		.		.
	SECTION 0001 TOTAL					.
	TOTAL BID					.

Added 2-17-99

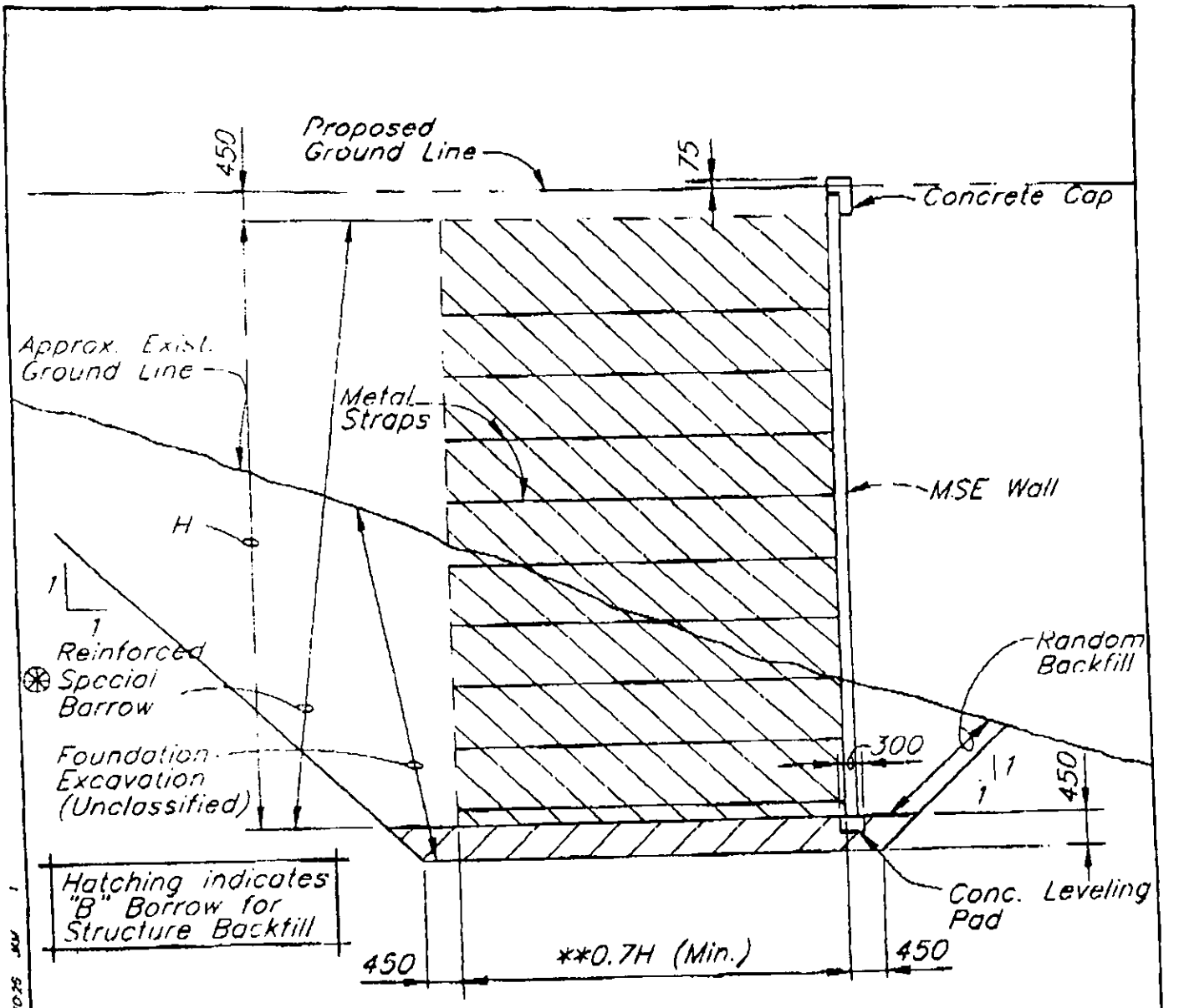
REVISED UNDERCUT AND BACKFILL MATERIAL
FOR THE MSE ABUTMENT WALLS

The depth of undercut required beneath the MSE abutment walls has been reduced from 1500mm to 450mm as shown on the enclosed revised sections "Y-Y" & "Z-Z". The quantity of B Borrow for structure backfill and Foundation Excavation (unclassified) as shown on sheet 16B of the plans shall be changed to the following:

B Borrow for Structure Backfill	2844 cubic meter
Foundation Excavation (unclassified)	1201 cubic meter

B BORROW. Special Borrow as described in the special provision, under Geosynthetics for Earth Slope Retention System, may be used in lieu of B Borrow for Structure Backfill as designated on enclosed revised sections "Y-Y" & "Z-Z".

ADDED: 2.17.99



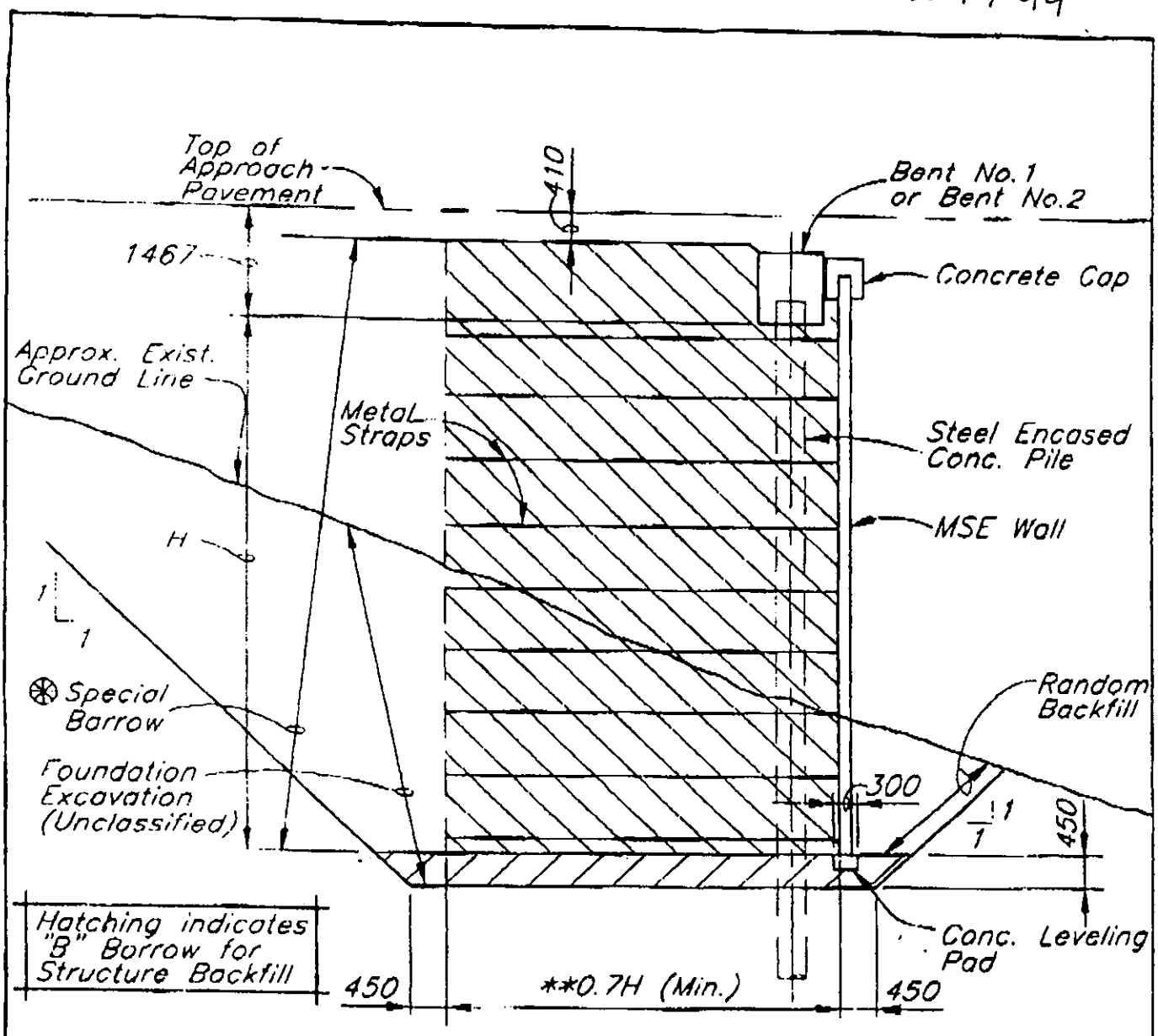
SECTION "Z-Z" (REVISED)

Scale = 1:75

** Will Vary Depending upon the Final Wall Design

NOTE:
See Sheet 16B of the Plans for the Original (Unchanged) Section "Z-Z".

ADDED: 2-17-99



SECTION "Y-Y" (REVISED)

Scale = 1:75

** Will Vary Depending upon the Final Wall Design

NOTE:
See Sheet 16B of the Plans for the Original (Unchanged) Section "Y-Y".