

ALABAMA DEPARTMENT

OF TRANSPORTATION

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STANDARD SPECIFICATIONS

2012

CONTRACT FORMS

PROJECT NO(s). ACOA59443-ATRP(017)

SPECIFICATIONS, PROPOSAL, CONTRACT AND BOND FOR CONSTRUCTION OF:

0.450 MILE ROADWAY IMPROVEMENTS

KNOWN AS FEDERAL AID PROJECT NO(s) ACOA59443-ATRP(017)

LOCATED: ON HARGROVE ROAD FROM THE INTERSECTION OF
10TH AVENUE TO THE JUNCTION OF HACKBERRY LANE IN
TUSCALOOSA

IN: TUSCALOOSA COUNTY

TYPE: ROADWAY IMPROVEMENTS

I HEREBY CERTIFY THAT THIS IS A TRUE AND CORRECT COPY OF THE
ORIGINAL CONTRACT NOW ON FILE IN THE OFFICE OF THE ALABAMA DEPARTMENT
OF TRANSPORTATION IN MONTGOMERY, ALABAMA

ALABAMA DEPARTMENT OF TRANSPORTATION

BY: _____

Clayton McBrien Jr
OFFICE ENGINEER

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ALABAMA DEPARTMENT OF TRANSPORTATION
MONTGOMERY, ALABAMA

THE AWARDING AUTHORITY, ALABAMA DEPARTMENT OF TRANSPORTATION, IN ACCORDANCE WITH § 39-5-1(b), CODE OF ALABAMA, 1975, DOES HEREBY CERTIFY THAT THE CONTRACT TO BE AWARDED ON PROJECT NO. ACOA59443-ATRP(017), TUSCALOOSA COUNTY : 0.450 MILE FOR CONSTRUCTING THE ROADWAY IMPROVEMENTS ON HARGROVE ROAD FROM THE INTERSECTION OF 10TH AVENUE TO THE JUNCTION OF HACKBERRY LANE IN TUSCALOOSA IS LET IN COMPLIANCE WITH TITLE 39, CODE OF ALABAMA 1975, AS AMENDED, AND ALL OTHER APPLICABLE PROVISIONS OF LAW.

TO THE BEST OF MY KNOWLEDGE, THIS CONTRACT COMPLIES WITH ALL APPLICABLE LAWS, RULES AND REGULATIONS OF THE STATE OF ALABAMA.

FUNDING FOR THIS PROJECT HAS BEEN APPROVED AND OBLIGATED.

ALABAMA DEPARTMENT OF TRANSPORTATION
JOHN R. COOPER, TRANSPORTATION DIRECTOR

BY: 
CLAY P. MCBRIEN, P.E.
STATE OFFICE ENGINEER

DATE: DECEMBER 6, 2017



ALABAMA DEPARTMENT OF TRANSPORTATION

MONTGOMERY, ALABAMA 36110

DATE: DECEMBER 1, 2017

MEMORANDUM

TO: CORNERSTONE CIVIL CONTRACTORS, LLC
CONTRACTOR

FROM: ALABAMA DEPARTMENT OF TRANSPORTATION

RE: PUBLIC EMPLOYMENT AGENCY

The Alabama State Employment Service is the Public Employment Agency that will be glad to serve you if you wish them to help by furnishing labor on:

PROJECT NO(s). ACOA59443-ATRP(017)

TUSCALOOSA COUNTY

The name and address of the local employment office that will serve you on this project is listed below:

BRENDA TRUELOVE, MANAGER
ALABAMA STATE EMPLOYMENT SERVICE
202 SKYLAND DRIVE
TUSCALOOSA, AL 35405
205-758-7591



PROPOSAL NO. 8

FOR THE CONSTRUCTION OF FEDERAL AID
PROJECT NO(S). ACOA59443-ATRP(017)

TUSCALOOSA COUNTY, ALABAMA

CONTRACT ID: 20171201034



NON-TRANSFERABLE

Proposal of

Contractor Name: CORNERSTONE CIVIL CONTRACTORS, LLC

Of (City, State): NORTHPORT, AL

ALDOT Contractor Identification Number: 03114

Alabama General Contractors License Number: 39115

for constructing the Roadway Improvements on Hargrove Road from the intersection of 10th Avenue to the junction of Hackberry Lane in Tuscaloosa. Length 0.450 mi. In the County of TUSCALOOSA, State of Alabama.

The plans are composed of the drawings identified as follows:

FEDERAL AID PROJECT NO(S). ACOA59443-ATRP(017)

The specifications are hereto attached.

In order to be considered, proposals must be received at the location and time shown below:

Alabama Department of Transportation
Bureau of Office Engineer, Room E-108
1409 Coliseum Blvd, Montgomery AL 36110-2060

Phone: (334)242-6444

BEFORE: 10:00 AM ON December 1, 2017



REVISED: 11/30/17

**PROJECT NO(S). ACOA59443-ATRP(017)
TUSCALOOSA COUNTY, ALABAMA**

Contract ID: 20171201034

TO THE ALABAMA DEPARTMENT OF TRANSPORTATION DIRECTOR:

SIR: The following proposal is made on behalf of the undersigned and no others. Evidence of authority to submit the proposal is herewith furnished.

The undersigned has carefully examined the plans for this project, the Alabama Department of Transportation Standard Specifications for Highway Construction, 2012 Edition, including the special provisions hereto attached, and has also personally examined the site of work. On the basis of the specifications and plans, the undersigned proposes to furnish all necessary machinery, tools, apparatus and other means of construction, and do all the work and furnish all material in the manner specified.

The undersigned further agrees to complete the entire project in One Hundred Fifty (150) working days.

(See Special Provision No. 12-2109(2))

A(n) 7.00% DBE Contract Obligation is required.

The undersigned understands that the quantities below are approximate only and are subject to either increase or decrease and hereby proposes to perform any increased or decreased quantities of work in accordance with said Specifications. The undersigned further understands and specifically agrees that in making this proposal, in case of error in the extension of prices in the bid, the unit price will govern.

By signing this contract, the contracting parties affirm, for the duration of the agreement, that they will not violate federal immigration law or knowingly employ, hire for employment, or continue to employ an unauthorized alien within the State of Alabama. Furthermore, a contracting party found to be in violation of this provision shall be deemed in breach of the agreement and shall be responsible for all damages resulting therefrom.





Alabama Department of Transportation

Contract Schedule of Items

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Contract ID: 20171201034

Project(s): ACOA59443-ATRP(017)

Awarded Vendor: 03114 CORNERSTONE CIVIL CONTRACTORS, LLC

Proposal Line Number	Item Code / Description	Approximate Quantity and Units	Unit Price		Bid Amount			
			Dollars	Cents	Dollars	Cents		
SECTION 0001		Total						
0010	201A002 Clearing And Grubbing (Maximum Allowable Bid \$ 4,000.00 Per Acre) (Approximately 2 Acres)	LUMP SUM				8,000.00		
0020	206C000 Removing Concrete Sidewalk	1,025.000 SQYD		6.55		6,713.75		
0030	206C002 Removing Concrete Slope Paving	47.000 SQYD		16.00		752.00		
0040	206C010 Removing Concrete Driveway	440.000 SQYD		11.00		4,840.00		
0050	206D000 Removing Pipe	372.000 LF		15.00		5,580.00		
0060	206D002 Removing Curb	1,843.000 LF		4.00		7,372.00		
0070	206D003 Removing Curb And Gutter	1,872.000 LF		4.82		9,023.04		
0080	206D005 Removing Gutter	306.000 LF		9.42		2,882.52		
0090	206E001 Removing Inlets	9.000 Each		334.20		3,007.80		
0100	209A000 Mailbox Reset, Single	8.000 Each		193.50		1,548.00		
0110	210A000 Unclassified Excavation	8,367.000 CUYD		18.00		150,606.00		
0120	210D011 Borrow Excavation (A4 Or Better)	765.000 CUYD		17.55		13,425.75		
0130	214A000 Structure Excavation	1,234.000 CUYD		13.54		16,708.36		
0140	214B001 Foundation Backfill, Commercial	348.000 CUYD		57.30		19,940.40		
0150	301A008 Crushed Aggregate Base Course, Type B, Plant Mixed, 5" Compacted Thickness	3,114.000 SQYD		11.47		35,717.58		
0160	305B071 Coarse Aggregate, Section 801, For Miscellaneous Use	1,581.000 Ton		27.50		43,477.50		





Alabama Department of Transportation

Contract Schedule of Items

Contract ID: 20171201034

Project(s): ACOA59443-ATRP(017)

Awarded Vendor: 03114 CORNERSTONE CIVIL CONTRACTORS, LLC

Proposal Line Number	Item Code / Description	Approximate Quantity and Units	Unit Price		Bid Amount	
			Dollars	Cents	Dollars	Cents
0170	305B077 Crushed Aggregate, Section 825, For Miscellaneous Use	346.000 Ton		44.80	15,500.80	
0180	305B078 Crushed Aggregate, Section 825, Type B, For Miscellaneous Use	556.000 Ton		44.05	24,491.80	
0190	401A000 Bituminous Treatment A	1,957.000 SQYD		1.17	2,289.69	
0200	405A000 Tack Coat	930.000 Gal		5.05	4,696.50	
0210	407B000 Joint Sealant For Hot Mix Asphalt Pavement	1.000 Mile		1,121.45	1,121.45	
0220	424A340 Superpave Bituminous Concrete Wearing Surface Layer, 1/2" Maximum Aggregate Size Mix, ESAL Range A/B	205.000 Ton		133.59	27,385.95	
0230	424A360 Superpave Bituminous Concrete Wearing Surface Layer, 1/2" Maximum Aggregate Size Mix, ESAL Range C/D	1,416.000 Ton		107.85	152,715.60	
0240	424B651 Superpave Bituminous Concrete Upper Binder Layer, 1" Maximum Aggregate Size Mix, ESAL Range C/D	1,351.000 Ton		100.70	136,045.70	
0250	424B655 Superpave Bituminous Concrete Upper Binder Layer, Patching, 1" Maximum Aggregate Size Mix, ESAL Range C/D	80.000 Ton		158.44	12,675.20	
0260	424B657 Superpave Bituminous Concrete Upper Binder Layer, Leveling, 1/2" Maximum Aggregate Size Mix, ESAL Range C/D	116.000 Ton		135.12	15,673.92	
0270	424B662 Superpave Bituminous Concrete Upper Binder Layer, Widening, 1" Maximum Aggregate Size Mix, ESAL Range C/D	127.000 Ton		126.24	16,032.48	
0280	424C360 Superpave Bituminous Concrete Base Layer, 1" Maximum Aggregate Size Mix, ESAL Range C/D	1,551.000 Ton		100.45	155,797.95	





Alabama Department of Transportation

Contract Schedule of Items

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Contract ID: 20171201034

Project(s): ACOA59443-ATRP(017)

Awarded Vendor: 03114 CORNERSTONE CIVIL CONTRACTORS, LLC

Proposal Line Number	Item Code / Description	Approximate Quantity and Units	Unit Price		Bid Amount	
			Dollars	Cents	Dollars	Cents
0290	424C364 Superpave Bituminous Concrete Base Layer, Patching, 1" Maximum Aggregate Size Mix, ESAL Range C/D	15.000 Ton		158.44		2,376.60
0300	424C370 Superpave Bituminous Concrete Base Layer, Widening, 1" Maximum Aggregate Size Mix, ESAL Range C/D	145.000 Ton		127.60		18,502.00
0310	430B040 Aggregate Surfacing (Crushed Aggregate Base, Type B)	500.000 Ton		35.83		17,915.00
0320	517A004 Ornamental Handrail	36.000 LF		192.00		6,912.00
0330	530A000 15" Roadway Pipe (Class 3 R.C.)	112.000 LF		72.96		8,171.52
0340	530A001 18" Roadway Pipe (Class 3 R.C.)	612.000 LF		66.36		40,612.32
0350	530A005 42" Roadway Pipe (Class 3 R.C.)	4.000 LF		254.16		1,016.64
0360	530B001 22" Span, 14" Rise Roadway Pipe (Class 3 R.C.)	460.000 LF		74.48		34,260.80
0370	530B002 29" Span, 18" Rise Roadway Pipe (Class 3 R.C.)	108.000 LF		79.74		8,611.92
0380	530B005 51" Span, 31" Rise Roadway Pipe (Class 3 R.C.)	44.000 LF		206.11		9,068.84
0390	600A000 Mobilization	LUMP SUM				250,000.00
0400	610D003 Filter Blanket, Geotextile	300.000 SQYD		2.32		696.00
0410	618A001 Concrete Sidewalk, 6" Thick	503.000 SQYD		75.15		37,800.45
0420	618B003 Concrete Driveway, 6" Thick (Includes Wire Mesh)	407.000 SQYD		64.77		26,361.39
0430	619A056 42" Roadway Pipe End Treatment, Class 2	1.000 Each		5,118.00		5,118.00





Alabama Department of Transportation

Contract Schedule of Items

Contract ID: 20171201034

Project(s): ACOA59443-ATRP(017)

Awarded Vendor: 03114 CORNERSTONE CIVIL CONTRACTORS, LLC

Proposal Line Number	Item Code / Description	Approximate Quantity and Units	Unit Price		Bid Amount	
			Dollars	Cents	Dollars	Cents
0440	621A022 Junction Boxes, Type 1 (Modified)	8.000 Each		3,508.00		28,064.00
0450	621C030 Inlets, Type "Special"	4.000 Each		7,200.00		28,800.00
0460	621C036 Inlets, Type S1 Or S3 (1 Wing) (Modified)	2.000 Each		4,240.00		8,480.00
0470	621C049 Inlets, Type S1 Or S3 (2 Wing) (Modified)	4.000 Each		4,472.00		17,888.00
0480	621C087 Inlets, Type S2 Or S4 (1 Wing) (Modified)	2.000 Each		4,240.00		8,480.00
0490	621C088 Inlets, Type S2 Or S4 (2 Wing) (Modified)	1.000 Each		4,472.00		4,472.00
0500	623A001 Concrete Gutter (Valley)	1,259.000 LF		39.80		50,108.20
0510	623B000 Concrete Curb, Type N	137.000 LF		24.05		3,294.85
0520	623B001 Concrete Curb, Type N Special	89.000 LF		66.15		5,887.35
0530	623B002 Concrete Curb, Type A	386.000 LF		24.05		9,283.30
0540	623C003 Combination Curb & Gutter, Type C (Modified)	4,270.000 LF		16.84		71,906.80
0550	638D000 Wood Fence	80.000 LF		47.40		3,792.00
0560	641R510 3/4 Inch Water Meter And Box Reset	21.000 Each		320.00		6,720.00
0570	641S500 Valve Box Reset	19.000 Each		189.50		3,600.50
0580	645K500 Manhole Frame And Cover Reset	7.000 Each		506.00		3,542.00
0590	646J000 Gas Valve Box Reset	2.000 Each		253.00		506.00
0600	650A000 Topsoil	230.000 CUYD		37.78		8,689.40





Alabama Department of Transportation

Contract Schedule of Items

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Contract ID: 20171201034

Project(s): ACOA59443-ATRP(017)

Awarded Vendor: 03114 CORNERSTONE CIVIL CONTRACTORS, LLC

Proposal Line Number	Item Code / Description	Approximate Quantity and Units	Unit Price		Bid Amount	
			Dollars	Cents	Dollars	Cents
0610	650B000 Topsoil From Stockpiles	570.000 CUYD		17.64	10,054.80	
0620	654A000 Solid Sodding	7,220.000 SQYD		5.11	36,894.20	
0630	660C050 Shrubs, Ilex Cornuta Carissa (Carissa Holly)	18.000 Each		90.20	1,623.60	
0640	660C073 Shrubs, Loropetalum Chinense (Loropetalum)	17.000 Each		90.20	1,533.40	
0650	660C113 Shrubs, Ilex Aquifolium X Cornuta (Nellie R. Stevens Holly)	6.000 Each		541.00	3,246.00	
0660	660C202 Shrubs, Ilex Cornuta 'Needlepoint' (Needlepoint Holly)	45.000 Each		90.20	4,059.00	
0670	660D152 Trees, Lagerstroemia Indica X Fauriei 'Natchez' (Natchez Crapemyrtle)	11.000 Each		300.00	3,300.00	
0680	665A000 Temporary Seeding	1.000 Acre		600.00	600.00	
0690	665B001 Temporary Mulching	3.000 Ton		600.00	1,800.00	
0700	665C010 Temporary Pipe	100.000 LF		43.26	4,326.00	
0710	665G000 Sand Bags	500.000 Each		6.33	3,165.00	
0720	665I000 Temporary Riprap, Class 2	25.000 Ton		44.72	1,118.00	
0730	665J002 Silt Fence	5,030.000 LF		3.90	19,617.00	
0740	665N000 Temporary Coarse Aggregate,ALDOT Number 1	75.000 Ton		30.80	2,310.00	
0750	665N001 Temporary Coarse Aggregate,ALDOT Number 4	25.000 Ton		30.80	770.00	
0760	665O001 Silt Fence Removal	5,030.000 LF		1.20	6,036.00	





Alabama Department of Transportation

Contract Schedule of Items

Contract ID: 20171201034

Project(s): ACOA59443-ATRP(017)

Awarded Vendor: 03114 CORNERSTONE CIVIL CONTRACTORS, LLC

Proposal Line Number	Item Code / Description	Approximate Quantity and Units	Unit Price		Bid Amount	
			Dollars	Cents	Dollars	Cents
0770	665P005 Inlet Protection, Stage 3 Or 4	62.000 Each		480.00		29,760.00
0780	665Q002 Wattle	300.000 LF		12.00		3,600.00
0790	674A000 Construction Safety Fence	500.000 LF		2.00		1,000.00
0800	680A001 Geometric Controls	LUMP SUM				49,050.00
0810	698A000 Construction Fuel (Maximum Bid Limited to \$ 98,100.00)	LUMP SUM				60,000.00
0820	701B207 Dotted, Class 2, Type A Traffic Stripe (5" Wide)	824.000 LF		0.60		494.40
0830	701C000 Broken Temporary Traffic Stripe	1.000 Mile		902.00		902.00
0840	701C001 Solid Temporary Traffic Stripe	3.000 Mile		901.00		2,703.00
0850	701G086 Broken Yellow, Class 2T, Type A Traffic Stripe	1,786.000 LF		0.60		1,071.60
0860	701G249 Solid White, Class 2, Type A Traffic Stripe	573.000 LF		0.78		446.94
0870	701G253 Solid White, Class 2, Type A Traffic Stripe (5" Wide)	596.000 LF		0.90		536.40
0880	701G256 Broken Yellow, Class 2, Type A Traffic Stripe (5" Wide)	1,450.000 LF		0.66		957.00
0890	701G265 Solid Yellow, Class 2, Type A Traffic Stripe (5" Wide)	5,293.000 LF		0.78		4,128.54
0900	703A002 Traffic Control Markings, Class 2, Type A	2,327.000 SQFT		4.80		11,169.60
0910	703B002 Traffic Control Legends, Class 2, Type A	135.000 SQFT		4.80		648.00
0920	703D001 Temporary Traffic Control Markings	1,500.000 SQFT		0.60		900.00





Alabama Department of Transportation

Contract Schedule of Items

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Contract ID: 20171201034

Project(s): ACOA59443-ATRP(017)

Awarded Vendor: 03114 CORNERSTONE CIVIL CONTRACTORS, LLC

Proposal Line Number	Item Code / Description	Approximate Quantity and Units	Unit Price		Bid Amount	
			Dollars	Cents	Dollars	Cents
0930	705A030 Pavement Markers, Class A-H, Type 2-C	66.000 Each		4.80		316.80
0940	705A032 Pavement Markers, Class A-H, Type 1-B	90.000 Each		4.80		432.00
0950	705A037 Pavement Markers, Class A-H, Type 2-D	76.000 Each		6.00		456.00
0960	705A038 Pavement Markers, Class A-H, Type 2-E	35.000 Each		4.80		168.00
0970	710A115 Class 4, Aluminum Flat Sign Panels 0.08" Thick Or Steel Flat Sign Panels 14 Gauge (Type III Or Type IV Background)	27.000 SQFT		16.84		454.68
0980	710A126 Class 8, Aluminum Flat Sign Panels 0.08" Thick Or Steel Flat Sign Panels 14 Gauge (Type IX Background)	58.000 SQFT		21.65		1,255.70
0990	710B021 Roadway Sign Post (#3 U Channel, Galvanized Steel or 2", 14 Ga Square Tubular Steel)	104.000 LF		10.82		1,125.28
1000	730C000 Furnishing And Installing Traffic Control Unit (Hargrove Road/Hackberry Lane at Hargrove Road/21st Street)	LUMP SUM				26,261.00
1010	730E000 Metal Traffic Signal Pole Foundation	3.000 Each		6,202.00		18,606.00
1020	730F000 Metal Traffic Signal Pole With 30 Ft Mast Arm Assembly	1.000 Each		15,955.00		15,955.00
1030	730F001 Metal Traffic Signal Pole With 45 Ft Mast Arm Assembly	1.000 Each		20,078.00		20,078.00
1040	730F002 Metal Traffic Signal Pole With 30 Ft Mast Arm Assembly and 50 Ft Mast Arm Assembly	1.000 Each		28,749.00		28,749.00
1050	730K000 Traffic Signal Junction Box	6.000 Each		963.00		5,778.00
1060	730L002 1", Metallic, Conduit	50.000 LF		8.00		400.00





Alabama Department of Transportation

Contract Schedule of Items

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Contract ID: 20171201034

Project(s): ACOA59443-ATRP(017)

Awarded Vendor: 03114 CORNERSTONE CIVIL CONTRACTORS, LLC

Proposal Line Number	Item Code / Description	Approximate Quantity and Units	Unit Price		Bid Amount	
			Dollars	Cents	Dollars	Cents
1070	730L003 1", Non-Metallic, Conduit	100.000 LF		10.00		1,000.00
1080	730L005 2", Non-Metallic, Conduit	850.000 LF		6.63		5,635.50
1090	730N010 Luminaire Extension Assembly, 12 Foot	4.000 Each		2,822.00		11,288.00
1100	730P022 Vehicular Signal Head, 12 Inch, 3 Section, Type LED	9.000 Each		1,084.00		9,756.00
1110	730P023 Vehicular Signal Head, 12 Inch, 4 Section, Type LED	1.000 Each		1,353.00		1,353.00
1120	730Q011 Pedestrian Signal Head, Type LED	2.000 Each		976.00		1,952.00
1130	730R022 Controller Assembly, Type III, 8 Phase	1.000 Each		18,991.00		18,991.00
1140	730U400 Radar Detection System (Hargrove Road/Hackberry Lane at Hargrove Road/21st Street)	LUMP SUM				55,822.00
1150	740B000 Construction Signs	916.000 SQFT		7.22		6,613.52
1160	740C000 Special Construction Signs	449.000 SQFT		11.43		5,132.07
1170	740D000 Channelizing Drums	100.000 Each		48.00		4,800.00
1180	740E000 Cones (36 Inches High)	50.000 Each		19.00		950.00
1190	740F002 Barricades, Type III	22.000 Each		198.50		4,367.00
1200	740I002 Warning Lights, Type B	12.000 Each		335.50		4,026.00
1210	740M001 Ballast For Cone	50.000 Each		11.00		550.00
1220	742A001 Portable Changeable Message Sign, Type 2	2.000 Each		5,153.00		10,306.00





Alabama Department of Transportation

Contract Schedule of Items

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Contract ID: 20171201034

Project(s): ACOA59443-ATRP(017)

Awarded Vendor: 03114 CORNERSTONE CIVIL CONTRACTORS, LLC

Proposal Line Number	Item Code / Description	Approximate Quantity and Units	Unit Price		Bid Amount	
			Dollars	Cents	Dollars	Cents
1230	756A027 6" Electrical Conduit, 1 Line, Type 1 Installation	70.000 LF		52.34	3,663.80	
1240	756A028 6" Electrical Conduit, 1 Line, Type 5 Installation	55.000 LF		96.13	5,287.15	
1250	770L005 Bollard, Complete In Place	13.000 Each		420.00	5,460.00	
			Total Bid:		\$2,169,768.60	



FEDERAL-AID FUNDED PROJECTS

PLEASE READ AND COMPLETE SECTIONS A AND B. THE EXECUTION HEREINAFTER MADE ALSO CONSTITUTES THE EXECUTION OF THE PROPOSAL AND REPRESENTS THE AGREEMENT OF THE CONTRACTOR TO COMPLY WITH ALL DOCUMENTS CONTAINED IN THE PROPOSAL AND THOSE REFERRED TO THEREIN. FAILURE TO SUBMIT THE SWORN CERTIFICATION THROUGH PAGE 6 OF THIS NOTICE WILL BE CONSIDERED A NON-RESPONSIVE BID. BID BOND MUST BE SEPARATELY EXECUTED BY CONTRACTOR AND SURETY.

The contractor, subrecipient, or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of USDOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:

- (1.) Withholding monthly progress payments;
- (2.) Assessing sanctions; and/or
- (3.) Disqualifying the contractor from future bidding as non-responsive.

The Statement Required To Be Submitted By Proposed Contractor Pursuant To Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246) and Regulations in 41 CFR Part 60-4 On All Federal and Federally-Assisted Contracts In Excess of \$10,000 Will Be Included In the Award of Your Contract and Should Be Returned With Your Executed Contract.

The undersigned agrees that the terms and commitments contained herein shall not be constituted as a debt of the State of Alabama in violation of Article 11, Section 213 of the Constitution of Alabama, 1901, as amended by Amendment Number 26. It is further agreed that if any provision of this contract shall contravene any statute or Constitutional provision or amendment, either now in effect or which may, during the course of this contract, be enacted, then that conflicting provision in the contract shall be null and void.

The undersigned understands that in the event the term of this contract includes more than one fiscal year, said contract is subject to termination should funds not be appropriated for the continued payment of the contract in subsequent fiscal years.

The undersigned understands that in the event of the proration of the fund from which payment under this contract is to be made, the contract will be subject to termination.

Section A: The Alabama Department of Transportation is obligated on every Federal-aid project to implement, to the extent practical, 49CFR26, "Participation by Disadvantaged Business Enterprises (DBE) in U.S. DOT Financial Programs". This participation can be achieved by race neutral and/or race conscious means.

When race conscious means are used the contract goal for DBE participation will be indicated on Page Two of the Proposal Cover Sheet and in Section 11.1 of the Alabama Department of Transportation Standard Specifications for Highway Construction. Race neutral participation occurs when the contractor exceeds the indicated contract goal, or in the absence of a contract goal, obtains participation from a certified DBE that meets the CREDIT TOWARD PARTICIPATION portion of Section 11.1 of the Alabama Department of Transportation Standard Specifications for Highway Construction.

If the Department has determined that this project has sufficient opportunities for MBE/DBE participation the goal for this contract will be listed on Page Two of the Proposal Cover Sheet.

All bidders must complete form HR-DBE, "BIDDERS LIST OF QUOTERS FOR THE DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM."

If the contractor is low bidder for the project, it is understood the contractor will provide a DBE Utilization Plan which outlines the proposed percentage of DBE Utilization within five (5) calendar days of the letting date, along with documentation of the contractor's "Good Faith" efforts to utilize DBE firms if the proposed percentage of utilization is less than the designated project goal. The contractor's good faith efforts will fully comply with and meet all requirements, provisions and criteria of Title 49, Code of Federal Regulations, Part 26, including the criteria set forth in 49 CFR, Part 26, Appendix A and will comply with and meet the requirements, provisions and criteria set forth in Section 11.1 of the Alabama Department of Transportation



Standard Specifications for Highway Construction as all of such foregoing requirements, provisions and criteria are applicable to Disadvantaged Business Enterprises, all of which the contractor represents that he is familiar. The contractor understands that the good faith efforts of the contractor will be reviewed by the Department in keeping with all such requirements, provisions and criteria.

NOTE

The Department will advise the low bidder of his status as soon as possible after the opening of bids. A copy of the Department's DBE Utilization form has been attached to this proposal for use in complying with the Requirement.

Failure by the successful bidder to provide an acceptable DBE Utilization plan within the time frame required or failure of the successful bidder to make and document Good Faith Efforts, when applicable, will result in non-award of the contract to that bidder. If the contract is awarded to the next low bidder, the original low bidder will be prohibited from doing any work on the contract, either as subcontractor or in any other capacity. The original low bidder will also be prohibited from bidding on the project if it is re-advertised for letting. These restrictions shall apply to any other name under which the same person, individual, partnership, company, firm, corporation, association, co-operative or other legal entity that may be operating in which the principal owner(s) is involved.

Section B: CONTRACTOR'S CERTIFICATION

The contractor proposes to perform all "Force Account of Extra Work" that may be required on the basis provided in the Specifications hereto attached, and to give such work personal attention in order to see that it is economically performed.

The contractor further proposes to execute the Contract Agreement in a form to be attached as soon as the work is awarded to the contractor and to begin and complete the work within the respective time limit provided for in the Specifications hereto attached.

The contractor also proposes to furnish a Performance Bond, acceptable to the State, in an amount equal to the total amount of the contract. This bond shall serve not only to guarantee the completion of the work but also to guarantee the excellence of both workmanship and materials until the work is finally accepted. The contractor will also furnish a materialsman bond, acceptable to the State, equal to the amount of the contract.

The contractor encloses a cashier's check or bid bond for five percent (5%) of the bid, maximum \$50,000.00, and hereby agrees that in case of failure to execute a contract and furnish bonds within fifteen (15) days* after notice of award, the awarding authority shall retain from the proposal guaranty, if it is a cashier's check, or recover from the principal and/or the sureties, if the guaranty is a bid bond, the difference between the amount of the Contract as awarded and the amount of the proposal of the next lowest acceptable bidder, which amount shall not exceed \$50,000.00.

If no other bids are received, the full amount of the proposal guaranty shall be so retained and/or recovered as Liquidated Damages for such default. It is understood that in case the work is not awarded to the contractor, the proposal guaranty, if a cashier's check, will be returned as provided in the Alabama Department of Transportation Standard Specifications for Highway Construction.

In compliance with State of Alabama Act 2016-312, the contractor further certifies that it is not currently engaged in, and will not engage in, the boycott of a person or an entity based in or doing business with a jurisdiction with which this state can enjoy open trade.

1. DISADVANTAGED BUSINESS ENTERPRISES

The contractor intends to comply with the contract documents to utilize Disadvantaged Business Enterprises (hereinafter referred to at times as (DBE)) to the extent practical and when, under Section A herein above, the contract documents specify a minimum monetary amount to be expended with Disadvantaged Business Enterprises, to equal or exceed said amount through subcontracting and/or by purchases of materials and services on the project.

It is understood that failure to submit a Disadvantaged Business Enterprise Plan, when such is required by the contract within the time frame so specified, will be cause for assessment of penalties as provided in the contract.

*Time may be modified by Special Provision.



It is further understood that failure to comply with the contract relating to Disadvantaged Business Enterprises, when such are applicable, will be cause for the assessment of penalties as provided in the contract.

2. REQUIREMENT BY THE EQUAL EMPLOYMENT OPPORTUNITY REGULATIONS OF THE SECRETARY OF LABOR (41 CFR 60-1.7(b) (1))

THE CONTRACTOR MUST CHECK THE APPROPRIATE BOX BELOW:

The contractor submitting this proposal certifies that such contractor

HAS / / HAS NOT / /

participated in a previous contract or subcontract subject to the Equal Opportunity Clause, as required by Executive Orders 10925, 1114 or 11246.

If the contractor checked the "HAS" box above, the following statement must be completed. The contractor submitting this proposal certifies that such contractor

HAS / / HAS NOT / /

filed with the Joint Reporting Committee, the director of OFCC, any Federal Agency or the former President's Committee on Equal Employment Opportunity all reports due under the applicable filing requirements of those organizations. All reports due are considered to be those requested by one of these committees or agencies.

Concurrently, Standard Form 100 (EEO-1) is the only report required by the Executive Orders or their implementing regulations.

Proposed prime contractors and subcontractors who have participated in a previous contract or subcontract subject to the Executive Orders and who have not filed the required reports should note that 41 CFR 60-1.7(b)(1) prevents the award of contracts and subcontracts unless such contractor submits a report covering the delinquent period or such other period specified by the Federal Highway Administration or by the director, Office of Federal Contract Compliance, U. S. Department of Labor.

3. COLLUSION

It is further certified that neither the person, firm, partnership or corporation submitting this bid, nor any of their officers, have directly or indirectly entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this contract.

4. SUSPENSION/DEBARMENT

A. Certification Regarding Debarment, Suspension and Other Responsibility Matters - Primary Covered Transactions

Instructions for Certification

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

The inability of a person to provide the certification required 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 person from participation in this transaction.



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.

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

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 the rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is being submitted for assistance in obtaining a copy of those regulations.

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.

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 Transactions," 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.

A participant in a covered transaction may rely upon a certification of a prospective participant in a lower-tier covered transaction that it 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.

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 a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

Except for transactions authorized under 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 and Other Responsibility Matters - Primary Covered Transactions

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

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

Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain or performing a public (Federal, State or local) 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;

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 the preceding paragraph of this



certification; and have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

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.

B. For Lower-Tier Requirements, see Section XI of "Required Contract Provisions Federal-Aid Construction Contracts" located in the proposal.

Exceptions to the above are to be submitted on a separate sheet with the bid proposal. For any exception noted, indicate to whom it applies, initiating agency and dates of action. Providing false information may result in criminal prosecution or administrative sanctions.

5. LOBBYING RESTRICTIONS

These restrictions were established by Section 319 of Public Law 101-121 Department of the Interior and Related Agencies Appropriations Act for Fiscal Year 1990).

The contractor certifies to the best of his/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.

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 Section 1352, Title 31, U.S. Code. Any person who fails to file this 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.

The contractor also agrees by submitting this proposal that he/she shall require that the language of this certification be included in all lower-tier subcontracts which exceed \$100,000 and that all such subrecipients shall certify and disclose accordingly.

I further certify that I am a properly authorized individual or corporate official, as applicable, to make this certification that the above is true and correct; and that I recognize, by signing this certification, I am also signing the contract proposal on behalf of the contractor in whose name the proposal is made, whether individual, partnership, or corporation as might be applicable.



NOTE: PROVIDED THE BID BOND ON THE FOLLOWING TWO PAGES IS PROPERLY EXECUTED IN THE CONTRACTOR'S NAME, SIGNED BY AN AUTHORIZED OFFICER OF THE CONTRACTOR CORPORATION (OR INDIVIDUAL OR PARTNER, WHEN NOT A CORPORATION), THE SAME MAY MAKE THE FOREGOING CERTIFICATIONS BY SIGNING BEFORE A PROPERLY SWORN NOTARY PUBLIC. THE CERTIFICATIONS MUST BE PROPERLY SWORN TO, SIGNED AND NOTARIZED BELOW.

Signature of Contractor. If the contractor is an INDIVIDUAL, signature of the individual is required; if contractor is a CORPORATION, signature of proper corporate officer is required; if contractor is a PARTNERSHIP, signature of partner is required; if contractor is JOINT VENTURE, appropriate signatures of all contractors are required.

Legal name of Contractor:

Cornerstone Civil Contractors, LLC

(Partnership, Joint Venture, Corporation or Individual)

[Handwritten Signature]

By:

(Signature of Officer or Individual, as applicable)

By:

IF JOINT VENTURE (Signature of Officers or Individual, as applicable)

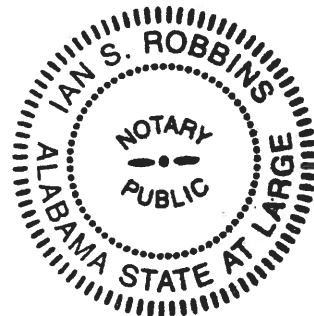
The foregoing certifications are sworn to and subscribed before me on this

29th day of November, 20 17.

My Commission Expires 10/12/2021

[Handwritten Signature]
NOTARY PUBLIC

AWARD WILL NOT BE CONFERRED UNLESS THIS FORM IS COMPLETED AND SIGNED AND WITNESSED BY A NOTARY.





Revised 5/2016

FORM OF BID BOND

KNOW ALL BY THESE PRESENTS: that the contractor, as Principal, and the Surety are held and firmly bound unto the

STATE OF ALABAMA DEPARTMENT OF TRANSPORTATION

as Oblige, in the full and just sum of five percent (5%) of amount bid (Maximum amount - \$50,000.00), lawful money of the United States, for the payment of which sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally firmly by these presents.

WHEREAS, the said Principal is herewith submitting its proposal for Project Number(s) ACOA59443-ATRP(017)

Tuscaloosa County/Countries

The condition of this obligation is such that: if the aforesaid Principal shall be awarded the contract and said Principal will, within the time required, enter into a formal contract and give a good and sufficient bond to secure the performance of the terms and conditions of the contract, then this obligation will be void; otherwise, the Principal and the Surety will pay unto the Oblige the difference in money between the amount of the contract as awarded and the amount of the proposal of the next lowest acceptable bidder, but not to exceed the total amount of the proposal guaranty. If no other bids are received, the full amount of the proposal guaranty shall be retained and/or recovered as liquidated damages for such default.

Witness our hands and seals this 1st day of December, 2017

By: [Signature]
(Signature of Individual Bidder or Officer Authorized to Sign Bids and Contracts for the Firm)

Owner/Manager
Position or Title

By: _____
(Signature of Individual Bidder or Officer Authorized to Sign Bids and Contracts for the Firm)

Position or Title

Comerstone Civil Contractors, LLC
Name of Business, Corporation, Partnership, or Joint Venture

ALABAMA
State of Charter or Incorporation

Travelers Casualty and Surety Company of America
(Name of Surety)

BY: [Signature]
Charles F. Horton, Jr. (Attorney in Fact)

One Tower Square, Hartford, CT 06183
(Address of Surety)



PROPOSAL WILL NOT BE ACCEPTED UNLESS THIS FORM OF BID BOND IS USED AND SIGNED BY PRINCIPAL AND SURETY OR A CASHIER'S CHECK (DRAWN ON AN ALABAMA BANK) IN THE PROPER AMOUNT IS FURNISHED. PLEASE LEAVE ATTACHED IN YOUR BID PROPOSAL.





Alabama Department of Transportation

Special Provisions

REVISED: 11/30/17

PROJECT NO(s). ACOA59443-ATRP(017)

TUSCALOOSA COUNTY, ALABAMA

The Following Special Provisions are supplementary requirements and amendments to the Standard Specifications for Highway Construction. The requirements and amendments given in these Special Provisions take precedence over the requirements given in the Standard Specifications.

S.P. Code	Special Provision Description
005/12	Form FHWA-1273 Required Contract Provisions Federal-Aid Construction Projects
12-0090	Title VI Assurance
12-0091	Non-Discrimination Statutes and Authorities
12-0095(2)	Disadvantaged Business Enterprise (DBE)
12-0097	Required Contract Provision for All Federal Aid Projects for EEO
12-0100-3	Highway Construction Wage Rates in Blount, Calhoun, Etowah, Shelby, St. Clair and Tuscaloosa Counties
12-0107	Waterstop Materials
12-0182(3)	Water Line
12-0198	Combination Bids
12-0220(2)	Roadway Signs
12-0263(3)	Asphalt Pavement
12-0291(2)	Asphalt Materials
12-0300	Concrete Sidewalks and Driveways
12-0309	Soil, Soil Aggregate, and Aggregate, Base and Subbases
12-0325(2)	Working Drawings
12-0351	Steel Reinforcement
12-0352(7)	Structural Steel, Fasteners, and Miscellaneous Metals
12-0354	Sieves for Testing Materials
12-0355	Mineral Filler, Hydrated Lime, Calcium Chloride, Brick, and Blocks
12-0356	Concrete Curing Materials
12-0359	Coatings, Paints, Enamels, and Varnishes
12-0399(3)	Temporary Soil Erosion and Sediment Control
12-0426(3)	Liquidated Damages
12-0521	Definition of Terms
12-0530	Preparation of Proposals
12-0547	Welded Steel Encasement Pipe
12-0599(2)	Asphalt Materials
12-0604	Extension of Contract Time
12-0607	Contractor's Advertisement of Completion
12-0643(2)	Bituminous Material Price Adjustments and Construction Fuel for HMA Production
12-0676(3)	Structural Portland Cement Concrete
12-0737(2)	Structures for Traffic Control Devices and Highway Lighting
12-0769(2)	Extra and Force Account Work
12-0798(2)	Structural Materials for Traffic Control Devices and Highway Lighting
12-0879	Award and Execution of Contract
12-1108	Planting Zones
12-1265	Sanitary Sewers
12-1315	Bituminous Surface Treatments
12-1385	Steel and Iron Products (Buy America)





Alabama Department of Transportation

Special Provisions

REVISED: 11/30/17

PROJECT NO(s). ACOA59443-ATRP(017)

TUSCALOOSA COUNTY, ALABAMA

The Following Special Provisions are supplementary requirements and amendments to the Standard Specifications for Highway Construction. The requirements and amendments given in these Special Provisions take precedence over the requirements given in the Standard Specifications.

S.P. Code	Special Provision Description
12-1597(2)	Preformed Traffic Control Markings
12-1625	Award and Execution of Contract
12-1655	Roadway Pipe Culverts
12-1657(3)	Weight (Mass) Measure for Pay Purposes
12-1726	Cargo Preference Act (Federal-Aid Projects)
12-1799	Mobilization
12-2109(2)	Delay Begin Work Date
12-2318	Cooperation with Utility Companies
12-2330	Ornamental Handrail
12-2331	Traffic Signals
12-2332	Bollards
12-2467	Wood Fence



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: November 10, 2011

Special Provision No. 12-0097

EFFECTIVE DATE: January 1, 2012

SUBJECT: Required Contract Provision for all Federal Aid Projects
for Equal Employment Opportunity

Alabama Standard Specifications, 2012 Edition, are hereby amended to include the following:

In compliance with Executive Order 11246, the following Standard Federal Equal Opportunity Construction Contract Specifications shall apply:

General Requirements

(41 CFR 60-4.3)

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:
 - (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
 - (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
 - (iii) 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
 - (iv) American Indian or Alaskan Native (all persons having origins in any of the 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, 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 7a through 7p of these specifications. The goals set forth in the solicitation from 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. Covered construction contractors performing

construction work in geographical areas where they do not have a federal or federally-assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are as shown on Attachment No. 1. The Contractor is expected to make substantially uniform progress in meeting 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 organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organization's 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 hiring 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 therefore, along with whatever additional actions the Contractor may have taken.
 - d. Provide immediate written notification to the Director 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 areas 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 sources complied under 7b above.
 - f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their co-operation 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 a 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 seek 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 a discriminatory effect by continually monitoring all personnel and employment-related activities to ensure that 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 that assist in fulfilling one or more of their affirmative action obligations (7a through 7p). The efforts of a contractor 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 7a through 7p of these Specifications 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 Contract may be in violation of the Executive Order if a specific minority group of women is under-utilized).
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 suspension, 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 the 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, or these specifications, the Director shall 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 numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g. mechanic, apprentice, 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 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).

Hometown Plans

(41 CFR 60-4.2)

- (a) A contractor participating, either individually or through an association, in an approved Hometown Plan (including heavy highway affirmative action plans) 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 a Contractor is not participating in an approved Hometown Plan it shall comply with the Specifications set forth in §60-4.3 of this part and with the goals and timetables for the appropriate area as listed in the Notice required by 41 CFR 4.2 with regard to that trade. For the purposes of this part 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 labor organization for that trade but the two have not jointly executed a specific commitment to minority and female goals and timetables and incorporated the commitment in the Hometown Plan for that trade:
 - (5) Is 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.
- (b) Contractors participating in Hometown Plans must be able to demonstrate their participation and document their compliance with the provisions of the Hometown Plan.

Solicitations

(41 CFR 60-4.2)

- (d) The following notice shall be included in, and shall be a part of, all solicitations for offers and bids on all Federal and federally assisted construction contracts or subcontracts in excess of \$10,000 to be performed in geographical areas designated by the Director pursuant to §60-4.6 of this part (see 41 CFR-4.2 (a)):

Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246)

1. The Offerer's or Bidder's attention is called to the "Equal opportunity Clause" and the "Standard Federal Equal Employment Specifications" set forth herein.
2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as shown on Attachment No. 1.
 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. With regard to this second area, the contractor also is subject to the goals for both its federally-involved and nonfederally involved construction.
 The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Employment Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CPR Part 60-4. Compliance with the goals will be measured against the total work hours performed.
3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.
4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is that shown on Attachment No. 1.

Show Cause Notice

(41 CFR 60-4.8)

If an investigation or compliance review reveals that a construction contractor or subcontractor has violated the Executive Order, any contract clause, specifications or the regulations in this chapter and if administrative enforcement is contemplated, the Director shall issue to the contractor or subcontractor a notice to show cause which shall contain the items specified in (i) - (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 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.

Attachment No. 1**Goals & Timetables**

(41 CFR 60-4.2)

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

<u>FEMALE</u>		
Area Covered – Statewide		
<u>Timetable</u>	<u>Trade</u>	<u>Goals %</u>
Until Further		
Notice	All	6.9%
<u>MINORITY</u>		
Area Covered – Etowah, Jefferson, Shelby, St. Clair & Walker Counties		
<u>Timetable</u>	<u>Trade</u>	<u>Goals %</u>
Until Further		
Notice	All	24.9%
Area Covered – Autauga, Barbour, Bullock, Butler, Coffee, Coosa, Covington, Crenshaw, Dale, Dallas, Elmore, Geneva, Henry, Houston, Lowndes, Macon, Montgomery, Perry, Pike & Tallapoosa Counties		
<u>Timetable</u>	<u>Trade</u>	<u>Goals %</u>
Until Further		
Notice	All	29.9%
Area Covered – Tuscaloosa County		
<u>Timetable</u>	<u>Trade</u>	<u>Goals %</u>
Until Further		
Notice	All	20.6%
Area Covered – Russell County		
<u>Timetable</u>	<u>Trade</u>	<u>Goals %</u>
Until Further		
Notice	All	29.6%
Area Covered – Franklin, Lawrence & Morgan Counties		
<u>Timetable</u>	<u>Trade</u>	<u>Goals %</u>
Until Further		
Notice	All	11.2%
Area Covered – DeKalb & Jackson Counties		
<u>Timetable</u>	<u>Trade</u>	<u>Goals %</u>
Until Further		
Notice	All	8.6%

Area Covered – Baldwin & Mobile Counties

<u>Timetable</u>	<u>Trade</u>	<u>Goals %</u>
Until Further		
Notice	All	25.9%

Area Covered – Choctaw, Clarke, Conecuh, Escambia, Marengo, Monroe, Washington & Wilcox Counties

<u>Timetable</u>	<u>Trade</u>	<u>Goals %</u>
Until Further		
Notice	All	26.4%

Area Covered – Calhoun County

<u>Timetable</u>	<u>Trade</u>	<u>Goals %</u>
Until Further		
Notice	All	14.3%

Area Covered – Bibb, Blount, Cherokee, Chilton, Clay, Cleburne, Cullman, Fayette, Greene, Hale, Lamar, Marion, Pickens, Randolph, Sumter, Talladega & Winston Counties

<u>Timetable</u>	<u>Trade</u>	<u>Goals %</u>
Until Further		
Notice	All	20.7%

Area Covered – Limestone, Madison & Marshall Counties

<u>Timetable</u>	<u>Trade</u>	<u>Goals %</u>
Until Further		
Notice	All	12.0%

Area Covered – Chambers & Lee Counties

<u>Timetable</u>	<u>Trade</u>	<u>Goals %</u>
Until Further		
Notice	All	31.6%

Area Covered – Colbert & Lauderdale Counties

<u>Timetable</u>	<u>Trade</u>	<u>Goals %</u>
Until Further		
Notice	All	11.9%

DATE: JANUARY 9, 2017

SPECIAL PROVISIONS NO.: 12-0100-3

General Decision Number: AL170002 01/06/2017 AL2

Superseded General Decision Number: AL20160002

State: Alabama

Construction Type: Highway

Counties: Blount, Calhoun, Etowah, Shelby, St Clair and Tuscaloosa Counties in Alabama.

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest areas projects, and railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation; bridges involving marine construction; other major bridges).

----- (THE FOLLOWING NOTE DOES NOT APPLY TO THIS CONTRACT) -----

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.20 for calendar year 2017 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2017. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/06/2017

* SUAL2011-001 01/04/2011

	Rates	Fringes
Carpenter.....	\$ 13.88	
Concrete finisher.....	\$ 13.26	
Electrician.....	\$ 19.73	
Laborers:		
Asphalt Raker.....	\$ 11.23	
Concrete Laborer.....	\$ 10.84	
Grade Checker.....	\$ 12.58	
Guardrail Erector.....	\$ 12.47	
Pipe Layer.....	\$ 12.58	
Side Rail/Form Setter.....	\$ 11.97	

Traffic Control Specialist..\$ 11.27
 Unskilled.....\$ 9.84

Power equipment operators:

Aggregate Spreader.....\$ 14.17
 Asphalt Distributor.....\$ 14.27
 Asphalt Paver.....\$ 11.85
 Asphalt Spreader.....\$ 13.65
 Backhoe, Clamshell,
 Dragline, and Shovel.....\$ 15.87
 Broom (Sweeper).....\$ 11.68
 Bulldozer.....\$ 14.73
 Crane & Derrick.....\$ 20.63
 Front End Loader.....\$ 13.38
 Mechanic.....\$ 17.54
 Milling Machine.....\$ 12.31
 Motor Grader and Motor
 Patrol.....\$ 16.10
 Oiler/Greaseman.....\$ 13.33
 Roller (Self-Propelled).....\$ 12.38
 Scraper.....\$ 13.00
 Striping Machine.....\$ 15.20
 Track Hoe/Excavator.....\$ 14.64
 Tractor and Loader (farm
 rubber tired).....\$ 11.40
 Tractor/Loader (all other
 work).....\$ 11.22

Truck drivers:

Multi-Rear Axle.....\$ 12.25
 Single Rear Axle.....\$ 11.54

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

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 Note: Executive Order (EO) 13706, Establishing Paid Sick Leave
 for Federal Contractors applies to all contracts subject to the
 Davis-Bacon Act for which the contract is awarded (and any
 solicitation was issued) on or after January 1, 2017. If this
 contract is covered by the EO, the contractor must provide
 employees with 1 hour of paid sick leave for every 30 hours
 they work, up to 56 hours of paid sick leave each year.
 Employees must be permitted to use paid sick leave for their
 own illness, injury or other health-related needs, including
 preventive care; to assist a family member (or person who is
 like family to the employee) who is ill, injured, or has other
 health-related needs, including preventive care; or for reasons
 resulting from, or to assist a family member (or person who is
 like family to the employee) who is a victim of, domestic
 violence, sexual assault, or stalking. Additional information

on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

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

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the

wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

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

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

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

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

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

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

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

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

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

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

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

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END OF GENERAL DECISION



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: November 8, 2011

Special Provision No. 12-0107

EFFECTIVE DATE: January 1, 2012

SUBJECT: Waterstop Materials.

Alabama Standard Specifications, 2012 Edition, shall be amended by modifying Section 832 as follows:

SECTION 832 CONCRETE JOINT FILLERS, JOINT AND CRACK SEALANTS, AND WATERSTOP MATERIALS

832.05 Waterstop Materials.

(a) DESCRIPTION.

Waterstops shall be of the size and shape shown on the plans. The material may be either neoprene, polyvinylchloride or strip applied expandable waterstop meeting the requirements given in this Section.

(b) NEOPRENE.

Physical Requirements.

1. Tensile Strength, Method A using die C - 2000 psi {13.78 MPa} Min., ASTM D 412.
2. Ultimate Elongation, Method A using die C - 360 % Min., ASTM D 412.
3. Type A Shore Durometer Hardness - 65 ± 5 , ASTM D 2240.
4. Change in Type A Durometer Hardness, 70 hrs. heat aged @ 158 °F {70 °C} + 15 points

Max., ASTM D 2240.

5. Compression Set, Method B, Max permissible change after 22 hrs. heat aged @ 158 °F {70 °C} 30%, ASTM D 395.

(c) POLYVINYLCHLORIDE.

Physical Requirements.

1. Tensile Strength, Method A using die C - 1750 psi {12.17 MPa} Min., ASTM D 412.
2. Ultimate Elongation, Method A using die C - 300 % Min., ASTM D 412.
3. Type A Shore Durometer Hardness 80 ± 5 ASTM D 2240.
4. Change in Type A Durometer Hardness, 70 hrs. heat aged @ 158 °F {70 °C} + 15 points

Max., ASTM D 2240.

(d) STRIP APPLIED EXPANDABLE WATERSTOP.

Physical Requirements.

1. Specific Gravity - 130-160 , ASTM D 71.
2. Penetration - cone at 77 °F, 150 gm, 5 sec, 40 mm ± 5 , ASTM D 217.
3. Volatile Matter - 1 % Max., ASTM D 6.



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: October 21, 2013

Special Provision No. 12-0182(3)

EFFECTIVE DATE: January 1, 2014

SUBJECT: Water Line.

Alabama Standard Specifications, 2012 Edition, SECTION 641 and SECTION 863 shall be modified as follows:

SECTION 641 WATER LINE

641.03 Construction Requirements.

(a) GENERAL.

2. HYDRANT.

This Item [641.03(a)2] shall be amended by adding the following paragraph thereto:

Each fire hydrant unit shall include 3 feet of piping to attach to the water line. Fire Hydrant Extensions shall be installed to connect the standard fire hydrant unit as shown on the plans to the water line when the line is deeper than the standard 3 foot fire hydrant piping attachment.

(e) BACKFILLING.

This Subarticle [641.03(e)] shall be replaced with the following:

(e) BACKFILLING.

Backfilling shall be performed immediately after inspection as directed by the Engineer to secure the pipe position prior to proceeding to the next section.

The backfill material shall be carefully deposited equally on both sides of the pipe in uniform layers not to exceed 6 inches {150 mm} in compacted thickness to a density of not less than 95 percent of AASHTO T 99 maximum density. Backfill that is not under roadbeds shall be compacted as directed by the Engineer to be consistent with surrounding materials.

Where roadways and other crossings are disturbed, the Contractor shall restore them to their original condition and shall replace all surface material and all paving, sidewalks, sod, or other disturbed surfaces, by furnishing all necessary new materials without extra compensation.

All pipe shall be pressure tested as noted in this Section before complete backfilling of the pipe will be permitted.

All trenches and excavations shall be backfilled with approved natural soil unless shown otherwise on the plans.

After completing the backfill, the Contractor shall promptly remove all surplus material, rubbish, and all equipment, leaving the site and adjacent areas in a neat and presentable condition.

641.05 Basis of Payment.

(a) UNIT PRICE COVERAGE.

Items 641.05(a)2. and 3. shall be replaced with the following:

2. WATER MAIN.

The accepted quantity of water main laid or re-laid will be paid for at the contract unit price per linear foot {meter}, complete in place, which shall be payment in full for furnishing and installing pipe; including joint material, polyethylene sheathing when required, fittings for PVC and HDPE pipe, restrained joint when specified, making necessary pipe connections, pigging, flushing,

testing, excavating, backfilling, backfill material, and for all other materials, tools, labor, equipment and incidentals necessary to complete the work.

3. WATER SERVICE LINE.

The accepted quantity of water service line laid or re-laid will be paid for at the contract unit price per linear foot {meter}, complete in place, which shall be payment in full for furnishing and installing pipe; fittings for PVC pipe only, couplings, and joint material, excavating, backfilling, backfill material, and for all other materials, tools, labor, equipment and incidentals necessary to complete the work.

Items 641.05(a)5, 6, and 7. shall be replaced with the following:

5. FIRE AND FLUSH HYDRANT.

Fire and flush hydrants will be paid for at the contract unit price and include all labor, materials, equipment and incidentals necessary to furnish and install one hydrant. Fire hydrants shall also include 3 feet {1 m} of piping to connect to the water line. Additional piping to connect to depths greater than 3 feet {1 m} will be paid as fire hydrant extension.

6. FIRE AND FLUSH HYDRANT RESET.

Fire and flush hydrant resets will be paid for at the contract unit price which shall be payment for all labor, materials, equipment and incidentals necessary to reset one hydrant complete in place including excavation, backfilling, resetting the fire hydrant and all necessary connections, valves, and pipe. If any new fire hydrant extensions are required, they will be paid for under the appropriate pay item.

7. FIRE HYDRANT EXTENSIONS.

Fire hydrant extensions will be paid for at the contract unit price per linear foot {meter} which shall be payment for all labor, materials, equipment and incidentals necessary to extend one fire hydrant unit to the required water line grade.

(b) PAYMENT SHALL BE MADE UNDER ITEM NO.:

Subarticle 641.05(b) shall be replaced by the following:

(b) PAYMENT SHALL BE MADE UNDER ITEM NO.:

- 641-A ___ inch {mm} * Water ** Laid (***) - per linear foot {meter}
- 641-B ___ inch {mm} * Water ** Relaid (***) - per linear foot {meter}
- 641-C Ductile Iron Fittings - per pound {kg}
- 641-D Fire Hydrant - per each
- 641-E Fire Hydrant Reset - per each
- 641-F Fire Hydrant Extension - per linear foot {meter}
- 641-G Flush Hydrant - per each
- 641-H Flush Hydrant Reset - per each
- 641-I ___ inch {mm} Air Release Valve - per each
- 641-J ___ inch {mm} Gate Valve with Box - per each
- 641-K ___ inch {mm} Butterfly Valve with Box - per each
- 641-L Concrete for Water Mains (Thrust Blocks) - per cubic yard {cubic meter}
- 641-M ___ inch {mm} Retainer Gland - per each
- 641-N ___ inch {mm} x ___ inch {mm} Anchor Tee - per each
- 641-O ___ inch {mm} x ___ inch {mm} Tapping Valve and Sleeve - per each
- 641-P ___ inch {mm} Service Tap - per each
- 641-Q ___ inch {mm} Water Meter and Box Set - per each
- 641-R ___ inch {mm} Water Meter and Box Reset - per each
- 641-S Valve Box Reset - per each

* Show Type of Pipe: Ductile Iron (DI); PolyVinyl Chloride (PVC); Polyethylene (PE); High Density Polyethylene (HDPE); Crosslinked Polyethylene (PEX Type A); Copper.

** Designate One Type: Main or Service Line.

*** Designate Restrained Joint if Required.

SECTION 863

WATER PIPE, FIRE HYDRANTS, VALVES, AND APPURTENANCES

863.01 Ductile Iron Water Pipe.

Ductile Iron pipe shall meet the requirements of AWWA C151 with a minimum working pressure of 150 psi {1030 kPa}. The pipe shall have an inner cement mortar lining meeting AWWA C104 and an outer bituminous coating. The push-on joints shall meet the requirements of AWWA C111. Restrained joints shall meet the requirements of AWWA C110. Lock joint pipe shall meet the requirements of AWWA C151. The pipe length shall be a minimum of 18 feet {5.5 m}.

863.02 Ductile Iron Fittings.

Ductile Iron fittings shall meet the requirements of AWWA C110, AWWA C153, or AWWA C151 when approved by the Engineer. Fittings shall have an inner cement mortar lining meeting AWWA C104 and an outer bituminous coating. Fittings shall have a minimum pressure rating equal to the adjoining pipe installed. For fittings sizes 4 inch {100 mm} through 12 inch {300 mm}, the minimum pressure rating shall be 250 psi {1720 kPa}.

863.03 Copper Water Pipe.

Pipe and fittings shall meet the requirements of ASTM B88 Type K.

863.04 Poly (Vinyl Chloride) (PVC) Plastic Pipe.

Pipe sizes 4 inch {100 mm} to 12 inch {300 mm} shall meet the requirements of AWWA C900 Class 235, DR 18 or heavier. Pipe sizes 14 inch {350 mm} to 48 inch {1200 mm} shall meet the requirements of AWWA C905 Pressure Class 235, DR 18 or heavier. Pipe and fittings sizes smaller than 4 inch {100 mm} shall meet the requirements of PVC 1120, PVC 1220, or PVC 2120 with a minimum cell classification 12454-B for ASTM D2241, SDR 26 or heavier or ASTM 1785 Schedule 40, 80, or 120.

Joints and gasket material shall be as recommended by the pipe manufacturer. Solvent welding of field joints shall only be allowed for pipes 1.5 inches {38 mm} in diameter and smaller.

863.05 Polyethylene (PE) Tubing.

Pipe and fittings 2 inches {50 mm} and smaller shall be made of PE3408 meeting the requirements of ASTM D 2239, minimum SDR 7, ASTM D3350 and AWWA C901.

863.06 High Density Polyethylene(HDPE) Pipe.

HDPE pipe and bends shall meet the requirements of ASTM D1248, ASTM D3350(PE 3408), and ASTM F714. The HDPE pipe shall have a minimum wall thickness determined by the pressure rating required for use.

863.07 Cross-Linked Polyethylene (PEX Type A) Pipe.

Pipe 2 inches {50 mm} and smaller shall meet the requirements of AWWA C 904, Standard Dimension Ratio (SDR) 9, and standard Copper Tube Sizes (CTS). Fittings shall meet the requirements of AWWA C800 and for brass compression sleeve fittings. The pipe shall only be used below ground.

863.08 Gate Valve.

Gate valves shall meet the requirements of AWWA C509. Gate valves shall have o-ring seals. Gate valves shall have a non-rising stem that opens counterclockwise with a 2 inch {50 mm} square nut. Gate valves shall have mechanical joints meeting the requirements of AWWA C-111. The disc shall be SBR coated and the valve body shall be fusion bonded epoxy inside and out. Valves shall be furnished complete with necessary gaskets, bolts, and nuts as needed for mechanical joint ends. Gate valves shall be selected from the Utilities' approved material/manufacturer list.

863.09 Butterfly Valve.

Butterfly valves shall be rubber seated and meet the requirements of AWWA C504. The valve body shall meet the requirements of ASTM A126, Class B or ASTM A48, Class 40. Butterfly valves shall open counterclockwise with a 2 inch {50 mm} square nut. Butterfly valves shall have mechanical joints meeting the requirements of AWWA C-111. The disc shall meet the requirements of ASTM A536 or ASTM A48, Class 40. The rubber mating seat shall be stainless steel. All butterfly valves shall be provided with o-ring seals, nonadjustable stuffing boxes and shall be self-sealing or self-adjusting to allow for

replacing without removing the valve or the valve shaft. Butterfly valves shall be selected from the Utilities' approved material/manufacturer list.

863.10 Valve Boxes and Stem Extensions.

Valve boxes shall be cast iron and provided with all valves that are installed vertically. Valve boxes shall have a minimum diameter of 5 1/4 inches {130 mm}. Box covers shall be marked "water". Valve boxes shall be selected from the Utilities' approved material/manufacturer list. Valve stem extensions shall be provided with all valves that are greater than 3 feet {900 mm} below the adjacent ground surface. The extension stem shall be of the same size as the valve stem and shall be provided with a stem guide.

863.11 Tapping Valve & Sleeve.

Tapping valves shall meet the requirements for gate valves as described in section 863.07. Tapping sleeves shall be ductile iron, cement mortar lined meeting the requirements of AWWA C104, and have a bituminous exterior coat.

863.12 Air Release Valve.

Air release valves shall be as detailed by project plans and specifications.

863.13 Corporation Stop and Curb Stop.

Corporation stops shall meet the requirements of AWWA C800. Curb stops shall have full port openings. Corporation stops and curb stops shall have compression type connections and shall be selected from the Utilities' approved material/manufacturer list.

863.14 Fire Hydrant.

Fire hydrants shall meet the requirements of AWWA C502. Fire hydrant shall have a minimum working pressure of 175 psig {1200 kPa} and a minimum test pressure of 300 psig {2070 kPa}. Fire hydrants shall have two each 2.5 inch {63 mm} nozzles and one each 4.5 inch {114 mm} pumper nozzle. Fire hydrants shall have a 1.5 inch pentagon, one-piece operating nut that opens left. The fire hydrant main valve shall close with pressure. Fire hydrants shall have a 6 inch {150 mm} mechanical joint inlet. All operating parts, including the drain ring, operating nut, hold-down nut, upper valve plate, seat ring, drain lever, and nozzles shall be made of bronze. The bonnet assembly shall provide for an oil or grease reservoir and lubricating system that lubricants all stem threads and bearing surfaces each time the hydrant is operated. The reservoir shall be completely sealed from the waterway and all external contaminants by two each o-ring stem seals. Fire hydrants shall be factory pre-filled with a lubricant suitable for a working temperature range of -60 °F {-51.4 °C} to +150 °F {65.6 °C}. Fire hydrant shall be painted and seal coated as required by the project plans and specifications.

863.15 Flush Hydrant.

Flush Hydrants shall be the type shown on the plans or designated by the Engineer.

**REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS**

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, 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.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

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, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) 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 provisions of the Americans with 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 contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its 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, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program 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 minorities and women.

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 minorities and women 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 minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women 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, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such 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 its 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 their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are

applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

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. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

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 employees who are minorities and women 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 good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. 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 good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith 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 contracting agency 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 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 minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. 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 contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar

with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. 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. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. 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 the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

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

(1) The number and work hours 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; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency 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. The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor

will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics 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 issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions

of paragraph 1.d. of this section; also, 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 29 CFR 5.5(a)(4). 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. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) 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.

b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), 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 Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The 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.

(3) In the event the contractor, the laborers or mechanics to be employed in the 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. The Wage and Hour 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.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. 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 shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as 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.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor 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, so 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 contracting agency 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.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of 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. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) 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 shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b.(1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

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

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each 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 Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) 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 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, 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 FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action 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.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

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 U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or 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 Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen 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 worker 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 on 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 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's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

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 journeymen 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 determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

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 U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman 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 wage rate on the wage determination which provides for less than full fringe benefits for apprentices. 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.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor 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. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. 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.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 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 U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the 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 or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys 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 (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

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 contracting agency. 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 635.116).

a. The term "perform work with its own organization" refers to workers employed or leased 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 or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;

(2) the prime contractor remains responsible for the quality of the work of the leased employees;

(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and

(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

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 or propose 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 VI 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 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 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 contracting agency has assured that each subcontract is

evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

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 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. 3704).

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.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

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, Form FHWA-1022 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:

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 under this title or imprisoned not more than 5 years or both."

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

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

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

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.

2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

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

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier 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 first tier 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 first tier 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 contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier 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," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first 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 entering into this transaction.

g. The prospective first tier 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 Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

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 is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective 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.

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) 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;

(3) 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 (a)(2) of this certification; and

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

b. Where the prospective 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 Participants:

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

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," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

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 exceeding the \$25,000 threshold.

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 is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

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 Participants:

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 participating in covered transactions 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.

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is 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 its bid or proposal that the participant 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 AND MATERIALS PREFERENCE FOR APPALACHIAN DEVELOPMENT HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS ROAD CONTRACTS

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

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 the participant 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, the participant 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 one 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 provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. 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.

ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: March 6, 2015

Special Provision No. 12-0090

EFFECTIVE DATE: April 1, 2015

SUBJECT: Title VI Assurance.

Alabama Standard Specifications, 2012 Edition, shall be revised by the addition of the following:

APPENDIX A, TITLE VI ASSURANCE to FHWA

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

- (1) **Compliance with Regulations:** The contractor (hereinafter includes consultants) will comply with the Acts and Regulations relative to Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.
- (2) **Non-discrimination:** The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate either directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set for in Appendix B of 49 C.F.R. Part 21.
- (3) **Solicitations for Subcontractors, Including Procurements of Materials and Equipment:** In all solicitation, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontractor or supplier will be notified by the contractor of the contractor's obligations under this contract and the Acts and the Regulations relative to Non-discrimination on the grounds of race, color, or national origin.
- (4) **Information and Reports:** The contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the Federal Highway Administration to be pertinent to ascertain compliance with such Acts, Regulations, and instructions.

Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor will so certify to the Recipient or the Federal Highway Administration, as appropriate, and will set forth what efforts it has made to obtain the information.

- (5) **Sanctions for Noncompliance:** In the event of the contractor's noncompliance with Non-discrimination provisions of this contract, the Recipient will impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to:
- a. withholding payments to the contractor under the contract until the contractor complies; and/or
 - b. cancelling, terminating, or suspending a contract, in whole or in part.
- (6) **Incorporating of Provisions:** The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor will take action with respect to any subcontract or procurement as the Recipient or the Federal Highway Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided that if the contractor becomes involved in, or is threatened with litigation by subcontractor, or supplier as a result of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: March 6, 2015

Special Provision No. 12-0091

EFFECTIVE DATE: April 1, 2015

SUBJECT: Non-Discrimination Statutes and Authorities.

Alabama Standard Specifications, 2012 Edition, shall be revised by the addition of the following:

APPENDIX E

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

Pertinent Non-Discrimination Authorities:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq.*, 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 *et seq.*), (prohibits discrimination on the basis of sex);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq.*), as amended, (prohibits discrimination on the basis of disability); and 49 CFR Part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq.*), (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 – 12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;
- The Federal Aviation Administration's Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;

- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).

ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: December 12, 2016

Special Provision No. 12-0095(2)

EFFECTIVE DATE: January 1, 2017

SUBJECT: Disadvantaged Business Enterprise (DBE).

Alabama Standard Specifications, 2012 Edition, SECTION 111 shall be revised as follows:

SECTION 111 DISADVANTAGED BUSINESS ENTERPRISE (DBE)

111.01 Goals.

This contract contains a specific goal for the participation of certified DBEs. The goal is expressed as the percentage of the total amount of the contract that is required for DBE participation and is given in the proposal. This type of participation is defined as Race Conscious.

If no specific percentage is indicated in the proposal, then any DBE firm utilized for work in this contract is defined as Race Neutral. The requirements listed in Article 111.08 and 111.09 still apply to contracts with no specific goal. In addition, any participation by DBEs above the required goal is also defined as Race Neutral.

111.02 Certification.

The Department maintains a current listing of certified DBE firms by categories of work. The Department's certification extends only to the requirements of 49 CFR 26 with regard to business size, disadvantaged status, and ownership and control of business. The certification does not attest in any way to the capabilities or capacity of any business to perform satisfactorily.

DBE firms that are not on the current certification list must seek approval prior to tendering an offer on any project.

111.03 Low Bidder Submittal DBE Utilization Plan.

This contract will be awarded to the lowest responsible bidder. The apparent low bidder must submit within five calendar days of the letting date the following information in writing on Form OE-110 (DBE Utilization Plan) provided by the Department:

- the name and address of the DBE firm or firms;
- the description of the work to be subcontracted;
- the dollar amount of the work;
- a written commitment from the bidder to use the DBE;
- a written confirmation from the DBE that it is participating in the contract as provided in the commitment.

111.04 Failure by Low Bidder to Meet DBE Goal.

In the event the apparent low bidder cannot meet the DBE goal, the low bidder must provide documentation that good faith efforts were made to meet the goal.

111.05 Good Faith Efforts by Low Bidder.

(a) Solicitation of DBE Participation.

A good faith effort is soliciting through all reasonable and available means (e.g., attendance at pre-bid meetings, advertising, written notices, corresponding with the ALDOT's DBE Program Coordinator, placing postings on the Small Business Network of Bid Express) the interest of all certified DBEs who have the capability to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the DBEs to respond to the solicitation. The bidder must

determine with certainty if the DBEs are interested by taking appropriate steps to follow up initial solicitations.

(b) Selecting Portions of the Contract Work to Facilitate DBE Participation.

A good faith effort is selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items in to economically feasible units to facilitate DBE participation, even when the bidder might otherwise prefer to perform these work items with its own forces.

(c) Providing Information About Contract Requirements.

A good faith effort is providing interested DBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

(d) Negotiating in Good Faith.

A good faith effort is negotiating in good faith with interested DBEs. It is the bidder's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBEs to perform the work.

A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBEs is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also, the ability or desire of a bidder to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidders are not, however, required to accept higher quotes from DBEs if the price difference is excessive or unreasonable.

(e) Investigating the Capabilities of a DBE to Perform the Work.

A good faith effort is establishing sound reasons (based on a thorough investigation of the capabilities of a DBE to perform the work) for rejecting a DBE as being unqualified. The bidder's standing within its industry, and membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. nonunion employee status) are not legitimate causes for the rejection or nonsolicitation of bids in the bidder's efforts to meet the project goal.

(f) Providing Assistance in Obtaining Bonding, Credit, and Insurance.

A good faith effort is providing assistance to interested DBEs in obtaining bonding, lines of credit, or insurance as required by the DBE or bidder.

(g) Providing Assistance in Obtaining Equipment, Supplies, and Materials.

A good faith effort is providing assistance to interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.

(h) Utilizing Industry, Governmental, and Service Groups.

A good faith effort is effectively using the services of available minority/women contractors' groups; local, State, and Federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBEs.

111.06 Evaluation of Low Bidder's Good Faith Efforts.

The Department has established a "Good Faith Efforts Committee".

If the Good Faith Efforts Committee determines the information and documentation from the bidder are satisfactory, the bid will be declared responsible. Acceptable good faith efforts may include activities in addition to those that are described in Article 111.05 and 49 CFR Part 26 Appendix A. A low bidder's good faith efforts on other ALDOT construction contracts may be considered in determining the acceptability of the low bidder's good faith efforts to meet current participation goals.

If the information and documentation are unsatisfactory, the bidder will be notified in writing within five days. The bidder will be given the opportunity to appear before the Department's Transportation Director to present additional evidence of good faith efforts. The bidder will then be given a written decision on the outcome of the consideration of this evidence.

Failure to meet the contract goal or demonstrate good faith efforts will result in the bid being declared to be in default and the bid bond shall be forfeited.

111.07 DBE Termination After Award of the Contract.

(a) Notification of Termination.

A prime contractor cannot terminate a DBE subcontractor listed on the DBE Utilization Plan for convenience and then perform the work of the terminated subcontract with its own forces or those of an affiliate, without the Department's prior written consent. If a listed DBE subcontractor fails to perform, or performs unsatisfactorily, the prime contractor will notify the Project Manager in writing, with a copy to the Construction Engineer, stating the reasons for termination with supporting documentation.

(b) Substitution of New DBE for Terminated DBE.

If the reasons for termination are satisfactory, the prime contractor will be required to obtain a substitute DBE and submit a revised DBE Utilization Plan, or demonstrate good faith efforts as described in Articles 111.05 and 111.06 in trying to obtain a substitute DBE. If the prime contractor fails or refuses to comply, the Department reserves the right to issue a warning letter as defined in the DBE Violations (Article 111.09) and/or an order stopping all or part of the payment and work until satisfactory action has been taken.

111.08 Credit for Work Assigned to Meet the DBE Goal.

(a) Value of Work Performed by a DBE.

1. Work Done Directly by DBE Forces.

The dollar amount of that portion of a construction contract that is performed by the DBE's own forces will be counted towards meeting the DBE goal. This dollar amount shall include the cost of supplies and materials obtained by the DBE for the work of the contract, including equipment leased by the DBE. This dollar amount shall not include supplies, materials, and equipment the DBE purchases or leases from the prime contractor or affiliates of the prime contractor. (The term "affiliates" is defined in Subarticle 102.02(a)).

2. Fees and Commissions Charged by a DBE.

The dollar amount of fees or commissions charged by a DBE firm for providing a service, such as professional, technical, consultant, or managerial service, or for providing bonds or insurance specifically required for the performance of the contract will be counted towards meeting the DBE goal. The fee shall be reasonable and not excessive as compared with fees customarily paid for similar services.

3. DBE Obtaining a Subcontract with Lower Tier Subcontractor.

When a DBE subcontracts part of the work of its subcontract to another firm, the value of this work will be counted toward the DBE goal if the DBE's subcontractor is a DBE.

Work that a DBE subcontracts to a non-DBE firm will not be counted toward the DBE goal.

(b) Joint Venture.

When a DBE performs as a participant in a joint venture, the dollar amount of the contract equal to the distinct, clearly defined portion of the work of the contract that the DBE performs with its own forces will be counted toward DBE goal.

(c) Commercially Useful Function.

1. Requirement for a Commercially Useful Function.

The dollar amount of contract work performed by a DBE will only count towards meeting the DBE goal if the DBE performs a "commercially useful function".

2. Definition of a Commercially Useful Function.

A DBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing,

and supervising the work involved. To perform a commercially useful function, the DBE must also be responsible, with respect to materials and supplies used on the contract, for negotiating price, determining quality and quantity, ordering the material, and installing (where applicable) and paying for the material itself. The determination of whether or not a DBE is performing a commercially useful function will be based on the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the contract is commensurate with the work it is actually performing, and the DBE credit claimed for its performance of the work, and other relevant factors.

3. Extra Participation (Not a Commercially Useful Function).

A DBE does not perform a commercially useful function if its role is limited to that of an extra participant in a transaction, contract, or project through which funds are passed in order to obtain the appearance of DBE participation. The determination of whether or not a DBE is an extra participant will be based on similar transactions, particularly those in which DBEs do not participate.

4. Insufficient Participation (Not a Commercially Useful Function).

If a DBE does not perform or exercise responsibility for at least 30 % of the total cost of its contract with its own work force, or the DBE subcontracts a greater portion of the work than would be expected on the basis of normal industry practice for the type of work involved, the DBE is not performing a commercially useful function.

5. Consideration of Trucking as a Commercially Useful Function.

The following factors will be given consideration in determining whether or not a DBE trucking company is performing a commercially useful function:

a. Responsibility for Management and Supervision of Trucking.

The DBE must be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract, and there cannot be a contrived arrangement for the purpose of meeting DBE goals.

b. Truck Ownership and Operation.

The DBE must own and operate at least one fully licensed, insured, and operational truck used on the contract.

c. Credit for Transportation Services.

The DBE will receive credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs.

d. Leasing from DBE Firm.

The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE will receive credit for the total value of the transportation services the lessee DBE provides on the contract.

e. Leasing from Non-DBE Firm.

The DBE may also lease trucks from a non-DBE firm, including an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit only for the fee or commission it receives as a result of the lease arrangement. The DBE does not receive credit for the total value of the transportation services provided by the lessee, since these services are not provided by a DBE.

f. Exclusive Use of Truck During Lease.

To receive credit for trucking, it must be clearly shown on a lease that the DBE has exclusive use of, and control over the truck. This does not preclude the leased truck from being used for work for others during the term of the lease with the consent of the DBE, so long as the lease gives the DBE absolute priority for use of the leased truck. Leased trucks must display the name and identification number of the DBE.

g. Lease Agreement Documentation

A copy of each lease agreement, both for DBE firms and non-DBE firms, must be submitted with the DBE Utilization Plan if the DBE Trucking company intends on utilizing

a this type of trucking participation or with the first Form DBE-10 submittal after the lease agreement is executed and utilized on the contract.

6. Consideration of Appeal by DBE that Work is a Commercially Useful Function.

When it is determined that a DBE is not performing a commercially useful function the prime contractor and the DBE will be given the opportunity to provide documentation to rebut this determination.

The Department's decisions concerning commercially useful functions are subject to review by other entities but are not administratively appealable to the USDOT.

(d) Materials and Supplies Counted Toward Meeting the DBE Goal.

1. DBE Manufacturer.

If the materials or supplies are obtained from a DBE manufacturer, 100 % of the cost of the materials or supplies will be counted toward meeting the DBE goal.

A DBE manufacturer shall be defined as a firm that operates or maintains a factory or establishment that produces, on the premises, the materials, supplies, articles, or equipment required under the contract.

2. DBE Regular Dealer.

If the materials or supplies are purchased from a DBE regular dealer, 60 % of the cost of the materials or supplies will be counted toward meeting the DBE goal.

A DBE regular dealer shall be defined as a firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials, supplies, articles or equipment of the general character described by the specifications and required under the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business.

To be a DBE regular dealer, the firm must be an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question.

A person may be a DBE regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating, or maintaining a place of business if the person both owns and operates distribution equipment for the products. Any supplementing of regular dealers' own distribution equipment shall be by a long-term lease agreement and not on an ad hoc or contract-by-contract basis. In addition, the regular dealer, with the exception of steel, must be certified in accordance with the Department's program for the Materials, Sources and Devices with Special Acceptance Requirements Manual.

Packagers, brokers, manufacturers' representatives, or other persons who arrange or expedite transactions are not DBE regular dealers.

3. Brokers

With respect to materials or supplies purchased from a DBE which is neither a DBE manufacturer nor a DBE regular dealer, the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site, will count toward the DBE goal if the fees are reasonable and not excessive as compared with fees customarily allowed for similar services.

The cost of the materials and supplies will not be counted toward the DBE goal.

(e) Certification at the Time of the Execution of the Contract.

If a firm is not currently certified as a DBE at the time of the execution of the contract, the firm's participation in the contract will not be counted toward the DBE goal.

When a prime contractor has made a commitment to using an ineligible firm (one decertified by the Department) and a subcontract has not been executed before the Department issued the decertification notice, work by the ineligible firm does not count toward the contract goal. The prime contractor must meet the contract DBE goal with an eligible DBE firm or demonstrate that he has made good faith efforts to do so.

If a prime contractor has executed a subcontract with an ineligible firm before the Department issued the decertification notice, the prime contractor may continue to use the firm on the contract and may continue to count the firm's participation toward the contract DBE goal.

(f) Payments Considered Applicable to the DBE Goal.

The participation of a DBE subcontractor toward meeting the DBE goal will only be counted toward the goal after the compensation for the work has been paid to the DBE.

(g) Reporting DBE Performance.

1. Monthly Estimate Report.

To document the DBE participation for the contract, the prime contractor shall furnish the Project Manager an ALDOT FORM DBE-10 for each estimate period. In the case of contracts with more than one project, a Form DBE-10 shall be submitted for each project estimate. The prime contractor shall provide the required data for each DBE active on the project during the estimate period. If no DBE was active during the time period, such indication should be made on the form.

Form DBE-10 shall be submitted on all Federal aid projects regardless of whether or not the contract contains a specific DBE goal.

The Form DBE-10 shall be submitted within sixty calendar days of the close of the estimate period for which it applies. Failure to furnish the Form DBE-10 in a timely manner may result in the withholding of further monthly estimates until the delinquent information has been submitted.

2. Monthly Estimate Documentation.

For DBE Manufacturers, Dealers, and Broker (including any fee/commission service work), a copy of the paid invoice shall be submitted with the DBE-10 form work for which the work performed and services provided applies. For DBE Truckers who haul materials from a commercial facility such as a quarry to the plant for stocking purposes for the production of materials for the contract, a copy of each haul ticket shall be provided to the Project Manager with the DBE-10 form. This documentation is to verify the work performed for this contract.

3. Final Report.

Prior to the submission of the final estimate voucher for signing, the prime contractor shall furnish a final Form DBE-10 for each DBE subcontractor. This final Form DBE-10 shall be submitted to document any changes in the quantities of work performed by the DBE since the project completion due to the final quantities review and resulting payment adjustments. This form shall be submitted with the information required in Subarticle 109.12(c).

4. Certification of Actual Payments Form.

Prior to the submission of the final estimate voucher for signing, the prime contractor shall furnish a Certification of Actual Payments to DBE Firms form for each DBE subcontractor. This form shall be submitted with the signature of an authorized representative of the DBE in order to document the total amount paid to the DBE firm as indicated on the final Form DBE-10. In the event that the DBE firm has gone out of business and is unavailable to sign the form, the prime contractor shall submit copies of the subcontractor estimates and cancelled checks verifying the amount paid to the DBE firm. This form shall be submitted with the information required in Subarticle 109.12(c).

111.09 DBE Violations.

(a) Descriptions of Violations.

1. Violations by Bidders and Prime Contractors.

Possible violations by bidders and prime contractors include, but are not limited to, failure to provide the DBE Utilization Plan within five calendar days of the letting date, failure to meet the contract goal, failure to make good faith efforts, deleting DBE subcontractors for convenience, improper DBE participation credit reports, continued failure to furnish Form DBE-10 reports, failure to comply with Department decisions and directives concerning DBE activities, and fraud.

2. Violations by DBE Subcontractors.

Possible violations by DBE subcontractors include those listed in 49 CFR Part 26.107 as well as failure to fulfill contract commitments and negotiations.

3. Determination of Violations.

These violations are only possible examples and not all inclusive. The Department reserves the right to determine exact violations and the extent of each violation on a case-by-case basis.

(b) Violations Prior to Award of the Contract.

Failure by the apparent low bidder to provide the DBE Utilization Plan within the time frame specified, or failure of the apparent low bidder to make and document good faith efforts will result in the contract not being awarded to that bidder and forfeiture of its bid bond.

The next low bidder will become the new low bidder and will have five calendar days from notification by the Department to provide the DBE Utilization Plan. Failure to provide the required DBE Utilization Plan or to make and document good faith efforts will result in the contract not being awarded to that bidder and forfeiture of its bid bond.

If the contract is awarded to the next low bidder, the original low bidder will be prohibited from doing any work relating to the contract either as subcontractor or in any other capacity.

These restrictions shall apply to any other name under which the same person, individual, partnership, company, firm, corporation, association, cooperative, affiliate, or other legal entity may be operating, and in which the principal owner(s) are involved.

(c) Violations While the Contract is in Effect.

For the first violation of the DBE requirements, a letter will be written to the prime contractor and/or the DBE, if applicable, citing the violation and warning that failure to rectify the violation or further violations will result in disqualification as outlined in Subarticle 102.02(b).

The second violation will result in the prime contractor and/or the DBE subcontractor being disqualified as outlined in Subarticle 102.02(b) for an indefinite period. The disqualification may be reviewed each six months, if requested in writing by the disqualified firm.

The third violation will result in the prime contractor and/or the DBE subcontractor being disqualified as outlined in Subarticle 102.02(b) for an indefinite period. The disqualification will be for at least one year. It may be reviewed after one year, if requested in writing by the disqualified firm.

An exception to the above is that an open and flagrant violation. The prime contractor and/or the DBE subcontractor will not be issued a warning letter, and the prime contractor and/or DBE subcontractor will be summarily disqualified as outlined in Subarticle 102.02(b) for at least six months. The disqualification may be reviewed after such time, if requested in writing by the disqualified firm. If applicable, the DBE subcontractor's continued status as a certified DBE will be recommended to the Department's DBE Review Committee for review.



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: February 29, 2012

Special Provision No. 12-0198

EFFECTIVE DATE: April 1, 2012

SUBJECT: Combination Bids.

Alabama Standard Specifications, 2012 Edition, SECTION 102 shall be revised as follows:

SECTION 102 PROPOSAL REQUIREMENTS AND CONDITIONS

102.08 Combination Bids.

(b) COUNTY FINANCED PROJECTS.

This Subarticle (102.08(b)) shall be replaced by the following:

(b) CITY AND COUNTY FINANCED PROJECTS.

Combination bids will not be accepted on any project or projects wholly or partially financed by a city unless all of the projects in the combination bid are city financed projects located in the same city.

Combination bids will not be accepted on any project or projects wholly or partially financed by a county unless all of the projects in the combination bid are county financed projects located in the same county.



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: May 16, 2016

Special Provision No. 12-0220(2)

EFFECTIVE DATE: August 1, 2016

SUBJECT: Roadway Signs.

Alabama Standard Specifications, 2012 Edition, Section 710 and Section 880 shall be amended as follows:

SECTION 710 ROADWAY SIGNS

710.01 Description

Article 710.01 shall be replaced by the following:

710.01 Description

(a) General

This Section shall cover the work of furnishing and erecting roadway signs of the various types, sizes, wording, marking, etc., detailed by the plans in accordance with the latest edition of the MUTCD except as modified herein or by the plan details. The type and number of signs, sign supports, backing frames when required, foundations and reflectorization to be furnished and installed shall be as detailed on the plans. Concrete foundations, when required, shall be constructed as shown on the plans or as directed by the Engineer.

(b) Types and Classes of Signs

The items of work for Roadway Signs will indicate whether the sign is of a reflectorized or non-reflectorized type, and the kind of backing material.

Sheeting used in the fabrication of sign faces shall be one of the following types unless required otherwise on the plans or in the proposal:

TYPES AND DESCRIPTIONS OF SIGN SHEETING	
Type I	Medium-intensity retroreflective sheeting, "engineering grade"
Type I-N	Non-reflective sheeting
Type II	Medium-high-intensity retroreflective sheeting, "super engineering grade"
Type III	High-intensity retroreflective sheeting
Type IV	High-intensity retroreflective sheeting, "microprismatic"
Type V	Super-high-intensity retroreflective sheeting, "microprismatic"
Type VI	Elastomeric high-intensity retroreflective sheeting without adhesive, "microprismatic"
Type VII	Sheeting previously classified as Type VII has been reclassified as Type VIII. The designation of Type VII has been discontinued. (ASTM D 4956-09)
Type VIII	Super-high-intensity retroreflective sheeting (ASTM D 4956 Table 2) , "microprismatic"
Type IX	Very-high-intensity retroreflective sheeting, "microprismatic"
Type X	Sheeting previously classified as Type X has been reclassified as Type VIII. The designation of Type X has been discontinued. (ASTM D 4956-09)
Type XI	Super-high-intensity unmetallized cube corner microprismatic retroreflective sheeting. (ASTM D 4956-09, Table 10)

CLASSES AND DESCRIPTIONS OF SIGNS	
Class 1	Non-reflectorized Background with Type III Reflectorized Demountable Copy
Class 1A	Non-reflectorized Background with Non-Reflectorized Demountable Copy
Class 2	Type III or IV Reflectorized Sheeting Background with the same Type Reflectorized Sheeting Demountable or Cut-Out Copy
Class 2A	Type III or IV Reflectorized Sheeting Background with Non-Reflectorized Demountable or Cut-Out Copy. For Multiple Extruded Panels, Type XI Reflectorized Sheeting Background with Digital Printing is also allowable.
Class 3	Non-reflectorized Background with Screen Copy
Class 4	Type III or IV Reflectorized Background with Screen Copy
Class 5	Type IV, or VIII Reflectorized Sheeting Background with Screen Copy
Class 6	Type III or IV Reflectorized Sheeting Background with Type VIII or IX Reflectorized Sheeting Demountable or Cut-out Copy. For Multiple Extruded Panels, Type XI Reflectorized Sheeting Background with Digital Printing is also allowable.
Class 7	Type IV, VIII, or IX Reflectorized Sheeting Background with Screen Copy
Class 8	Type VIII or IX Reflectorized Sheeting Background with Screen Copy

When the Contractor has the choice of selecting the sheeting Type within a respective Class, the mixing of different sheeting types on signs on the same project will not be allowed unless shown otherwise on the plans or in the proposal.

(c) Methods of Fabrication.

In addition to the Classes noted above, signs will be designated by the method of fabrication as follows:

1. Flat Panel.

A sign face which can be fabricated from a single sheet of material normally not in excess of 4 feet {1200 mm} in width.

2. Multiple Flat Panel.

A sign face which because of size cannot be fabricated from a single sheet of material. These panel sections shall be fabricated from sheets not less than 4 feet {1200 mm} in width, except that only one sheet for any one sign may be cut to less than 4 feet {1200 mm} in width to fabricate signs which are not multiples of 4 feet {1200 mm} in width. Multiple flat panel sign sections shall run from top edge to bottom edge of sign face without horizontal joints, except that signs greater than 11 feet {3.4 m} in height may have a horizontal joint but no sign shall have more than one horizontal joint.

The use of material sheets of greater width than the minimum 4 feet {1200 mm} noted to form sign panels will be acceptable; however, the backing, support, etc. must conform to the plan requirements for this classification of panel.

All panel joints shall be provided with backing strips firmly affixed to the sign to keep the panel sections in proper alignment as detailed on the plans.

3. Multiple Extruded Panels

Multiple panel signs may be made of extruded sections. All extruded sections shall be 12 inches {300 mm} wide mounted horizontally and shall have no vertical joints. All panels shall be flat and straight. Multiple extruded panel signs shall be limited to Class 6 and Class 2A signs. Exceptions will be made to allow 6 inch {150 mm} wide extruded sections in cases where the height of a sign or exit panel dictates. There shall not be more than one 6 inch {150 mm} wide panel allowed per individual sign or exit panel.

4. Aluminum Laminated Panels.

These sign face panels shall consist of sheet aluminum laminated to a honeycomb core, sealed completely around the perimeter with an extruded aluminum frame to form a surface of the length, width and depth required.

5. Aluminum Louvered Panels.

These sign face panels shall consist of aluminum louvers assembled in such a manner as to provide a rigid sign panel which will have a wind loading normal to the face of the sign of at least 50 percent less than that of a solid panel of the same size and yet provide an opaque background when viewed from an angle of 10° or less below the horizontal line of sight.

710.03 Construction Requirements.

(b) Staking out Signs.

Subarticle 710.03(b) shall be replaced with the following:

(b) Staking out Signs.

The Contractor shall not order posts until the length has been established in the field. If Geometric Controls are not set up, the Engineer shall stake out the location of each sign along the work. The Contractor, however, will be required to check all dimensions and clearances measured from such stakes and shall thereafter become responsible for orientation, elevation, offset and level of all signs erected. If Geometric Controls are set up, the contractor shall stake out the location of each sign along the work. The Contractor shall not order posts until the Engineer has reviewed the sign locations as staked. The Contractor will be required to provide all dimensions and clearances measured from such stakes and shall thereafter become responsible for orientation, elevation, offset and level of all signs erected

710.05 Basis of Payment.

(b) Payment will be made under Item No.:

Subarticle 710.05(b) shall be replaced by the following:

(b) Payment will be made under Item No.:

- 710-A Class *, ** Sign Panels *** - per square foot {square meter}
 - 710-B Roadway Sign Post (Description & Size) - per linear foot {meter}
 - 710-C Removal of Existing Roadway Signs - per lump sum
- * Appropriate Class
 - ** Aluminum Flat
Steel Flat
Aluminum Multiple Flat
Aluminum Multiple Extruded
Steel Multiple Flat
Aluminum Laminated
Aluminum Louvered
 - *** Approximate thickness of panel material desired.

SECTION 880 SIGN MATERIALS

880.04 Sign Supports.

(a) Ground Mounted Sign Supports.

2. Steel Posts.

d. Post Finish.

Subitem 880.04(a)2d shall be replaced with the following:

d. Post Finish.

Standard posts shall be hot dipped zinc galvanized after fabrication in accordance with ASTM A 123 for beam shape and ASTM A 53 for tubular shape.

Light weight {mass} or bendaway posts shall be zinc galvanized in accordance with the following:

- "U" Channel Section - ASTM A 123 after fabrication.
- Tubular Section - ASTM A 553, Grade G90 or better. An alternate coating may be an in-line hot dip galvanized zinc coating per ASTM B 6, followed by a chromate conversion coating and cross-linked polyurethane acrylic exterior coating, with the inside surface given a double in-line application of a full zinc-based organic coating.



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: May 13, 2014

Special Provision No. 12-0263(3)

EFFECTIVE DATE: June 1, 2014

SUBJECT: Asphalt Pavement.

Alabama Standard Specifications, 2012 Edition, shall be amended by modifying Section 106 and by replacing Sections 410, 420, 423, and 424 as follows:

SECTION 106 CONTROL OF MATERIALS

106.09 Quality Control and Quality Assurance (QC/QA) Requirements for Hot Mix Asphalt (HMA) Pavement.

Article 106.09 shall be replaced with the following:

106.09 Quality Control and Quality Assurance (QC/QA) Requirements for Hot Mix Asphalt (HMA) Pavement.

(a) GENERAL.

The following modifications apply only to the materials and work performed under Sections 327, 410, 420, 423 and 424.

In all cases, the Department's testing will be separate from the Contractor's testing and both shall be conducted by certified technicians.

All Quality Control aspects of this provision shall be the responsibility of the Contractor. Quality Control is defined as the activities that are related to the production of Hot Mix Asphalt Pavement which meet all the requirements of the Specifications, including mix design, process control testing, sampling and acceptance testing (when so designated by the Department) for determination of Pay Factors, and necessary adjustments to the production process.

All Quality Assurance aspects of this provision shall be the responsibility of the Department and will be accomplished in the following ways:

1. By conducting assurance/verification testing, on a random basis, of independent samples obtained by the Department, at a frequency of one or more per day;
2. By periodically observing tests performed by the Contractor;
3. By monitoring required Contractor control charts exhibiting test results of control parameters.

All Superpave Gyrotory Compactors shall have their angle of gyration verified by the Engineer following the procedure in AASHTO T 344, "Standard Method of Test for Evaluation of Superpave Gyrotory Compactor (SGC) Internal Angle of Gyration Using Simulated Loading". This includes all design, quality control, and quality assurance SGCs. The compactors shall tilt the specimen molds at an average internal angle of 20.2 ± 0.35 mrad (1.16 ± 0.02 degrees).

(b) QUALITY CONTROL.

The Contractor shall provide and maintain a quality control system that will provide reasonable assurance that all materials, products, and completed construction submitted for acceptance conform to contract requirements whether manufactured or processed by the Contractor or procured from subcontractors or vendors. Quality control managers, laboratory technicians and roadway technicians will be certified by the Department as outlined in ALDOT-374, "Certification Requirements for Hot Mix Asphalt Technicians". This quality control system shall conform to ALDOT-375, "Contractor Quality Control System for Hot Mix Asphalt".

The sampling and testing frequencies shall conform to the requirements given in Table 1 for a pay item when the accumulated amount of asphalt mix placed for that pay item exceeds 250 tons {250 metric tons}. The accumulated amount of asphalt mix shall be the current total amount of asphalt mix that has been placed beginning from the start of construction. The sampling and testing frequencies given in Table 1 may be waived by the Division Materials Engineer and the asphalt mix may be accepted by visual observation for a maximum accumulated asphalt mix placement quantity of 250 tons {250 metric tons} or less for any individual pay item. The Engineer will record the results of the acceptance of the asphalt mix on form BMT-16 if sampling and testing is not required.

SECTION 327 E and 420 MIXES						
SAMPLING AND TESTING REQUIREMENTS FOR QC/QA PROJECTS						
Control Parameter	Sample Size	Sampling Methods	Sampling Location	Testing Methods	ALDOT Testing Frequency	Contractor Testing Frequency
1. Asphalt Content *	ALDOT Sample = 55 lb {25 kg} Split into 2 equal samples	AASHTO T 168 & ALDOT-210	+Loaded Truck	ALDOT-354 or AASHTO T 308 ***	1 per day per LOT	++ 1 per 700 tons
2. Mixture Gradation **	Contractor Sample = 55 lb {25 kg} Split into 2 equal samples	AASHTO T 168 & ALDOT-210	+Loaded Truck	ALDOT-371 AASHTO T 308	1 per day per LOT	++ 1 per 700 tons
3. Asphalt Draindown	12 lb {5 kg}	AASHTO T 168 & ALDOT-210	+Loaded Truck	AASHTO T 305	As Required	As Required
<p>* See ALDOT-353 Determining H.M.A. Laboratory Quality Control / Assurance Parameters.</p> <p>** If the test results are out of specification tolerance on two consecutive tests for the same size sieve, production shall cease until proper plant adjustments are made.</p> <p>+ Beginning each production day, no sample for acceptance purposes shall be taken prior to the production of 50 tons. If the random number selected falls within the first 50 tons, the sample shall be taken from the first loaded truck following the truck containing the fiftieth ton produced.</p> <p>++ One sample for each 500 tons {500 metric tons} for Section 420 mixes.</p> <p><u>Note:</u> The testing increment shall have a 150 ton buffer between each increment.</p> <p>+++ Under AASHTO T 308, mixture calibration shall be used. The ignition furnace shall be equipped with an internal weighing system with microprocessor control where sample weight {mass} and percent weight {mass} loss is computed and produced on hard-copy output.</p>						

TABLE I (CONT'D.) SECTION 423 MIXES (STONE MATRIX ASPHALT)
SAMPLING AND TESTING REQUIREMENTS FOR QC/QA PROJECTS

Control Parameter	Sample Size	Sampling Methods	Sampling Location	Testing Methods	ALDOT Testing Frequency	Contractor Testing Frequency
1. Asphalt Content *	ALDOT Sample = 90 lb {40 kg} Split into 2 equal samples Contractor Sample = 90 lb {40 kg} Split into 2 equal samples	AASHTO T 168 & ALDOT-210	+Loaded Truck	ALDOT-354 or AASHTO T 308 +***	1 per day per LOT	++ 1 per 700 tons
2. Maximum Specific Gravity *		AASHTO T 168 & ALDOT-210	+Loaded Truck	AASHTO T 209 (Flask determination with dry back)	1 per day per LOT	++ 1 per 700 tons
3. Air Void Content & VMA *		AASHTO T 168 & ALDOT-210	+Loaded Truck	ALDOT-353 & ALDOT-307	1 per day per LOT	++ 1 per 700 tons
4. Mixture Gradation **		AASHTO T 168 & ALDOT-210	+Loaded Truck	ALDOT-371 AASHTO T 308	1 per day per LOT	++ 1 per 700 tons
5. Retained Tensile Strength Note: The TSR test is not required for any pay item less than a full lot.	25 lb {12 kg}	AASHTO T 168 & ALDOT-210	+Loaded Truck	ALDOT-361	1 set of 6 for the first full lot (2,800 tons {2,800 metric tons}) and 1 set of 6 for the next 10,000 tons {10,000 metric tons} and 1 set of 6 for each additional 20,000 tons {20,000 metric tons} or portion thereafter	1 set of 6 for the first full lot (2,800 tons {2,800 metric tons}) and 1 set of 6 for the next 10,000 tons {10,000 metric tons} and 1 set of 6 for each additional 20,000 tons {20,000 metric tons} or portion thereafter
6. Mat Density *		ALDOT-210	Roadway	ALDOT-222 & ALDOT-350		As per Contractor's QC plan (ALDOT-375)
				ALDOT-403 AASHTO T 166 Method A AASHTO T 275 AASHTO T 331	** 1/3000 lane feet/lift {1/900 lane m/lift	
7. Clay Content	Adequate Quantity	AASHTO T 2	Aggregate Stockpiles	AASHTO T 176	As required	As required
8. Asphalt Draindown	12 lb {5 kg}	AASHTO T 168 & ALDOT-210	+Loaded Truck	AASHTO T 305	As Required	As Required

* See ALDOT-353 Determining H.M.A. Laboratory Quality Control / Assurance Parameters.
 ** If the test results are out of specification tolerance on two consecutive tests for the same size sieve, production shall cease until proper plant adjustments are made.
 ** Cores shall be taken by the Contractor and the density will be determined by the Department.
 + Beginning each production day, no sample for acceptance purposes shall be taken prior to the production of 50 tons. If the random number selected falls within the first 50 tons, the sample shall be taken from the first loaded truck following the truck containing the fiftieth ton produced.
 ++ The sample shall be one set of three Marshall samples or one set of two gyratory samples +*+.
 Note: The testing increment shall have a 150 ton buffer between each increment.
 +*+ When slag is used as an aggregate in the mixture, four Marshall samples or three gyratory samples shall be compacted. The test result the furthest away from the average of the four test results shall be discarded and the remaining three test results shall be averaged for use in the computation of air voids.
 +*+* Under AASHTO T 308, mixture calibration shall be used. The ignition furnace shall be equipped with an internal weighing system with microprocessor control where sample weight {mass} and percent weight {mass} loss is computed and produced on hard-copy output.

TABLE I (CONT'D.)		SECTION 424 MIXES				(SUPERPAVE)	
SAMPLING AND TESTING REQUIREMENTS FOR QC/QA PROJECTS							
Control Parameter	Sample Size	Sampling Methods	Sampling Location	Testing Methods	ALDOT Testing Frequency	Contractor Testing Frequency	
1. Asphalt Content *	ALDOT Sample = 135 lb {60 kg} Split into 2 equal samples	AASHTO T 168 & ALDOT-210	+Loaded Truck	ALDOT-354 or AASHTO T 308 ****	1 per day per LOT	++ 1 per 700 tons	
2. Maximum Specific Gravity *		AASHTO T 168 & ALDOT-210	+Loaded Truck	AASHTO T 209 (Flask determination with dry back)	1 per day per LOT	++ 1 per 700 tons	
3. Air Void Content & VMA	Contractor Sample = 135 lb {60 kg} Split into 2 equal samples	AASHTO T 168 & ALDOT-210	+Loaded Truck	ALDOT-384 ALDOT-388 ALDOT-353	1 per day per LOT	++ 1 per 700 tons	
% Gmm @ Nd *		AASHTO T 168 & ALDOT-210	+Loaded Truck	ALDOT-371 AASHTO T 308	As needed	++ 1 per 700 tons	
4. Mixture Gradation & Dust to Asphalt Ratio *		AASHTO T 168 & ALDOT-210	+Loaded Truck		1 per day per LOT	++ 1 per 700 tons	
5. Retained Tensile Strength Note: The TSR test is not required for any pay item less than a full lot.	25 lb. {12 kg}	AASHTO T 168 & ALDOT-210	+Loaded Truck	ALDOT-361	1 set of 6 for the first full lot (2,800 tons {2,800 metric tons}) and 1 set of 6 for the next 10,000 tons {10,000 metric tons} and 1 set of 6 for each additional 20,000 tons {20,000 metric tons} or portion thereafter	1 set of 6 for the first full lot (2,800 tons {2,800 metric tons}) and 1 set of 6 randomly for the next 10,000 tons {10,000 metric tons} and 1 set of 6 for each additional 20,000 tons {20,000 metric tons} or portion thereafter	
6. Mat Density *		ALDOT-210	Roadway	ALDOT-222 & ALDOT-350 ALDOT-403 AASHTO T 166 Method A AASHTO T 275 AASHTO T 331	° ° 1/3,000 lane feet/lift {1/900 lane m/lift}	As per the Contractor's QC plan (ALDOT-375)	
7. Fine Aggregate Angularity ** FAA Note: The FAA test is not required for any pay item less than a full lot.	Adequate quantity to run AASHTO T 304, Method A or ASTM C 1252, Method A	AASHTO T 2	+Loaded Truck	AASHTO T 304, Method A Or ASTM C 1252, Method A	1 for the first full lot (2,800 tons {2,800 metric tons}) and 1 for the next 10,000 tons {10,000 metric tons} and 1 for each additional 20,000 tons {20,000 metric tons} or portion thereafter	1 for the first full lot (2,800 tons {2,800 metric tons}) and 1 randomly for the next 10,000 tons {10,000 metric tons} and 1 randomly for each additional 20,000 tons {20,000 metric tons} or portion thereafter	
8. Clay Content	Adequate quantity	AASHTO T 2	Stockpile	AASHTO T 176	As required	As required	
9. Asphalt Draindown	12 lb {5kg}	AASHTO T 168 & ALDOT-210	+Loaded Truck	AASHTO T 305	As Required	As Required	
10. Split Tensile **	35 lb. {17 kg}	AASHTO T 168 & ALDOT-210	+Loaded Truck	ALDOT 361 (Report the Unconditioned Sample for Split Tensile)	N/A	1 for the first full lot and 1 randomly for each additional 10,000 tons thereafter	

TABLE I (CONT'D.)	SECTION 424 MIXES	(SUPERPAVE)
SAMPLING AND TESTING REQUIREMENTS FOR QC/QA PROJECTS		
* See ALDOT-353 Determining H.M.A. Laboratory Quality Control / Assurance Parameters.		
** In virgin mixes, the sample may be taken from the cold feed conveyor.		
*** If the test results are out of specification tolerance on two consecutive tests for the same size sieve, production shall cease until proper plant adjustments are made.		
** Cores shall be taken by the Contractor and the density will be determined by the Department.		
+ Beginning each production day, no sample for acceptance purposes shall be taken prior to the production of 50 tons. If the random number selected falls within the first 50 tons, the sample shall be taken from the first loaded truck following the truck containing the fiftieth ton produced.		
++ The sample shall be one set of two gyratory samples+++.		
<u>Note:</u> The testing increment shall have a 150 ton buffer between each increment.		
+++ When slag is used as an aggregate in the mixture, three gyratory samples shall be compacted. The test result the furthest away from the average of the three test results shall be discarded and the remaining two test results shall be averaged for use in the computation of air voids.		
++++ Under AASHTO T 308, mixture calibration shall be used. The ignition furnace shall be equipped with an internal weighing system with microprocessor control where sample weight {mass} and percent weight {mass} loss is computed and produced on hard-copy output.		

(c) QUALITY ASSURANCE.

1. ACCEPTANCE PROCEDURES.

All materials will be evaluated for acceptance and payment through the Department's Acceptance Procedures specified herein. The Department will be responsible for determining the acceptability and pay factor of the construction and materials incorporated therein.

The Department will utilize the Contractor's QC System test results for liquid asphalt binder content and laboratory compacted air void content for pay purposes except where:

- a. The Department's Quality Assurance testing, as described in Item 3 below and Subarticle 410.08, does not validate the quality of the material.
- b. QC sampling and testing was not performed in accordance with specified procedures.

The Department will determine the sample locations.

The sampling and testing frequencies shall conform to the requirements given in Table 1 for a pay item when the accumulated amount of asphalt mix placed for that pay item exceeds 250 tons {250 metric tons}. The accumulated amount of asphalt mix shall be the current total amount of asphalt mix that has been placed beginning from the start of construction. The sampling and testing frequencies given in Table 1 may be waived by the Division Materials Engineer and the asphalt mix may be accepted by visual observation for a maximum accumulated asphalt mix placement quantity of 250 tons {250 metric tons} or less for any individual pay item. The Engineer will record the results of the acceptance of the asphalt mix on form BMT-16 if sampling and testing is not required.

All conforming and nonconforming inspections and test results will be monitored in accordance with ALDOT-353 and ALDOT-370 and shall be recorded on approved forms and charts which shall be kept up to date and complete and shall be available at all times to the Department during the performance of the work. Only those tests designated by the Department in advance as acceptance tests will be utilized in the computation of pay factors. Test properties shall be charted on forms that are in accordance with the applicable requirements of the Department. A copy of each chart and form to be used by the Contractor will be furnished by the Department. The Contractor shall furnish his own supply of the charts and forms. The Contractor or Producer may design their own forms and charts; however, these must be approved by the Engineer prior to their use.

A LOT is normally defined as 2,800 tons {metric tons} for Section 327, 423 and 424 mixes, and 2,000 tons {metric tons} for Section 420 mixes, consisting of four QC test sets of laboratory tests (liquid asphalt binder content and laboratory air voids or gradation), unless specifically stated otherwise in this item or elsewhere in the specifications. A LOT will usually consist of at least four density tests; however, a LOT may have fewer than four density tests. The Engineer will round a testing increment or a LOT to the nearest truckload of material.

A LOT lasting longer than thirty calendar days or a LOT with inactivity for longer than 30 calendar days will be terminated. Mix produced after the completion of the last full LOT, a terminated LOT, and small production projects will be evaluated and pay factors computed and may be accepted on the basis of less than four laboratory tests (liquid asphalt binder content and laboratory air voids or gradation).

Each LOT will be accepted on the basis of the actual number of test sets run for that LOT. If the production process is considered out of control (any individual test result for asphalt content, gradation (single sieve), or air voids has a pay factor equal to 0.80 computed from the "1 Test" column in Table II, Table III, or Table VI, of Subarticle 410.08 whichever is appropriate), production shall be suspended and corrections made as outlined in Subarticle 410.08. Gradation pay factors are normally computed on each screen tested and then averaged, however, if any individual screen has a pay factor of 0.80 (before being averaged with the other screen(s)), the process is considered out of control.

The Contractor may voluntarily terminate a LOT when the pay factor will be less than 0.90 when calculated using the one test row of table II, III, and VI in Section 410. If the Contractor terminates a LOT, production shall be suspended and corrections made as outlined in Subarticle 410.08. The voluntary termination of a LOT may only be done once per pay item, per project.

All sampling, testing and computations for a LOT will be completed and pay factors provided the Contractor as soon as possible.

All sampling and testing of materials, including frequency of samples and tests for the Contractor's Quality Control and the Department's verification, shall be performed in strict conformance with the Department's Testing Manual as modified in Table I. This Manual (available on the ALDOT Internet Site) contains guidance for sampling and testing procedures from AASHTO, ASTM, and ALDOT procedures.

2. ACCEPTANCE OR REJECTION.

The decision of the Engineer will be final as to the acceptance, rejection, or acceptance at an adjusted payment of each LOT. Rejected LOTS shall be removed at no cost to the Department and replaced at the contract unit bid price.

3. SAMPLING OF LOTS AND SUBLOTS.

It is the intent of these specifications that each LOT (for mixture testing) and each SUBLLOT (for mat density testing) will meet specification requirements at the time of initial evaluation. No resampling or retesting (other than referee testing described below) will be allowed. The Department will, however, perform at least one liquid asphalt binder content, one maximum specific gravity, one mixture gradation, and one set of laboratory compacted samples for air void content tests per day per Lot, as specified in Table I, to verify the Contractor's test results. If the Contractor is not required to perform a test that day (the tonnage calculated by the random number is not reached), the Department will not run a verification test. The Department will perform a verification test for each LOT, even where there is more than one LOT per day.

The Contractor will be notified by the Engineer as to the point in production at which to procure mixture acceptance samples. The Contractor shall sample the mixture and split it into two samples: the Contractor's primary sample and a referee sample. The portions of mixture for the referee sample shall be bagged, labeled, and stored for testing, if required. All referee samples will be kept by the Department until they are tested (if required).

The Contractor shall obtain a verification testing sample from each LOT each day for testing by the Department. The verification testing samples shall be taken at locations directed by the Engineer. These locations will be different from the Contractor's mixture acceptance sample locations. The Contractor may take half of each sample for verification testing. The Department will compare the verification sample to the closest (in tonnage) Contractor's primary sample. The sampling of Hot Mix Asphalt is outlined in ALDOT-380, Forms and Examples for Sampling and Computing Pay Factors for Hot Mix Asphalt.

4. TESTING AND LOT VERIFICATION.

Air voids shall be computed on the Contractor's sample by using the running average of the Contractor's last four maximum specific gravities. If slag is used as an aggregate in the mixture, the running average of the Contractor's four most recent determinations for the bulk specific gravity of the compacted mixture shall be used in the computation of the air voids for the Contractor's sample. The calculation of the running averages of both maximum specific gravity and bulk specific gravity shall start with the first LOT. The test strip is independent of the LOTS. Air voids shall be computed on the Department's sample by using the Department's individual maximum specific gravity and bulk specific gravity. The Department and the Contractor shall compare test results with each other for the above mentioned testing increments. If there are no differences or if the differences are within the

tolerances listed in Tables V or VI, Section 410, for each parameter, no further testing and analysis will be necessary and the Contractor's test values will be used in the computation of the appropriate LOT pay factor.

If the Contractor's air voids do not compare with the Department's test results, the Contractor shall re-compute test results using the individual maximum specific gravity for that particular testing increment and re-compare with the verification test result. If the results compare within the tolerances in Table V, Section 410, using the individual maximum specific gravities, no further testing will be required and the Contractor's running average of the last four maximum specific gravities will be used to compute air voids for pay factor determination.

Also, if the Contractor's air voids do not compare with the Department's test results, and the Contractor is using slag as an aggregate, the Contractor shall re-compute test results using the individual bulk specific gravity for that particular testing increment and re-compare with the verification test result. If the results compare within the tolerances in Table V, Section 410, using the individual bulk specific gravity, no further testing will be required and the Contractor's running average of the last four bulk specific gravities will be used to compute air voids for pay factor determination.

If the results of the Department's verification test and the Contractor's test do not compare within the tolerances in Tables V or VI, Section 410, but yield the same pay factor for the LOT when the Department's result is substituted for the Contractor's result, no further testing will be required. Where the Contractor's test results and the Department's test results do not compare and cannot be resolved by the above mentioned methods but the pay factor dispute is between 1.00 and 1.02 the Contractor may elect to accept the 1.00 pay factor and waive referee testing.

When differences between test results of the verification samples are not within the tolerances listed in Tables V or VI, Section 410, and cannot be resolved by the above mentioned methods, referee testing will be required.

All referee samples will be tested by the Bureau of Materials and Tests, Central Laboratory, 3704 Fairground Road, Montgomery, AL 36110. The Bureau of Materials and Tests Central Laboratory is an AASHTO accredited laboratory (see AASHTO R 18, Recommended Practice for Establishing and Implementing a Quality System for Construction Materials Testing Laboratories).

5. REFEREE TESTING

Laboratory:

All testing increments of the referee samples for the entire LOT shall be tested in the Bureau of Materials and Tests Hot Mix Laboratory for the pay factor parameter(s) (liquid asphalt binder content, laboratory compacted air voids, or gradation) in question. The Contractor's results (using the individual air voids and maximum specific gravities) will be compared to the Bureau of Materials and Tests results (using Materials and Tests individual bulk and maximum specific gravities) for each testing increment in the LOT. When the Contractor's results and the Bureau of Materials and Tests results are within the tolerances listed in Tables V or VI, Section 410, the Contractor's results will be used. When the Contractor's results are not within the tolerances listed in Tables V or VI, Section 410, the Bureau of Materials and Tests Central Laboratory results will be used for final pay factors. The Bureau of Materials and Tests Central Laboratory will record the Contractor's field results and the Central Laboratory's results of the parameter(s) in question on form BMT-135.

For each testing increment these results, either the Contractor's or the Bureau of Materials and Tests', will be used in the computation of the appropriate LOT pay factor.

Should differences between test results, that are not within the tolerances listed in Table V or VI, Section 410, for liquid asphalt binder content, air voids, or gradation continue for two consecutive days, operations shall be halted until testing discrepancies can be resolved. The Bureau of Materials and Tests will monitor testing procedures by Department and Contractor technicians until consistent test results are achieved.

Cores:

If the Contractor believes that the core density values determined by the State are in error, the Contractor shall notify the Division Materials Engineer in writing that referee testing is requested. Using the original cores, the Division will again determine the densities of the cores in question using a technician different from the technician who originally determined the core density. If these new densities result in a different pay factor, the new pay factor shall be applied to the tonnage in question (this may increase or decrease the Contractor's pay adjustment).

6. ADJUSTED PAYMENT FOR DEFICIENCIES.

The payment for each LOT will be adjusted on the basis of acceptance test results in accordance with the requirements given in this Section. Accurate records shall be kept of the quantity (tonnage) of plant mix in each LOT.

Pay factors shall be determined for each LOT from the values given in Tables II, III, IV, and VI, Section 410, in accordance with the following:

Pay Factor For:	Mix 327	Mix 420	Mix 423	Mix 424
Air Voids	N/A	N/A	Table II	Table III
Asphalt Content	Table II	Table II	Table II	Table III
Mat Density	N/A	N/A	Table IV	Table IV
Gradation	N/A	Table VI	N/A	N/A

The lowest numerical pay factor in a Lot will be applied to the contract price for the total tonnage {metric tonnage} in the LOT. This will result in an adjustment to the compensation for the Lot that will be shown in a separate line item on the payment estimates.

Pay factors above 1.00 will not be applied to mixes that are tested on fewer than three characteristics or when there are less than four laboratory tests (percent liquid asphalt binder and laboratory air voids or gradation) per characteristic; it is not necessary to obtain four roadway densities to obtain a pay factor above 1.00. When the pay factor is calculated to be greater than 1.00, a pay factor of 1.00 will be applied.

Pay factors above 1.00 will not be applied to mixes where the roadway density requirement has been lowered below 94%.

(d) ADJUSTMENT PERIOD.

During start-up operations, an adjustment period (test strip) as described below shall be required when producing a new job mix formula. The purpose of the adjustment period will be to permit the Contractor to adjust his production process and for Contractor QC personnel and ALDOT QA personnel to calibrate and coordinate their testing procedures. The Contractor has the option of running a test strip or waiving the test strip, if the proposed job mix formula has been produced satisfactorily on previous projects. The waiver of a test strip shall be in writing to the Project Manager prior to any production and placement of the previously produced job mix design. The Contractor assumes the risk of milling and relaying unacceptable mix with no additional compensation if the test strip is not utilized.

A test strip of not more than 500 tons {500 metric tons} shall be constructed. If the placement of a test strip is not completed the same day it is begun, the Contractor shall construct a new test strip. Production shall stop until the Contractor has completed one liquid asphalt binder content, one air void content, and four mat density tests for mixes other than 327 and 420. For 327 and 420 mixes the Contractor shall complete one liquid asphalt binder content and one gradation. The pay factors for liquid asphalt binder content, air void content, and gradation will be calculated using the one test row of Table II, Table III and Table VI, and the pay factor for mat density will be calculated using the four test row of Table IV in Section 410. The production point at which the mix shall be sampled shall be determined by the Contractor. This sample does not have to be randomly selected, but should be representative of the mix produced. Contractor mat density tests shall be performed with non destructive density testing devices, meeting the requirements of Section 306, which have been calibrated for the layer being placed according to ALDOT-222, ALDOT-350, or Section 306. The Contractor shall cut cores at these locations and immediately turn the cores over to the Department for density measurements and determination of the pay factor. The Department will conduct the same tests for verification at the same time the Contractor is conducting his tests. If a pay factor of less than 1.00 is obtained using the one test row of Table II, Table III and Table VI, and using the four test row of

Table IV in Section 410, a second test strip consisting of 200 tons {200 metric tons} shall be constructed. If a pay factor of less than 1.00 is obtained using the one test row of Table II, Table III and Table VI, and using the four test row of Table IV in Section 410 in the second test strip, additional 200 ton {200 metric ton} test strips shall be constructed until pay factors are equal to 1.00, at which time production can begin. A test strip is determined to be complete when the results of the tests are known.

The Engineer may require any test strip to be removed and replaced at no cost to the Department if the pay factor determined from the four test row for mat density and the one test row for other tests is 0.80. For actual payment purposes, a pay factor of 1.00 will be used for all first and second test strips allowed to remain in place. Pay factors will be applied to the third and all subsequent 200 ton test strips at the average of the computed rate (using the one test row) and 1.00.

SECTION 410 ASPHALT PAVEMENTS

410.01 Description.

The work under this Section covers the general requirements that are applicable to all types of hot and warm mix asphalt pavements of the plant mix type. Deviations from these general requirements will be indicated in the specific requirements for various types of mixes noted in the following sections of these Specifications.

This work shall consist of one or more courses of hot and warm mix asphalt plant mix constructed in accordance with these specifications and the specific requirements of the type of mixture required and in reasonably close conformity with the lines, grades, thicknesses, and typical cross sections shown on the plans or established by the Engineer. The Contractor may use either hot mix or warm mix for all Superpave ESAL Range mixes in Section 424. Warm mix asphalt shall be defined as the use of an approved warm mix technology in the plant mix at the time of production.

This work shall also include the preparation of the underlying surface on which the plant mix is to be placed, including patching and/or leveling as shown on the plans or directed.

In addition, this work shall also include the placing of widening at locations shown on the plans and/or directed by the Engineer. In general, widening shall consist of (1) narrow width build-ups, three feet or less {one meter or less}, required for widening existing pavement, (2) paving for turn-outs beyond three feet {one meter} from the edge of pavement, (3) pavement crossovers, and (4) turning lanes of less than 200 feet {60 m} for crossovers. Paving used on turn-outs for intersecting paved roads and shoulder paving will not be considered as widening unless shown on the plans.

Surface layers and wearing layers are defined as those layers where the pay item contains the wording "Wearing Surface".

All ALDOT procedures referenced are applicable to both hot and warm mix asphalt.

410.02 Materials.

(a) APPLICABLE SECTIONS OF SPECIFICATIONS.

Materials shall conform to requirements given in Sections 327, 420, 423 and 424.

(b) PRODUCTS AND PROCESSES FOR THE PRODUCTION OF WARM MIX ASPHALT.

Warm Mix Asphalt products and processes shall be selected from List II-27, "Warm Mix Asphalt Products and Processes" of the Department's manual titled "Materials, Sources, and Devices with Special Acceptance Requirements". Information concerning this list is given in Subarticle 106.01(f) and ALDOT-355.

(c) ANTI-STRIPPING AGENTS.

All warm mix asphalt mixtures shall include an anti-stripping agent. The warm mix additive supplier may certify that an anti-stripping agent is an integral part of the warm mix additive.

All hot mix asphalt mixtures except 327 and 420 shall be tested during design to determine if an anti-stripping agent is needed. During design and production, all other mixes shall have a tensile strength ratio (TSR) of at least 0.80 when tested in accordance with AASHTO T 283 as modified by ALDOT-361. If any TSR value falls below the minimum specified above, plant operations shall cease

until corrective measures are taken. However, if any visual stripping occurs in the design or field production, an anti-stripping agent shall be required if deemed necessary by the Engineer. Should it become necessary for the Contractor to include an anti-strip agent in the mix due to the occurrence of visual stripping during field production of the mix after the design tests indicated that the same mix met the above listed TSR requirement, such work will be paid for as Extra Work as defined by Article 104.03. Additional payment for the anti-strip agent will not be made in cases where the same mix has been previously used in field production and visual stripping occurred.

The amount of anti-stripping agent, when required, shall be 0.25 to 1.0 % by weight {mass} of the liquid asphalt binder content for liquid agents and 0.5 to 2.0 % by weight {mass} of the total aggregate for powdered agents. Liquid anti-stripping agent shall be added to the liquid asphalt binder by approved on-line blending equipment either at the refinery or the Contractor's mixing plant within $\pm 10\%$ of the specified rate.

Silicone may be used in liquid asphalt binder, not to exceed 2 ounces per 5000 gallons {3 ml per 1000 L}. Except when producing Warm Mix Asphalt, other additives shall not be added to the liquid asphalt binder unless expressly authorized in writing by the Materials and Tests Engineer.

The use of any unauthorized additive will be cause for rejection of the mixture.

(d) COMPOSITION OF MIXTURES.

1. ADJUSTMENTS TO RATE OF PLACEMENT.

The project designated rate per square yard {square meter} of the plant mix layers are designed assuming a compacted mix unit weight {mass} of not greater than 158 pounds per cubic foot {2530 kg/m³} for dense graded mixes (light weight aggregates excepted.) Hence, a correction to the plan designated rate per square yard {square meter} will be made in accordance with the following:

- If the compacted mix density as determined in the job mix formula design exceeds 158 , or is below 130, pounds per cubic foot, {2530 kg/m³, or is below 2080 kg/m³}, the correction will be based on the formula:

$$x = ab/158 \{x = ab/2530\}, \text{ where}$$

x = corrected rate per square yard {square meter},

a = laboratory compacted mix unit weight in pounds per cubic foot {density in kilograms per cubic meter} as shown in the job-mix formula, and

b = project designated rate per square yard {square meter} of plant mix as shown on the job plans.

- If the laboratory compacted density is between 130 pounds per cubic foot and 158 pounds per cubic foot {2080 kg/m³ and 2530 kg/m³}, no correction will be made to the pounds per square yard {kilograms per square meter} designated by the plans or proposal.

- If the plans provide for the use of lightweight aggregate (expanded clay or shale), the pounds per square yard {kilograms per square meter} of the layer shown by the plans or proposal will not be adjusted.

- If the plans provide for the use of an "Open Graded" plant mix layer, the pounds per square yard {kilograms per square meter} of the layer shown by the plans or proposal will not be adjusted.

2. REQUIREMENT FOR APPROVED JOB MIX FORMULA.

Work shall not be started under this Section on a specific project until the Contractor has submitted and received approval of a job-mix formula from the Materials and Tests Engineer and the job mix formula has been checked by the Division Materials Engineer for use on the project.

A change in aggregate sources will require a new job-mix formula before the new material is used. A change in liquid asphalt binder source and anti-stripping agent will be allowed without a new job-mix formula provided the design criteria is met by a one-point check of the mixture. The one-point check shall include the Air Void, VMA, Stability, Flow, and TSR (Tensile Strength Ratio) and may be determined during the production of the mix. However, no change in the grade of liquid asphalt binder will be allowed without the approval of the Materials and Tests Engineer.

3. CONTRACTOR'S RESPONSIBILITY FOR JOB-MIX FORMULA.

Designs for all mixes shall be the responsibility of the Contractor and shall be submitted by the Contractor for approval. Refer to applicable Sections (420, 424, etc.) for design criteria. The submitted formula shall have been designed by a certified technician (Level III - Designer) in a laboratory that has been certified by the Department.

4. APPROVAL OF JOB MIX FORMULA BY MATERIALS AND TESTS ENGINEER.

The Contractor shall submit to the Materials and Tests Engineer, for approval, a Job Mix Formula (JMF) for each mixture to be supplied from a specific plant. The Contractor shall allow at least four weeks for the evaluation and approval of the job mix formula.

The submitted formula shall include any additive by type and trade name and be accompanied by samples from the material sources he proposes to use in producing the mix. The job-mix formula for each mixture shall establish a single percentage of aggregate passing each required sieve size, a single percentage of liquid asphalt binder to be added to the aggregate, a single percentage of any additive, and a mixing temperature range suitable for the type, grade, etc. of liquid asphalt binder to be used in the mix. Each job-mix formula shall be accompanied by a test report from an approved laboratory certifying that all current Departmental design test parameters have been met (copies of the Departmental current design test parameters may be obtained from the office of the Materials and Tests Engineer). There will be no charge for the Department's checking of the Contractor's job-mix formula.

The approved job-mix formula for each mixture shall be in effect for a maximum of four years from the approval date on the JMF or until the Materials and Tests Engineer withdraws approval by written order.

5. APPROVAL OF JOB MIX FORMULA BY DIVISION MATERIALS ENGINEER.

At least two full working days prior to beginning the production of asphalt mix for a specific project, the Contractor shall submit a mix design (approved by the Materials and Tests Engineer) to the Division Materials Engineer. The project number shall be inserted on the approved job mix formula. The Division Materials Engineer will review the mix design to determine if the job mix formula is appropriate for the specific project. If the job mix formula is appropriate for the project, the Division Materials Engineer will sign the mix design as being approved, will note the date of approval, and will distribute copies for inspection of the asphalt production.

A copy of this approved job mix formula with the Materials and Tests Engineer's approval and the Division Materials Engineer's approval (with the date of approval) shall be available at the plant any time material is being delivered to the State.

6. ESTABLISHMENT OF DELIVERY TEMPERATURE.

The Engineer will check and record the temperature of the mixture upon delivery to the project site. The minimum delivery temperature for warm mix asphalt shall be 220 °F {104 °C}. The minimum delivery temperature for hot mix asphalt shall be 250 °F {121 °C}. The Engineer should monitor the work to ensure that there is not high variability in the delivery temperatures or isolated loads of temperature differentials that appear extreme. For pay items that do not require density as a pay factor (patching, widening, etc.) and / or for mixes that do not require density as a pay factor (OGFC, PATB, etc) the Contractor shall provide a + /- 25 °F {11 °C} delivery temperature range.

No loads will be accepted at a temperature greater than 350 °F {177 °C} for hot mix or warm mix asphalt.

7. CONFORMANCE TO APPROVED JOB MIX FORMULA.

All mixtures furnished for use on the project shall conform to the approved job-mix formulas within the following ranges of tolerances:

All liquid asphalt binders used shall meet the requirements given in Section 804. See appropriate pay factor table for liquid asphalt binder content requirements.

The mixing temperature shall not exceed 350 °F {177 °C}.

Tolerances for 327, 420 and 424 mixes:

- Plus or minus 7 % for the #4 {4.75 mm} and larger sieve requirements.
- Plus or minus 4 % for the #8 through #100 {2.36 mm through 150 μm} sieve requirements.
- Plus or minus 2.0 % for the #200 {75 μm} sieve requirement.

See Section 423 for gradation requirements for 423 mixes.

The initial setting of the controls for all materials shall be those amounts shown on the job-mix formula. The above tolerances are provided for slight variations inherent in job control applications. The Contractor shall make changes as necessary in order that the mixture will run as close as practical to the job-mix formula.

8. CONSISTENCY OF MIX DESIGN IN PLACEMENT OF WEARING LAYER.

More than one job mix formula may be submitted and approved for a layer of pavement. The placement of the entire wearing layer shall be from the same job mix unless otherwise approved in writing by the Engineer. For layers other than the wearing layer, the Contractor shall notify the Engineer in writing of the mix design change prior to changing production.

(e) RECYCLED ASPHALT PLANT MIX (RAP) AND RECLAIMED ASPHALT SHINGLES (RAS).

1. COMPLIANCE WITH ALDOT-372.

On all projects utilizing recycled/reclaimed material in the mixture, the Contractor's paving operation and RAP and RAS processing shall conform to the requirements given in ALDOT-372. The recycled hot and warm mix asphalt shall be a homogeneous mixture of reclaimed material, new aggregate (fine or coarse aggregate, or a mixture of fine and coarse aggregate) and new liquid asphalt binder material.

2. ALLOWABLE USAGE OF RAP AND RAS.

The Contractor shall have the option to use RAP and RAS in accordance with the requirements given in the following table unless shown otherwise on the plans:

ALLOWABLE USE OF RAP AND RAS		
Maximum Allowable Percent of RAP and RAS by mass of Total Aggregate Content		
Type of Mix	Maximum RAP Content #	Maximum RAP and RAS Content **
327, Plant Mix Bituminous Base	25 %	RAS Not Allowed
327-E, Permeable Asphalt Treated Base	10 %	RAS Not Allowed
420, Open Graded Friction Course	10 % RAP shall not contain chert*	RAS Not Allowed
423, Stone Matrix Asphalt 424, Superpave	Surface Layers: 20 % with no more than 15 % containing chert *; All Other Layers: 35 %	Surface Layers: 20 % *; All Other Layers: 35 %
* This limitation applies even if the surface layer is to be covered by an Open Graded Friction Course (Section 420). If the aggregate is chert gravel with a bulk specific gravity that is less than 2.550, a maximum of 15 % of the RAP will be allowed. RAP containing chert gravel shall be crushed so that 100 % of the RAP passes the 1/2 inch {12.5 mm} sieve. Additional RAP that does not contain chert gravel may be added to the mixture through a separate feeder.		
** RAS shall be limited to 5 % by mass of the total aggregate content.		

3. PROCESSING AND RESTRICTIONS FOR AGGREGATE IN RAP.

RAP used in 3/8 inch {9.5 mm} Section 424 "Superpave" maximum size mix shall be processed so that 100 % of the RAP passes the 1/2 inch {12.5 mm} sieve. For all other mixes, the maximum size of the aggregate in the RAP shall meet the maximum size for the mix specified. The aggregate in the RAP shall meet the aggregate requirements of the mix it is used in and the requirements given in Sections 801 and 802 (no gravel in Section 327 PATB, Section 420 and Section 423 mixes). RAP used in Section 327 PATB and Section 420 mixes shall be processed so that 100 % of the RAP is retained on the No. 4 {4.75 mm} sieve.

4. RECLAIMED ASPHALT SHINGLES (RAS).

Reclaimed Asphalt Shingles (RAS) shall be handled, stored, and used in accordance with the requirements given for RAP and the following requirements.

The RAS shall be materials produced as a by-product of the manufacturing process for roofing shingles and/or scrap shingle (from roofing materials).

The RAS shall be free from foreign materials such as paper, nails, wood, and metal flashing. The RAS shall be shredded or ground prior to being incorporated into the mixture. The shredded RAS shall have 100% passing the 1/2 inch {12.5 mm} sieve in any dimension and a minimum of 95% passing the 3/8 inch sieve.

In addition to the requirements set forth in ALDOT-372, RAP stockpiles utilized for JMF's with RAP content greater than 25 % shall also meet the following requirements.

ADDITIONAL RAP STOCKPILE REQUIREMENTS FOR RAP USED IN A JOB MIX FORMULA WITH INCREASED RAP CONTENT	
Control Parameter	Standard Deviation*
Asphalt Content	0.5 %
% Passing #200 Sieve	1.5 %
Sieve with 50 % RAP Passing	5.0 %
*Based on a minimum of 10 tests	

Testing for RAP stockpile shall be included as part of the design JMF submittal.

(f) LIQUID ASPHALT BINDER DRAINDOWN.

1. FIBER STABILIZER.

A fiber stabilizer is required for some mix types (Section 420, 423, etc). A fiber stabilizer may be used on other mix types where asphalt binder cement draindown is a problem. Where RAS is included in the JMF, fiber stabilizer shall not be required provided the draindown requirements of 0.30% or less are met when tested in accordance with AASHTO T305 at 325 °F {163 °C} and 350 °F {176 °C}.

When fiber is used, the dosage rate shall produce a maximum liquid asphalt binder cement draindown of 0.30 % or less when tested in accordance with AASHTO T305 at 325 °F {163 °C} and 350 °F {176 °C}. When fiber is used, the sampling and testing frequency for all mixes for both Contractor and Department testing during production shall be one test for each 5000 tons {metric tons} or portion thereof. The fiber shall be listed on List II-23, Fibers for use in Hot Mix Asphalt (from the Materials, Sources, and Devices with Special Acceptance Requirements (MSDSAR) manual). If pelletized fibers are used, the fiber within the pellet shall be listed on List II-23. All fibers listed on List II-23 shall meet the requirements of either Item 2, 3, or 4 of this Subarticle.

2. CELLULOSE FIBERS.

The maximum length of the fiber shall be 0.25 inches {6.35 mm}. A representative 3 gram sample, when heated in a crucible between 1100 and 1200 °F {595 and 650 °C} for at least 2 hours, shall show between 13 % and 23 % non-volatiles. A representative 5 gram sample, when stirred into 100 ml of distilled water, shall have a pH between 6.5 and 8.5 after sitting for 30 minutes. A representative 5 gram sample, when saturated with mineral spirits for 5 minutes and then sieved for 10 minutes on a No. 40 {425 μm} sieve, shall absorb between 4 % and 6 % its own weight of mineral spirits. A representative 10 gram sample, when weighed and placed into a 250 °F {121 °C} oven for two hours, shall lose less than 5 % by weight when weighed immediately upon removal from the oven.

Sieve analysis of the cellulose fiber shall be either of the following methods:

- Using an Alpine Air Jet Sieve (Type LS), a representative 5 gram sample of the fiber is sieved for 14 minutes at a controlled vacuum of 11 psi {75.8 kPa}. The fibers remaining on the screen are weighed. The results of this analysis shall indicate that 60 % to 80 % of the fiber passes the No. 100 {150 μm} sieve. Or:

- Using a Mesh Screen Analysis, a representative 10 gram sample of the fiber is sieved using a shaker with two nylon brushes on each screen. The results of this analysis shall indicate that the fiber has the following amounts passing the specified screens: 75 % to 95 % on the No. 20 {850 μm} sieve, 55 % to 75 % on the No. 40 {425 μm} sieve, and 20 % to 40 % on the No. 140 {100 μm} sieve.

3. MINERAL FIBERS.

When tested according to the Bauer-McNett fractionation, the fiber length shall have a maximum mean test value of 0.25 inches {6.35 mm}. By using a phase contrast microscope, and a representative test sample of at least 200 fibers, the fiber diameter shall have a maximum mean test value of 0.0002 inches {5.1 μm}. The shot content passing the No. 60 {285 μm} sieve shall be 85% to 95%. The shot content passing the No. 230 {65 μm} sieve shall be 60 % to 80 %. This is a measure of non-fibrous material determined on vibrating sieves (for further information see ASTM C 612).

4. SYNTHETIC FIBERS.

Synthetic fibers shall include but are not limited to one or a combination of the following: polyolefins (such as polyethylene and polypropylene) and aramids (such as Kevlar, Twaron and Nomex). Fibers shall be twisted fibrillated, flat fibrillated or monofilament with a maximum fiber length of 0.75 inches {19 mm}

5. PLACING FIBER IN MIX.

a. Manual Method.

Provided it can be demonstrated to the satisfaction of the Engineer that the proper dosage of the fibers is uniformly distributed into the mix, manual introduction of fibers is acceptable when a batch plant is used to make the mix. When the fibers are available in prepackaged (weighed) containers, proper dosage may be pre-determined per batch. A device is required to interrupt mixture production and warn the plant operator if the operator manually feeding the fiber fails to introduce it properly. Dry mixing time shall be increased at least five seconds to insure adequate blending. Wet mixing time shall be increased at least five seconds for cellulose fibers and up to five seconds for mineral fibers. Manual introduction of fibers shall not be used in drum plants.

b. Automatic Method.

Methodology and equipment for metering bulk loose and pelletized fiber into asphalt plants has been developed by the fiber suppliers. Whenever the fiber supplier's recommendations are more stringent than this specification, the fiber supplier's recommendations are controlling. This specification requires specialized equipment that can accurately proportion and meter, by weight {mass}, the proper amount per batch (for batch plants) or continuously, in a steady uniform manner (for drum plants). Fiber, pelletized or loose, shall not be fed through the cold feed bins or through the rap bin.

These proportioning devices shall be interlocked with the plant system and controlled to +/-10% of the weight of the fibers required so as to maintain the correct proportions for all production rates and batch sizes. During the test strip, an equipment calibration check shall be performed to the satisfaction of the Engineer which shows the fiber is being accurately metered and uniformly distributed into the mix. These metering devices shall provide in process high flow (+ 10% or more) and low flow (-10% or less) plant operator notification and interrupt the mix production where the fiber rate is not properly controlled. The fiber metering system shall also provide a record of feed rate (weight or mass per time) and include a section of translucent pipe for visual confirmation of consistent flow rates. Care shall be taken to insure that the fibers are not entrained in the plant's exhaust system. If there is any evidence of fiber in the bag-house or wet-washer fines, the liquid asphalt binder line and/or the fiber line shall be relocated so that the fiber is captured by liquid asphalt binder spray and incorporated into the mix. If there is any evidence of clumps of fibers or pellets at the discharge chute, the contractor shall increase the mixing time and/or intensity. This may entail extending the liquid asphalt binder and fiber feeding lines further into the drum.

(g) SAMPLING AND INSPECTION.

Aggregates will be accepted in stockpiles in accordance with the Department's Testing Manual provided there is no segregation or contamination, but production of required gradation in the mix shall be the Contractor's responsibility.

Liquid asphalt binder will be accepted on the basis of ALDOT-243.

The right is reserved to take samples, including aggregates from stockpiles, plant mix from the hot elevator, plant mix from the spreader, liquid asphalt binder from storage tanks at the plant, etc., and to make further tests as needed as a basis for continued acceptance of the materials.

Samples of the mixture in use will be taken and tested in accordance with Subarticle 106.09(b).

When directed, the Contractor shall cut samples with mechanical equipment from the compacted pavement for testing. Samples not smaller than 4 inches {100 mm} square or 4 inches {100 mm} in diameter for the full depth of the course to be tested shall be taken at the locations directed by the Engineer. Furnishing of suitable approved cutting equipment, the cutting of the samples, and the immediate repair of the sample holes with similar type of material shall be performed by the Contractor without extra compensation.

A laboratory shall be furnished for the control of each hot and warm mix asphalt plant in accordance with the provisions of Section 601.

410.03 Construction Requirements.

(a) EQUIPMENT.

In general, choice of equipment will be left to the Contractor and it shall be his responsibility to provide proper sized and amounts of equipment that will produce, deliver to the roadbed, spread, and compact the plant mixed material in sufficient quantities for the continuous movement of the spreaders under normal operating conditions.

The mixing plant, hauling, spreading, and compaction equipment shall meet the requirements listed below; however, other equipment that will produce equally satisfactory results, such as electronically or automatically controlled devices of proven performance, will be considered for use in lieu thereof.

The Contractor shall secure approval of all equipment prior to beginning work and any equipment found unsatisfactory shall be promptly replaced or supplemented.

1. REQUIREMENTS FOR ALL PLANTS.

Mixing plants shall comply with the requirements of AASHTO M 156 as modified by ALDOT-324, Mixing Plant Requirements for Hot-Mixed, Hot-Laid Asphalt Paving Mixtures. In addition to the above, if a recycled/reclaimed mix is used, the mixing plant shall be modified as necessary to accommodate the use of the reclaimed material and necessary additives. Mixing plants shall be inspected at least annually to insure compliance with the requirements of AASHTO M 156 and ALDOT-324. The Contractor/Vendor will be charged a fee as specified by ALDOT-355, General Information Concerning Materials, Sources, and Devices with Special Acceptance Requirements. If the plant is relocated or substantially modified in any way within a year of the last inspection, an additional inspection and related fee will be required.

The plant shall be equipped with a dust collector constructed to waste or store and later return uniformly to the aggregate mixture all or any part of the material collected.

2. SCALES.

A digital recorder shall be installed as part of the platform truck scales. The recorder shall produce a printed digital record on a ticket of the gross and tare weights {masses} of the delivery trucks along with a time and date print for each ticket. Provisions shall be made so that scales may not be manually manipulated during the printing process, and so interlocked as to allow printing only when the scale has come to rest. The scales and recorder shall be of sufficient capacity and size to accurately determine the weight {mass} of the heaviest loaded truck or tractor trailers that are used for the delivery of the hot and warm mix asphalt from that plant.

In lieu of plant and truck scales, the Contractor may provide either (1) an approved automatic printer system which will print the weights {masses} of the material delivered (evidenced by a weight {mass} ticket for each load), provided the system is used in conjunction with an approved automatic batching and control system, or (2) an electronic load cell weight {mass} determination system with associated computer hardware and automated printing system.

The Contractor may provide a "weigh {mass} batcher" system utilizing a weigh {mass} hopper equipped with load cells that determine the net amount of mix delivered from the weight {mass} hopper. An automated weigh {mass} printing system shall be provided to accurately print the weight {mass} of material delivered, the time, and the date for each ticket.

All scales which determine the weight {mass} of the mix for pay purposes shall meet the requirements of Subarticle 109.01(h).

3. HAULING AND REMIXING EQUIPMENT.

a. Load Limitations.

Reference is made to Article 105.12 concerning load limitations on hauling equipment.

Wherever a Material Remixing Device is used, the following restrictions shall apply:

- The device shall be empty while on a bridge.
- The device shall be moved across a bridge without any other vehicles or equipment being on the bridge.
- The device shall be moved on a bridge only within the limits of a lane and shall not be moved on the shoulder of a bridge.

- The device shall move at a speed no greater than 5 miles {8 km} per hour without acceleration or deceleration.

b. Trucks.

Each truck shall have a hole in the side of the body, approximately 5/16 of an inch {8 mm} in diameter and suitably placed, to allow for temperature measurement of the asphalt mix.

Trucks used for hauling hot and warm mix asphalt mixtures shall have tight, clean, smooth metal beds that have been thinly coated with a minimum amount of approved asphalt release agent (List II-6, Hot Mix Asphalt Release Coating for Truck Beds, in the MSDSAR manual) to prevent the mixture from adhering to the beds. The use of gasoline, kerosene, diesel or other volatile material is prohibited.

Each truck shall be equipped with a tarpaulin that shall be used as needed to protect the mixture from adverse conditions. The tarpaulin shall be made of water repellent material, be of sufficient weight and strength to resist tearing and be in good condition with no holes or tears. The tarpaulin shall be large enough to cover the load.

Mixture shall not leave the plant unless the load is covered when the following conditions exist:

- when the air temperature is below 60 °F {15 °C};
- when hauling time exceeds 30 minutes;
- or when threatening weather exists.

c. Material Remixing Device.

When Pay Item 410-H is included in the contract, a material remixing device shall be used for the placement of all asphalt layers except the following:

- 327-E, Permeable Asphalt Treated Base (PATB);

- a layer placed directly on top of PATB if the placement must be accomplished by operating the remixing device on the PATB.

If a pay item is not shown on the Plans, the Contractor may use a material remixing device without compensation.

A material remixing device shall not be placed on a Permeable Asphalt Treated Base.

The material remixing device shall be capable of remixing plant mix between the trucks and the finished mat. Plant mix shall be remixed in the device prior to being laid by the paver or spreader. The plant mix delivered by the material remixing device shall be a homogeneous, non-segregated mixture.

Equipment known to accomplish this remixing operation and currently approved by ALDOT are the ROADTEC Shuttlebuggy, Terex/Cedarapids CR 662 RM, BLAW-KNOX MC-330/TWIN PUG TUB, Weiler E1250, and the Weiler E2850.

A material remixing device will not be required for temporary work of short duration, bridge replacements having less than 1000 feet {300 m} of pavement at each end of a bridge, acceleration and deceleration lanes less than 1000 feet {300 m} in length, tapered sections, widening, patching, spot leveling, shoulders, crossovers, side street returns and other areas designated by the Engineer. A material remixing device will also not be required when placing a continuous leveling layer where the thickness of the layer is required to be transversely tapered (i.e. to correct cross slope) to a thickness less than twice the maximum aggregate size of the layer being placed.

4. HOT AND WARM MIX ASPHALT PAVERS OR SPREADERS.

Hot and warm mix asphalt pavers or spreaders shall be self-contained and of sufficient size, power, and stability to receive, distribute, and strike off the asphalt material at rates and widths consistent with the specified typical section requirements and details shown on the plans and noted in Item 410.03(f)2.

All asphalt pavers or spreaders used for mainline paving, including shoulders and interchange ramps, shall be equipped with a full width vibratory, or other compactive type, screed. The augers used to move the material across the width of the screed shall extend within 1.5 feet {450 mm} of the edge of the screed. It will be permissible to use a hydraulically extendable strikeoff for paving turnouts and short sections of pavement including variable width sections and crossovers.

When laying mixtures, the paver shall be capable of being operated at forward speeds consistent with satisfactory laying of the mixture, providing a finished surface of the required evenness and texture without tearing, gouging, or shoving of the mixture.

All hot and warm mix asphalt paving machines shall be operated with automatic grade and slope controls unless otherwise directed by the Engineer. The automatic grade controls shall be a contact ski, a mobile stringline, or non-contact sonic averaging sensors. The effective length of these controls shall be a minimum of 24 feet {7.3 m}. In the event of a malfunction of the automatic control system, the spreading operation shall be discontinued after one hour until the equipment is repaired.

If shown to be required on the plans, special attachments to the pavers and spreaders will be required to shape and finish the pavement.

5. COMPACTION EQUIPMENT.

Compaction equipment shall be capable of compacting the mixture to the required density throughout the depth of the layer while it is still in a workable condition without damage to the material. The Contractor shall be responsible for the selection of the types and number of rollers to be used.

(b) DAYLIGHT, WET WEATHER AND TEMPERATURE LIMITATIONS.

1. OPERATIONS IN DAYLIGHT.

Placement and compaction operations shall be performed during daylight hours unless noted otherwise on the plans or directed otherwise by the Engineer. (The requirements for lighting for nighttime work are given in Article 104.04(a)).

2. WET WEATHER.

The mixture shall be laid only upon an approved underlying course, which is dry, and only when weather conditions are suitable. The Engineer may, however, permit work of this character to continue when overtaken by sudden rains, up to the amount which may be in transit from the plant at the time, provided the surface just ahead of the placing is swept clear of water and the mixture is within the allowable temperature tolerances. The layer placed under such conditions shall be at the Contractor's risk and shall be removed and replaced by the Contractor without extra compensation should it prove unsatisfactory.

3. COLD WEATHER RESTRICTIONS.

Hot mix asphalt (HMA) layers of 200 pounds per square yard {110 kg/m²} or less shall not be placed when the surface or air temperature is below 40 °F {4 °C}; air temperature shall be 40 °F {4 °C} before the spreading operation is started. Spreading operations shall be stopped when the air temperature is below 45 °F {7 °C} and falling. For HMA layers over 200 pounds per square yard {110 kg/m²}, the above temperature may be lowered 5 °F {2 °C}. Unless otherwise stated in the plans and specifications, polymer modified HMA layers of 200 pounds per square yard {110 kg/m²} or less shall not be placed when the surface or air temperature is below 60 °F {15 °C}; for layers over 200 pounds per square yard {110 kg/m²}, the above temperature may be lowered 10 °F {5 °C}.

Warm mix asphalt (WMA) layers of 200 pounds per square yard {110 kg/m²} or less shall not be placed when the surface or air temperature is below 32 °F {0 °C}; air temperature shall be 32 °F {0 °C} before the spreading operation is started. Spreading operations shall be stopped when the air temperature is below 35 °F {2 °C} and falling. For WMA layers over 200 pounds per square yard {110 kg/m²}, the above temperature may be lowered 5 °F {2 °C}. Unless otherwise stated in the plans and specifications, polymer modified WMA layers of 200 pounds per square yard {110 kg/m²} or less shall not be placed when the surface or air temperature is below 50 °F {10 °C}; for layers over 200 pounds per square yard {110 kg/m²}, the above temperature may be lowered 10 °F {5 °C}.

With the exception of Section 420 "Polymer Modified Open Graded Friction Course" layers, the Contractor may place HMA and WMA layers at temperatures lower than the cold weather limits. The Contractor is warned that other factors such as wind speed and percent humidity may increase the heat loss from the HMA and WMA layers. All other requirements for the installation and quality of the HMA and WMA layers shall be applicable to the work even when the restrictions against placement of the HMA and WMA during cold weather are not followed. The layers placed under such conditions shall be at the Contractor's risk and shall be removed and replaced without extra compensation if they are unacceptable. There will be no direct payment for additional costs associated with the placement of HMA and WMA during cold weather.

(c) PREPARATION OF UNDERLYING SURFACE.

1. GENERAL.

The underlying surface must be approved before the placing of a plant mix application will be allowed. The underlying surface, whether an old surface or a new surface, shall be thoroughly cleaned of all foreign or loose material and maintained in such condition in advance of the surfacing work.

Failures in existing pavement or base shall be corrected, as noted in Item 410.03(c)2, in advance of the placement of an overlying layer.

A prime coat, when required, shall be placed in accordance with Section 401. A tack coat, when required, shall be placed in accordance with Section 405.

2. PATCHING.

When patching of an existing surface is provided by the plans, the Engineer will examine the pavement surface and designate the area to be patched. The designated areas shall be trimmed to neat vertical lines for the depth of the unstable material as directed. The loose faulty material shall be picked up and removed from the area. The newly exposed patch area shall be cleaned and treated with prime or tack material as directed before placement of patching material. The hot and/or warm mix asphalt patching material shall be placed and compacted by methods approved by the Engineer until the patch area is filled to the elevation of the surrounding surface. Compaction of the patching material shall be to the degree that further consolidation of the patching material is not anticipated and is acceptable to the Engineer.

3. LEVELING.

When leveling of an existing pavement or base is provided by the plans, the surface shall be brought to required grade and cross section with plant mix material. The surface to be treated shall be prepared as noted herein and approved before placing the new material. The plant mix material shall be spread in accordance with the provisions of Item 410.03(f)2.

Leveling shall include superelevating when so directed.

4. WIDENING.

When widening is provided by the plans, the widening shall be placed at the locations designated by the plans and/or as directed by the Engineer. The requirements for placing the widening shall be the same, as far as practical, as for the placing of the normal roadway. Compaction of the widening material shall be to the degree that further consolidation of the widening material is not anticipated and is acceptable to the Engineer.

(d) PREPARATION OF MIXTURES.

1. LIQUID ASPHALT BINDER.

The liquid asphalt binder material shall be heated in a manner that insures the even heating of the entire mass under efficient and positive control at all times. Any liquid asphalt binder material which, in the opinion of the Engineer, has been damaged shall be rejected.

2. AGGREGATE.

a. Aggregate Used for Batch Mixing and Continuous Mixing Operations.

All aggregates shall be dried so that the moisture content of the hot and warm mix asphalt at the point of sampling is less than 0.20 % by weight {mass} in accordance with ALDOT-130. The temperature of the aggregate at the dryer shall not exceed 600 °F {315 °C}.

When more than two ingredients enter into the composition of the mineral aggregate, they shall be combined as directed.

The aggregate, immediately after being heated, shall be screened into three or more sizes and conveyed into separate bins, ready for batching and mixing with liquid asphalt binder material. However, for mixes using aggregate of 1/2 inch {12.5 mm} maximum size, the number of bins may be reduced to two.

b. Aggregates for Dryer Drum Mixing Operations.

Maintenance of a uniform aggregate gradation is essential for a dryer drum operation; hence, caution and care shall be exercised in stockpiling of materials to avoid segregation.

3. MIXING.

a. Mixing Temperature.

The mixing temperature of HMA and WMA shall be in accordance with the refineries' recommendations, based upon the temperature-viscosity curve, and shall be adequate to produce a mixture in accordance with the specification requirements. The mixing temperature shall not exceed 350 °F {177 °C}.

The mixing temperature for HMA and WMA shall be continuously recorded and delivered to the Engineer on the next working day.

b. Batch Mixing.

The dried mineral aggregate, and measured mineral filler when used, prepared as prescribed above, shall be combined in uniform batches by determining the weight {mass} of and conveying into the mixer the proportionate amounts of each aggregate required to meet the job-mix formula. The largest size aggregate shall be introduced first, then smaller sizes progressively, with mineral filler last, or all mineral components may be added simultaneously. The mineral components shall be thoroughly mixed. The required quantity of liquid asphalt binder material for each batch shall be measured by weight {mass} using scales or a liquid asphalt binder material metering device attached to the liquid asphalt binder material bucket.

After the mineral components have been mixed, the liquid asphalt binder material shall be added and the mixing continued for a period of at least 45 seconds, or longer if necessary to produce a homogeneous mixture. However, if a check by ASTM D 2489 (Ross Method) shows that 95% plus coating is obtained, a shorter mixing time will suffice. The Engineer may then give written permission for a change. Each batch must be kept separate throughout the weight {mass} determining and mixing operations.

The mixture shall be uniform in composition, free from lumps or balls of material containing an excess quantity of asphalt, or from pockets deficient in asphalt.

c. Continuous Mixing.

Components shall be introduced and proportioned volumetrically by continuous methods utilizing equipment specified herein for continuous plants. Amounts of aggregate and liquid asphalt binder material entering the mixer, and the rate of travel through the mixer, shall be so coordinated that a uniform mixture of specified gradation and liquid asphalt binder content will be produced.

d. Dryer-Drum Mixing.

Components shall be proportioned by weight {mass} as noted herein in Item 410.03(a)1 for this method of mixing. Amounts of aggregate and liquid asphalt binder material entering the mixer, and the rate of travel through the mixer, shall be so coordinated that a uniform mixture of specified gradation and liquid asphalt binder content will be produced. An anti-stripping agent may be required to insure adequate coating of the aggregates, if so directed by the Engineer.

4. RECYCLED MIXTURES.

a. New Aggregate Temperature.

The temperature of the new aggregate shall be super-heated to the point where, when combined with the reclaimed material, the specified discharge is produced; however, in no case shall the temperature of the new aggregate exceed 600 °F {315 °C}.

b. Mixing.

The plant shall be designed and operated so that heat transfer will take place in the mixing unit without damage to, or vaporization of, the liquid asphalt binder material. For batch type plants, a minimum dry mixing cycle of 15 seconds shall be required for the new aggregate and reclaimed material before introduction of the new liquid asphalt binder material. All environmental regulations shall be met as required by Article 107.22.

(e) TRANSPORTING MIXTURE.

The mixture shall be transported in approved equipment in accordance with Item 410.03(a)3. The equipment shall be in sufficient numbers to deliver the material to the roadbed without delay in the quantity required. Loads shall not be delivered too late in the day to be spread, compacted, and finished during daylight hours, unless nighttime work is allowed as shown on the plans or directed by the Engineer. Loads shall not be delivered at a temperature greater than 350 °F {177 °C} , or less than 220 °F {105 °C} without written permission of the State Materials and Tests Engineer.

(f) PLACING THE MIXTURE.

1. RATE OF PLACEMENT.

The rate of plant mix to be placed will be specified by the plans; however, this rate may require correction to adjust for the compacted mix unit weight {density} as determined in the job-mix formula design as outlined in Subarticle 410.02(b). The Engineer may direct in writing that the designated weight {mass} be increased or decreased in certain areas. It shall be the Contractor's responsibility to place and spread the material uniformly to such thickness as will produce the specified average rate, separately for each layer of base, binder, and surface, and to maintain a continuing check on tonnage {mass} and yardage {area} throughout the day's operation to insure uniform specified rate.

The unit for checking the average rate shall be approximately 5000 square yards {5000 m²} to the nearest even truck load. If the last check performed in any day or any section of roadway is between 2000 and 5000 square yards {2000 and 5000 m²}, this section shall be classified as a unit; if less than 2000 square yards {2000 m²}, this section shall be added to the previous unit and the revised unit rechecked. When the initial day's operation is less than 2000 square yards {2000 m²}, this initial section will be carried over to subsequent days' operations to make a unit of approximately 5000 square yards {5000 m²}.

In any unit checked, the average rate shall not vary from the specified rate by more than 10 pounds per square yard {5 kg/m²} for layers of 225 pounds per square yard {120 kg/m²} or less, and 15 pounds per square yard {8 kg/m²} for layers greater than 225 pounds per square yard {120 kg/m²}. On the first applied layer of resurfacing where there is no required milling or leveling, this tolerance is increased to 15 pounds per square yard {8 kg/m²} for layers of 225 pounds per square yard {120kg/m²} or less, and 25 pounds per square yard {13 kg/m²} for layers greater than 225 pounds per square yard {120 kg/m²}. This tolerance is for providing leeway in equipment adjustment only. A consistent and uncorrected variation from the specified rate, even within this tolerance, will not be allowed without the Engineer's written approval. This tolerance does not apply to patching, leveling, and widening.

If the average rate of any unit is found deficient by more than the above referenced tolerance, the Engineer will determine (1) whether the Contractor shall remove and replace the deficient unit without payment for the removal or the material removed, or (2) whether the Contractor may leave the deficient unit in place and cover it with a layer of the same mix of adjusted maximum size aggregate of not less than 80 pounds per square yard {45 kg/m²} average. In case (2), the surface layer shall not be feather-edged at the end of the overlay layer, but a sufficient amount of the surface beyond the ends of the deficient unit shall be removed, to a neat line across the pavement, to allow placing the full 80 pounds per square yard {45 kg/m²} and to make a joint that will meet the surface requirements. There will be no payment for any portion of the overlay needed to bring the total up to the designated average rate for that unit.

If the average rate of any unit is found to exceed the above referenced tolerance, the tonnage {metric tonnage} in the unit that is in excess of the specified rate will be paid for as specified in Subarticle 410.09(a).

Unless otherwise provided in the following sections of these specifications, or shown on the plans, the average rate placed and compacted in one layer shall not exceed 350 pounds per square yard {200 kg/m²} for base or binder layers, and 225 pounds per square yard {120 kg/m²} for surface layers. Where the amount to be placed exceeds these limits, it shall be placed and compacted in two or more approximately equal layers or as shown on the plans.

2. SPREADING.

a. General.

Spreading of the hot and warm mix asphalt mixture shall be performed by equipment meeting the requirements of Item 410.03(a)4, except as noted in this Item. Approved specialized equipment may be employed to spread the hot and warm mix asphalt material where standard full scale equipment is impractical due to size and irregularity of the area to be paved.

For hot and warm mix asphalt pavement wearing layers, spreading operations shall be so correlated with plant and hauling equipment that the spreading operation, once begun, shall proceed at a speed as uniform and continuous as practical. The continual forward movement of the spreader requires the use of hauling vehicles capable of supplying the spreader with hot and warm mix asphalt material while the spreader is in motion. Repetitive interruptions or stopping of the spreader

shall be cause for the Engineer to stop the work until the Contractor evaluates the cause of the stoppage and has provided a definite action plan for correction of the interruptions. Any interruption will require the thorough check of the area immediately under the spreader and any variances shall be corrected immediately or the material removed and replaced, as directed, without additional compensation.

Material placed in the spreader shall be immediately spread and screeded to such uniform depth that the average rate of the mixture required is secured. Alignment of the outside edges of the pavement shall be controlled by preset control lines, and shall be finished in conformity with these controls.

Any spreading operation, which cannot produce acceptable joints within the surface tolerances and density requirements, shall be cause for requiring the Contractor to modify his operations to include additional spreading equipment.

b. Spreading by Motor Grader.

For areas of a hot and warm mix asphalt plant mix surface inaccessible to the mechanical spreader, patching of pot holes and correcting failures in existing pavement, the plant mix may be dumped in low areas in the amounts directed, windrowed, spread, and compacted to bring the elevation and section to the desired level.

If shown on the plans, the Contractor shall use a motor grader or a motor grader equipped with a dragbox to perform the spreading for the leveling operation. The motor grader shall be equipped with smooth faced tires. The dragbox, when required, shall be of sufficient size and weight {mass} to effectively shape and level the plant mix and shall be approved by the Engineer prior to use.

c. Spreading by Hand.

For areas inaccessible to mechanical spreading equipment, and when patching potholes and minor pavement failures, hand spreading of the hot and warm mix asphalt mixture may be permitted. The mixture shall be distributed immediately into place by means of suitable tools and spread in a uniformly loose layer.

(g) COMPACTING.

As soon as the mixture has been spread and has set sufficiently to prevent undue cracking or shoving, rolling shall begin. A delay in the initial rolling will not be tolerated and the initial or breakdown rolling should in general be performed by rolling longitudinally, beginning at the sides and proceeding toward the center of the surface.

The Contractor as part of his QC plan shall establish a rolling pattern when initially constructing any leveling layers using the nondestructive testing devices approved in Section 306 of the Specifications. The device shall either be calibrated to roadway cores or gage counts and shall be used to determine the rolling pattern producing maximum density. Contractor QC personnel shall be on site throughout each day to perform periodic checks and verify that the rolling pattern continually produces the maximum density that is achievable.

When paving abuts a previously placed lane, the longitudinal joint shall be rolled in the first pass. On superelevated curves rolling shall begin at the low side and progress toward the high side.

If any displacement occurs during rolling, it shall be corrected at once. To prevent adhesion of surface mixture to the rollers, the wheels shall be kept adequately moistened with water and a non-foaming detergent, but an excess of water will not be permitted.

Adequate precaution shall be taken to prevent dropping of gasoline or oil on the pavement. In places inaccessible to a roller, compaction shall be obtained with hand or mechanical tampers that produce adequate pressure to obtain the required density.

When the roller is in contact with a bridge deck, vibratory mode shall be turned off and the roller shall operate in static mode only.

Throughout the process of compacting, tests for surface smoothness as required by Article 410.05 and density as required by Section 306 shall be made continuously.

(h) JOINTS.

1. GENERAL.

Placing of hot and warm mix asphalt paving layers shall be as continuous as possible. All joints shall be made in a careful manner in such a way as to provide a smooth, well-bonded, and sealed joint meeting the density and surface requirements of Articles 410.04 and 410.05. Failure to meet

requirements noted above shall be cause for ordering the removal and reconstruction of the joint without extra compensation.

The contact surface of concrete structures shall be treated with a thin coat of liquid asphalt binder material, tack material, or the liquid asphalt binder material used in the mix, prior to construction of the joint. When directed by the Engineer, the same treatment noted above shall be used on cold asphalt joints.

2. LONGITUDINAL.

Longitudinal joints in the wearing surface shall conform with the edges of proposed traffic lanes, insofar as practical. Any necessary longitudinal joints in underlying layers shall be offset so as to be at least 6 inches {150 mm} from the joint in the next overlying layer.

3. TRANSVERSE.

Transverse joints shall be carefully constructed. Rollers shall not pass over the unprotected edge of the freshly laid mixture unless laying operations are to be discontinued. To facilitate the expeditious removal of the plant mix joint when laying operations are resumed, the Contractor shall place a heavy wrapping paper on the underlying surface across the joint and place plant mix on top of the paper.

Upon resumption of the work, a neat vertical joint shall be formed into the previously laid material to expose the full depth of the layer. The fresh mixture shall be raked and tamped to provide a well-bonded and sealed joint meeting surface and density requirements.

410.04 Density Requirements.

Density requirements shall be as specified in Table IV, Subarticle 410.08(e).

410.05 Surface and Edge Requirements.

(a) SURFACE SMOOTHNESS REQUIREMENTS.

1. GENERAL.

Surface smoothness and roadway section will be checked by the use of string, Engineer's level, and straight edge.

The Contractor shall furnish string, straightedges, and the necessary personnel to handle them under the supervision of the Engineer.

Surface smoothness tests shall be made continuously during and immediately after rolling so that irregularities may be eliminated to the extent possible by rolling while the material is still workable; otherwise, deficiencies shall be corrected as provided in Article 410.06.

2. PERPENDICULAR TO CENTERLINE OF ROADWAY.

The finished surface of all base, binder, and wearing surface layers shall not vary more than 1/4 of an inch {6 mm} from a 10 foot {3.0 m} straightedge placed perpendicular (at a right angle) to the centerline of the roadway anywhere on the surface.

Unless shown otherwise in the contract, the slope shall not vary by more than 0.20 % from the required slope in any 10 foot {3.0 m} distance over which the slope is measured without the Engineer's written approval. (If, for example, a 2.0 % slope is required, the measured slope shall not be greater than 2.2 % or less than 1.8 %.)

3. PARALLEL TO CENTERLINE OF ROADWAY.

The surface shall not vary more than 1/4 of an inch {6 mm} from a 16 foot {4.8 m} straightedge placed parallel to the centerline anywhere on the surface. A 16 foot {4.8 m} rolling straightedge, equipped with marking capability, may be used in lieu of the fixed straightedge if approved by the Engineer.

The finished surface shall not vary more than 3/8 of an inch {9 mm} in any 25 foot {8 m} section from a taut string applied parallel to the surface at the following locations: 1 foot {300 mm} inside of the edges of pavement, at the centerline, and at other points designated by the Engineer. The variance from the designated grade shall not increase or decrease by more than 1/2 of an inch {12 mm} in 100 feet {30 m}.

(b) EDGE REQUIREMENTS.

Unless shown otherwise on the plans, surface, binder, and leveling pavement edges not confined by curbing or other structures may be lightly tamped, generally with a lute and immediately

behind the placement operation, to form an approximately 1:1 slope as a preventative measure against cracking and bulging during the rolling process. This procedure shall also be required on the initial edge of a longitudinal cold joint. These edges shall be neatly shaped to line behind the breakdown roller and shall be trimmed as necessary after final rolling, to an accurately lined string or wire providing a maximum tolerance of 2 inches {50 mm} outside the theoretical edge of pavement, with a maximum variation from a true line of 1/2 of an inch {12 mm} in 10 feet {3 m} and a slope not flatter than 1:1. Edges that are distorted by rolling shall be corrected promptly.

(c) RIDEABILITY REQUIREMENTS.

The rideability requirements covered in this Subarticle shall apply only when either Item 410-A, 410-B, or 410-C is included on the plans or in the proposal.

1. TESTING DEVICE.

a. Description.

The testing device shall be a longitudinal profilograph including all accessories and chart paper herein described. The chart paper containing the log of the smoothness index shall become the property of the Department at the time the measurements are taken. The following categories cover the furnishing and disposition of the profilograph:

Pay Item 410-A - The furnishing, by the Contractor, of a new profilograph, including chart paper, and its reconditioning, if deemed necessary by the Engineer, and title transfer to the Department upon completion of its use on the project.

Pay Item 410-B - The furnishing, by the Department, of a profilograph for use on the project. The Contractor shall furnish the chart paper.

Pay Item 410-C - The furnishing, by the Contractor, of a new or acceptable used profilograph, including chart paper, for use on the project with the Contractor retaining ownership of the profilograph.

b. Equipment Requirements.

The profilograph shall be a California type profilograph, completely equipped with all necessary accessories. The profilograph shall be hand-propelled and shall have multiple averaging wheels.

When the profilograph is required to be furnished by the Contractor, the Contractor shall calibrate the profilograph prior to delivery to the project and shall maintain the profilograph during the time its use is required on the project. When the profilograph is furnished by the State, the Department will calibrate and maintain the profilograph.

Chart paper for the profilograph shall be furnished in sufficient quantities for all calibration, test runs, and actual tests deemed necessary by the Engineer.

c. Equipment Delivery.

The profilograph shall be delivered to the project a minimum of two weeks before the beginning of the paving operation of the pavement layer to be tested to allow time for checking the profilograph.

2. TESTING PROCEDURE.

a. Description.

Unless shown otherwise by the plans, the following surfaces will be subject to the requirements of this Subarticle if one of the pay items listed in Subitem 410.05(c)1.a. is included in the proposal:

- Actual wearing surfaces including Polymer Modified Open Graded Friction Course (Section 420);
- The surface of the layer directly beneath the Polymer Modified Open Graded Friction Course.

The actual testing procedure shall be as outlined in ALDOT-335, a copy of which may be obtained from the Department's webpage. The Engineer reserves the right to make minor modifications to this procedure if he deems such will produce better results.

The profilograph test shall be performed as soon as practical after the pavement has been rolled and compacted sufficiently to prevent damage to the surface but no later than the next work day after placement of the pavement, unless otherwise authorized by the Engineer. The

Contractor shall furnish the necessary personnel to operate the profilograph under the direction of the Engineer.

The profilograph test is considered a part of the paving operation and will be performed immediately in the proper sequence, in a satisfactory manner, even to the exclusion of other work.

b. Rideability Requirements.

The results of the profilograph tests shall be evaluated by Department personnel as outlined in ALDOT-335.

If a Profile Index of 50.0 inches per mile {800.0 mm/km} is exceeded in any test section of any daily paving operation, the paving operation will be suspended as soon as possible after results of the unacceptable test section are obtained. The paving will not be allowed to resume until corrective action is taken by the Contractor.

When the Profile Index is more than 20.0 inches per mile {320.0 mm/km}, per section, a unit price reduction will be assessed. When the Profile Index is less than 10.0 inches per mile {160.0 mm/km} per section, a unit price increase will be added. The price adjustments are given in the following Table 1.

TABLE I	
Profile Index Inches/Mile/Section {Millimeters/Kilometer/Section}	Contract Price Adjustment Percent of Pavement Unit Bid Price
Under 10.0 {Under 160.0}	105 - (Profile Index/2.0) {105 - (Profile Index/32.0)}
10.0 to less than 20.0 {160.0 to less than 320.0}	100
20.0 thru 50.0 {320.0 thru 800.0}	100 - (Profile Index - 20.0)/1.5 {100 - (Profile Index - 320.0)/24.0}
Over 50.0 {Over 800.0}	Unacceptable

Any price adjustment for rideability considerations will be applied to the theoretical tonnage {metric tonnage}, calculated using the plan specified rate of placement, placed in those sections testing under 10.0, or more than 20.0, inches/mile {160.0, or more than 320.0, mm/km} per section.

c. Stringline and Straightedge Requirements.

On test sections where the Profile Index is 20.0 inches per mile {320.0 mm/km}, or less, the longitudinal stringline and straightedge requirements of Item 410.05(a)3 may be waived by the Engineer except at transverse construction joints and tie-ins. Within 50 feet {15 m} of all transverse construction joints and tie-ins, and on all test sections where the Profile Index is greater than 20.0 inches per mile or greater {320.0 mm/km}, all requirements of Item 410.05(a)3 will apply.

410.06 Correction of Deficiencies and Defects.

Deficiencies in surface smoothness shall be remedied to the extent practicable by rolling while the material is still workable. Otherwise the layer shall be removed and replaced as necessary to obtain required smoothness. "Skin patching" of a surface layer to correct low areas or heating and scraping to correct high areas will not be permitted. Overlays of not less than 80 pounds per square yard {45 kg/m²} may be authorized by the Engineer for surface smoothness deficiencies provided all material in the overlay is without additional cost to the Department.

Deficiencies in thickness shall be remedied as specified in Item 410.03(f)1.

All areas containing excessive or deficient amounts of liquid asphalt binder, all areas showing unacceptable segregation of materials, and all areas unbonded after rolling shall be removed and replaced at no cost to the Department. Unacceptable segregation of a hot and warm mix asphalt mat is defined as any area in which two six inch {150 mm} cores are taken and the average percent liquid asphalt binder content of the cores have an absolute difference greater than 0.50 percentage points of the design liquid asphalt binder content, or the combined gradation analysis of the two cores on selected sieves has an absolute difference greater than 10 percentage points from the job-mix formula. All testing shall be in accordance with ALDOT-389, "Evaluation of Segregated Areas in Hot Mix

Asphalt Pavement." The location of all cores taken for segregation evaluation will be determined by the Department. All coring and traffic control required by ALDOT-389 shall be conducted/supplied by the Contractor at no cost to the Department; however, the Contractor will be reimbursed \$500.00 per core when core results are within tolerances and the coring operations require additional traffic control.

At any time that segregation is determined to be unacceptable, work shall be automatically suspended if positive corrective action is not taken by the Contractor to prevent further segregation in the mat. Upon suspension, the Contractor shall place a test section not to exceed 500 tons {500 metric tons} of the affected mixture for evaluation by the Engineer. However, if after a few loads it is apparent that the corrective actions were not adequate, work shall again be suspended and the segregated areas evaluated in accordance with ALDOT-389. Likewise, if after 500 tons {500 metric tons} it is apparent that the problem has been solved, work will be allowed to continue.

When correcting subsurface mixtures (base and binder layers), the removal and replacement may be limited to the actual defective areas or the full mat width within the limits of individual defective areas as directed by the Engineer. Removal and replacement of hot and warm mix asphalt wearing surface layers shall be a minimum of the full mat width and 10 feet {3 m} in length. All surface tolerance requirements shall apply to the corrected areas for both subsurface and surface mixes.

Areas found deficient in density shall be removed and replaced or immediately re-rolled until density is acceptable.

All work specified in this Article shall be performed without additional compensation.

410.07 Maintenance and Protection.

Sections of newly finished work shall be protected from all traffic until they become properly hardened. Maintenance shall include immediate repairs of any defects that may occur on the work; such repairs shall be repeated as often as necessary to maintain the work in a continuously satisfactory condition. The Contractor shall be responsible for the protection of the work and protection of any traffic using the work. No extra compensation will be paid for maintenance and protection.

410.08 Method of Measurement.

(a) GENERAL.

The accepted quantity of hot and warm mix asphalt plant mix used as directed will be measured in tons of 2000 pounds {metric tons} in accordance with the following:

When the laboratory compacted density as determined in the job-mix formula design exceeds 158 pounds per cubic foot {2530 kg/m³}, the actual total tonnage {metric tonnage} of mix placed will be adjusted for pay purposes in accordance with the following formula (this shall not apply to Section 327 PATB and Section 420 OGFC):

$$y = 158 c / a \quad \{ y = 2530 c / a \}, \text{ where}$$

y = total tonnage {metric tonnage} of plant mix for pay purposes;

c = actual tonnage {metric tonnage} of plant mix measured and placed, except items subject to pay factor adjustment under the QC/QA provisions. On items subject to pay factor adjustment, the adjusted tonnage {metric tonnage} (after pay factor adjustment) will be used;

a = laboratory compacted mix unit weight in pounds per cubic foot {density in kilograms per cubic meter} as shown in the job-mix formula.

No adjustments to the actual total tonnage {metric tonnage} placed will be made where the laboratory compacted mix density is below 158 pounds per cubic foot {2530 kg/m³}.

No adjustments to the actual tonnage {metric tonnage} placed will be made when the use of lightweight aggregate (expanded clay or shale) is designated.

For determining weight {mass}, each load of hot and warm mix asphalt mixture shall have its weight {mass} determined on approved certified scales, as specified in Article 109.01, furnished by the Contractor without direct compensation.

The weight {mass} measurement shall include all components of the mixture. No deductions will be made for any of the components, including the liquid asphalt binder material, contained in the mixture.

The laboratory compacted density requirements for OGFC are given in Section 420. Section 327 PATB does not have a laboratory compacted density requirement because a layer thickness (typically 4 inches {100 mm}) is required instead of a rate of placement.

(b) ACCEPTANCE OF THE MIXTURE.

The hot and warm mix asphalt mixture will be evaluated at the plant on a LOT to LOT basis. The material will be tested for acceptance in accordance with the provisions of Section 106 and the following requirements. However, any load or loads of mixture, which, in the opinion of the Engineer, are obviously unacceptable, will be rejected for use in the work.

The Contractor shall control all operations in the handling, preparation, and mixing of the hot and warm mix asphalt plant mix so that the percent liquid asphalt binder and voids in laboratory compacted samples or gradation will meet the approved job-mix formula within the tolerances shown in Tables II, III, and VI for the 1.00 pay factor. In recognition of the fact that the drying and screening operations may generate additional dust over that shown in the approved mix design, the Contractor's attention is drawn to the realization that the dust must be controlled in order to control VMA and voids in the total mix.

Acceptance of the mixture will be in accordance with Subarticle 106.09(c).

LOT pay factors for asphalt content and air voids will be determined from Table II for Section 423 mixes and from Table III for a Section 424 mix after the requirements of Item 106.09(c)3 are satisfied. LOT pay factors for asphalt content will be determined from the top half of Table II for Section 327 and 420 mixes after the requirements of Item 106.09(c)3 are satisfied. Air voids are not a pay factor for Section 327 and 420 mixes. Gradation is shown as a pay factor for Section 420 mixes in Table VI. The pay factor values determined for each sieve noted in Table VI will be averaged. This average will then be compared to the asphalt content pay factor. The lowest of these two pay factors will be applied to the mix.

Calculations for the acceptance test results for asphalt content and voids in total mix shall be carried to the thousandths (0.001) and rounded to the nearest hundredth (0.01). Calculations for averages shall be carried to the thousandths (0.001) and rounded to the nearest hundredth (0.01) in accordance with AASHTO R 11 rules of rounding. LOT pay factors will be calculated to the nearest hundredth (0.01).

Payment for Section 327 and 423 mixes will be on the basis of Table II Acceptance Schedule for Payment. Payment for a Section 424 mix will be on the basis of Table III Acceptance Schedule for Payment. Payment for Section 420 mixes will be on the basis of Table II and Table VI.

(c) SUSPENSION AND VOLUNTARY TERMINATION OF LOTS.

The production process will be considered out of control when any individual test result (asphalt content, gradation, or air voids) from a LOT has a pay factor equal to 0.80 computed from the "1 Test" row in Table II, Table III, or Table VI, whichever is appropriate. When gradation is a pay factor, a 0.80 result for an individual screen (before averaging) is considered out of control. If any single gradation for the 327 mixes falls outside of the gradation band shown in Section 327 the process is considered out of control. When this happens, production shall be suspended. If mix from the suspended LOT is contained in storage/surge bins, that mix will be considered part of the suspended LOT, and shall not be placed on any State project.

When production is suspended as described above, or when the contractor voluntarily terminates a lot, production shall not be re-started until after all of the following has been accomplished:

- (1) the Contractor shall notify the Project Manager immediately that the process is out of control, or that the LOT has been terminated voluntarily, and that production has been suspended;
- (2) the Contractor shall determine what adjustments to make in order to bring the process under control and inform the Project Manager in writing of these adjustments;
- (3) after adjustments, the Contractor shall produce sufficient mix (approximately 25 to 35 tons {25 to 35 metric tons}) as a trial batch and test for control parameters (asphalt content, gradation, and air voids);
- (4) adjustments, trial batches, and tests shall be repeated as many times as necessary until pay factors for asphalt content, gradation, and air voids equal 1.00, minimum, at which time production may be re-started. Mix utilized as a trial batch shall not be used on the project.

(d) ACCEPTANCE SCHEDULE OF PAYMENT FOR ASPHALT PLANT MIX CHARACTERISTICS.

TABLE II						
SECTION 327 MIXES**						
SECTION 420 MIXES (OPEN GRADED FRICTION COURSE)**						
SECTION 423 MIXES (STONE MATRIX ASPHALT)						
ACCEPTANCE SCHEDULE OF PAYMENT FOR ASPHALT PLANT MIX CHARACTERISTICS						
Arithmetic Average of the Absolute Values of Deviations of the LOT Acceptance Tests From Job Mix Formula Values						
Asphalt Content						
LOT Pay Factor ->	1.02	1.00	0.98	0.95	0.90	0.80*
1 Test	-	0.00-0.48	0.49-0.51	0.52-0.57	0.58-0.66	Over 0.66
2 Tests	-	0.00-0.34	0.35-0.36	0.37-0.40	0.41-0.47	Over 0.47
3 Tests	-	0.00-0.28	0.29-0.29	0.30-0.33	0.34-0.38	Over 0.38
4 Tests	0.00-0.14	0.15-0.24	0.25-0.26	0.27-0.28	0.29-0.33	Over 0.33
Voids in Total Mix (Lab. Compacted Samples)						
LOT Pay Factor ->	1.02	1.00	0.98	0.95	0.90	0.80*
1 Test	-	0.00-1.50	1.51-1.62	1.63-1.80	1.81-2.10	Over 2.10
2 Tests	-	0.00-1.06	1.07-1.15	1.16-1.27	1.28-1.48	Over 1.48
3 Tests	-	0.00-0.87	0.88-0.94	0.95-1.04	1.05-1.21	Over 1.21
4 Tests	0.00-0.45	0.46-0.75	0.76-0.81	0.82-0.90	0.91-1.05	Over 1.05
* If approved by the Department, the Contractor may accept the indicated LOT partial pay. The Department may require removal and replacement. If the LOT pay factor is greater than 0.80, the Contractor has the option to remove at no cost to the Department and to replace at contract unit bid price rather than accepting the reduced LOT payment.						
** The Acceptance Schedule of Payment for "Voids in Total Mix" will not apply to the 327 and 420 mixes						

TABLE III						
SECTION 424 MIXES (SUPERPAVE)						
ACCEPTANCE SCHEDULE OF PAYMENT FOR ASPHALT PLANT MIX CHARACTERISTICS						
Arithmetic Average of the Absolute Values of Deviations of the LOT Acceptance Tests From Job Mix Formula Values						
Asphalt Content						
LOT Pay Factor ->	1.02	1.00	0.98	0.95	0.90	0.80*
1 Test	-	0.00-0.62	0.63-0.68	0.69-0.75	0.76-0.88	Over 0.88
2 Tests	-	0.00-0.44	0.45-0.48	0.49-0.53	0.54-0.62	Over 0.62
3 Tests	-	0.00-0.36	0.37-0.39	0.40-0.43	0.44-0.51	Over 0.51
4 Tests	0.00-0.19	0.20-0.31	0.32-0.34	0.35-0.38	0.39-0.44	Over 0.44
Voids in Total Mix (Lab. Compacted Samples)						
LOT Pay Factor ->	1.02	1.00	0.98	0.95	0.90	0.80*
1 Test	-	0.00-2.50	2.51-2.70	2.71-3.00	3.01-3.50	Over 3.50
2 Tests	-	0.00-1.77	1.78-1.91	1.92-2.12	2.13-2.47	Over 2.47
3 Tests	-	0.00-1.44	1.45-1.56	1.57-1.73	1.74-2.02	Over 2.02
4 Tests	0.00-0.75	0.76-1.25	1.26-1.35	1.36-1.50	1.51-1.75	Over 1.75
* If approved by the Department, the Contractor may accept the indicated LOT partial pay. The Department may require removal and replacement. If the LOT pay factor is greater than 0.80, the Contractor has the option to remove at no cost to the Department and to replace at contract unit bid price rather than accepting the reduced LOT payment.						

TABLE VI				
SECTION 420 MIXES (OPEN GRADED FRICTION COURSE)				
ACCEPTANCE SCHEDULE OF PAYMENT FOR ASPHALT PLANT MIX CHARACTERISTICS				
Arithmetic Average of the Absolute Values of Deviations of the LOT Acceptance Tests From Job Mix Formula Values				
Gradation 3/8" {9.5 mm} Sieve				
LOT Pay Factor	1 Test	2 Tests	3 Tests	4 Tests
1.02	-	-	-	0.00 - 3.60
1.00	0.00 - 12.00	0.00 - 8.48	0.00 - 6.93	3.61 - 6.00
0.98	12.01 - 12.96	8.49 - 9.16	6.94 - 7.48	6.01 - 6.48
0.95	12.97 - 14.40	9.17 - 10.18	7.49 - 8.31	6.49 - 7.20
0.90	14.41 - 16.80	10.19 - 11.88	8.32 - 9.70	7.21 - 8.40
0.80*	Over 16.80	Over 11.88	Over 9.70	Over 8.40
Gradation No. 8 {2.36 mm} Sieve				
LOT Pay Factor	1 Test	2 Tests	3 Tests	4 Tests
1.02	-	-	-	0.00 - 2.40
1.00	0.00 - 8.00	0.00 - 5.66	0.00 - 4.62	2.41 - 4.00
0.98	8.01 - 8.64	5.67 - 6.11	4.63 - 4.99	4.01 - 4.32
0.95	8.65 - 9.60	6.12 - 6.79	5.00 - 5.54	4.33 - 4.80
0.90	9.61 - 11.20	6.80 - 7.92	5.55 - 6.47	4.81 - 5.60
0.80*	Over 11.20	Over 7.92	Over 6.47	Over 5.60
The comparison value for ALDOT and Contractor testing for the 3/8" {9.5 mm} and No. 8 {2.36 mm} sieves is +/- 2.0%.				
* If approved by the Department, the Contractor may accept the indicated LOT partial pay. The Department may require removal and replacement. If the LOT pay factor is greater than 0.80, the Contractor has the option to remove at no cost to the Department and to replace at contract unit bid price rather than accepting the reduced LOT payment.				

(e) ACCEPTANCE OF THE ROADWAY DENSITY.

For paving that is not mainline paving (paving for patching, widening, and crossovers and leveling), in-place density pay factors will not be applied. For mainline paving (including shoulders, ramps, and acceleration/deceleration lanes), in-place density pay factors will be applied as specified herein unless otherwise noted on the plans or in the specifications.

After the hot and/or warm mix asphalt mixture has been placed and compacted, it shall be evaluated for density. A core for mat density determination shall be taken by the Contractor on each 3000 foot {900 m} segment of roadway lane of asphalt mixture placed. The location of each test will be designated by the Department. The core shall meet a minimum thickness for use in determining the roadway density. If the core's average thickness in inches {millimeters} is not at least 0.008 times the rate in pounds per square yard {0.375 times the rate in kilograms per square meter}, another core shall be taken (as close a practical to the original location) where the Engineer believes the pavement is thick enough for roadway density determination. The core's average thickness shall be determined by measuring the core's thickness at six equidistant locations around the circumference of the core. The Department will take immediate possession of the core and will make a density determination of the core in accordance with AASHTO T 166, Method A. The density values of the cores will be used to compute the pay factor for that subplot. Testing locations will be selected with the random number method outlined in ALDOT-210. Contractors are allowed, but not required, to take cores anywhere, anytime for quality control. This includes taking cores from the wearing layer. The contractor must have the permission of the Engineer to take cores from a PATB (327) or OGFC (420) mix. All core holes shall be promptly repaired at the contractor's expense. For purposes of evaluation, a LOT will be as defined in Item 106.09(c)1. A SUBLOT for evaluation of density will be equal to 12,000 feet {3600 m} (4 test results) or fraction of a 12,000 foot {3600 m} length as applicable. For instance, a 27,000 foot

{8100 m} LOT would be divided into two 12,000 foot {3600 m} SUBLOTS and one 3000 foot {900 m} SUBLOT.

The in-place density will be expressed as a percentage of the theoretical maximum mix density with the following relationship:

$$\% \text{ TMD} = \frac{\text{In-place Density}}{\text{Maximum Mix Density}} \times 100$$

Maximum mix density is equated to maximum mix specific gravity as measured with AASHTO T 209, Flask determination with dry back. The maximum mix specific gravity used will be the average of the values from the four most recent determinations using Contractor data.

The appropriate pay factor for each SUBLOT will be determined from Table IV for the appropriate number of test results. The pay factor for the LOT will be determined by computing the weighted average of the SUBLOTS:

$$\text{LOT Pay Factor (PF)} = \frac{\text{PF SUBLOT 1 (Length SUBLOT 1)} + \text{PF SUBLOT 2 (Length SUBLOT 2)} + \dots}{\text{Length SUBLOT 1} + \text{Length SUBLOT 2} + \dots}$$

Calculations for the acceptance test results for in-place density will be carried to the hundredths (0.01) and rounded to the nearest tenth (0.1). LOT and SUBLOT pay factor calculations will be carried to the thousandths (0.001) and rounded to the nearest hundredth (0.01) in accordance with AASHTO R 11 rules of rounding.

The low rates of placement at which minimum density does not apply are given in Section 306. Density pay factors will not be applied to pavement layers placed at these rates.

TABLE IV ACCEPTANCE SCHEDULE OF PAYMENT FOR IN-PLACE DENSITY					
SECTION 423 MIXES (STONE MATRIX ASPHALT)					
Characteristic	SUBLLOT PAY FACTOR	Arithmetic Average of the Absolute Values of Deviations of SUBLLOT Acceptance Tests From Target**			
		1 Test	2 Tests	3 Tests	4 Tests
In-Place Density	1.02	0.00 - 2.00	0.00 - 1.41	0.00 - 1.15	0.00 - 1.00
	1.00	2.01 - 3.33	1.42 - 2.36	1.16 - 1.92	1.01 - 1.67
	0.98	3.34 - 3.60	2.37 - 2.55	1.93 - 2.08	1.68 - 1.80
	0.95	3.61 - 4.00	2.56 - 2.83	2.09 - 2.31	1.81 - 2.00
	0.90	4.01 - 4.67	2.84 - 3.30	2.32 - 2.69	2.01 - 2.33
	0.80*	Over 4.67	Over 3.30	Over 2.69	Over 2.33
SECTION 424 MIXES (SUPERPAVE)					
Characteristic	SUBLLOT PAY FACTOR	Arithmetic Average of the Absolute Values of Deviations of SUBLLOT Acceptance Tests From Target**			
		1 Test	2 Tests	3 Tests	4 Tests
In-Place Density	1.02	0.0-2.25	0.0-1.59	0.0-1.30	0.0-1.12
	1.00	2.26-3.75	1.60-2.65	1.31-2.17	1.13-1.88
	0.98	3.76-4.05	2.66-2.86	2.18-2.34	1.89-2.02
	0.95	4.06-4.50	2.87-3.18	2.35-2.60	2.03-2.25
	0.90	4.51-5.25	3.19-3.71	2.61-3.03	2.26-2.62
	0.80*	Over 5.25	over 3.71	over 3.03	Over 2.62

* If approved by the Department, the Contractor may accept the indicated partial SUBLLOT pay. The Department may require removal and replacement. The Contractor has the option to remove at no cost to the Department and replace at contract unit bid price rather than accepting the reduced SUBLLOT payment.

** Target density shall be 94.0 % of the theoretical maximum density for all mixes except for:
 - the range of placement rates given in Item 306.03(g)3 (140 pounds per square yard or greater {76 kg per square meter or greater} and less than 200 pounds per square yard {109 kg per square meter} over surface treatments) the target density shall be 92.0 % and;
 - ESAL Range A and B mixes where the Contractor demonstrates and explains in writing why 94 % of the theoretical maximum density cannot be achieved and the Engineer informs the Contractor by written notification that the target density can be reduced to 93 % or 92 %.

TABLE V COMPARISON OF ALDOT AND CONTRACTOR TESTING	
TEST	ACCEPTABLE
ASPHALT CONTENT	± 0.30 %
AIR VOIDS	± 0.50 %
GRADATION *	See Table VI

* Gradations given in Articles 327.02 and 420.02.

(f) TACK COAT.

Tack coat liquid asphalt material used as directed will be measured and paid for as specified in Section 405.

(g) WASTED AND EXCESS MATERIALS APPLIED.

Deductions in measurement will be made for all material wasted or lost due to negligence of the Contractor or applied beyond the limits of the work.

(h) **PROFILOGRAPH.**

The number of profilographs measured for payment will be the actual number of units ordered and accepted.

(i) **MATERIAL REMIXING DEVICE.**

The number of material remixing devices measured for payment will be the number of units approved by the Engineer for use. These devices will be measured per each device.

410.09 Basis of Payment.

(a) **UNIT PRICE COVERAGE.**

Compensation for plant mix material, measured as provided above, will be made on a tonnage {metric tonnage} basis and the contract unit price per ton {metric ton} for each individual item shall be full compensation for construction of the hot and warm mix asphalt plant mix layer complete in place on the roadbed as indicated or directed, including all materials, procurement, handling, hauling, and processing cost, and includes all equipment, tools, labor, and incidentals required to complete the work.

Unless otherwise covered by a separate pay item, the cost of excavation for patching and widening, compacting the subgrade, backfilling, spreading, or disposing of excess excavated material, removal and disposal of old pavement, removal and resetting of roadway signs and mailboxes, and removal and disposal of pavement markers shall be subsidiary obligations of the associated plant mix pay item, and no additional payment will be made for performing the work.

No payment will be made for unacceptable material; for material needed to overlay layers deficient in thickness; for material used in replacing defective or condemned construction; for material wasted in handling, hauling, or otherwise; or for maintaining the work.

When the average rate of placement is found to exceed the tolerance given in Item 410.03(f)1., the tonnage {metric tonnage} placed above the specified rate in that unit will be paid for at 50 percent of the contract unit price. This reduction will not be applied to patching, leveling, and widening.

The ordered and accepted profilographs, measured as noted above, will be paid for at the contract unit price bid which shall be full compensation for furnishing the unit and includes all equipment, tools, labor, calibration, maintenance, services, supplies, chart paper, and incidentals necessary to complete these items of work.

The number of approved remixing devices, measured as noted above, will be paid for at the contract unit bid price. This price shall be full compensation for furnishing the vehicles and shall include all equipment, tools, labor, calibration, maintenance, services, operator, and all other items necessary to furnish and operate the vehicles.

(b) **PAYMENT WILL BE MADE UNDER ITEM NO.:**

See Appropriate Section for Type of Plant Mix Involved.

410-A Profilograph - per Each

410-B State Furnished Profilograph - per Each

410-C Contractor Retained Profilograph - per Each

410-H Material Remixing Device - per Each

SECTION 420

POLYMER MODIFIED OPEN GRADED FRICTION COURSE

420.01 Description.

The work covered by this Section shall consist of constructing a hot mixed, hot laid polymer modified open graded friction course wearing layer generally placed on an existing pavement. The typical cross section and the average weight per square yard will be shown on the plans. Requirements for all hot mix asphalt pavements as specified in Section 410 are applicable to this Section, subject to any exceptions contained herein. Quality Control/Quality Assurance (QC/QA) requirements as specified in Section 106 are applicable to this Section, subject to any exceptions contained herein.

420.02 Materials.

The materials furnished for use shall comply with the requirements of Section 410 and the following:

(a) AGGREGATES.

The aggregate shall be limited to 100% crushed, aggregates of the following: granite, quarried quartzite, slag, sandstone or manufactured lightweight aggregate, all of which shall be from approved sources and meet the appropriate requirements of Sections 801 and 802. However, if additional dust (- 200 {- 75 μ m} material) is needed, mineral filler (meeting the requirements of Section 805) or agricultural limestone may be used. If agricultural limestone is used, it shall meet the requirements of ASTM C 602, Standard Specification for Agricultural Liming Materials, for Class E agricultural limestone, so that a minimum of 80.0 % of the material will pass the No. 8 {2.35 mm} sieve and 25.0 % will pass the No. 60 {0.250 mm} sieve. In addition, a minimum of 5.0 % will pass the No. 200 {75 μ m} sieve. No more than 10.0 % agricultural limestone shall be used.

The aggregate shall be combined into a total blend that will produce an acceptable job mix within the gradation limits shown below in the following table. The blend shall be made from at least two stockpiles of different gradations. At least 10% of the blend shall be taken from each stockpile.

AGGREGATE GRADATION FOR OPEN GRADED FRICTION COURSE	
Sieve (Square Mesh Type)	Percent Passing By Weight {Mass}
3/4 inch {19.0 mm}	100
1/2 inch {12.5 mm}	85 - 100
3/8 inch {9.5 mm}	55 - 65
No. 4 {4.75 mm}	10 - 25
No. 8 {2.36 mm}	5 - 10
No. 200 {75 μ m}	2 - 4

The requirements for allowing the use of RAP and RAS are given in Article 410.02.

(b) LIQUID ASPHALT BINDER.

The liquid binder shall be a polymer modified PG 76-22 meeting the requirements of Section 804. The proportion of liquid asphalt binder to total sample by weight {mass} shall be 4.7 % to 9.0 %. The exact proportion shall be fixed by the job mix formula.

Additives or modifiers shall be used to prevent stripping of liquid asphalt binder if stripping is observed during design, production or laydown. These additives or modifiers shall be furnished and used at no additional cost to the State.

(c) POLYMER.

The polymer additive shall meet the requirements of Section 811.

(d) LIQUID ASPHALT BINDER DRAINDOWN.

A fiber stabilizer meeting the requirements given in Section 410 shall be incorporated into the mix to reduce draindown. The fiber shall be blended into the mix in accordance with the requirements given in Section 410.

(e) TACK COAT MATERIALS

Tack coat materials shall either be a CQS-1hp asphalt emulsion used in conjunction with the spray paver equipment as required in Subarticle 420.04 (d) or "PG Asphalt for Trackless Tack" with conventional paving equipment. The CQS-1hp shall be smooth and homogeneous and shall meet the requirements shown in the following table:

CQS-1hp MODIFIED ASPHALT EMULSION			
TEST OF EMULSION			
Parameter	Test Method	Value	
Viscosity @ 77° F, SF	AASHTO T 59	20 Min.	150 Max.
Sieve Test, %	AASHTO T 59	-	0.1 Max. ¹
24-Hour Storage Stability, %	AASHTO T 59	-	1.0 Max. ²
Residue By Distillation	AASHTO T 59	60 Min.	-
Oil Distillate, by Volume of Emulsion, %	AASHTO T 59	-	-
Particle Charge	AASHTO T 59	Positive ³	
TEST OF RESIDUE FROM EMULSION			
Solubility in TCE, %	AASHTO T 44 ⁴	97.5 Min.	-
Elastic Recovery @ 50 °F	AASHTO T 301	60.0 Min.	-
Penetration @ 77 °F	AASHTO T 49	60 Min.	110 Max.
Ductility @ 77.0 °F	AASHTO T 51	40 Min.	-
<p>1. Sieve test may be waived based on successful application in the field.</p> <p>2. After standing undisturbed for 24 hours, the surface shall show no white, milky-colored substance, but shall be a smooth homogeneous color throughout the sample.</p> <p>3. If the Particle Charge Test is inconclusive, a pH test (AASHTO T 200) shall be used with a maximum of 6.7 allowable.</p> <p>4. ASTM D 5546 may be used when polymers block the filter during the test.</p>			

The original "PG Asphalt for Trackless Tack" (no RTFO or PAV testing) shall conform to the physical requirements shown in the following table:

SPECIFICATIONS FOR PG ASPHALT FOR TRACKLESS TACK		
Parameter	Specification	Test Method
Rotational Viscosity	Maximum 3 Pa•s @ 135 °C	AASHTO T 316
Penetration	Maximum 25 @ 77 °F {25 °C}, 100 g. 5s	AASHTO T 49
Softening Point (°C)	Minimum 70	AASHTO T 53
Dynamic Shear, G*/sin δ	Minimum 1.0 kPa @ 82 °C	AASHTO T 315

420.03 Design

The Open Graded Friction Course shall be designed with a minimum air void content of 12% according to ALDOT-259, OPEN GRADED ASPHALT CONCRETE FRICTION COURSE DESIGN METHOD. The contractor shall have the responsibility for the design of Section 420 mixes. The laboratory compacted density as determined in the job-mix formula design shall not exceed 150 pounds per cubic foot {2400 kg/m³}; this corresponds with a maximum specific gravity value of 2.837 or a bulk specific gravity of 2.411.

The work will be accepted on a LOT by LOT basis in accordance with the applicable requirements. Pay factors for air voids and density shall not apply.

420.04 Construction Requirements.

(a) GENERAL.

The requirements of Articles 410.03 through 410.07 shall apply except as modified hereinafter in this Article.

(b) RATE OF PLACEMENT OF TACK COAT.

The rate of application of the tack coat on the asphalt surface shall be 0.13 to 0.18 gallons per square yard within a tolerance of -0.02 and +0.02 gallons per square yard for the PG Asphalt for Trackless Tack. CQS-1hP asphalt emulsion shall be applied at a rate of 0.18 - 0.23 gallons per square yard within a tolerance of -0.02 and +0.02 gallons per square yard. A uniform distribution of tack coat across the mat shall be enforced and streaked tack shots shall not be accepted.

(c) CONVENTIONAL PAVING EQUIPMENT WITH THE USE OF "PG ASPHALT FOR TRACKLESS TACK"

The use of conventional paving equipment shall be allowed when the tack coat material used is "PG Asphalt for Trackless Tack" meeting the requirements given in Subarticle 420.02. "PG Asphalt for Trackless Tack" shall be applied at a temperature of 300 °F to 375 °F, on a clean dry surface.

(d) SPRAY PAVER PAVING EQUIPMENT WITH THE USE OF CQS-1HP ASPHALT EMULSION

The requirements given in Article 410.03 shall be applicable to the construction of the open graded friction course except for the following:

- The paving machine shall incorporate a tack distribution system, receiving hopper, feed conveyor, and a variable width, heated, ironing or vibratory type screed.

- The tack distribution system shall include metered mechanical pressure sprayer to accurately apply and monitor the rate of application of the emulsion for the tack. The rate shall be uniform across the entire paving width. It shall be applied at a temperature of 140 - 180 °F. Application shall be immediately in front of the screed unit. No wheel or other part of the paving machine shall come in contact with the tack before the paving mix is applied.

- Extensions added to the screed shall be provided with the same heating capability as the main screed unit, except for use on variable width tapered areas as approved by the Engineer.

(e) COMPACTION EQUIPMENT.

Item 410.03(a)5 is amended to require that steel wheel tandem (7 ton {6 metric ton} minimum size) rollers shall be furnished in sufficient numbers based on the quantity of material being placed to provide effective compaction coverage within the workable time period of the mix as designated by the Engineer. Rubber-tire rollers shall not be used.

(f) WEATHER AND TEMPERATURE LIMITATIONS.

The weather, air, and surface temperature limitations for (polymerized) HMA mixes are found in Subarticle 410.03(b).

(g) COMPACTING.

Subarticle 410.03(g) is amended to require that rolling shall be as approved by the Engineer; no density tests will be required.

420.05 Method of Measurement.

The accepted quantities of polymer modified open graded friction course will be measured as provided in Article 410.08.

The CQS-1hp emulsion or "PG Asphalt for Trackless Tack" for the tack coat will be measured in gallons in accordance with the requirements given in Article 109.02.

420.06 Basis of Payment.

(a) UNIT PRICE COVERAGE.

Polymer Modified Open Graded Friction Course, measured as noted above, will be paid for at the contract unit price bid in accordance with Article 410.09.

The unit price of the Open Graded Friction Course Tack Coat shall be full compensation for all materials, equipment, and labor required to furnish and place the tack.

(b) PAYMENT WILL BE MADE UNDER ITEM NO.:

- 420 - A Polymer Modified Open Graded Friction Course - per ton {metric ton}
- 420 - B Open Graded Friction Course Tack Coat - per gallon

SECTION 423

STONE MATRIX ASPHALT (SMA)(FIBER STABILIZED ASPHALT CONCRETE)

423.01 Description.

The work covered by this Section shall consist of constructing a hot mix asphalt layer of fiber stabilized stone matrix asphalt pavement on a prepared surface in accordance with these specifications and in conformity with the lines, grades, typical cross section, and the placement rate shown on the plans or as directed. The plant, equipment, and construction requirements for this pavement are specified in Sections 106 and 410, subject to any exceptions herein. All 423 mixes shall be designed and produced in accordance with the requirements given in this Section and ALDOT-395, SMA Mix Design.

423.02 Materials.

(a) AGGREGATES.

1. PROCEDURE FOR ACCEPTANCE OF COARSE AND FINE AGGREGATES.

All fine and coarse aggregate furnished shall come from an approved producer who is participating in and meeting the requirements of ALDOT-249, *Procedure for Acceptance of Coarse and Fine Aggregates*. The producer's name shall be listed in the Department's *Materials, Sources, and Devices with Special Acceptance Requirements Manual*, List I-1. The Department has established a list of qualified producers of fine and coarse aggregates. Refer to Subarticle 106.01(f) and ALDOT-355 concerning this list.

2. TYPES OF ACCEPTABLE COARSE AGGREGATES FOR SMA.

Coarse aggregate shall be aggregate retained on the No. 4 {4.75 mm} sieve. The virgin coarse aggregate shall be 100% crushed granite, quarried quartzite, limestone, sandstone, slag, or other 100% crushed manufactured stone meeting the requirements given in Section 801.

3. FLAT AND ELONGATED PARTICLES IN COARSE AGGREGATES FOR SMA.

The maximum amount of flat and elongated particles in coarse aggregate for SMA is given in the following table.

PERCENT OF FLAT AND ELONGATED PARTICLES IN COARSE AGGREGATE FOR SMA		
Test Method		Maximum
Flat & Elongated % by Count 3:1 (max to min)	ASTM D 4791 Section 8.4	20 %
Flat & Elongated % by Count 5:1 (max to min)	ASTM D 4791 Section 8.4	5 %

4. COARSE AGGREGATE SOUNDNESS FOR SMA.

The percent degradation of the source aggregate by the sodium sulfate soundness test (AASHTO T 104, Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate) after five cycles of testing shall not exceed 10 %.

5. DELETERIOUS MATERIALS AND ABSORPTION IN COARSE AGGREGATE FOR SMA.

The amount of deleterious substances and absorption in the coarse aggregate shall not exceed the limits given in the following table.

DELETERIOUS MATERIALS AND ABSORPTION IN COARSE AGGREGATE FOR SMA	
Coal and Lignite (Visual)	0.25 %
Clay Lumps and Friable Particles (AASHTO T 112)	0.25 %
Other local deleterious substances (Shale, Mica, Marcasite, etc.) (Visual)	2.0 %
Absorption (Absorption on the material passing the 3/4 inch {19.0 mm} sieve and retained on the No. 4 {4.75 mm} sieve) (AASHTO T 85 *). Applies to gravel aggregates only.	2.0 %
* Section 8.1 of AASHTO T 85 modified to require a 15 minute vacuum saturation period as per Section 6.3 of AASHTO T 209 prior to the required 15-19 hour soaking period.	

6. LOS ANGELES ABRASION CRITERIA FOR COARSE AGGREGATE FOR SMA.

The percent loss of the coarse aggregate by the LA Abrasion test (AASHTO T 96, Resistance to Abrasion of Small Size Aggregate by use of the Los Angeles Machine) shall not exceed 48 % except that, for Sandstone and Blast Furnace Slag, the LA Abrasion shall not exceed 55 %.

7. FINE AGGREGATE FOR SMA.

Fine aggregate shall be 100% crushed granite, limestone, sandstone, slag, or other 100% crushed manufactured stone meeting the requirements of Section 802 and the following table. The parent material shall meet the requirements given in Section 801.

FINE AGGREGATE QUALITY REQUIREMENTS FOR SMA		
Test Method	Minimum	Maximum
Uncompacted Voids %, AASHTO T 304*	45 %	100 %
Sand Equivalent %, AASHTO T 176*	50 %	100 %
Liquid Limit %, AASHTO T 89	0 %	25 %
Plasticity Index, AASHTO T 90	Non-plastic	
*The Sand Equivalent and Uncompacted Voids may be run on the blend of the aggregates.		

The fine aggregate shall be non-plastic when tested in accordance with AASHTO T 89, as modified by ALDOT-232, and AASHTO T 90 and shall have a maximum of 1.0 % clay lumps and friable particles as determined by AASHTO T 112. It shall consist of hard, tough grain, free of injurious amounts of clay, loam, or other deleterious substances.

8. MINERAL FILLER FOR SMA.

The mineral filler shall meet the requirements of Section 805.

(b) RECYCLED ASPHALT PAVEMENT (RAP) & RECLAIMED ASPHALT SHINGLES (RAS).

The requirements for allowing the use of RAP and RAS are given in Article 410.02.

(c) BLEND OF AGGREGATES.

The combined aggregates shall conform to the percent passing by volume requirements given in the following table.

PERCENT PASSING BY VOLUME OF AGGREGATE FOR SMA										
Sieve Size	1.5 inch {37.5 mm} Maximum Aggregate Size		1 inch {25.0 mm} Maximum Aggregate Size		3/4 inch {19.0 mm} Maximum Aggregate Size		1/2 inch {12.5 mm} Maximum Aggregate Size		3/8 inch {9.5 mm} Maximum Aggregate Size	
	Lower Limit	Upper Limit	Lower Limit	Upper Limit	Lower Limit	Upper Limit	Lower Limit	Upper Limit	Lower Limit	Upper Limit
1.5 inch {37.5 mm}	100	100								
1 inch {25.0 mm}	90	100	100	100						
3/4 inch {19.0 mm}	30	86	90	100	100	100				
1/2 inch {12.5 mm}	26	63	50	74	90	100	100	100		
3/8 inch {9.5 mm}	24	52	25	60	26	78	90	100	100	100
# 4 {4.75 mm}	20	28	20	28	20	28	26	60	90	100
# 8 {2.36 mm}	16	24	16	24	16	24	20	28	28	65
# 16 {1.18 mm}	13	21	13	21	13	21	13	21	22	36
# 30 {600 μm}	12	18	12	18	12	18	12	18	18	28
# 50 {300 μm}	12	15	12	15	12	15	12	15	15	22
# 200 {75 μm}	8	10	8	10	8	10	8	10	12	15

An example of how to blend aggregate based upon volume can be found in ALDOT-395, SMA Mix Design. The production tolerances for the above gradation bands are as specified in Item 410.02(d)7, except that the tolerance for the No. 4 {4.75 mm} sieve is +/- 4% and for the 3/8 inch {9.5 mm} sieve is +/- 6%.

Aggregates that tend to polish under traffic, such as limestone, dolomite, or marble, shall be permitted only in widening as defined by Article 410.01, shoulder paving, underlying layers, and layers that are to be covered by Polymer Modified Open Graded Friction Course (Section 420) mix in this contract, except as noted in the following table.

ALLOWABLE CARBONATE STONE CRITERIA FOR SMA	
BPN 9 Value Of Aggregate Source *	Maximum Allowable Percentage Of Carbonate Stone
≤ 25	30
26 through 28	35
29 through 31	40
32 through 34	45
≥ 35	50
* This value, BPN 9, is made using the British Pendulum Tester on aggregate source specimen polished for 9 hours on an accelerated polishing machine known as the British Wheel as per ASTM D 3319, ASTM E 303 and BMTP-382.	

In no case shall the total amount of virgin carbonate stone in the combined mixture used as actual wearing surface layers exceed the percentage shown in Table 4. When parts of the carbonate stone used in the mix are from differing strata of material or coming from multiple sources that are represented by different BPN 9 values, the lowest BPN 9 value will be used.

(d) LIQUID ASPHALT BINDER.

1. REQUIRED TYPE OF LIQUID ASPHALT BINDER FOR SMA.

Unless otherwise shown on the plans, for pavement layers in the top 2 inches the liquid asphalt binder shall meet the requirements of Section 804 and shall be polymer-modified to meet a PG 76-22 as given in Section 811. For pavement layers below the top 2 inches the liquid asphalt binder shall be PG 67-22 and shall meet the requirements of Section 804. If Open Graded Friction Course (Section 420) layers are required, the top 2 inches shall be measured from the bottom of the Open Graded Friction Course layer.

2. REQUIRED MINIMUM AMOUNT OF LIQUID ASPHALT BINDER FOR SMA.

The minimum liquid asphalt binder content shall be as given in the following table (by weight {mass} of total mix).

MINIMUM LIQUID ASPHALT BINDER CONTENT FOR SMA			
Maximum Aggregate Size (inches) {mm}	Nominal Aggregate Size (inches) {mm}	Minimum Liquid Asphalt Binder Content (% by weight) {% by mass}	Minimum Liquid Asphalt Binder Content for mixes containing RAS (% by weight) {% by mass}
1.5 {37.5}	1.0 {25}	5.3	5.5
1.0 {25.0}	3/4 {19.0}	5.5	5.7
3/4 {19.0}	1/2 {12.5}	5.7	5.9
1/2 {12.5}	3/8 {9.5}	5.9	6.1
3/8 {9.5}	No. 4 {4.75}	6.1	6.3

3. LIQUID ASPHALT BINDER DRAINDOWN.

A fiber stabilizer meeting the requirements given in Section 410 shall be incorporated into the mix to reduce draindown. The fiber shall be blended into the mix in accordance with the requirements given in Section 410. RAS may be allowed as a fiber stabilizer provided it meets the requirements in Section 410.

423.03 Design.

All SMA mixes shall be designed according to ALDOT-395, SMA Mix Design. SMA mixes shall be designed using a 50 blow Marshall design or a 60 gyration gyratory compactor design. The SMA shall have a minimum VMA of 17, a VCA_{MIX} less than the VCA_{DRC} (calculating Voids in the Coarse Aggregate is explained in ALDOT-395 SMA Mix Design) and air voids of 3.5% for SMA mixes containing RAS or 4.0 % for all other SMA mixes. The SMA mix shall be designed with a minimum tensile strength ratio of 0.80 according to ALDOT-361. The mix shall exhibit 4.50 mm or less rutting when tested in accordance with ALDOT-401, Rutting Susceptibility Determination of Asphalt Paving Mixtures Using the Asphalt Pavement Analyzer.

423.04 Hot Mix Asphalt Plant Requirements.

(a) MINERAL FILLER.

To ensure accurate metering and proportioning, the introduction of the mineral filler shall be in accordance with Section 4.3 of AASHTO M 156 as specified in ALDOT-324. Adequate dry storage shall be provided for the mineral filler. In a batch plant, mineral filler shall be added directly into the weigh hopper. In a drum plant, mineral filler shall be added directly into the drum mixer near enough to the liquid asphalt binder line so that the mineral filler is captured by the liquid asphalt binder. Note: For most SMA projects, the flow rate of the mineral filler governs the plant production rate.

(b) HOT-MIXTURE STORAGE.

SMA shall be stored according to the requirements as given in ALDOT 324, "Plant Requirements for Plants Producing Hot-Mixed, Hot-Laid Asphalt Mixtures". SMA shall not be heated above 350 °F {177 °C} without the approval of the Engineer.

423.05 Construction Requirements.**(a) GENERAL.**

Construction requirements shall be the same as specified in Articles 410.03 through 410.07 except as noted in this Article.

(b) WEATHER AND TEMPERATURE LIMITATIONS.

The weather, air and surface temperature limitations for (polymerized) HMA mixes are found in Subarticle 410.03(b).

(c) SURFACE PREPARATION.

A thin tack coat meeting the requirements of Section 405 shall be applied to ensure uniform and complete adherence of the overlay.

(d) COMPACTION.

Due to the nature of stone matrix asphalt mixture, the surface shall be rolled immediately. Rollers shall move at a uniform speed, not to exceed 3 miles per hour {5 km/hr}, with the drive roller nearest the paver. Rolling shall be continued until all roller marks are eliminated and the required density has been obtained. The Contractor shall monitor density during the compaction process using the nondestructive testing devices approved in Section 306 of the Specifications to ensure that the required density is being obtained. The device shall either be calibrated to roadway cores or gage counts and shall be used to determine the rolling pattern producing maximum density. If vibratory compaction causes aggregate breakdown or forces liquid asphalt binder to the surface, the vibratory mode shall be turned off and the roller shall operate in static mode only.

To prevent adhesion of the mixture to the rollers, it shall be necessary to keep the wheels properly moistened with water mixed with very small quantities of detergent or other approved material.

423.06 Method of Measurement.

The accepted quantities of stone matrix asphalt binder layer and stone matrix asphalt wearing layer will be measured as provided in Article 410.08. The SMA mix shall be evaluated for liquid asphalt binder content, laboratory compacted air voids, and in-place density; pay factors will be applied.

423.07 Basis of Payment.**(a) UNIT PRICE COVERAGE.**

Stone Matrix Asphalt Binder Layer and Stone Matrix Asphalt Wearing Layer, measured as noted above, will be paid for at the contract unit price bid in accordance with Article 410.09.

(b) PAYMENT WILL BE MADE UNDER ITEM NO.:

423-A Stone Matrix Asphalt Wearing Layer, * Maximum Aggregate Size
- per ton {metric ton}

423-B Stone Matrix Asphalt Binder Layer, * Maximum Aggregate Size
- per ton {metric ton}

* Specify Maximum Aggregate Size, either 1.5, 1, 3/4, 1/2 or 3/8 inches
{37.5 mm, 25 mm, 19 mm, 12.5 mm, or 9.5 mm}

SECTION 424

SUPERPAVE BITUMINOUS CONCRETE BASE, BINDER, AND WEARING SURFACE LAYERS

424.01 Description

The work covered by this Section shall consist of a hot or warm bituminous plant mixed pavement layer placed on a prepared surface in accordance with these specifications and in reasonably close conformity with the lines, grades, typical cross section, and the approximate placement rate shown on the plans or as directed.

The Contractor may use either hot mix or warm mix for all Superpave ESAL Range mixes in Section 424.

General requirements for all bituminous concrete pavements as specified in Section 410 are applicable to this Section, subject to any exceptions contained herein. Quality Control/Quality Assurance (QC/QA) requirements as specified in Section 106 are applicable to this section, subject to any exceptions contained herein.

The work will be accepted on a LOT by LOT basis in accordance with the applicable requirements.

424.02 Materials.

The materials furnished for use shall conform to the requirements of Section 410 and the following:

(a) AGGREGATES.

1. PROCEDURE FOR ACCEPTANCE OF COARSE AND FINE AGGREGATES.

All fine and coarse aggregate furnished shall come from an approved producer who is participating in and meeting the requirements of ALDOT-249, *Procedure for Acceptance of Coarse and Fine Aggregates*. The producer's name shall be listed in the Department's *Materials, Sources, and Devices with Special Acceptance Requirements Manual*, List I-1. The Department has established a list of qualified producers of fine and coarse aggregates. Refer to Subarticle 106.01(f) and ALDOT-355 concerning this list.

2. TYPES OF ACCEPTABLE COARSE AGGREGATES FOR SUPERPAVE.

Coarse aggregate shall be aggregate retained on the No. 4 {4.75 mm} sieve.

Coarse aggregate shall consist of crushed (or uncrushed) gravel with a bulk specific gravity greater than 2.550 (AASHTO T 85), crushed stone, or crushed slag, or a combination thereof having hard, strong, durable pieces, free from adherent coatings, and meeting all requirements of these specifications.

3. FLAT AND ELONGATED PARTICLES IN COARSE AGGREGATES FOR SUPERPAVE.

The maximum amount of flat and elongated particles in coarse aggregate for Superpave is given in the following table.

PERCENT OF FLAT AND ELONGATED PARTICLES IN COARSE AGGREGATE FOR SUPERPAVE		
Test Method		Maximum
Flat & Elongated % by Count 5:1 (max to min)	ASTM D 4791 Section 8.4	10 % *
* Shall not apply to the 3/8 inch {9.5 mm} mix or to ESAL Range A/B		

4. COARSE AGGREGATE SOUNDNESS FOR SUPERPAVE.

The percent degradation of the source aggregate by the sodium sulfate soundness test (AASHTO T 104, Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate) after five cycles of testing shall not exceed 10 %.

5. DELETERIOUS MATERIALS AND ABSORPTION IN COARSE AGGREGATE FOR SUPERPAVE.

The amount of deleterious substances and absorption in the coarse aggregate shall not exceed the following limits:

RESTRICTION OF DELETERIOUS MATERIALS AND ABSORPTION IN COARSE AGGREGATE FOR SUPERPAVE	
Coal and Lignite (Visual)	0.25 %
Clay Lumps and Friable Particles (AASHTO T 112)	0.25 %
Other local deleterious substances (Shale, Mica, Marcasite, etc.) (Visual)	2.0 %
Absorption (Absorption on the material passing the 3/4 inch {19.0 mm} sieve and retained on the No. 4 {4.75 mm sieve}) (AASHTO T 85 *). Applies to gravel aggregates only.	2.0 %
* Section 8.1 of AASHTO T 85 modified to require a 15 minute vacuum saturation period as per Section 6.3 of AASHTO T 209 prior to the required 15-19 hour soaking period.	

6. LOS ANGELES ABRASION CRITERIA FOR COARSE AGGREGATE FOR SUPERPAVE.

The percent loss of the coarse aggregate by the LA Abrasion test (AASHTO T 96, Resistance to Abrasion of Small Size Aggregate by use of the Los Angeles Machine) shall not exceed 48 % except that, for Sandstone and Blast Furnace Slag, the LA Abrasion shall not exceed 55 %.

7. FINE AGGREGATE FOR SUPERPAVE.

Fine aggregate shall be aggregate passing the No. 4 {4.75 mm} sieve. Gravel used to manufacture fine aggregate shall have a bulk specific gravity greater than 2.550 (AASHTO T 85).

The fine aggregate shall be non-plastic when tested in accordance with AASHTO T 89, as modified by ALDOT-232, and AASHTO T 90 and shall have a maximum of 1.0 % clay lumps and friable particles as determined by AASHTO T 112. It shall consist of hard, tough grain, free of injurious amounts of clay, loam, or other deleterious substances.

8. CLAY CONTENT FOR SUPERPAVE.

The amount of clay material, as indicated by the sand equivalent, measured on the aggregate passing the No. 4 {4.75 mm} sieve as determined by AASHTO T 176, Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test, shall be no less than the values defined in the following table according to the total design traffic in equivalent single axle loads (ESALs).

CLAY CONTENT CRITERIA FOR SUPERPAVE		
ESAL Range	Traffic (ESALs)	Sand Equivalent
A/B	ESALs < 1.0x10 ⁶	≥ 40.0
C/D	1.0x10 ⁶ ≤ ESALs < 1.0x10 ⁷	≥ 45.0
E	1.0x10 ⁷ ≤ ESALs < 3.0x10 ⁷	≥ 45.0

9. MINERAL FILLER FOR SUPERPAVE.

Mineral filler shall consist of finely divided mineral matter such as rock dust, slag dust, hydrated lime, hydraulic cement, or fly ash meeting the requirements of Section 805.

The introduction of mineral filler shall be in accordance with AASHTO M 156, Section 3.3, as specified in ALDOT-324, with the additional requirement that accurate proportioning shall be accomplished by means of pneumatic or mechanical metering.

(b) RECYCLED ASPHALT PAVEMENT (RAP) & RECLAIMED ASPHALT SHINGLES (RAS).

The requirements for allowing the use of RAP and RAS are given in Article 410.02.

(c) BLEND OF AGGREGATES.

1. GRADATIONS FOR BLEND OF AGGREGATES.

The coarse and fine aggregates, mineral filler, and recycled material shall be combined in a total blend that will produce an acceptable job mix within the gradation limits determined by the maximum and minimum control points as shown in the following tables. Maximum particle size is defined as the sieve size that is two sizes larger than the first sieve to retain more than 10 % of the material. The sequence of sieve sizes to be used in determining maximum particle size is given in the following tables. Gradation charts illustrating gradation requirements are given in Article 424.03.

The required mix will be shown on the plans. Also, all ESAL range "E" mixes shall exhibit 4.50 mm or less rutting when tested according to ALDOT-401, Rutting Susceptibility Determination of Asphalt Paving Mixtures Using the Asphalt Pavement Analyzer.

AGGREGATE GRADATION CONTROL POINTS FOR SUPERPAVE 1 1/2 inch {37.5 mm} Maximum Aggregate Size Mix		
Sieve Size	Control Point (Percent Passing)	
	Minimum	Maximum
No. 200 {75 μm}	1	7
No. 8 {2.36 mm}	19	45
3/4" {19 mm}	19	90
1" {25 mm} Nominal	90	100
1.5" {37.5 mm} Maximum	100	-

AGGREGATE GRADATION CONTROL POINTS FOR SUPERPAVE 1 inch {25.0 mm} Maximum Aggregate Size Mix		
Sieve Size	Control Point (Percent Passing)	
	Minimum	Maximum
No. 200 {75 μm}	2	8
No. 8 {2.36 mm}	23	49
1/2" {12.5 mm}	23	90
3/4" {19 mm} Nominal	90	100
1" {25 mm} Maximum	100	-

AGGREGATE GRADATION CONTROL POINTS FOR SUPERPAVE 3/4 inch {19.0 mm} Maximum Aggregate Size Mix		
Sieve Size	Control Point (Percent Passing)	
	Minimum	Maximum
No. 200 {75 μm}	2	10
No. 8 {2.36 mm}	28	58
3/8" {9.5 mm}	28	90
1/2" {12.5 mm} Nominal	90	100
3/4" {19.0 mm} Maximum	100	-

AGGREGATE GRADATION CONTROL POINTS FOR SUPERPAVE 1/2 inch {12.5 mm} Maximum Aggregate Size Mix		
Sieve Size	Control Point (Percent Passing)	
	Minimum	Maximum
No. 200 {75 μm}	2	10
No. 8 {2.36 mm}	32	67
No. 4 {4.75 mm}	32	90
3/8" {9.5 mm} Nominal	90	100
1/2" {12.5 mm} Maximum	100	-

AGGREGATE GRADATION CONTROL POINTS FOR SUPERPAVE 3/8 inch {9.5 mm} Maximum Aggregate Size Mix		
Sieve Size	Control Point (Percent Passing)	
	Minimum	Maximum
No. 200 {75 μm}	6	12
No. 16 {1.18 mm}	30	60
No. 4 {4.75 mm} Nominal	75	100
3/8" {9.5 mm} Maximum	95	100

Note: Up to 5% may be retained on the maximum size sieve (3/8 inch {9.5 mm}) and up to 25% may be retained on the nominal size sieve (#4 {4.75 mm}).

2. COARSE AGGREGATE ANGULARITY FOR BLEND OF AGGREGATES.

The coarse aggregate angularity shall be measured on the total blended aggregate retained on the No. 4 {4.75 mm} sieve in accordance with ASTM D 5821.

A fractured face is defined as an angular, rough, or broken surface of an aggregate particle created by crushing, by other artificial means, or by nature. A face is considered fractured only if it has a projected area at least as large as one-quarter of the maximum projected area (maximum cross-sectional area) of the particle and has sharp, well-defined edges.

The percent by weight {mass} of the coarse particles of the blended aggregate retained on the No. 4 {4.75 mm} sieve with one fractured face and with two or more fractured faces shall be no less than the values in the following table.

COARSE AGGREGATE ANGULARITY REQUIREMENTS FOR SUPERPAVE			
ESAL Range	Traffic (ESALs)	Wearing Surface & Binder Layers	Base Layers
A/B	ESALs < 1.0x10 ⁶	75 / -	50 / -
C/D	1.0x10 ⁶ ≤ ESALs < 1.0x10 ⁷	85 / 80	60 / -
E	1.0x10 ⁷ ≤ ESALs < 3.0x10 ⁷	95 / 90	80 / 75
Note: "85 / 80" denotes that 85 % of the coarse aggregate has at least one fractured face and 80 % has two or more fractured faces.			

3. FINE AGGREGATE ANGULARITY FOR BLEND OF AGGREGATES.

The percent air voids in loosely compacted fine aggregate, measured according to AASHTO T 304, Method "A", or ASTM C 1252, Method "A", *Uncompacted Void Content of Fine Aggregate (as Influenced by Particle Shape, Surface Texture, and Grading)* shall be no less than the values in the following table.

FINE AGGREGATE ANGULARITY REQUIREMENTS FOR SUPERPAVE			
ESAL Range	Traffic (ESALs)	Minimum % Air Void	
		Base	Binder & Surface
A/B	ESALs < 1.0x10 ⁶	43	43
C/D	1.0x10 ⁶ ≤ ESALs < 1.0x10 ⁷	43	45
E	1.0x10 ⁷ ≤ ESALs < 3.0x10 ⁷	43	45

4. RESTRICTIONS IN THE USE OF CARBONATE STONE FOR BLEND OF AGGREGATES.

The restrictions for the use of carbonate stone are given in the following table. These restrictions do not apply to widening as defined in Article 410. 01, shoulder paving, underlying layers, and layers that are to be covered by Polymer Modified Open Graded Friction Course (Section 420) mix in this contract.

CRITERIA FOR THE USE OF CARBONATE STONE IN SUPERPAVE	
BPN 9 Value Of Aggregate Source *	Maximum Allowable Percentage Of Carbonate Stone
≤ 25	30
26 through 28	35
29 through 31	40
32 through 34	45
≥ 35	50
* This value, BPN 9, is made using the British Pendulum Tester on aggregate source specimen polished for 9 hours on an accelerated polishing machine known as the British Wheel as per ASTM D 3319, ASTM E 303 and ALDOT-382.	

In no case shall the total amount of virgin carbonate stone in the combined mixture used as actual wearing surface layers that are exposed to traffic exceed the percentage shown in the above table. When parts of the carbonate stone used in the mix are from differing strata of material or coming from multiple sources that are represented by different BPN 9 values, the lowest BPN 9 value will be used.

(d) LIQUID ASPHALT BINDER.

Liquid asphalt binders shall come from an approved producer who is participating in and meeting the requirements of ALDOT-243, *Acceptance Program For Asphalt Materials*. The producer's name shall be listed in the Department's *Materials, Sources, and Devices With Special Acceptance Requirements Manual*, List I-4. The Department has established a list of qualified producers of asphalt materials. Refer to Subarticle 106.01(f) and ALDOT-355 concerning this list. Unless shown otherwise on the plans or in the proposal, liquid asphalt binder for use in all mixes shall meet the requirements of AASHTO M 320, *Standard Specification For Performance Graded Asphalt Binder*, as modified by the requirements given in the following table and Section 804.

ALLOWABLE ASPHALT BINDER GRADES FOR SUPERPAVE			
ESAL Range	Traffic (ESALs)	Base, Lower, & Upper Binder Layers	Wearing Surface Layers
A/B	ESALs < 1.0x10 ⁶	PG 67-22	PG 67-22
C/D	1.0x10 ⁶ ≤ ESALs < 1.0x10 ⁷	PG 67-22	PG 67-22
E	1.0x10 ⁷ ≤ ESALs < 3.0x10 ⁷	PG 67-22	PG 76-22
The asphalt binder shall be PG 76-22 for leveling when the top of the leveling is within 2 inches {50 mm} of the final pavement surface. The asphalt binder may be PG 67-22 for leveling that is not within 2 inches {50 mm} of the final pavement surface and for all patching and widening;. If Open Graded Friction Course (Section 420) layers are required, the final pavement surface shall be the surface of the layer below these layers.			

Asphalt Binders shall meet the requirements of Section 804.

Polymer modifiers shall be blended at an approved refinery and meet the requirements of Section 811. Approved Warm Mix additives or processes are given in List II-27, "Warm Mix Asphalt Products and Processes" of the Materials, Sources, and Devices with Special Acceptance Requirements manual.

(e) MIX PROPERTIES.

1. AIR VOIDS (Va).

The design air voids for all levels of traffic is 3.5 % for mixes containing RAS and 4.0 % for all other mixes.

2. VOIDS IN MINERAL AGGREGATE (VMA).

The job mix shall be designed at a minimum VMA given in the following table.

VOIDS IN MINERAL AGGREGATE DESIGN VMA FOR SUPERPAVE ***		
Maximum Aggregate Size * (inches) {mm}	Nominal Aggregate Size (inches) {mm}	Minimum VMA (%)
3/8 {9.5}	No. 4 {4.75}	16.5 **
1/2 {12.5}	3/8 {9.5}	15.5
3/4 {19.0}	1/2 {12.5}	14.5
1 {25.0}	3/4 {19.0}	13.5
1.5 {37.5}	1 {25.0}	12.5
* As defined in Subarticle 424.02(c)		
** All 3/8" (9.5 mm) mixes where the ESAL range is greater than A/B shall have a maximum VMA of 18.0.		
*** Production VMA may be 0.5 lower than design VMA.		

3. LIQUID ASPHALT BINDER CONTENT (Pb).

The job mix shall be designed at a minimum Liquid Asphalt Binder Content (Pb) given in the following table. Production tolerances shall be governed by the pay factors in Table III, Section 410.08.

LIQUID ASPHALT BINDER CONTENT (Pb) CRITERIA FOR SUPERPAVE			
Maximum Aggregate Size* (inches) {mm}	Nominal Aggregate Size (inches) {mm}	Minimum Liquid Asphalt Binder Content (Pb) by Percent of Total Mix**	Minimum Liquid Asphalt Binder Content (Pb) for mixes containing RAS by Percent of Total Mix**
3/8 {9.5 }	No. 4 {4.75}	5.90	6.1
1/2 {12.5 }	3/8 {9.5}	5.50	5.7
3/4 {19.0 }	1/2 {12.5}	5.10	5.3
1 {25.0 }	3/4 {19.0}	4.40	4.6
1.5 {37.5 }	1 {25.0}	4.20	4.4
* As defined in Subarticle 424.02(d)			
** Nd = 60			

4. DUST PROPORTION (D/Pbe).

The ratio of the percent by weight {mass} of aggregate passing the 75 μ m sieve to the effective asphalt content expressed as percent by weight {mass} of the total mix shall be between 0.60 and 1.4. All 3/8 inch {9.5 mm} mixes shall have a dust to effective asphalt ratio range of 0.90 to 2.00. These ratio limits apply to both the design and production phases. Effective asphalt content is that liquid asphalt binder not absorbed into the aggregate pore structure and is determined in accordance with Section 4.09 of the Asphalt Institute's, MS-2, *Mix Design Methods for Asphalt Concrete*.

5. LIQUID ASPHALT BINDER DRAINDOWN.

A fiber stabilizer meeting the requirements given in Section 410 may be incorporated into the mix to reduce draindown. The fiber shall be blended into the mix in accordance with the requirements given in Section 410.

6. RESISTANCE TO MOISTURE-INDUCED DAMAGE.

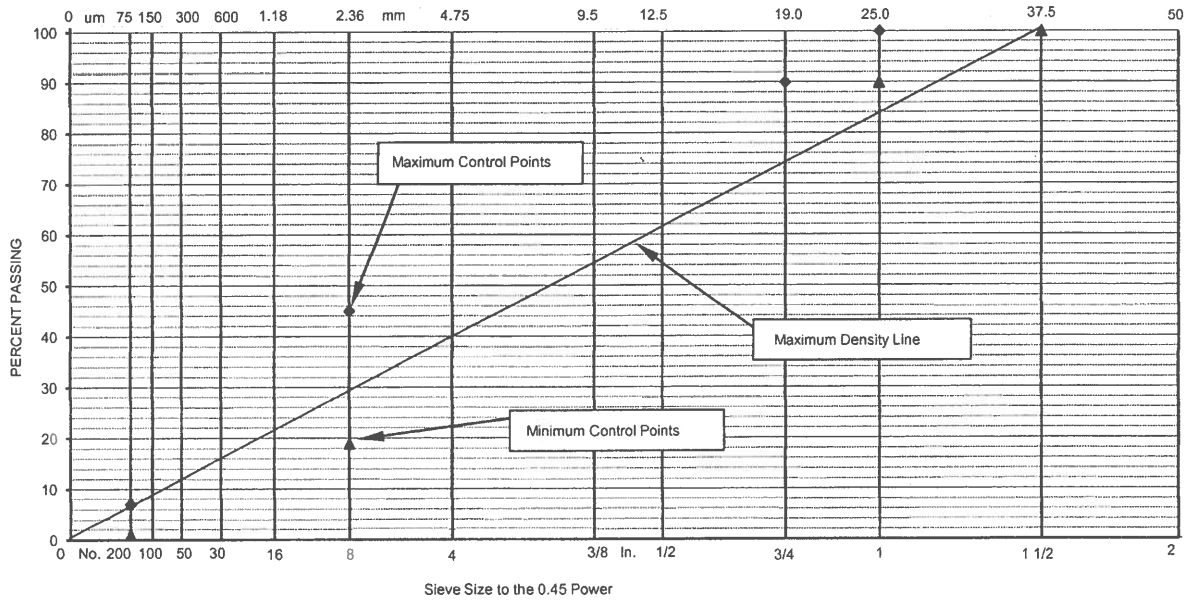
All mixes shall be designed and produced to have a tensile strength ratio (TSR) of at least 0.80 when compacted according to ALDOT-384 at 7.0 % air voids and tested in accordance with AASHTO T 283 as modified by ALDOT-361, except the specimen shall be 6.00" {150 mm} in diameter and 3.75" {95 mm} in height.

(f) DESIGN PROCEDURE.

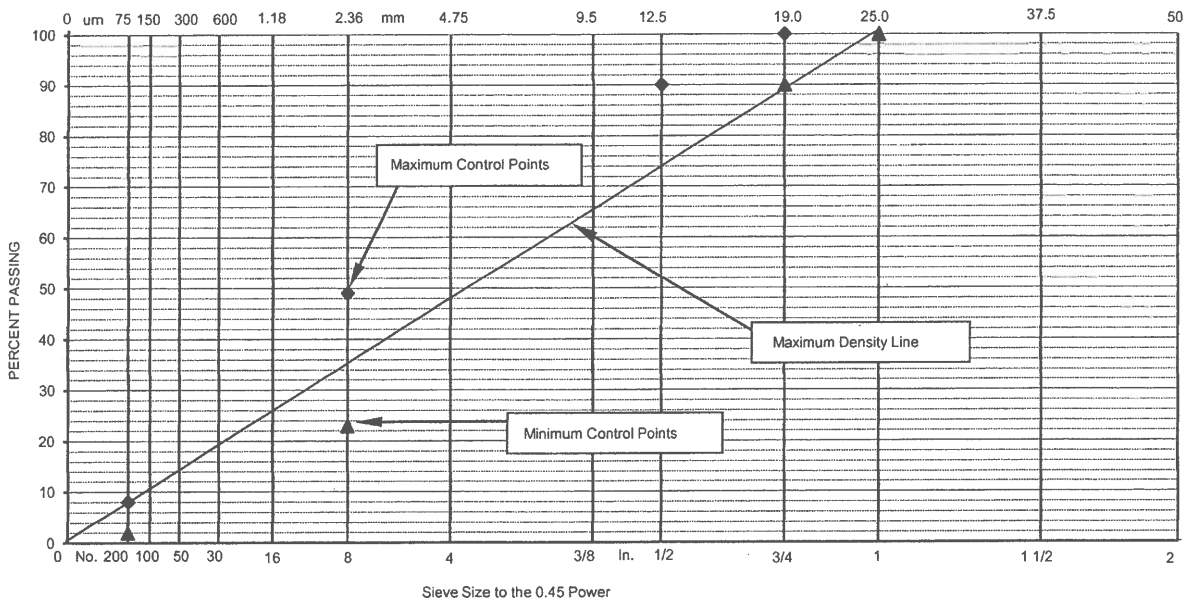
All Superpave mixes with 100 % virgin aggregate shall be designed in accordance with ALDOT-384, *Mix Design Procedure for Superpave Level I*. All other Superpave mixes containing RAP shall be designed in accordance with ALDOT-388, *Superpave Volumetric Mix Design Procedure Using Recycled Asphalt Pavement*. All Superpave Gyratory Compactors shall have their angle of gyration verified by the Engineer following the procedure in AASHTO T 344, Standard Method of Test for Evaluation of Superpave Gyratory Compactor (SGC) Internal Angle of Gyration Using Simulated Loading. This includes all design, quality control, and quality assurance SGCs. The compactors shall tilt the specimen molds at an average internal angle of 20.2 ± 0.35 mrad (1.16 ± 0.02 degrees).

424.03 Gradation Requirements.

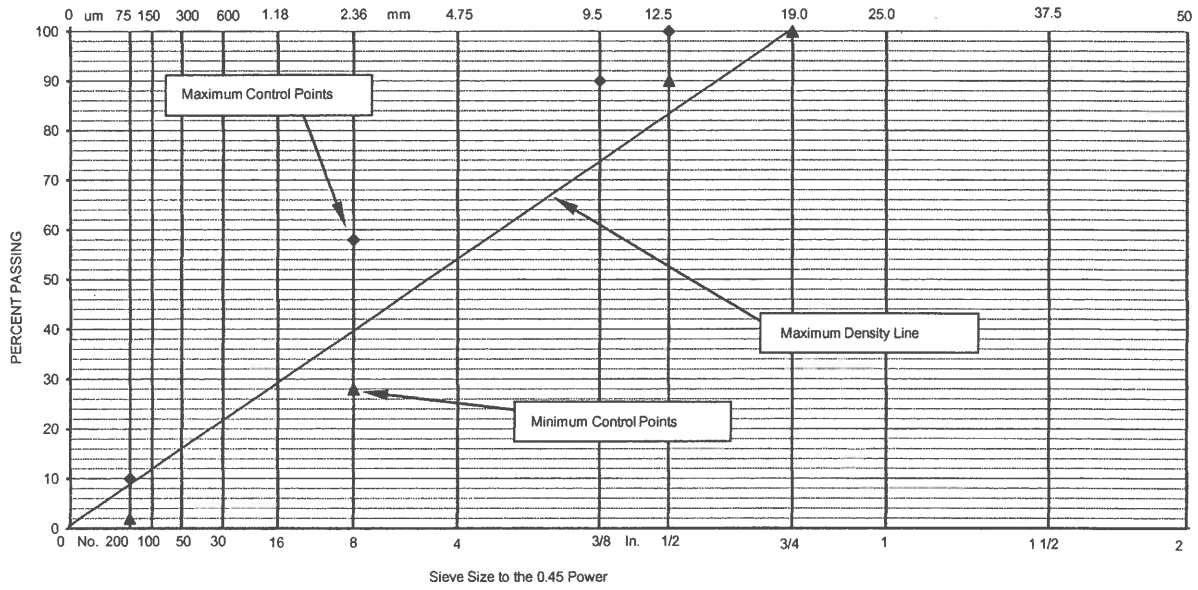
GRADATION CHART FOR 1 1/2 inch (37.5 mm) MAXIMUM SIZE AGGREGATE



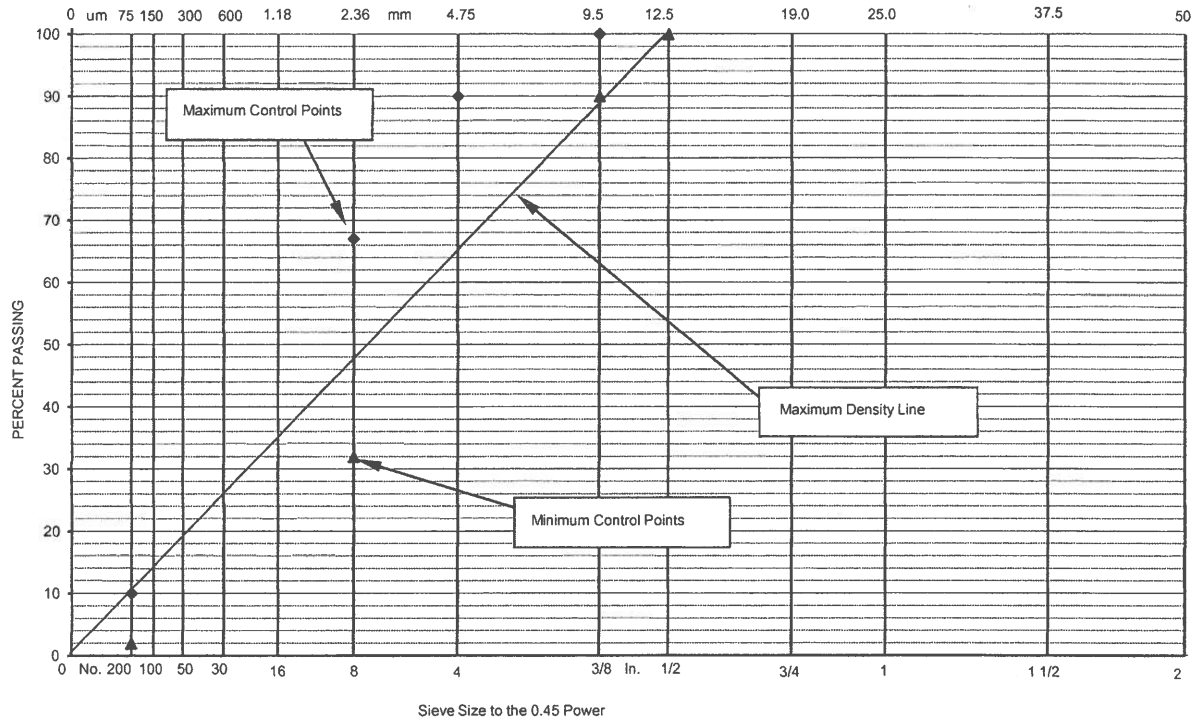
GRADATION CHART FOR 1 inch (25 mm) MAXIMUM SIZE AGGREGATE

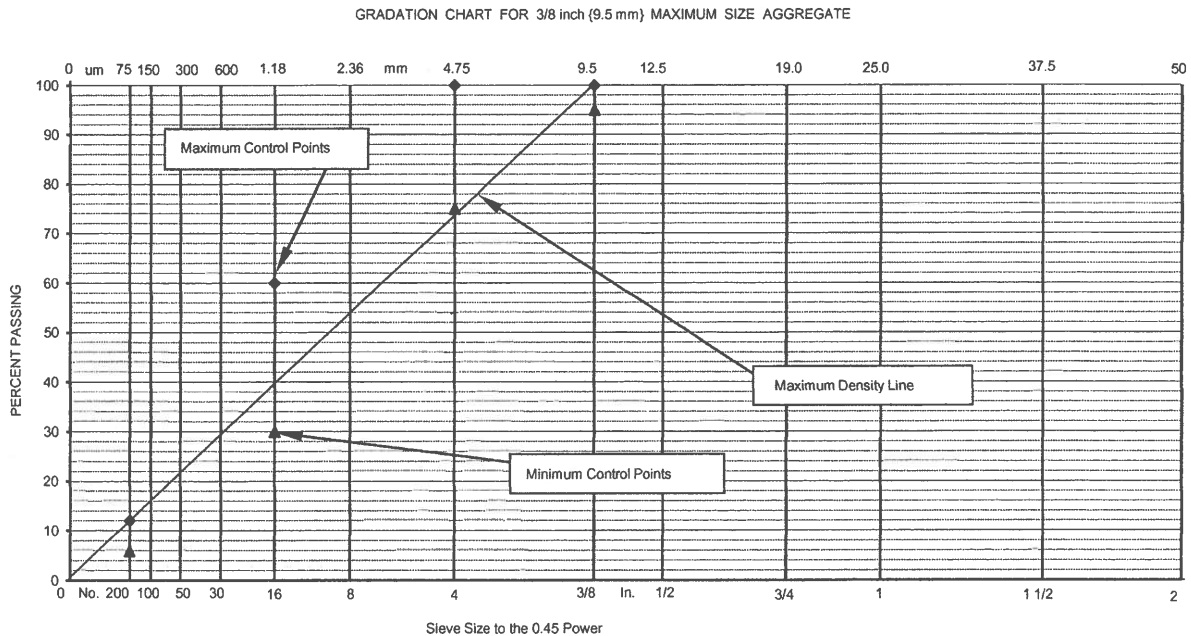


GRADATION CHART FOR 3/4 inch (19 mm) MAXIMUM SIZE AGGREGATE



GRADATION CHART FOR 1/2 inch (12.5 mm) MAXIMUM SIZE AGGREGATE





424.04 Construction Requirements.

(a) GENERAL.

The mixing temperature shall not exceed 350 °F {177 °C}.

(b) BINDER LAYER AND WEARING SURFACE LAYER.

Construction requirements shall be as specified in Articles 410.03 through 410.07.

(c) BASE LAYER.

The construction requirements for base layers shall be as specified in Articles 410.03 through 410.07, except as follows:

The edges shall be trimmed immediately after final rolling, using an accurately aligned string or wire, to a tolerance of 2 inches {50 mm} outside the theoretical edge of the layer and to a slope not flatter than 1:1.

Any edge distorted by rolling shall be promptly corrected.

(d) PREPARATION OF MIXTURES - MOISTURE CONTENT.

Each time an asphalt content measurement is made (ALDOT-354 or AASHTO T 308), the amount of moisture in the mixture shall be determined, regardless of aggregate type, as specified in ALDOT-130 and reported on Form BMT-20. The moisture determination shall be used in computing the corrected asphalt content. Moisture samples shall be taken with the asphalt content samples from the loaded truck. Moisture in the mixture shall not exceed 0.20% by weight {mass}.

(e) PRODUCTION TOLERANCES.

All mixtures furnished for use shall conform to the approved job mix formula (JMF) within the tolerances set in Article 410.02. Mixture gradations may be produced provided the gradations are within the tolerances.

424.05 Method of Measurement.

The accepted quantities of Superpave Bituminous Concrete Wearing Surface Layer, Superpave Bituminous Concrete Binder Layer, and Superpave Bituminous Concrete Base Layer will be measured as provided in Article 410.08, subject to any exceptions contained herein.

424.06 Basis of Payment.**(a) UNIT PRICE COVERAGE.**

Superpave Bituminous Concrete Wearing Surface Layer, Superpave Bituminous Concrete Binder Layer, and Superpave Bituminous Concrete Base Layer will be paid for at the contract unit price bid in accordance with Article 410.09, subject to any exceptions contained herein.

(b) PAYMENT WILL BE MADE UNDER ITEM NO.:

- 424-A Superpave Bituminous Concrete Wearing Surface Layer, ** ,
 *** Maximum Aggregate Size Mix, ESAL Range **** - per ton {metric ton}
- 424-B Superpave Bituminous Concrete * Binder Layer, ** ,
 *** Maximum Aggregate Size Mix, ESAL Range **** - per ton {metric ton}
- 424-C Superpave Bituminous Concrete Base Layer, ** ,
 *** Maximum Aggregate Size Mix, ESAL Range **** - per ton {metric ton}

- * Specify either "Upper" or "Lower".
- ** Specify "Patching", "Leveling", "Widening", etc. only when required.
- *** Specify Maximum Aggregate Size: 3/8", 1/2", 3/4", 1", or 1.5" {9.5 mm, 12.5 mm, 19.0 mm, 25.0 mm, or 37.5 mm}.
- **** Specify "A/B", "C/D", or "E".



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: August 14, 2017

Special Provision No. 12-0291(2)

EFFECTIVE DATE: September 1, 2017.

SUBJECT: Asphalt Materials

Alabama Standard Specifications, 2012 Edition, shall be revised by replacing SECTION 804 with the following:

SECTION 804 ASPHALT MATERIALS

804.01 General.

The asphalt materials furnished shall be of approved quality and shall meet the requirements shown under its respective type in the following tables and referenced specifications for the kind of material furnished. For any contract, the material furnished shall show uniform test results. Where more than one grade of material is permitted for any item of work, the Engineer shall specify the grade. In all cases, the Engineer will specify the consistency limits for the grade of material shown on the plans and/or proposal. The Contractor may, without extra compensation, supply asphalt material containing approved additives for producing non-stripping characteristics. For such materials, an adjustment in the total asphalt requirements of this subdivision will be made as deemed necessary. Other additives shall not be added to the asphalt material unless expressly authorized in writing by the Materials and Tests Engineer. The use of any unauthorized additive will be cause for rejection of the asphalt material.

Sampling of tank cars, tank trucks, distributor trucks, or recirculating storage tanks shall be by the use of a sampling valve, installed in the tanks, as prescribed in Figure 3 of AASHTO T 40.

All products furnished for use shall be from an approved producer who is participating in and meeting the requirements of ALDOT-243, ACCEPTANCE PROGRAM FOR ASPHALT MATERIALS, and listed on List I-4, PRODUCERS OF ASPHALT PRODUCTS, of the Department's "Materials, Sources, and Devices with Special Acceptance Requirements" Manual. Refer to Subarticle 106.01(f) and ALDOT-355 concerning this list.

804.02 Performance Graded Asphalt Binders (PGAB).

The material supplied under this Article shall be asphalt prepared by the refining of asphaltic petroleum. No air-blown or oxidized asphalt will be allowed. The refined asphalt binder shall be homogeneous, free of water and shall not foam when heated at 347 °F {175 °C}.

The PG 58-22, PG 64-22, and PG 76-22 binders shall conform to the requirements given in AASHTO M-320 as shown in Tables 1, 2 and 4 in Article 804.07. The PG 67-22 binder (not shown in AASHTO M-320) shall conform to the requirements given in AASHTO M-320 and the requirements given in Table 3 of Article 804.07.

Shipping temperature of the asphalt from the refinery shall not exceed 356 °F {180 °C} for unmodified binders. For polymer modified binders, shipping temperatures in excess of 356 °F {180 °C} may be allowed with the approval of the Materials and Tests Engineer. At the time of use, the asphalt temperature shall comply with the requirements of Item 401.03(d)2. or Subarticle 410.02(b) whichever is applicable.

804.03 Cutback Asphalt.

The materials supplied under this Article shall be made from liquid asphalt binder and naphtha solvent, so proportioned and mixed that the finished product shall be homogeneous and conform to the requirements of AASHTO M 81 for rapid curing cutback and AASHTO M 82 for medium curing cutback.

804.04 Emulsified Asphalt.

The materials supplied under this Article shall be homogeneous emulsification of asphalt and shall show no separation of asphalt or objectionable change in viscosity within three months after delivery. Separation at any time caused by freezing or contamination shall be cause for rejection. Emulsified asphalt shall conform to the requirements as shown in Asphalt Materials Table No. 5 in Article 804.07.

804.05 Emulsified Petroleum Resin.

The material supplied under this Article shall be a homogeneous emulsification of petroleum resin. The emulsified petroleum resin shall be supplied from the producer in the form in which it shall be placed. No dilution of the product will be allowed after the product has left the supplier's facility. Emulsified petroleum resin shall conform to the requirements as shown in Asphalt Materials Table No. 6 in Article 804.07.

804.06 Blank.

804.07 Tables of Asphalt Materials.

(a) ASPHALT MATERIALS TABLE NUMBER 1, GRADE PG 58-22.

ASPHALT MATERIALS TABLE NO. 1 SPECIFICATIONS FOR PERFORMANCE GRADED ASPHALT BINDER		
Property	Grade PG 58-22	
	Specification	Test Method
<i>Original Binder</i>		
Flash Point Temperature	Minimum 230 °C	AASHTO T 48
Rotational Viscosity	Maximum 3 Pa•s @ 135 °C	AASHTO T 316
Dynamic Shear, G*/sin δ	Minimum 1.00 kPa @ 58 °C	AASHTO T 315
<i>Rolling Thin Film Oven Residue (AASHTO T 240)</i>		
Mass Loss (RTFO)	Maximum 1.00 %	AASHTO T 240
Dynamic Shear, G*/sin δ	Minimum 2.20 kPa @ 58 °C	AASHTO T 315
<i>Pressure Aging Vessel Residue (AASHTO R 28)</i>		
Dynamic Shear, G*•sin δ	Maximum 5000 kPa @ 22 °C	AASHTO T 315
Creep Stiffness, S	Maximum 300 MPa @ -12 °C	AASHTO T 313
m-value	Minimum 0.300 @ -12 °C	AASHTO T 313

(b) ASPHALT MATERIALS TABLE NUMBER 2, GRADE PG 64-22.

ASPHALT MATERIALS TABLE NO. 2 SPECIFICATIONS FOR PERFORMANCE GRADED ASPHALT BINDER		
Property	Grade PG 64-22	
	Specification	Test Method
<i>Original Binder</i>		
Flash Point Temperature	Minimum 230 °C	AASHTO T 48
Rotational Viscosity	Maximum 3 Pa•s @ 135 °C	AASHTO T 316
Dynamic Shear, G*/sin δ	Minimum 1.00 kPa @ 64°C	AASHTO T 315
<i>Rolling Thin Film Oven Residue (AASHTO T 240)</i>		
Mass Loss (RTFO)	Maximum 1.00 %	AASHTO T 240
Dynamic Shear, G*/sin δ	Minimum 2.20 kPa @ 64 °C	AASHTO T 315
<i>Pressure Aging Vessel Residue (AASHTO R 28)</i>		
Dynamic Shear, G*•sin δ	Maximum 5000 kPa @ 25 °C	AASHTO T 315
Creep Stiffness, S	Maximum 300 MPa @ -12 °C	AASHTO T 313
m-value	Minimum 0.300 @ -12 °C	AASHTO T 313

The binder shown in Table No. 2 shall be made by adding polymer to a refined grade of PG 58-22 or shall be blended from PG 76-22 using an ALDOT approved blending procedure at the refinery. Air blown and oxidized asphalt shall not be used.

All PG 64-22 shall contain a minimum of 1.5 %, by weight, polymer solids.

A sample and infrared scan (Fourier Transform Infrared, FTIR) using the ALDOT 408 test method to determine the styrene and butadiene peaks and polymer percentage at the appropriate polymer loading shall be submitted to the Materials and Tests Engineer for laboratory evaluation prior to use.

All polymers shall conform to Section 811 for polymer additives.

All Polymer Modified Asphalt Binder manufacturers shall submit the information required in Article 811.01 annually or upon request by the Department.

(c) ASPHALT MATERIALS TABLE NUMBER 3, GRADE PG 67-22.

ASPHALT MATERIALS TABLE NO. 3 SPECIFICATIONS FOR PERFORMANCE GRADED ASPHALT BINDERS (NOT SHOWN IN AASHTO M-320)		
Property	Grade PG 67-22	
	Specification	Test Method
<i>Original Binder</i>		
Flash Point Temperature	Minimum 230 °C	AASHTO T 48
Rotational Viscosity	Maximum 3 Pa·s @ 135 °C	AASHTO T 316
Dynamic Shear, G*/sin δ	Minimum 1.00 kPa @ 67 °C	AASHTO T 315
<i>Rolling Thin Film Oven Residue (AASHTO T 240)</i>		
Mass Loss (RTFO)	Maximum 1.00 %	AASHTO T 240
Dynamic Shear, G*/sin δ	Minimum 2.20 kPa @ 67 °C	AASHTO T 315
<i>Pressure Aging Vessel Residue (AASHTO R 28)</i>		
Dynamic Shear, G*·sin δ	Maximum 5000 kPa @ 26.5 °C	AASHTO T 315
Creep Stiffness, S	Maximum 300 MPa @ -12 °C	AASHTO T 313
m-value	Minimum 0.300 @ -12 °C	AASHTO T 313

(d) ASPHALT MATERIALS TABLE NUMBER 4, GRADE PG 76-22.

ASPHALT MATERIALS TABLE NO. 4 SPECIFICATIONS FOR PERFORMANCE GRADED ASPHALT BINDER		
Property	Grade PG 76-22	
	Specification	Test Method
<i>Original Binder</i>		
Flash Point Temperature	Minimum 230 °C	AASHTO T 48
Rotational Viscosity	Maximum 3 Pa•s @ 135 °C	AASHTO T 316
Dynamic Shear, G*/sin δ	Minimum 1.00 kPa @ 76°C	AASHTO T 315
<i>Rolling Thin Film Oven Residue (AASHTO T 240)</i>		
Mass Loss (RTFO)	Maximum 1.00 %	AASHTO T 240
Dynamic Shear, G*/sin δ	Minimum 2.20 kPa @ 76 °C	AASHTO T 315
Elastic Recovery	Minimum 50 % @ 10 °C	AASHTO T 301 ¹
<i>Pressure Aging Vessel Residue (AASHTO R 28)</i>		
Dynamic Shear, G*•sin δ	Maximum 5000 kPa @ 26.5 °C	AASHTO T 315
Creep Stiffness, S	Maximum 300 MPa @ -12 °C	AASHTO T 313
m-value	Minimum 0.300 @ -12 °C	AASHTO T 313
¹ The following exceptions shall be made to the requirements given in AASHTO T 301: The statement given in Section 4.5 that reads "Attach the clips to the pins or hooks of the force adapter and the testing machine..." shall be disregarded. The mold shall be in accordance with the requirements given in ASTM D 6084 with dimensions noted in this method. All Elastic Recovery failures will be subject to FTIR scans for acceptability.		

All binders used in Table 4 shall be made by the addition of polymer to refined grades of PG 67-22 without using air blown or oxidized asphalt.

All PG 76-22 shall contain a minimum of 2.5 %, by weight, polymer solids.

A sample and infrared scan (Fourier Transform Infrared, FTIR) using the ALDOT 408 test method to determine the styrene and butadiene peaks along with the percentage of polymer added at the appropriate polymer loading shall be submitted to the Materials and Tests Engineer for laboratory evaluation prior to use. All polymers shall conform to Section 811 for polymer additives.

All Polymer Modified Asphalt Binder manufacturers shall submit the information required in Article 811.01 annually or upon request by the Department.

(e) ASPHALT MATERIALS TABLE NUMBER 5, EMULSIFIED ASPHALTS.

ASPHALT MATERIALS TABLE NO. 5 SPECIFICATIONS FOR EMULSIFIED ASPHALTS											
VISCOSITY GRADE											
	NTSS-1HM Min-Max	NTQS-1HL Min-Max	CMS-2, CMS-2h, CSS-1, CSS-1h, CRS-2, CRS-2p* CRS-2l*	AE-P Min-Max	CMS-1hp Min-Max	CRS-1h Min-Max	CBC-1HT Min-Max	CRS-2h CRS-2hp* Min-Max	CQS-1h CQS-1hp* Min-Max	CHTT-1hs Min-Max	AASHTO TESTS
AASHTO M 208			Meet								T 59
Elastic Recovery Minimum 50% @ 50° F {10° C}	--		50% for CRS-2p and CRS-2l	--	50%	--	--	50% for CRS-2hp	50% for CQS-1hp	--	T 301 **
Viscosity, Saybolt Furol: @ 77 °F {25 °C}, Sec @ 122 °F {50 °C}, Sec	25 500	100	--	10 50	30 400	15-100	10-100	200 500	20 150	0 100	T 59 T 59 *See Note #4
Settlement, 5 days, %	-- 5	--	--	-- 5	--	--	--	--	--	--	T 59
Storage Stability Test 24 hr., %	-- 1.0	-- 1.0	--	--	-- 1.0	-- 1.0	-- 1.0	-- 1.0	-- 1.0	-- 1.0	T 59
Demulsibility, 35 ml/0.8%	--	--	--	--	--	--	--	--	--	--	
Sod. Dioctyl Sulfosuccinate, %	--	--	--	--	--	--	--	60	--	--	T 59
Particle Charge			Positive	--	Positive	Positive	Positive	Positive	Positive	Positive	T 59
Sieve Test, %			Non-ionic	-- 0.10	-- 0.10	-- 0.10	-- 0.30	-- 0.10	-- 0.10	0.10	T 59
Distillation:											
Oil Distillate or Naphtha, by Volume of											
Emulsion, %	-- 1.0			-- 12	-- 3.0	-- 3.0	--	-- 3.0	--	3.0	T 59
Residue by Distillation, %	50	60		45	50	55	50	65	60	50	T 59
Stone Coating Test, % Coated	--	--		--	--	--	--	--	--	--	See Note #1
Modified Sand Coating	--	--		--	--	--	--	--	--	--	See Note #2
Tests on Residue from											
Distillation:											
Float Test @ 140° F {60° C}, Sec.	--	--		20	--	--	--	--	--	--	See Note #3
Solubility in CLCH: CCL2, %	--	--		97.5	--	--	--	97.5	97.5	--	T 44
Ductility @ 77° F {25° C}, cm	--	--		--	--	--	--	60	40	--	T 51
ASH, % by Mass	--	--		--	--	--	--	--	--	--	T 111
Specific Gravity, 77° F / 77° F	--	--		--	--	--	--	--	--	--	T 228
{25° C / 25° C}	65°C	60°C		--	--	--	--	--	--	--	
Softening Point					40° C	49° C				49° C	T 53
Dynamic Shear @ 67° C {G'/sinδ,				--	--	--	--	--	--	--	T 315
MSCR @ 67° C, J _{ir} @ 3.2/MPa				--	--	--	--	--	--	--	T 350
Penetration 77° F {25° C}, 100 g, 5s	-- 20	-- 20		--	45-90	40 90	2.0	70 100	60 110	40 90	T 49

* All CRS-2p, CRS-2hp, CRS-2l, and CQS-1hp shall contain a minimum of 3.0% polymer by volume. CRS-2p shall meet the requirements given in AASHTO M 316 with the exception of polymer content. All polymers shall conform to the requirements given in Section 811. All Elastic Recovery failures will be subject to FTIR scans for acceptability.
** The following exceptions shall be made to the requirements given in AASHTO T 301: The statement given in Section 4.5 that reads "Attach the clips to the pins or hooks of the force adapter and the testing machine..." shall be disregarded. The mold shall be in accordance with the requirements given in ASTM D 6084 with dimensions noted in this method.

NOTES TO ASPHALT MATERIALS TABLE NO. 5.

NOTE #1. Stone Coating Test.

Use AASHTO T 59, Coating Test, except the mixture of stone and asphalt emulsion shall be mixed vigorously for five minutes and then immediately drenched with approximately twice its own volume of tap water at room temperature after which the aggregate shall be at least 90 percent coated with an asphalt film.

NOTE #2. Modified Sand Coating Test.

Use AASHTO T 59, Coating Test, except a mixture of air-dry test aggregate and asphalt emulsion shall be mixed thoroughly for five minutes then allowed to stand for five hours, after which the mixture shall be capable of being mixed for an additional five minutes. The mixture shall then be drenched with approximately twice its own volume of tap water at room temperature without showing more than 10 percent loss of bituminous film. The test aggregate for use in this test shall be a combination of 90 percent concrete sand and 10 percent Portland cement. The amount of asphalt emulsion used shall be 10 percent by weight {mass} of the aggregate.

NOTE #3. Float Test.

Use AASHTO T 50, with the exception that the residue shall be allowed to cool to room temperature and re-melted at lowest possible temperature that will bring it to a sufficiently fluid condition for easy pouring. Then pour into the collar for completion of the float test.

NOTE #4. Viscosity Test.

If the Viscosity Test begins to drip at 122 °F {50 °C} test temperature, the test shall be repeated at 160 °F {70 °C}. The Viscosity at 160 °F {70 °C} shall not exceed 200 seconds.

(f) ASPHALT MATERIALS TABLE NUMBER 6, EMULSIFIED PETROLEUM RESIN.

ASPHALT MATERIALS TABLE NO. 6 SPECIFICATIONS FOR EMULSIFIED PETROLEUM RESIN				
TESTS	RESULTS		TEST METHODS	
	Minimum	Maximum	ASTM	AASHTO
Particle Charge Test	Positive		D 244	T 59
Residue, % (Residue contains 5% Asphalt)	60	--	D 244	T 59
Sieve Test, %	--	0.1	D 244	T 59
Viscosity, @ 77 °F {25 °C}, SFS	14	60	D 244	T 59
Tests on Residue:				
Flash Point, COC (°F)	210	---	D 92	T 48
Viscosity at 140 °F {60 °C} (cST)	190	450	D 2170	T 201
* ASTM D 244 Evaporation Test for percent of residue is modified by heating 50 gram sample to 149 °C until foaming ceases, then cooling immediately and calculating results.				
** Test procedure identical with ASTM except that distilled water shall be used in place of 2% sodium oleate solution.				

ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: November 9, 2015

Special Provision No. 12-0300

EFFECTIVE DATE: July 1, 2017.

SUBJECT: Concrete Sidewalks and Driveways.

Alabama Standard Specifications, 2012 Edition, SECTION 618 shall be replaced by the following:

SECTION 618 CONCRETE SIDEWALKS AND DRIVEWAYS

618.01 Description.

This Section shall cover the work of constructing a portland cement concrete sidewalk or driveway, with or without reinforcement as shown on the plans, in one course on a prepared subgrade in accordance with these specifications, and of the thickness and typical cross-section shown on the plans. Lines and grade shall be as shown on the plans or established. "Subgrade" in this Section shall mean the prepared foundation on which the sidewalk or driveway is constructed.

This Section shall also cover the work of retrofit installation of truncated domes (detectable warning devices) on existing sidewalks.

618.02 Materials.

All materials furnished for use shall comply with the appropriate requirements of Division 800, Materials, and the following:

- Concrete shall meet the requirements for a Class A concrete as provided in Section 501.
- Reinforcing steel shall meet the requirements of Section 502 and plan details.
- Truncated domes for retrofit shall be selected from the Department's List II-25, Detectable Warning Devices. This list is in the Department's Manual, "Materials, Sources, and Devices with Special Acceptance Requirements". Only the materials on this list shall be furnished for use. Information concerning this list is given in Subarticle 106.01(f) and ALDOT-355.

618.03 Construction Requirements.

(a) Equipment.

The equipment used for mixing concrete shall conform to the requirements of Section 501.

The Contractor may use forms or, if requested in writing and approved by the Department, an approved automatic extrusion type paving machine.

Forms shall be of wood, or metal, and shall be sufficiently staked to hold them true to line and grade while concrete is being deposited against them. If of wood, they shall be 2 inch {50 mm} or 3 inch {75 mm} (nominal size) stock lumber surfaces on all sides. If of metal, they shall be of approved section having a base width of at least 4 inches {100 mm} and shall have a flat surface on top. The depth of the forms shall equal the depth of the sidewalk or driveway. Adequate means shall be provided for securely fastening the ends of forms together.

Any automatic extrusion machine considered must be demonstrated to produce a consolidated concrete section conforming to the dimensions, cross section, line, and grades shown on the plans or directed within the requirements noted herein in this Section.

(b) Subgrade.

All soft or other unsuitable material in the subgrade shall be removed and replaced with suitable material. All fills and filling material shall be placed and compacted by rolling with an

approved roller or hand tamped with approved tamping devices in layers not exceeding 6 inches {150 mm} in thickness. Any existing areas that have been previously compacted by traffic to a greater degree than the remainder of the subgrade, shall be loosened and the whole subgrade uniformly compacted as directed.

(c) Foundation Backfill.

Where provided by the plans and/or proposal, foundation backfill shall be placed and constructed as provided in Section 214. No direct payment will be made for foundation backfill except when Item 214-B is provided in the proposal and such is ordered placed by the Engineer.

(d) Setting Forms.

Forms shall be set to true line and grade and rigidly held in place by stakes or braces. Ends of adjoining form sections shall be flush. Forms and division plates shall be cleaned and oiled before placing concrete against them.

(e) Handling, Measuring, Proportioning, and Mixing Materials.

The method of handling, measuring, proportioning, and mixing concrete materials shall conform to Section 501, Structure Concrete. Where metal reinforcement is shown on the plans and/or provided in the proposal, it shall be placed in accordance with Section 502.

(f) Placing Concrete.

A template resting upon the side forms and having its lower edge at the exact elevation of the subgrade shall be drawn along the forms and the subgrade shaped true before any concrete is deposited. The subgrade shall be moist and shall be free of debris and all foreign material when concrete is deposited upon it. The freshly mixed concrete shall be placed promptly on the prepared subgrade to the depth required to complete the sidewalk or driveway in one course. It shall then be vibrated and/or tamped and struck off with an approved straightedge resting upon the side forms and drawn forward with a sawing motion. The concrete shall then be floated with a wooden float until the surface is true. Concrete laid during cold weather shall conform to the requirements given in Section 501.

(g) Joints.

Unless otherwise shown by plan details, the surface of sidewalks and driveways shall be marked in squares or rectangles not exceeding 36 square feet {3.5 m²} in area by using an approved marking tool. The marking tool shall provide a groove approximately 1/2 inch {13 mm} in depth and with rounded edges.

Unless otherwise directed by the Engineer, expansion joints 3/8 of an inch {9 mm} (min.) wide shall be placed as follows:

- At all curb returns and where the walks or drives join other concrete units.
- To line up with expansion joints of adjacent curbs, drives, etc., but in no instance more than 80 feet {24 m} between joints.
- Where continuous runs of walks or drives are 80 feet {24 m} or longer, transverse expansion joints shall be provided; one joint for each additional 80 feet {24 m} or fraction thereof, of length.
- Where walks or drives are confined longitudinally by other concrete units and the width of the walk or drive is in excess of 15 feet {5 m}, one longitudinal expansion joint will be required for each additional 15 feet {5 m}, or fraction thereof, of width.
- Expansion joints shall be formed using a filler and sealer specified in Articles 832.01 and 832.02.
- Unless shown otherwise by plan details, the joint filler shall be from the bottom of the walks or drives to 1 inch {25 mm} from the top; the sealer shall be 3/4 of an inch {19 mm} thick and shall be recessed 1/4 of an inch {6 mm} from the top.

(h) Curing and Protecting.

Immediately after the finishing operations have been completed, the entire surface of the newly laid concrete shall be protected against rapid drying out and cured as provided in Subarticle 450.03(m), unless the Contractor elects to use Type III portland cement, in which case the total curing time will be reduced. No vehicles shall be permitted on the new concrete for seven days and pedestrians shall not be permitted thereon for at least 72 hours unless the Contractor elects

to use Type III portland cement, in which case the time limit will be reduced to 24 hours for walks and four days for driveways.

(i) Backfilling.

After the concrete has set sufficiently, the side forms shall be removed and the spaces on both sides shall be backfilled with suitable material. This backfill shall be compacted to a level 1 inch {25 mm} below the walk or driveway and left in a neat and workmanlike condition.

(j) Truncated Dome Retrofit

A truncated dome retrofit shall be installed according to the details shown in the plans.

618.04 Method of Measurement.

The quantity of accepted sidewalks or driveways will be measured, complete in place, and the area computed in square yards {square meters}. Measurement for separate payment for foundation backfill will only be made when Item 214-B is provided in the proposal and such is ordered by the Engineer.

Truncated dome retrofit shall be measured per square foot {square meter}, complete in place. Truncated domes installed as part of a new sidewalk will not be measured separately for payment, but will be included in the cost of the sidewalk.

618.05 Basis of Payment.

(a) Unit Price Coverage.

The accepted quantity of sidewalk or driveway will be paid for at the contract unit price for Concrete Sidewalks or Concrete Driveways, complete in place, which shall be payment in full for furnishing all materials (including joints), for the hauling, preparation, and placing of all materials, for the preparation of the subgrade, excavation, backfilling, and for all labor, equipment, tools, and incidentals necessary to complete the work.

The accepted quantity of truncated dome retrofit will be paid for at the contract unit price, complete in place, which shall be payment in full for furnishing all materials, for the hauling, preparation, and placing of all materials, for the preparation of the sites and for all labor, equipment, tools, and incidentals necessary to complete the work.

(b) Payment will be made under Item No.:

- 618-A Concrete Sidewalk, ____ inch(es) {mm} Thick - per square yard {square meter}
- 618-B Concrete Driveway, ____ inch(es) {mm} Thick - per square yard {square meter}
- 618-C Truncated Dome Retrofit - per square foot {square meter}



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: June 14, 2012

Special Provision No. 12-0309

EFFECTIVE DATE: September 1, 2012

SUBJECT: Soil, Soil Aggregate, and Aggregate, Base and Subbases.

Alabama Standard Specifications, 2012 Edition, SECTION 301 shall be amended by replacing Articles 301.05 and 301.06 with the following:

SECTION 301 SOIL, SOIL AGGREGATE, AND AGGREGATE, BASE AND SUBBASES

301.05 Sampling and Testing.

(a) GENERAL.

All sampling and testing, except in-place density, will be performed on the complete in-place base or subbase layers after final mixing and spreading on the roadway has been completed except as noted in Subarticle 301.05(c) for cement treated base material. In-place density will be performed on the layers after final shaping and compacting has been completed.

Any necessary sample holes, etc., required to satisfactorily establish the acceptability of any base layer shall be repaired by the Contractor immediately with like material. The cost of such repairs is considered to be incidental to the work and shall be performed without additional compensation.

(b) SURFACE REQUIREMENTS.

The finished surface of each subbase or base layer shall not vary more than 1/2 of an inch {13 mm} in any 25 foot {8 meter} section from a taut string applied parallel to the surface and roadbed centerline at the following locations: 1 foot {300 mm} inside the edges of subbase or base, at the centerline, and at other points as designated. The finished surface shall not vary more than 3/8 of an inch {10 mm} from the required section measured with a template placed at right angles to the roadbed centerline. The template shall be of a rigid frame adjustable metal type, accurately set, and at least as long as the width of base layer being checked up to 24 feet {7.2 m}. Additional widths may be checked by the use of string and Engineer's level. The Contractor shall furnish template, string, and necessary personnel to handle same under the direction of the Engineer.

Where a Permeable Asphalt Treated Base (PATB) layer is to be placed (Pay Item 327-E), the finished base layer elevations shall not vary from design by more than 0.03 feet {10 mm} based on rod and level survey readings taken at a minimum of five locations across each lane (edge, outer wheel path, midlane, inner wheel path, and inside edge of lane) at longitudinal intervals not greater than 50 feet {15 m}. Surface irregularities shall not exceed 1/4 inch {7 mm} between two points longitudinally or transversely using a 10-foot {3 m} straightedge.

(c) GRADATION AND DENSITY.

Testing for compliance will be made as specified in Subarticle 301.05(a) except that a layer with a cement additive will require the pretesting of the blended components prior to the addition of the cement additive on the primary belt at the mixing plant.

The gradation of each layer will be checked at intervals as currently scheduled by the Department to determine compliance with the material specifications. Material falling outside of the specified bands of the general composition table shall be evaluated in accordance with the following: for each failing test, the price reduction will be five percent plus one percent for each percent for which the material failed to meet the required specifications. This applies to each sieve, percent clay, liquid limit (LL), or plasticity index (PI) requirement. These percentages are cumulative and apply to all material represented by that sample. If the resulting reduced unit price is less than 80% of the original unit price, the contractor will be given the option of modifying the in place material or

removing and replacing the material. In either case, the gradation of the material will be re-tested for compliance with the material specifications.

The density of each layer will be checked at intervals as currently scheduled by the Department to verify compliance with specification requirements. Density requirements are specified in Section 306.

(d) THICKNESS.

The thickness of each layer will be checked at intervals as currently scheduled by the Department and at closer intervals if necessary to determine the limits of any section found to be outside of the tolerance limits.

1. For a layer placed under a "square yard" {"square meter"} item, the compacted thickness of the layer shall not be more than 1/2 of an inch {13 mm} less nor 1 inch {25 mm} more than the thickness specified on the plans or directed. A thickness greater than the 1 inch {25 mm} tolerance may be accepted if uniform over a sufficient length to not materially affect the riding surface or reduce any required clearances and is within surface smoothness tolerances specified in Subarticle 301.05(b).

2. For a layer placed under a "cubic yard" {"cubic meter"} item, the compacted thickness of the layer shall not exceed eight percent of each layer, plus or minus, of the designated thickness. Excess thickness above the eight percent noted above may be permitted to remain in place provided the riding surface is not affected and any required clearances are maintained, The excess material above the eight percent tolerance allowed will be deducted from the pay quantities.

3. If the base layer contains cement, areas below required thickness or elevation shall be corrected by increasing the thickness of the next layer; or for the top layer, the surface may be brought to proper elevation and thickness with layers of bituminous plant mix of appropriate gradation where the pavement is to be a bituminous type. These leveling layers shall be placed ahead of a plant mix pavement layer or after a liquid surface treatment layer, if any. These layers shall be placed without additional compensation, or the Contractor may at his option remove and replace the deficient areas at his own expense. Low areas in the subgrade under concrete pavement shall be corrected as specified under Subarticle 450.03(c).

(e) WIDTH.

The widths shown on the plans, or directed, shall be the widths used for determining the area for pay purposes of square yard {square meter} layers. Widths in excess of the designated width may be acceptable if not detrimental to the appearance or design of the project; however, no deviation in excess of 0.3 feet {90 mm} less than the designated dimension for each side of a roadway will be acceptable.

301.06 Maintenance of the Work.

Each base layer shall be maintained as provided herein without extra compensation until it is covered by a succeeding layer or acceptance of the contract. The surface shall be kept free of ruts, ridges, holes, and substantially true to profile, grade, and cross-section. Each base layer must have the required density and moisture at the time it is covered by another layer. However, maintenance requirements for moisture will be waived for Crushed Aggregate Base after the layer has been properly compacted with proper moisture content. No layer of base shall be covered by another layer or primed until it has been approved by the Engineer.

Special attention is directed to the fact that lime or cement treated bases require special care to insure proper curing. Daily watering, rolling, or maintenance of curing material is considered an integral part of the work until the treated layer is covered by another layer or completion of the contract.

The Engineer may re-test a primed base layer where he suspects that it does not have the required density and moisture. All areas found deficient shall be corrected by the Contractor, at his expense, prior to the placement of the next overlying layer.

It shall be the Contractor's responsibility to protect the base from damage and to protect the prime from being picked up or damaged by traffic and to replace promptly any base or prime so damaged.

ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: December 4, 2015

Special Provision No. 12-0325(2)

EFFECTIVE DATE: March 1, 2016

SUBJECT: Working Drawings.

Alabama Standard Specifications, 2012 Edition, Section 105, shall be amended as follows:

SECTION 105 CONTROL OF WORK

105.02 Plans and Drawings.

(c) Working Drawings.

1. Preparation of Drawings.

Item 105.02(c)2 shall be replaced by the following:

1. Preparation of Drawings.

The Contractor shall prepare and submit working drawings to supplement the plans. Working drawings shall be prepared to provide a complete illustration of the construction methods and materials proposed for use by the Contractor. Design calculations shall be submitted with the drawings. The signature, seal, and date of signature shall be placed on all details and design calculations by a Professional Engineer that is licensed in the State of Alabama and not employed by the ALDOT.

Working drawings and design calculations shall be submitted for:

1. Cofferdams, sheeting and shoring near a railroad track;
2. Cofferdams where "cofferdam and pumping" is required;
3. Structural steel girder erection plans for continuous span bridges;
4. Temporary bracing to provide stability for bridge girders;
5. Stay-in-place bridge deck forms;
6. Falsework for bridge deck overhangs (portion of deck outside of exterior girders);
7. Falsework for bridge bent caps;
8. Proposed temporary bridges;
9. Temporary steel sheet pile walls;
10. Falsework for the support of the top slab of cast in place concrete culverts;
11. Proposed placement of cranes on bridges;
12. Construction loads on bridges.

Working drawings and design calculations shall be submitted for any other construction process where noted on the plans or shown to be required in these specifications.

The Contractor shall be fully responsible for all of the costs of unacceptable construction work whether or not working drawings are submitted for the construction procedures and temporary materials that affect the quality of construction.

2. Submittal.

Item 105.02(c)2 shall be replaced by the following:

2. Submittal.

Six copies of working drawings and design calculations shall be submitted by the Contractor to the Construction Engineer. The drawings and calculations shall be submitted well in advance of the point in time when the work will be performed.

Working drawings for work on or over the railroad right-of-way must have the approval of the railroad company before the work will be allowed to begin. The Contractor shall submit four extra sets of drawings and design calculations for use by the Construction Engineer in obtaining a review by the railroad company. The Contractor shall make the submittal far enough in advance of the need for the work to begin so that the railroad company will have ample time to review the drawings and design calculations.

Working drawings and design calculations that have been submitted and distributed to ALDOT construction personnel by the Construction Engineer may be resubmitted for another project provided all requirements are identical in nature to the previous project. The resubmittal of working drawings and calculations shall be signed, sealed and dated again by the Professional Engineer that originally sealed the drawings. The Professional Engineer shall clearly indicate on the drawings and calculations that the resubmittal is applicable to the new work.

ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: July 12, 2012

Special Provision No. 12-0351

EFFECTIVE DATE: November 1, 2012

SUBJECT: Steel Reinforcement.

Alabama Standard Specifications, 2012 Edition, SECTION 502 shall be amended as follows:

SECTION 502 STEEL REINFORCEMENT

502.03 Construction Requirements.

(d) SPLICING AND LAPPING STEEL REINFORCEMENT.

4. BUTT SPLICING.

This Item [502.03(d)4] shall be replaced by the following:

4. BUTT SPLICING.

Reinforcing bars shall be butt spliced only when shown on the plans. The butt splice shall be a mechanical coupling splice.

The mechanical coupling shall be made with a coupler that can develop, in tension, at least 125 percent of the specified yield strength (f_y) of the bar. The Contractor shall prepare three test splices using the proposed method of splicing and reinforcing bars obtained from the supplier of the reinforcing steel. These test splices and two unspliced bars will be tested by the Alabama Department of Transportation's Bureau of Materials and Tests. The tension tests will be performed on full cross section specimens in accordance with ASTM E 8 {E 8M}, using a gage length that spans the extremities of the connector. Complete details of the mechanical splice and the methods and equipment proposed for use in making the splice shall be submitted to the Department for approval.



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: February 1, 2017

Special Provision No. 12-0352(7)

EFFECTIVE DATE: April 1, 2017

SUBJECT: Structural Steel, Fasteners, and Miscellaneous Metals.

Alabama Standard Specifications, 2012 Edition, SECTION 508 and SECTION 836 shall be amended as follows:

SECTION 508 STRUCTURAL STEEL AND MISCELLANEOUS METALS

508.01 Description.

Article 508.01 shall be revised by adding the following paragraph:

Issues concerning non-conforming work, repair procedures, requests for variances and/or clarification of Contract plans and/or Specifications including approved shop drawings shall be addressed by submitting ALDOT Bridge Bureau form BBF-15 "Request for Approval" (RFA) to the State Bridge Engineer for review and approval along with any supporting documentation.

508.02 Materials.

Subarticle 508.02(g) shall be replaced with the following:

(g) Materials for bridge deck drainage systems shall conform to the requirements shown on the plans. Galvanizing, if required, shall conform to ASTM A 120 for pipe, AASHTO M 111 for forgings, shapes, etc., AASHTO M 232 for miscellaneous hardware and anchor bolt assemblies (anchor bolts, nuts, and washers), and ASTM B 695 Class 50 for bolt assemblies (bolts, nuts, and washers).

508.03 Construction Requirements.

(a) General.

The fourth paragraph of Subarticle 508.03(a) shall be replaced with the following:

All foreign material which adheres to the steel after fabrication, including tight mill scale, shall be removed without additional compensation. Tight mill scale on the top of the top flanges of girders and beams may remain except in the locations where studs are to be attached. The surface of the steel shall be cleaned to bright metal just prior to attaching studs.

(b) Shop Fabrication.

Subarticle 508.03(b) shall be replaced with the following:

(b) Shop Fabrication.

The requirements for shop fabrication are given in Section 836.

Within 30 days after the award of the contract, the Contractor shall submit the following items to the Bridge Engineer:

- Name, address and location of the plant where the structural steel will be fabricated.
- A current copy of the fabricator's American Institute of Steel Construction Certification including Fracture Critical Endorsement (FC) or Sophisticated Paint Endorsement (SPE), where required.
- A written statement naming the ALDOT III-1 coating system that will be applied to the structural steel.
- Construction survey data if this is shown to be required on the plans.

The review of the shop drawings, and the time allowed for the review given in Section 105, will not begin until all of the required items have been received by the Bridge Engineer. Additional evidence of the fabricator's qualifications and experience shall be furnished if requested by the Bridge Engineer.

No material shall be fabricated before the Department has been notified where the fabrication order has been placed. The Fabricator is responsible for notifying the Bridge Engineer of any outsourced work to be done by another facility, the name and address of the outside source, and the proposed schedule.

Shops fabricating main structural steel members (as defined by Subarticle 836.01(b)) and/or items paid for under Pay Item 508-B (with the exception of navigational light brackets, inspection catwalks, platforms and ladders) shall be certified by the American Institute of Steel Construction. These facilities shall conform to the AISC Certification Program for Steel Bridge Fabricators for either Intermediate Bridge or Advanced Bridge depending on the complexity of the structure by design for all steel bridges. For fracture critical work, shops shall be certified for either Intermediate Bridge or Advanced Bridge with the fracture critical endorsement.

Shops fabricating expansion dams (finger joints, etc.) for interior and exterior bridge joints shall be certified by the AISC Certification Program for Bridge and Highway Metal Component Manufacturers or by the Intermediate AISC Bridge Certification program for steel bridge fabrication.

Shops producing miscellaneous steel bridge items (other than those described above) shall be qualified to do such work by placement on the ALDOT List I-9: Producers of Inlet Grates and Seats for Drainage Structures and Miscellaneous Fabricated Bridge Items.

For the purpose of ALDOT Quality Assurance inspection and scheduling a completed ALDOT Bridge Bureau Form BBF-11 shall be submitted to the Bridge Engineer stating the tentative schedule for fabrication no less than 45 days in advance of the actual fabrication of 508B pay items and no less than 7 days for 508A pay items.

(d) Erection.

- 6. High Strength Bolting.
 - d. Installation.

In Subitem 508.03(d) 6 d, Table 1 shall be replaced by the following:

TABLE 1	
NOMINAL BOLT DIAMETER & THREAD PITCH	REQUIRED MINIMUM BOLT TENSION
ASTM A 325 high strength bolts only.	
1/2 inch	12,050 pounds
5/8 inch	19,200 pounds
3/4 inch	28,400 pounds
7/8 inch	39,250 pounds
1 inch	51,500 pounds
1 - 1/8 inches	56,450 pounds
1 - 1/4 inches	71,700 pounds
1 - 3/8 inches	85,450 pounds
1 - 1/2 inches	104,000 pounds
ASTM A 325M high strength bolts only.	
M16 x 2	91.0 kN
M20 x 2.5	142.1 kN
M22 x 2.5	175.7 kN
M24 x 3	205.1 kN
M27 x 3	266.7 kN
M30 x 3.5	327.2 kN
M36 x 4	474.6 kN

A new Item 508.03(d) 7 shall be added as follows:

- 7. Bolted Connections.

The bolt length used shall be such that the end of the bolt is flush with but does not extend more than 1/4" beyond the outer face of the nut when properly installed. In bolted connections, other than high strength steel bolts, the bolts shall be drawn up tight and the threads burred at the face of the nut with a pointed tool.

8. Bolted Connections.

Item 508.03(d) 8 shall be replaced with the following:

8. Welded Shear Connector Studs.

The required locations of the studs shall be marked at the fabrication shop. The fabricator shall center punch the steel at the center of all stud locations to provide a durable marking. A highly visible indelible paint marker shall be applied over the center punch points prior to shipment of girders to the project.

The Contractor shall notify the Project Manager of the date that installation of the studs will begin in the field. This notification shall be given a minimum of five calendar days prior to the date of installation. The Project Manager will notify the Bridge Engineer of the installation date so that the inspection of the installation can be made by a representative of the Bridge Engineer. Studs shall not be installed until the representative of the Bridge Engineer is given the opportunity to inspect the preparation of base metal, layout and the location of the studs including the studs and ceramic ferrules to be used in the operations. The fusion areas on the top flange to which studs are to be welded shall be cleaned to bright metal before welding. The fusion area of the studs should be clean and free of rust. Once the stud welding operations are underway one stud out of every tenth row of studs on each girder line will require bend testing to 30° from its original axis for assurance that the studs are being applied properly. Any stud that exhibits a failure will be replaced with a new stud after the base metal location of the failed stud is repaired by grinding to bright and sound metal.

Studs shall be one of those shown in List II-4 of the ALDOT manual "MATERIALS, SOURCES, AND OTHER DEVICES WITH SPECIAL ACCEPTANCE REQUIREMENTS".

Studs shall be attached in accordance with the requirements given in the AASHTO/AWS D1.5M/D1.5:2015, Bridge Welding Code, Seventh Edition.

9. Welded Shear Connector Studs.

Item 508.03(d) 9 shall be replaced with the following:

9. Painting.

Painting shall conform to requirements of Section 521.

10. Painting.

Item 508.03(d) 10 shall be replaced with the following:

10. Name Plates.

No permanent plates or markers other than those shown on the plans or approved will be permitted on any structure. Any marks or signs painted on structural steel by the fabricator or contractor shall be obliterated prior to applying the first field coat by cleaning and/or painting over the marks or signs with paint of the same type used for the shop coat.

11. Name Plates.

Item 508.03(d) 11 shall be deleted.

508.04 Method of Measurement.

(a) Items No. 508-A, and 508-D.

Subarticle 508.04(a) shall be replaced with the following:

(a) Items No. 508-A, and 508-D.

The theoretical poundage {mass} of accepted metal in the per pound {kilogram} price items, complete in place, will be computed in conformity with the following:

1. The weight {mass} of steel shall be assumed at 0.2833 pounds per cubic inch {7850 kg/m³}. The weight {mass} of cast iron shall be assumed at 0.26 pounds per cubic inch {7200 kg/m³}. The weight {mass} of bronze shall be assumed at 0.315 pounds per cubic inch {8150 kg/m³}.
2. The weights {masses} of rolled shapes in the completed structure, shall be calculated on the basis of their theoretical weights {masses} and dimensions given in the handbooks of the mills rolling the various sections and shapes. The weights {masses} of steel plates shall

be computed on the basis of their detailed dimensions as shown on the approved shop drawings. Weights shown on the approved shop drawings shall not be used for payment purposes.

3. The weight {mass} of castings shall be calculated from the detail dimensions shown on the approved shop drawings, with an addition of 10 percent for fillets, overrun and finishing.
4. Only the weight {mass} of materials used in the completed, permanent work will be measured for payment.
5. No allowance in weight {mass} will be made for shop or field paint.
6. For the purpose of measurement and payment, incidentals such as bearing plates, pedestals, and other minor metal parts shall, unless otherwise provided, be considered as structural steel even though made of other materials except the bronze bearing plates and the PTFE coated bearing plates will be paid for under Item 508-C.
7. For purposes of measurement and payment when payment is on a per pound {kilogram} basis, required welded shear connection studs will be included in the quantity of structural steel.

508.05 Basis of Payment.

(b) Item No. 508-B.

Subarticle 508.05(b) shall be replaced with the following:

(b) Item No. 508-B.

Accepted metal superstructure span units will be paid for at the contract unit price bid for each respective unit, complete in place, which shall be payment in full for furnishing, fabricating, transporting, erecting and painting all materials and for all labor, equipment, tools, falsework, cleaning up and incidentals necessary to complete the work.

Unless noted otherwise on the plans, this item shall include the following:

- All structural steel in the superstructure unit
- Structural steel in the bearing devices, except the PTFE coated bearing plates
- Expansion dams (finger joints , etc.) for interior and exterior open bridge joints

Where separate pay items are not provided, this item shall also include furnishing, fabrication, painting or galvanization, transporting and installing ladders, platforms, catwalks, and navigational lighting brackets.

Joint armor plates, channels, angles, anchor bolts, etc. for sealed interior and exterior bridge joint design shall be as specified in Section 522 and are not as a part of this item. This item does not include reinforcing steel and concrete.

Structural steel bearing plates for Type 3, 4 and 5 elastomeric bearings shall be included in the payment for elastomeric bearings under Pay Item 511-A and are not a part of this item.

SECTION 836 STRUCTURAL STEEL, FASTENERS, AND MISCELLANEOUS METALS

836.01 General.

(a) Marking of Steels.

Subarticle 836.01(a) shall be replaced with the following:

(a) Marking of Steels.

Steels, when received from the mill shall be identified in accordance with ASTM A 6 {A 6M}. On steel piling the heat number and section size shall be legibly marked on each piece by stamp, paint, tag, sticker or other industry accepted method. Any piece that cannot be properly identified at time of use will be rejected until such time documentation or approved testing of the items in question can prove conformance to the requirements.

Certified mill test reports or certified reports of tests made by other agencies which are recognized by the ALDOT, shall be furnished for each heat of steel verifying that the material meets the requirements of the type and grade specified. The Department reserves the right to make its own test of any material, and the material may be rejected if these tests prove the material does not meet the requirements.

For identification purposes, the fabricator shall utilize low stress stencils to dye stamp the mill heat numbers of the flanges and webs in the webs of welded members and in the webs of rolled members. The heat numbers shall be legible, located adjacent to piece marks, and placed centered between the top and bottom flange in the first panel to the left end and near side of the member.

All steel which is required to have a yield point greater than 36,000 psi {250 MPa} shall, at all times in the fabricator's plant, be color marked to identify its AASHTO, ASTM, or special specification.

(b) General Requirements.

Item 836.01(b) 1 shall be replaced with the following:

1. Structural steel shall conform to the requirements of AASHTO M 270 Grade 36 {Grade 250} unless otherwise noted hereinafter in this Section or shown on the plans.

AASHTO material specifications shall govern in lieu of ASTM material specifications where an AASHTO equivalent specification exists for all references within any referenced specification.

With the approval of the Engineer, materials (other than web and flange material and web splice and flange splice material) for members may be taken from stock, provided the fabricator provides all documentation which shows the material conforms to the required specifications, prior to use of such material.

The term "main member", as used hereinafter in this section or shown on the contract plans, is defined as any member requiring Charpy V-notch (CVN) testing.

Structural steel members requiring Charpy V-notch testing shall include, but not be limited to, the following:

- All rolled beams in the superstructure and steel pier caps.
- All flanges and webs of steel plate girders and steel pier caps.
- All cover plates for beams and girders.
- All flange and web splice plates for beams, girders, and floorbeams or stringer beams.
- All connection plates welded to rolled beams, steel plate girders, and steel pier caps.
- All diaphragms or cross frames for curved beams and girders, including their gusset and connection plates.
- All stringer beams (floorbeams) and any connection plates welded thereto.
- All floorbeam trusses (cross frames) which support stringer beams (floorbeams), including their gusset and connection plates.

The material supplied shall meet the longitudinal Charpy V-notch test noted below. Sampling and testing shall be in accordance with AASHTO T 243 with the (H) frequency of heat testing used. All members requiring CVN testing shall have heat numbers legibly marked during fabrication.

Steel Grade	Thickness	Test Requirements
M 270 Grade 36	Up to 4"	15 ft. lb. @ 70°F. (Min. Ser. Temp. 0°F. and above)
M 270 Grade 50 & Grade 50W	Up to 4" Mech. Fastened Up to 2" Welded Over 2" to 4" Welded	15 ft. lb. @ 40°F. (Min. Ser. Temp. -1°F. to -30°F.) 15 ft. lb. @ 40°F. 20 ft. lb. @ 40°F.
{250}	{Up to 102 mm}	{20 J @ 21 °C} {Min. Ser. Temp. -18 °C and above}
{345 & 345W}	{Up to 102 mm Mech. Fastened} {Up to 51 mm Welded} {Over 51 mm to 102 mm Welded}	{20 J @ 4 °C} {Min. Ser. Temp. -18 °C to -34 °C} {20 J @ 4 °C} {27 J @ 4 °C}
If the yield point of the material exceeds 65 ksi {450 MPa}, the temperature of the CVN value for acceptability shall be reduced by 15 °F {8 °C} for each increment of 10 ksi {70 MPa} above 65 ksi {450 MPa}.		

When designated on the plans, the Contractor (Fabricator) shall furnish one main load carrying member 18 inches {460 mm} overlength in order to provide an 18 inch {460 mm} sample for Departmental testing.

Unless otherwise shown on the plans, steel plates for main members shall be cut and fabricated so that the primary direction of rolling is parallel to the direction of the main tensile and/or compressive stresses.

5. High strength and alloy steel shall be in accordance with the following.

Subitem 836.01(b)5 b shall be replaced with the following:

b. High strength structural steel for bolted and welded construction shall conform to AASHTO M 270 of the Grade as shown on the contract plans (Grade 50 or Grade 50W). AASHTO M 270 Grade 50 {Grade 345} steel shall be limited to structural shapes in groups 1, 2 and 3 in ASTM A 6 {A 6M} and to plates and bars in thicknesses through 4 inches {102 mm}. Plates and bars over 3/4 inch {19 mm} through 4 inches {102 mm} in thickness shall be "killed-fine grain practice."

836.16 Notice and Facilities for Inspection.

Article 836.16 shall be replaced with the following:

836.16 Notice and Facilities for Inspection.

After the Bridge Engineer has received the fabricator notification required by 508.03(b) and as the fabrication begins, copies of the mill test reports and fabricators material information, for materials which require CVN testing, shall be supplied to the Bridge Engineer or his representative prior to completion and acceptance of fabrication.

No materials or members will be accepted by the Bridge Engineer's representative on structural steel until the Department's form BBF-1 (available from the Bridge Engineer) and the supporting mill test reports for the materials have been furnished and approved by the Department. A complete package of this information shall be given to the ALDOT representative at the fabricator's plant, to be followed by a submittal to the ALDOT Materials & Tests' Certification office where official certification & approval is processed. The BBF-1 form shall be signed by a company official and shall be notarized. The acceptance of members as fabricated may be noted by the affixing of the ALDOT Stamp on the member by the Bridge Engineer's representative.

The Contractor/Fabricator shall provide ALDOT with adequate, suitable office facilities and equipment when required for the inspection of materials and workmanship in the fabrication plant. This office shall be conveniently located near the fabricating plant or work site, shall be private and not shared with the fabricator or any other agency, and shall be equipped so that it may be locked. It shall be climate controlled, water tight and include necessary office furnishings such as a desk/table, chairs and file cabinet. (Telephone is optional).

Inspectors shall be allowed free access to the necessary parts of the work. Refer to articles 105.09, 105.10, and 105.11 concerning the duties of the Inspector(s) and inspection of work.

Unless otherwise provided, the Contractor shall furnish, without extra compensation, test specimens as provided herein.

Fabrication shops shall have a master tape calibrated by the National Institute of Standards and Technology. All tapes used in fabrication measurements shall be calibrated with the master tape before being used on the project. Any master tape found damaged or with a certification over two years old shall be replaced or recalibrated.

The quality control program for any fabrication work performed will be subject to the review of the Bridge Engineer. A written current copy of the fabricator's Quality Control Manual and current copies of all nondestructive testing and Quality Control Inspection personnel certifications associated with fabrication work shall be on file with the Bridge Engineer prior to the beginning of work.

Any bridge fabrication facility that is required to have an AISC Certification of Intermediate Bridge or Advanced Bridge shall have a Certified Welding Inspector (CWI) employed by, or retained by, and preferably working with the fabricator's quality control office. A CWI shall be present on all shifts and shall be available at any location that fabrication and welding are to take place.

Quality Control guidelines and all welding code requirements shall conform to the AASHTO/AWS D1.5M/D1.5:2015, Bridge Welding Code, Seventh Edition. If the Bridge Engineer finds the fabricator's Quality Control Department is not providing sufficient inspection on the work in progress, he may suspend all or any portion of the work in progress (reference is made to Article 105.01 and Subarticle 108.07(a)). Work may resume only after necessary adjustments to the Quality Control Program are instituted which will assure conformance to the contract requirements.

All nondestructive testing personnel shall meet the requirements set forth in the "ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel (ANSI/ASNT CP-105-2011)".

836.17 Handling, Storage and Transporting of Materials.

Article 836.17 shall be replaced with the following:

836.17 Handling, Storage and Transporting of Materials.

The loading, unloading, handling and storing of materials shall be so conducted that the metal will not be injured or damaged. Structural material delivered at the bridge shop receiving yard shall be stored above the surface of the ground upon platforms, skids, or other supports and shall be protected from corrosion. It shall be kept free from accumulations of dirt, grease or foreign matter.

During and after fabrication, proper lifting equipment with the capacity to handle members carefully at all times so that no member or part thereof will be bent, excessively stressed, deformed or otherwise damaged shall be used. Handling of members shall require the use of suitable clamps, plate hooks or other suitable devices. Chains or chokers will not be allowed without the use of a protective shield between the chain and the member. Members longer than 50 feet {15 m} shall utilize a two or more point pickup method. Members shall be transported in such a manner that they will not be excessively stressed, deformed or otherwise damaged. Unless otherwise authorized for exceptionally deep girders, girders and beams shall be stored and transported in a "workway position" as used in the structure with appropriate shoring and blocking methods suitable to the Engineer. Chain tie downs shall be provided with protection shields. Multiple stacking of beams and girders may only be done in a manner acceptable to the Engineer. Any suspected damage from handling, storage or hauling shall be cause for the Engineer to order verification of design camber and/or repair of the beam or girder.

All structural materials shall be examined by shop personnel and/or quality control, at the earliest possible time for evidence of any defects. If pitting or other defects are plainly visible during early stages of fabrication prior to any required surface preparation (sand or shot blasting), evaluation shall be required. Information regarding actual material thickness, amount of area affected and end use of material being evaluated will be submitted to the Engineer for acceptability. Any required conditioning will be allowed only when in compliance with ASTM A 6 {A 6M}.

The above shall also apply to pitting of fabricated material stored prior to shipment and to material delivered to the bridge site. Attention is called to Subarticle 106.05(b).

Preparation and shipment of fabricated pieces shall conform to the following:

Loose Members.

1. Parts not completely assembled in the shop shall be secured, insofar as practicable, to prevent damage in shipping or handling.
2. Projecting parts likely to be damaged during shipment shall be blocked with wood or otherwise protected.

Packages.

1. Pins, small parts and small packages of bolts, rivets, washers, and nuts shall be shipped in boxes, crates, kegs, or barrels. A list and description of the contained material shall be plainly marked on the outside of each shipped container.

2. Anchor bolts, washers, and other anchorage or grillage materials, shall be shipped in time to suit the requirements of the masonry construction.

Loading diagrams shall be provided to the Bridge Engineer for his review when Structural Steel items are to be shipped by barge or railcar.

836.19 Workmanship and Finish.

(a) General.

Subarticle 836.19(a) shall be replaced with the following:

(a) General.

Workmanship and finish shall be first class in every respect. Materials at the shop shall be kept clean and protected from the weather insofar as practical. Shearing, burning, chipping and grinding shall be neatly and accurately done in a workmanlike manner.

Damage incurred to members or the surfaces of members for any reason shall be cause for the Engineer to order the damage repaired or to reject the member in accordance with the following:

1. Except as noted in paragraph 2 below, damage to surfaces of plates that does not reduce the plate thickness below the permissible minimum thickness allowed by ASTM A 6 {A 6 M} or the thickness of structural shapes in excess of 1/32 inch {0.8 mm} for material less than 3/8 inch {9.5 mm} in thickness, 1/16 inch {3.2 mm} for materials 3/8 inch to 2 inches {9.5 mm to 50 mm} inclusive in thickness or 1/8 {3.2 mm} in for material over 2 inches {50 mm} thick are considered repairable. Damage in excess of the limits noted will be evaluated by the Engineer as to whether to reject or allow repair of member.
2. Surface indentation of members caused by lifting devices shall be evaluated by the Bridge Engineer's representative to determine if the damage is repairable and if repairable, the repairs necessary for acceptance. Continued use of lifting devices that cause damage, especially that which reduces the specified thickness by more than 1/16 inch {1.6 mm}, will be cause for the rejection of all such members so damaged.
3. In general, when allowed, repair work will consist of welding and/or grinding of the surfaces; however, when evaluation of base metal defects becomes necessary, such evaluation shall be done in the presence of the Bridge Engineer's Representative. The type of evaluation shall be determined by the fabricators quality control personnel subject to the approval of the Bridge Engineer's Representative. After evaluation of such defects and where welding is necessary on rolled surfaces, stringer beads shall be placed parallel to the direction of stress. All welding shall be performed by competent welders using low hydrogen welding electrodes and/or other welding consumables listed in an ALDOT approved welding procedure (WPS). The Engineer shall be the sole judge as to the acceptability of the repair work, any unacceptable work shall be cause for rejection of a member.
4. A form of buffer and/or shield shall be utilized during fitting operations to protect base materials from damage caused by fitting tools or devices. If evidence of base metal damage appears due to misuse of such devices, the material may be deemed unacceptable.

(c) Camber or Curving of Beams and Girders.

Subarticle 836.19(c) shall be replaced with the following:

(c) Camber or Curving of Beams and Girders.

Camber in rolled beams shall be accomplished by the heat up-set method utilizing the lowest possible temperature not to exceed 1100 °F {590 °C}, as evidenced by infrared thermometers or heat crayons. The application of heat shall be carefully supervised using a method acceptable to the Engineer.

Camber for built-up girders shall be accomplished by cutting the web to the prescribed camber with suitable allowance for shrinkage due to cutting and welding. However, moderate variation from

the prescribed camber tolerance may be corrected by a carefully supervised application of heat not to exceed 1100 °F {590 °C} as evidenced by infrared thermometers or heat crayons.

Horizontal curving of rolled beams shall be accomplished by the heat up-set method which will require a written procedure approved by the Engineer. Said procedure shall utilize the lowest temperature possible but not in excess of 1100 °F {590 °C} as evidenced by infrared thermometers or heat crayons.

Horizontal curving of built-up girders shall be accomplished by cutting flange plates to the radii shown by the plan details from wider plates, unless the heat up-set method is allowed by the plans or proposal. When the heat up-set method is allowed, such will require a written procedure approved by the Engineer. Said procedure shall utilize minimum temperatures not to exceed 1100°F {590 °C} as evidenced by infrared thermometers or heat crayons.

After heating of metals as noted, the metal shall not be artificially cooled until after naturally cooling to 600°F {315 °C}. or less. The method of artificial cooling must be acceptable to the Engineer. Water or water spray misting shall not be used as a means of artificial cooling. Any material that is heated above the temperature limit noted will be rejected until tests and investigations reveal the material is suitable for use. The Fabricator shall be solely responsible for providing any test data or other information deemed necessary by the Engineer to evaluate the acceptability of the material at no cost to the Department.

The fabricator's Quality Control Inspector shall furnish verification certificates of the actual measurements of the camber, overall length and horizontal sweep placed in each beam or girder. Actual measurements shall be verified and recorded by the Fabricator's Quality Control Inspector.

(d) Straightness, Camber and Sweep in Welded Beams and Girders.

Subarticle 836.19(d) shall be replaced with the following:

(d) Straightness, Camber, and Sweep in Welded Beams, Girders and Ancillary Products.

1. Straightness of Welded Beams and Girders (No Required Camber or Sweep).

If requirements for camber and sweep are not given in the contract, welded beams and girders shall be straight within a plus and minus tolerance for straightness. The straightness tolerance shall be +/- 1/8 inches per foot times the number of feet from the nearest end of the beam or girder divided by 10 {+/- 3 mm times the number of millimeters from the nearest end of the beam or girder divided by 3000}.

2. Tolerance for the Camber of Welded Beams, Girders and Bridge Deck Joint Armor Plates.

The camber of welded beams, girders and armor plates shall be within a plus and minus tolerance measured in inches. The tolerance shall be + 1/8 inches and - 0 inches per foot times the number of feet from the nearest end of the beam, girder, or armor plate divided by 10 {+ 3 mm and - 0 mm times the number of millimeters from the nearest end of the beam, girder, or armor plate divided by 3000}.

3. Tolerance for the Sweep of Welded Beams and Girders.

The sweep of horizontally welded beams and girders shall be within a plus and minus tolerance measured in inches. The tolerance shall be +/- 1/8 inches per foot times the number of feet from the nearest end of the beam or girder divided by 10 {+/- 3 mm times the number of millimeters from the nearest end of the beam or girder divided by 3000}.

The horizontal alignment of the sweep of the top and bottom flanges at any point along welded beam or girder shall be within 3/8 inch {10 mm}.

(e) Surface Profile at the Centerline of Structural Steel Finger Joints.

Subarticle 836.19(e) shall be replaced with the following:

(e) Surface Profile at the Centerline of Structural Steel Finger Joints.

The profile of the surface of a structural steel finger joint, measured along the centerline of the finger plate sections of the finger joint (transverse to the centerline of the roadway) shall be within a plus and minus tolerance. The tolerance shall be + 1/16 inch and - 0 inches per foot times the number of feet from the nearest end of the joint divided by 10 {+ 2 mm and - 0 mm times the number of millimeters from the nearest end of the joint divided by 3000}. When all fabrication is completed the flat surfaces of each finger plate section shall be straight edged for flatness and any area found exceeding 1/8 inch in 10 feet {3 mm in 3 m} shall be marked and corrected by approved

methods. A 10 foot {3 m} straight-edge shall be used and lapped at least 5 feet {1.5 m} over the prior 10 foot {3 m} check.

836.20 Thermal Cutting.

Article 836.20 shall be modified by replacing the third paragraph with the following:

Other methods of cutting steel may be acceptable provided the method will produce cut surfaces within the required tolerances for thermal cut surfaces.

836.27 Shop Assembling.

(b) Assembling.

Item 836.27(b)4 shall be replaced with the following:

4. Abutting joints in compression members, where so specified on the drawings, shall be faced and brought to an even bearing. No milling shall be done until members are completely shop assembled, unless otherwise provided on the plans. Where joints are not faced (field splices in continuous steel girder lines), the opening shall not exceed 3/8 inch {9.5 mm}.

836.29 Match-Marking.

Article 836.29 shall be replaced with the following:

836.29 Match-Marking.

Connecting parts assembled in the shop for the purpose of reaming or drilling holes in field connections shall be match-marked with low stress stencils using figures and letters at least 3/8 inch {10 mm} high, and a diagram showing such marks shall be shown on approved shop drawings. Reamed parts shall not be interchanged.

836.33 High Strength Fasteners.

Article 836.33 shall be replaced with the following:

836.33 High Strength Fasteners.

The components of high strength bolt assemblies shall meet the requirements of the following:

- ASTM A 325 {A 325M} - Bolts
- ASTM A 563 {A 563M} - Nuts
- ASTM F 436 {F 436M} - Washers
- ASTM F 959 - Direct Tension Indicators

Unless otherwise noted by plan details, or approved by the Engineer, Type 1 bolts shall be used for standard construction and Type 3 bolts shall be used with weathering steel.

Galvanization, where required shall be in accordance with the provisions of ASTM B 695 Class 50. When an Inorganic Zinc Paint Primer is specified on the contract plans, all bolts shall be galvanized.

The producer, supplier and distributor shall submit the documentation required to certify that the bolt assembly components are in compliance with these specifications.

These requirements shall be modified or supplemented as follows:

(a) Quality Assurance.

Acceptance of bolts, nuts, washers and direct tension indicator washers shall be based on the "Production Lot Method" of identification and quality assurance. A production lot is a group of bolts, nuts, washers or load indicator washers that are the same nominal size, are produced from the same heat of steel and are processed together through all operations to the shipping container. The manufacturer shall identify and maintain the integrity of each production lot from raw-material selection through all processing operations and treatments to final packing and shipment.

(b) Manufacturing.

1. Bolts.

Bolts shall meet the hardness requirements given in ASTM A 325 {A 325M}.

2. Nuts.

Nuts to be galvanized shall be heat treated grade DH.

Plain (ungalvanized) nuts shall be grades C, D or C3 with a minimum Rockwell hardness of 89 HRB (or Brinell hardness 180 HB), or heat treated grades DH or DH3. (The hardness requirements for grades C, D and C3 exceed the current AASHTO/ASTM requirements).

Nuts that are to be galvanized shall be tapped oversize the minimum amount required for proper assembly. The amount of overtap in the nut shall be such that the nut will turn freely on the bolt in the coated condition. Galvanized nuts shall meet the mechanical requirements of ASTM A 563 {A 563M} and the rotational-capacity test herein (the overtapping requirements of ASTM A 563 {A 563M} paragraph 7.4 shall be considered maximum values instead of minimum, as currently shown).

3. Marking.

All bolts, nuts and washers shall be marked in accordance with the appropriate AASHTO/ASTM Specifications.

(c) Testing.

1. Bolts.

Proof load tests (ASTM F 606 Method 1) are required. Minimum frequency of tests shall be as specified in ASTM A 325 {A 325M} paragraph 9.5.

Wedge tests on full size bolts (ASTM F 606 paragraph 3.5) are required. If bolts are to be galvanized, tests shall be performed after galvanizing. Minimum frequency of tests shall be as specified in ASTM A 325 {A 325M} paragraph 9.5.

If galvanized bolts are supplied, the thickness of the zinc coating shall be measured. Measurements shall be taken on the wrench flats or top of bolt head.

2. Nuts.

Proof load tests (ASTM F 606 paragraph 4.2) are required. Minimum frequency of tests shall be as specified in ASTM A 563 {A 563M} paragraph 9.3. If nuts are to be galvanized, tests shall be performed after galvanizing, overtapping and lubricating.

If galvanized nuts are supplied, the thickness of the zinc coating shall be measured. Measurements shall be taken on the wrench flats.

3. Washers.

If galvanized washers are supplied, hardness testing shall be performed after galvanizing. (Coating shall be removed prior to taking hardness measurements).

The thickness of the zinc coating shall be measured.

4. Assemblies.

Rotational-capacity tests are required and shall be performed on all plain and galvanized (after galvanizing) bolt, nut and washer assemblies by the manufacturer or distributor prior to shipping. Washers are required as part of the test.

The following shall apply:

- a. Except as modified herein, the rotational-capacity test shall be performed in accordance with the requirements of ASTM A 325 {A 325M}.
- b. Each combination of bolt production lot, nut lot and washer lot shall be tested as an assembly. Where washers are not required by the installation procedures, they need not be included in the lot identification. A production lot change of either the bolt, nut, or washer shall require the testing of additional assemblies.
- c. A rotational-capacity lot number shall be assigned to each combination of lots tested.
- d. The minimum frequency of testing shall be two assemblies per rotational-capacity lot.
- e. The bolt, nut and washer assembly shall be assembled in a Skidmore-Wilhelm Calibrator or an acceptable equivalent device (note - this requirement supersedes the current ASTM A 325 {A 325M} requirement that the test be performed in a steel joint). For short bolts which are too short to be assembled in the Skidmore-Wilhelm Calibrator, See Subitem 836.33(c)4.i.
- f. The minimum rotation, from a snug tight condition (10% of the specified proof load), shall be:
 - 240° (2/3 turn) for bolt lengths < 4 diameters
 - 360° (1 turn) for bolt lengths > 4 diameters and < 8 diameters
 - 480° (1 1/3 turn) for bolt lengths > 8 diameters

- g. The tension reached at the above rotation shall be equal to or greater than 1.15 times the required installation tension. The installation tension and the tension for the turn test are shown below:

Diameter (In.)	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2
Req. Installation Tension (kips)	12	19	28	39	51	56	71	85	103
Turn Test Tension (kips)	14	22	32	45	59	64	82	98	118

Diameter {mm}	16	20	22	24	27	30	36
Req. Installation Tension {kN}	94.2	147	182	212	275	337	490
Turn Test Tension {kN}	108.3	169.1	209.3	243.8	316.3	387.6	563.5

- h. After the required installation tension listed above has been exceeded, one reading of tension and torque shall be taken and recorded. The torque value shall conform to the following:
Torque \leq 0.25 PD
Where: Torque = measured torque (foot-pounds); P = measured bolt tension (pounds) and D = bolt diameter (feet).
- i. Bolts that are too short to test in a Skidmore-Wilhelm Calibrator may be tested in a steel joint. The tension requirement of Subitem 836.33(c)4.g. need not apply. The maximum torque requirement of Subitem 836.33(c)4.h. shall be computed using a value of P equal to the turn test tension shown in the table in Subitem 836.33(c)4.g.

5. Reporting.

The results of all tests (including zinc coating thickness) required herein and in the appropriate AASHTO specifications shall be recorded.

The location where tests are performed and the date of tests shall be recorded.

(d) Documentation.

1. Mill Test Report(s) (MTR).

An MTR shall be furnished for all mill steel used in the manufacture of the bolts, nuts, and washers.

The place where the material was melted and manufactured shall be shown on the MTR.

2. Manufacturer Certified Test Report(s) (MCTR).

The manufacturer of the bolts, nuts and washers shall furnish test reports (MCTR) for the item furnished.

Each MCTR shall show the relevant information required in accordance with Item 836.33(c)5.

The manufacturer performing the rotational-capacity test shall include on the MCTR:

- The lot number of each of the items tested.
- The rotational-capacity lot number as required in Subitem 836.33(c)4.c.
- The results of the tests required in Item 836.33(c)4.
- The pertinent information required in Item 836.33(c)5.
- A statement that MCTR for the items are in conformance to this specification and the appropriate AASHTO specifications.
- The location where the bolt assembly components were manufactured.

3. Distributor Certified Test Report(s) (DCTR).

The DCTR shall include MCTR above for the various bolt assembly components.

The rotational-capacity test may be performed by a distributor (in lieu of a manufacturer) and reported on the DCTR.

The results of the tests required in Item 836.33(c)4. shall be shown on the DCTR.

The pertinent information required in Item 836.33(c)5. shall be shown on the DCTR.

The rotational-capacity lot number as required in Subitem 836.33(c)4.c. shall be shown on the DCTR.

The DCTR shall contain a statement that the MCTR are in conformance to this specification and the appropriate AASHTO specifications.

(e) Shipping.

Bolts, nuts and washers from each rotational-capacity lot shall be shipped in the same container. If there is only one production lot number for each size of nut and washer, the nuts and washers may be shipped in separate containers. Each container shall be permanently marked with the rotational- capacity lot number such that identification will be possible at any stage prior to installation.

836.46 Welds.

(a) General.

Subarticle 836.46(a) shall be replaced with the following:

(a) General.

Shop welding shall be performed by Submerged Arc Welding (SAW) in accordance with the specification noted herein. In the event the above method cannot be used, approved manual welding or other approved and qualified automatic or semi-automatic methods may be authorized.

Field Welding shall be performed by manual Shielded Metal Arc Welding (SMAW) using approved electrodes and procedures in accordance with the specifications noted herein.

If a minimum of 3 inches (75 mm) of excess material beyond the theoretical end cuts does not exist, extension bars or run-off tabs shall be used at girder ends to insure sound welds on web to flange welds.

All welding shall be subject to the inspection and approval of the Engineer or his representative. During inspection of the work any workman, including welders and inspection technicians, who, in the opinion of the Engineer, produces inferior work, may under the provision of Article 108.06 be disqualified from performing Departmental work.

All welding shall be in accordance with the AASHTO/AWS D1.5M/D1.5:2015, Bridge Welding Code, Seventh Edition as modified by the following:

Article 3.1. A new sentence shall be added to paragraph 3.1.3 as follows:

"Shop welding, except for minor secondary members and minor repair welding, shall be done under a cover of a permanent structure and/or building capable of protecting the actual welding operation from inclement weather. Any standing water that would be dangerous to the welder or operator or to the integrity of the weld itself shall be cause for the welding to stop until such time as the situation is corrected."

Paragraph 3.2.9. The original A.W.S. subclause was deleted but shall be replaced with the following:

"Paragraph 3.2.9. All corners of thermal cut or sheared edges, including edges of flanges of beams and girders along with splice material and other sharp edges deemed undesirable by the Engineer on structural members designated to be coated shall be slightly rounded. Said rounding shall be accomplished by light grinding to produce a satisfactory surface for painting (approximately 1/16 inch {1.6 mm} radius). The grinding shall be performed in such a manner as to produce a neat workmanship like product without nicks or notches in the metal."

A new paragraph to 3.5.1.9 shall be added as follows:

"Paragraph 3.5.1.9 Gaps shall not exceed 0.040 inches {1.0 mm} between the contact surfaces at the bottom flanges of beams or girders and steel bearing plates. There shall be no gap for at least 75% of this contact area."

New Paragraphs 4.9 and 4.10 shall be added as follows:

"Paragraph 4.9 (SAW - single electrode), 4.10 (SAW - parallel and multiple electrodes). A properly operated heating torch shall run immediately ahead (about 12 inches {300 mm}, and on the same side, in advance of the point of welding) of the submerged arc welding head to remove moisture from the steel in the vicinity of the weld when making web to flange fillet welds of plate girders. Gases producing moisture in welding operations are discouraged unless it can be shown that the resultant temperature of the metal is sufficient to vaporize any moisture that might be present."

Paragraphs 6.7.1, 6.7.1.1, and 6.7.1.2 in regard to Nondestructive Testing (NDT) of Complete Joint Penetration groove welds shall be deleted in their entirety and the following substituted in lieu thereof:

"Paragraph 6.7.1 - Complete Joint Penetration (CJP) groove welds shall be tested by A.W.S. D1.5 Bridge Welding Code requirements in regard to and mandating the use of either radiographic testing (RT) or ultrasonic testing (UT) in accordance with the following: "6.7.1.1 - Shop Welds.

100% of all CJP butt weld splices in the following: all flanges (tension and compression) of beams and girders, all flanges of floorbeams, all members of floorbeam trusses which support stringer beams, all flanges of steel bent caps; and all chords, diagonals and verticals of trusses.

50% of all vertical CJP butt weld splices in webs of beams, girders, floorbeams, and steel bent caps. This requirement shall consist of 25% of the web depth beginning at the top of the web plate and 25% of the web depth beginning at the bottom of the web plate. If rejectable discontinuities are found in the vertical CJP butt welded splices, the remainder of the weld shall be tested.

15% of each longitudinal CJP butt weld splice in the webs of beams, girders, floorbeams, and steel bent caps, and in truss members. This requirement shall consist of 5% of weld length at each end of each plate and 5% of the weld length at the center of the plate (each plate is defined as that portion of web between vertical splices either welded or bolted). If rejectable discontinuities are found in a partially NDT examined longitudinal joint, additional NDT examinations using the original NDT process of that joint shall be made as required by the Engineer.

100% of all CJP welds used at the ends of longitudinal stiffeners welded to girder webs and the CJP welds used to splice sections of the longitudinal stiffeners together.

100% of all CJP groove welds in T- and corner joints (girder stiffener/connection plate to flange welds) shall be tested by UT.

All welded repairs of RT or UT examined joints shall be re-examined by the original NDT process for quality and acceptability in the area of the repair.

6.7.1.2. - Field Welds.

100% of all butt welds in beams, girders, floorbeams, steel bent caps; and chords, diagonals, and verticals of trusses. All repairs of radiographed joints shall be reradiographed in the repair area."

A New Paragraph 6.7.2.1 shall be added as follows:

"Paragraph 6.7.2.1 Magnetic particle examination of all fillet welds and/or reinforcement welds used in bearing assembly fabrication and a minimum of 10% of all fillet welds in expansion dams is required. If defects are found which require repair they shall be re-examined with magnetic particle testing after the repairs are made. Magnetic particle examination shall follow the procedures and requirements as outlined in AWS Subsection 6.7.

A New Paragraph 6.7.7 shall be added as follows:

"Paragraph 6.7.7 Dye penetrant (PT) examination of all welded and finished plate edges of CJP butt weld splices of girder web plate or girder flange plate weld splices in main members is required. This examination shall be performed in addition to the required radiographic testing (RT) or ultrasonic testing (UT). If defects are found which require repair these areas shall be re-examined with PT after repairs are made. Written documentation of all non-destructive testing performed on all welding which requires NDT testing shall be submitted to the ALDOT representative within 48 hours of completion of the tests.

ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: July 13, 2012

Special Provision No. 12-0354

EFFECTIVE DATE: November 1, 2012

SUBJECT: Sieves for Testing Materials.

Alabama Standard Specifications, 2012 Edition, SECTION 800 shall be amended as follows:

SECTION 800 MATERIALS

800.03 Testing, General.

The fourth paragraph of this Article [800.03] shall be replaced with the following:

The sieves used for testing materials shall be woven wire cloth conforming to ASTM E 11.



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: July 13, 2012

Special Provision No. 12-0355

EFFECTIVE DATE: November 1, 2012

SUBJECT: Mineral Filler, Hydrated Lime, Calcium Chloride, Brick, and Blocks.

Alabama Standard Specifications, 2012 Edition, SECTION 805 shall be replaced by the following:

SECTION 805 MINERAL FILLER, HYDRATED LIME, CALCIUM CHLORIDE, BRICK, AND BLOCKS

805.01 Mineral Filler, Hydrated Lime, Calcium Chloride, Brick, and Blocks.

These minerals shall meet the following requirements:

Mineral Filler	AASHTO M 17
Hydrated Lime	ASTM C 207, Type N.
Calcium Chloride	AASHTO M 144, Type S or L
Sewer Brick	AASHTO M 91, Grade S.M. or M.M.
Building Brick (Clay or Shale)	ASTM C 62, Grade S.W. or M.W.
Concrete Brick (Manholes, etc)	ASTM C 55, Type 11, Grade S
Concrete Brick (Buildings)	ASTM C 55, Type 1, Grade N-I or N-II
Concrete Block (Hollow Load Bearing)	ASTM C 90, Grade N, Type I or II

805.02 Mineral Filler for Hot Mix Asphalt.

These minerals shall consist of finely divided mineral matter such as crusher fines, rock dust, slag dust, hydrated lime, hydraulic cement, Portland cement, loess or Class "F" fly ash meeting the requirements of AASHTO M 17. Any lime based product shall meet the requirements of AASHTO M 303.



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: July 13, 2012

Special Provision No. 12-0356

EFFECTIVE DATE: November 1, 2012

SUBJECT: Concrete Curing Materials.

Alabama Standard Specifications, 2012 Edition, SECTION 830 shall be amended as follows:

SECTION 830 CONCRETE CURING MATERIALS

830.01 Burlap Cloth and Waterproof Covering Material.

(b) TYPES OF COVERING MATERIAL.

This Subarticle [830.01(b)] shall be replaced with the following:

(b) TYPES OF COVERING MATERIAL.

1. Burlap cloth shall conform to the requirements of AASHTO M 182 for Class 4 burlap.
2. White Waterproof Paper shall conform to the requirements of ASTM C 171.
3. Polyethylene sheeting (film) shall be white opaque conforming to the requirements of ASTM C 171 modified to omit the elongation requirements when the sheeting is internally reinforced with a cord net having a cord spacing of 1/4 to 1/2 of an inch {6 to 13 mm}. (Net may be nylon or other approved material.)
4. White Burlap Polyethylene sheet shall conform to the requirements of ASTM C 171.

830.02 Impervious Membrane.

This Article [830.02] shall be replaced with the following:

830.02 Impervious Membrane.

Impervious membrane compounds shall meet the requirements of ASTM C 309, Class A. Type 2 white pigmented shall be used on concrete pavement. Other types may be used on other concrete.

Membrane liquid shall be applied under pressure with spray nozzles in such a manner as to cover the area being treated with a uniform film. For concrete pavement the rate of application shall be 1 gallon {4 L} to not more than 135 square feet {13 m²}, applied in two applications. For sidewalks the rate of application shall be 1 gallon {4 L} to not more than 200 square feet {19 m²}.



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: July 13, 2012

Special Provision No. 12-0359

EFFECTIVE DATE: November 1, 2012

SUBJECT: Coatings, Paints, Enamels, and Varnishes.

Alabama Standard Specifications, 2012 Edition, SECTION 855 shall be amended as follows:

SECTION 855 COATINGS, PAINTS, ENAMELS, AND VARNISHES FOR METAL AND WOOD STRUCTURES

855.03 Identification and Certification.

Subarticle 855.03(c) shall be replaced with the following:

(c) Each system of inorganic zinc primer used on bolted connection surfaces (faying) shall be qualified in accordance with "Testing Method to Determine The Slip Coefficient For Coatings Used In Bolted Joints" as adopted by the Research Council On Structural Connections. This qualification is required for the systems shown on List III-1 in the Materials Sources and Devices with Special Acceptance Requirements manual. See Appendix A of Allowable Stress Design Specification For Structural Joints Using ASTM A 325 {A 325M} or ASTM A 490 {A 490M} Bolts published by the Research Council On Structural Connections. All inorganic zinc primers shall have a minimum slip coefficient of 0.33 unless shown otherwise on the bridge plans.



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: March 20, 2014

Special Provision No. 12-0399(3)

EFFECTIVE DATE: August 1, 2014

SUBJECT: Temporary Soil Erosion and Sediment Control.

Alabama Standard Specifications, 2012 Edition, SECTION 106 and SECTION 665, shall be modified as follows:

SECTION 106 CONTROL OF MATERIALS

106.01 Source of Supply and Quality Requirements.

(b) CLEARANCES AND ACKNOWLEDGMENTS FOR THE USE OF OFFSITE AREAS.

2. SUBMITTAL OF COPIES OF REGULATORY CLEARANCES AND ACKNOWLEDGMENTS.

Item 106.01(b)2 shall be replaced with the following:

2. SUBMITTAL OF COPIES OF REGULATORY CLEARANCES AND ACKNOWLEDGMENTS.

The Contractor shall submit copies of clearances and acknowledgements as verification that regulatory authorities are aware of the offsite activity and that the activity will not adversely impact natural resources.

Clearances and acknowledgements will not be required for offsite areas used for short term parking, staging or material stockpiling where the activity does not require clearing or grading. Only a copy of applicable ADEM permitting will be required for offsite areas commercially owned and operated by a third party that is not an ALDOT contractor or subcontractor.

SECTION 665 TEMPORARY SOIL EROSION AND SEDIMENT CONTROL

Section 665 shall be replaced with the following:

SECTION 665 TEMPORARY SOIL EROSION AND SEDIMENT CONTROL

665.01 Description.

This Section shall cover, but not limit, those items of temporary soil erosion and sediment control necessary for the management of construction stormwater discharge quality. The Contractor shall provide and maintain temporary soil erosion and sediment controls designed to protect the project site from soil erosion and adjacent property and waters from damage by sediment transport and deposition during construction. These temporary soil erosion and sediment controls shall be referred to as "Best Management Practices" (BMPs). A BMP is any procedure, process, technique, plan or device that can be utilized to enhance the control of soil erosion and sediment transport.

665.02 Materials.**(a) TEMPORARY SEEDING.**

Seeds shall be furnished in accordance with the requirements given in Item 860.01(a)1. Seed mixes used for temporary seeding shall be in accordance with the following table:

TEMPORARY SEEDING	
September through December	
Annual Ryegrass	25 pounds per acre {28 kg per hectare}
Kentucky 31 Fescue	30 pounds per acre {34 kg per hectare}
Reseeding Crimson Clover	10 pounds per acre {11 kg per hectare}
January through April 15	
Kentucky 31 Fescue	30 pounds per acre {34 kg per hectare}
Reseeding Crimson Clover	30 pounds per acre {34 kg per hectare}
Annual Ryegrass	15 pounds per acre {18 kg per hectare}
April 16 through August	
Brown Top Millet	30 pounds per acre {34 kg per hectare}
Kentucky 31 Fescue	30 pounds per acre {34 kg per hectare}
Hulled Bermuda Grass	10 pounds per acre {11 kg per hectare}

(b) TEMPORARY MULCHING.

Temporary mulching materials shall conform to the requirements given in Article 860.03 for Mulching Material.

(c) TEMPORARY PIPE.

Temporary pipe may be constructed of any type of material that will be suitable for the required work. The inside diameter of the pipe shall be selected by the Contractor based on expected flows and shall be a minimum of 12 inches {300 mm} or as shown on the plans. End treatments, joint sections, and tees shall also be of materials and sizes that are suitable for the required work. Anchors shall be installed when required to keep the pipe in place.

(d) POLYETHYLENE.

Polyethylene sheets may be of any size or color capable of serving the purpose intended provided it is of at least 4 mil {0.1 mm} in thickness.

(e) TEMPORARY COARSE AGGREGATE.

Temporary coarse aggregate shall be either stone or concrete from the demolition of structures on the Right of Way.

Stone aggregate for stabilized construction entrances and temporary access roads to sedimentation basins shall meet the requirements for ALDOT Number 1 coarse aggregate given in Section 801. Concrete from the demolition of structures shall meet the gradation requirements for ALDOT Number 1 coarse aggregate given in Section 801. Reinforcing steel shall be removed from the concrete used for temporary coarse aggregate.

Stone aggregate for other erosion and sediment control purposes shall be the size shown on the plans and shall meet the requirements given in Section 801.

(f) TEMPORARY RIPRAP.

Unless shown otherwise on the plans, temporary riprap shall be either stone or concrete from the demolition of structures on the Right of Way. Stone riprap shall meet the requirements for Class 2 riprap given in Section 814. Concrete from the demolition of structures shall meet the size and weight requirements given for Class 2 riprap in Section 814. Reinforcing steel shall be cut flush with the surfaces of the demolished concrete. The geotextile used for both underlayment and as a choker shall meet the requirements of AASHTO M288 for Permanent Erosion Control Geotextile, Class 1. A list of geotextile materials acceptable for use in this application (List II-3 "GEOTEXTILES") is given in the ALDOT manual titled "Materials, Sources, and Devices with Special Acceptance Requirements". Choker stone shall meet the requirements of Section 801.

(g) HAY BALES.

Bales may be either hay or straw containing 5 cubic feet {0.14 m³} of material and having a weight {mass} of not less than 35 pounds {16 kg} with a minimum length of 3 feet {0.9 m}.

(h) SAND BAGS.

Bags may be cotton, burlap, woven polypropylene, polyethylene, polyamide fabric or other material that will adequately confine the aggregate content for the duration of the use of the bag. Bags shall be filled with sand, limestone screenings or aggregate that is smaller than ALDOT #78. Fill material shall be selected by the Contractor based on the required bag application. Each filled bag shall have minimum dimensions of 18" x 12" x 3" {450 mm x 305 mm x 75 mm} and shall have a minimum weight {mass} of 30 pounds {13 kg}.

(i) SILT FENCE.

Silt fence shall be a geotextile filter supported between posts with a wire mesh backing as shown on the plans. Posts shall be strong enough to provide and retain the fence configuration shown on the plans while being subjected to loading of silt, water and debris.

Silt fence shall meet the requirements given in Section 810 and AASHTO M 288 as supplemented by the following requirements:

- The support backing for the geotextile shall be 14 gage steel wire mesh. The vertical spacing of the wire in the mesh shall be 6 {150 mm} inches. The minimum horizontal spacing of the wires shall be 6 inches {150 mm} and the maximum horizontal spacing shall be 12 inches {300 mm}.

- The geotextile filter shall be either a non-woven geotextile or a woven geotextile composed of monofilament yarns.

A list of geotextile materials acceptable for use in this application (List II-3 "GEOTEXTILES") is given in the ALDOT manual titled "Materials, Sources, and Devices with Special Acceptance Requirements".

(j) WATTLES.

A wattle shall be a tubular shaped product specifically manufactured for erosion and sediment control. Biodegradable wattles shall be manufactured using interwoven biodegradable plant material such as straw, coir, or wood shavings in biodegradable or photodegradable netting that is of sufficient strength to resist damage during handling, installation and use. Wattles manufactured using non-biodegradable materials shall be completely removed from the project when no longer required or useful. Disposal shall be in accordance with recommendations from the wattle manufacturer.

The required minimum diameter of the wattle shall be determined based upon its intended application and shall be as follows unless shown otherwise on the plans. When installed for the purposes of slowing sheet flow or by interrupting the lengths of longer slopes (slopes longer than 50 feet {15 m}), the minimum diameter of the wattle shall be 9 inches {230 mm}. For all other applications including perimeter sediment barriers the minimum diameter of the wattle shall be 20 inches {500 mm}. Wattles of smaller than required diameter may be provided as a stacked installation in accordance with manufacturer recommendations for stacking if the total height of the installation is at least 20 inches {500 mm}. The diameter or height will be verified by measuring the wattle after installation. Wattles installed in a ditch check application shall have a geotextile underlayment that shall meet the requirements of AASHTO M288 for Permanent Erosion Control Geotextile, Class 1. A list of geotextile materials acceptable for use in this application (List II-3 "GEOTEXTILES") is given in the ALDOT manual titled "Materials, Sources, and Devices with Special Acceptance Requirements". A geotextile underlayment is not required if the ditch is otherwise lined with materials such as rolled erosion control product, sod, or established permanent vegetation.

A list of acceptable manufactured wattle products (LIST II-24 "TEMPORARY EROSION AND SEDIMENT CONTROL PRODUCTS") is given in the ALDOT manual titled "Materials, Sources, and Devices with Special Acceptance Requirements".

(k) SILT DIKES.

Silt dikes shall be a triangular shaped cross section with a height of at least 8" {200 mm} in the center with equal length sides and a 16" to 20" {400 mm to 500 mm} base. The triangular shape shall be urethane foam. The outer cover shall be a woven geotextile fabric placed around the urethane foam. The geotextile shall also extend beyond both sides of the triangle at least 2 feet {600 mm}. Dikes shall be attached to the ground with wire staples in accordance with the silt dike manufacturer's recommendations.

(l) BRUSH BARRIER.

Brush Barriers shall be constructed of selected brush, limbs and small trees from the clearing operations. The geotextile used for both underlayment and as a choker shall meet the requirements of AASHTO M288 for Permanent Erosion Control Geotextile, Class 1. A list of geotextile materials acceptable for use in this application (LIST II-3 "GEOTEXTILES") is given in the ALDOT manual titled "Materials, Sources, and Devices with Special Acceptance Requirements".

(m) MANUFACTURED INLET PROTECTION DEVICE.

Manufactured Inlet Protection Devices shall be provided in accordance with requirements shown on the plans. Manufactured inlet protection devices shall consist of filter fabric held in place by a rigid frame. The frame shall be strong enough to support the stormwater flow and weight of any sediment that accumulates on the filter. The manufactured inlet protection device shall have an overflow feature to allow the passage of water during high flow conditions. The filter fabric shall have the following properties:

- Minimum Tensile Strength (Machine Direction) of 80 pounds {355 Newtons} (ASTM D 4632);
- Minimum Permittivity of 0.05 sec^{-1} (ASTM D 4491);
- Maximum Apparent Opening Size of US Std #30 sieve {0.60 mm} (ASTM D 4751);
- Minimum UV Stability of 70% (ASTM D 4355 at 500 hours).

A list of acceptable manufactured inlet protection devices (LIST II-24 "TEMPORARY EROSION AND SEDIMENT CONTROL PRODUCTS") is given in the ALDOT manual titled "Materials, Sources, and Devices with Special Acceptance Requirements".

(n) FLOATING BASIN BOOM.

Floating basin booms shall consist of a reinforced fabric attached on the upper side to floatation members and ballasted on the lower side with chains or weights to form a bottom-tensioned floating curtain boom. Floating basin booms shall be devices manufactured specifically for use in containing sediment suspended in water.

All materials used in the floating basin boom shall comply with the requirements shown on the plan details and the manufacturer's recommendations for the intended application.

The floatation members shall be made of foam with a minimum diameter of 6 inches {150 mm} or as shown on the plans. The skirt depth below the foam floatation shall be a minimum of 5 feet {1.5 meters} or as shown on the plans. The ballast shall be galvanized proof coil chains or other acceptable weights capable of retaining the skirt in a vertical position. The boom shall be Yellow or International Orange in color.

Anchors capable of holding the floating basin boom in place shall be made of a material recommended by the manufacturer.

(o) SEDIMENTATION BASINS.

Components of sedimentation basins shall meet the requirements shown on the plans. Materials for the construction of the sedimentation basins shall be selected from the lists in the Department's "Materials, Sources and Devices with Special Acceptance Requirements" if lists are available for the materials. If lists are not available, materials shall be provided in accordance with all applicable Department specifications and shall be of a quality that enables the sedimentation basin to function as intended for the duration of the need of the sedimentation basin.

The Contractor shall submit a description of all of the materials proposed for the construction of the sedimentation basins. The proposed list of materials shall be submitted with the submittal of the Stormwater Management Plan (SWMP) that is described in Subarticle 108.04(b).

(p) FLOW BAFFLES.

Flow Baffles shall be a rolled erosion control product supported between posts with a wire mesh backing as shown on the plans. The posts and wire mesh shall meet the same requirements as given for silt fence. The rolled erosion control product shall consist of 100 % coconut (coir) fibers and meet the following requirements:

- Minimum Weight of 20 ounces per square yard {678 grams per square meter} (ASTM D 5261);
- Open Area of 50% as determined by physical measurement.

A list of materials acceptable for use in this application (List II-24 "TEMPORARY EROSION AND SEDIMENT CONTROL PRODUCTS") is given in the ALDOT manual titled "Materials, Sources, and Devices with Special Acceptance Requirements".

(q) **BASIN DEWATERING DEVICES.**

Basin Dewatering Devices shall be a product or structure that withdraws water from the surface of the basin and meets the requirements that are shown on the plans. A list of acceptable basin dewatering devices- (List II-24 "TEMPORARY EROSION AND SEDIMENT CONTROL PRODUCTS") is given in the ALDOT manual titled "Materials, Sources, and Devices with Special Acceptance Requirements".

665.03 Construction Requirements.

(a) **EROSION CONTROL AND RUNOFF CONVEYANCE.**

1. **TEMPORARY SEEDING AND MULCHING.**

a. **Inspection to Evaluate Temporary Stabilization.**

The project shall be inspected in accordance with the requirements given in Item 107.21(d)2. Areas of the project not undergoing active construction shall be evaluated for temporary stabilization requirements.

b. **Temporary Mulching Only.**

At locations where final grading should be completed within 60 calendar days, all bare ground shall be stabilized with temporary mulching applied by either hydraulic or conventional methods at a rate of no less than 3.0 tons per acre.

c. **Temporary Seeding and Mulching.**

At locations where final grading will not be completed within 60 calendar days, all bare ground shall be stabilized with temporary seeding and mulching.

Ground preparation will not be required for temporary seeding and temporary mulching except as follows. Areas to be seeded temporarily shall be left in a rough graded condition. Areas that are smooth or hard shall be lightly scarified with scarifying teeth or some other acceptable method, running perpendicular to the direction of water flow. The intent of this scarifying is to obtain a rough area to hold seed and prevent the formation of rills and gulleys. Areas where sight distances must be maintained shall be bladed smooth. All debris in these areas shall be removed to allow mowing.

Application of 1000 pounds {1120 kg} of 8-8-8 fertilizer per acre {hectare} shall be applied by either hydraulic or conventional methods. Seeding and mulching shall also be applied by either hydraulic or conventional methods at a rate of no less than 2.0 tons per acre, separately or concurrently with fertilizer.

d. **Anchoring of Temporary Mulching near Traffic and Streams.**

Temporary mulch within 10 feet {3 meters} of traffic or live streams shall be anchored by either crimping, the application of a tackifier adhesive, or the installation of a mulch control netting in accordance with the requirements given in Section 656.

e. **Acceptance of Temporary Seeding and Mulching.**

Full payment for Temporary Mulching will be made after application of the mulch in accordance with the requirements given in Section 656. Payment for Temporary Seeding will be made in full upon satisfactory application. Acceptance of the Temporary Seeding item requires a cover of living plants capable of effectively preventing soil erosion until such time that permanent soil erosion prevention measures can be installed.

2. **POLYETHELENE.**

Polyethylene sheets shall be placed to eliminate soil erosion on the surfaces of slopes, berms, ditches, and at other locations shown on the plans, accepted SWMP, or as directed by the Engineer. The sheets shall be installed flat and securely anchored to the ground after the ground has been cleared of all objects that may tear the sheets. Upstream sheets shall overlap downstream sheets a minimum of 6 inches {150 mm}. Anchors are considered incidental to this work.

3. **TEMPORARY EARTH BERMS.**

Temporary earth berms shall be constructed at the top of cut or fill sections and at other locations where the diversion of water is required. Stream diversion is addressed in Sections 107 and 524. Temporary earth berms shall be constructed at locations shown on the plans, the approved SWMP or as directed by the Engineer. Temporary earth berms may be plated with polyethylene or aggregate. The height of the berms shall be a minimum of 2 feet {600 mm} after compaction. The width of the top of the berm shall be 2 feet {600 mm} with 2:1 side slopes. The construction of berms is encouraged and

berms of a very temporary nature may be constructed by the windrowing of material. There will be no direct payment for berms not meeting requirements given in this Section and the requirements shown in the plans. If Pay Item 665-T is not included in the contract, the cost of constructing Temporary Earth Berms will be considered incidental to the grading operation.

4. TEMPORARY PIPE.

Temporary Pipe shall be sized to carry the anticipated volumes of flow and shall be installed as permitted by the Engineer or as shown on the plans. The length shall be as determined by the Engineer. Temporary pipes may be placed without the bedding requirements required for the installation of permanent pipe. Pipes shall be securely anchored. Any required tees or joint sections are considered incidental to the work. End treatments shall be installed in a manner to allow the pipe to function effectively.

5. STABILIZED CONSTRUCTION ENTRANCE.

Stabilized construction entrances shall be constructed of materials, at the locations, and to the dimensions shown on the plans, as modified in the accepted SWMP or as directed by the Engineer. The Contractor shall be responsible for maintaining the construction entrance to prevent sediment tracking.

6. DUST CONTROL.

The contractor shall prevent visible dust from leaving the project site by the use of water, dust control agents, or other effective means as approved and directed by the Engineer. Dust control shall be considered ineffective where dust creates a potentially unsafe condition, public nuisance or condition endangering the value, utility or appearance of any property. There will be no direct compensation for dust control.

7. SLOPE TRACKING.

Slope tracking or the surface roughening of slopes shall be accomplished by the walking of tracked equipment upslope and downslope (not along the slope) over the entire erodible area. Slope tracking shall be performed on slopes that are 4:1 or steeper and longer than 20 feet. Slope tracking shall be performed immediately after the final shaping of the slope.

(b) SEDIMENT CONTROL.

1. PLACEMENT OF SEDIMENT CONTROL BMPs IN STREAMS.

Sediment control BMPs shall not be placed in a live stream for the purpose of capturing upland sediment. Additionally, no live stream shall be dammed or ponded for the purpose of water access and usage. Secondary sediment control BMPs in the form of Floating Basin Booms may be placed in live streams parallel to the flow along the bank only as shown in the plans or at the direction of the Engineer.

2. DITCH CHECKS.

Ditch checks shall be constructed at locations shown on the plans, the accepted SWMP or as directed by the Engineer. Materials and products used to construct ditch checks may include sand bags, hay bales, wattles with geotextile, silt fence, silt dikes, or rock with geotextile. The materials used shall be installed in accordance with the requirements given in this Section, the requirements shown on the plans and the manufacturer's recommendations for manufactured products.

3. SEDIMENT BARRIERS.

Sediment barriers shall be constructed at the locations shown on the plans, the accepted SWMP or where directed by the Engineer to intercept sheet flow runoff and to treat concrete washout wastewater. Sediment barriers utilized for sediment control adjacent to the construction limits or a live stream shall be installed prior to beginning any grubbing work in the contributing drainage area. Types of sediment barrier may include silt fence, hay bales, sand bags, silt dikes or wattles. The materials used shall be installed in accordance with the requirements given in this Section, the requirements shown on the plans and the manufacturer's recommendations for manufactured products.

4. BRUSH BARRIERS.

Brush barriers shall be constructed at the locations shown on the plans, the approved SWMP or where directed or permitted by the Engineer. Brush barriers may be constructed in rural areas where natural ground is sloping away from the project. Brush barriers shall be compacted to a relatively dense barrier with uniform heights of between 3 and 5 feet and base widths of between 5

and 10 feet {between 1.5 m and 3.0 m} perpendicular to the flow. Geotextile underlayment and geotextile choker shall be securely attached to the faces of brush barriers. These barriers shall be removed when no longer needed unless otherwise directed by the Engineer.

5. INLET PROTECTION.

Inlet protection shall be installed at locations and in accordance with requirements shown on the plans for the appropriate stages of construction or as directed by the Engineer. Approved manufactured products shall be installed as per manufacturer's recommendations. Site constructed protection may include wattles, silt fence, sand bags, drainage sumps or other practices shown on the plans or directed by the Engineer. In no case will in-structure protection be allowed.

Stage 1 Inlet Protection shall be installed after the outflow drainage has been installed and prior to the construction of the inlet. Stage 1 Inlet Protection shall be ditch checks and/or sediment barriers and shall allow sufficient access to continue inlet construction.

Stage 2 Inlet Protection shall be installed after the inlet is constructed and prior to backfilling. Stage 2 Inlet Protection shall be a sediment barrier. Hay bales are not acceptable for use during this stage of inlet construction.

Stage 3 Protection is required after inlets are completed through grate installation and prior to complete stabilization of the area surrounding the inlet. Stage 3 Inlet Protection for drop inlets shall be in accordance with requirements and details shown on the plans. Stage 3 Inlet Protection shall be a manufactured inlet protection device or constructed with coarse aggregate, wattles or sand bags. Hay bales are not acceptable for use during this stage of inlet construction.

Stage 4 Inlet Protection for drop inlets shall be in accordance with requirements shown on the plans. Stage 4 Inlet Protection shall be a manufactured inlet protection device or constructed with hay bales, wattles or sandbags stacked at least three bags high. Hay bales, sand bags and wattles shall be used as a barrier along the perimeter of the slope paved apron as shown on the plans for a minimum distance of 20 feet {6.1 m}. If impervious surfaces extend beyond 20 feet {6.1 m}, sand bags shall be used as a barrier across the surface 20 feet {6.1 m} from the inlet. Stage 4 Protection will only be required where there is surrounding impervious surfaces that may receive sediment laden runoff.

All inlet protection installations shall be constructed to ensure that runoff does not bypass the inlet. Components of inlet protection may be reused on future installations provided the condition meets the material requirements given in this Section.

6. OUTLET PROTECTION.

Outlet protection required by the plans or directed by the Engineer shall be installed in accordance with the details shown on the plans as soon as practicable after the completion of the drainage structures.

7. DRAINAGE SUMPS.

Temporary drainage sumps shall be constructed as shown on the plans and in locations directed or permitted by the Engineer using the Erosion and Sediment Control Plan (ESCP) as guidance for the location. In general, the shape should be rectangular at the surface with the longer dimension parallel to the flow of water. The minimum volume shall be that shown on the plans. Sumps may be constructed with larger volumes as directed and permitted by the Engineer.

Construction of the sumps shall be accomplished by methods and equipment suitable for the purpose and acceptable to the Engineer. The sump may be supplemented by the use of a ditch check, temporary pipe, polyethylene or other temporary items shown on the plans or approved by the Engineer.

When the sump is deemed of no further use, it shall be backfilled with suitable material and compacted as directed and the area dressed and shaped to blend with the adjacent natural ground.

8. SEDIMENTATION BASINS.

Sedimentation basins shall be constructed in accordance with the details shown on the plans and at the locations shown on the plans or as directed by the Engineer. Sedimentation basins shall be constructed prior to beginning grading operations in the contributing drainage area. Where sedimentation basins are to be constructed in locations where permanent ditches are required, the required ditch lines and grades shall be utilized for the construction of the sedimentation basins. During removal of the sedimentation basin, aggregate used to construct the sedimentation basin may

remain in the ditch as a permanent lining. Sedimentation basins are designed to allow the removal of sediment and turbidity from stormwater runoff by the flocculation and settlement of suspended particles. The removal of sediment and turbidity shall be accomplished by the retention of stormwater runoff in the basin for a period of time before completely draining. In no case shall sediment be allowed to exceed one third of the height of the forebay or drainage sump adjacent to the inlet of the basin.

Access roads to facilitate maintenance efforts shall be constructed of materials, at the locations, and to the dimensions shown on the plans, as modified in the accepted SWMP or as directed by the Engineer. The Contractor shall be responsible for maintaining the access road until directed by the Engineer to perform basin removal or retrofit. The Contractor shall take care during removal of accumulated sediment to not puncture the basin liner. The Contractor shall also take care during removal or retrofit of the sedimentation basin to not excavate past the original basin bottom elevation unless otherwise directed by the Engineer.

9. FLOW BAFFLES.

Flow Baffles shall be installed in sedimentation basins or ditch applications as required by the plans to reduce the velocity of stormwater runoff. They shall be installed in accordance with the details shown on the plans.

10. BASIN DEWATERING DEVICES.

Basin Dewatering Devices shall be installed in sedimentation basins in accordance with the details shown on the plans. Each device shall be capable of dewatering the full capacity of the basin over a period of 72 hours unless otherwise specified in the plans. Each device shall have a shutoff valve on the outlet pipe that should remain closed until discharges meet state water quality standards and the requirements of the ADEM NPDES General Permit.

11. FLOATING BASIN BOOMS.

Floating basin booms shall be installed only for secondary sediment containment or to prevent the migration of sediment within a water body. Floating Basin Booms shall be installed at the locations shown on the plans, the accepted SWMP or as directed by the Engineer. Installation shall be as shown on the plans and as recommended by the manufacturer. Basin Booms shall not be installed in locations where they will not be effective or in conditions where continuous maintenance is not practical.

(c) MAINTENANCE AND REMOVAL REQUIREMENTS.

The Contractor shall be responsible for daily inspection, daily preventative maintenance and immediate repairs of all temporary soil erosion and sediment control items. The Contractor shall maintain on-site, or have readily available, sufficient erosion and sediment control devices and materials to perform maintenance, repairs, and prepare the site for impending rain events. All BMPs which capture sediment shall be cleaned by the removal and disposal of sediment when the holding capacity reaches one third full and when necessary for the BMP to remain functional. Any offsite sediment loss shall be removed as directed by the Engineer. Any offsite-tracking of sediment onto public roadways shall be removed and construction entrances shall be stabilized as needed. Sediment removed during the maintenance of BMPs or collected from off-site cleanup should be reincorporated into the site or disposed of as approved by the Engineer.

All temporary soil erosion and sediment control BMPs shall be removed from the project when no longer needed unless shown otherwise on the plans, the accepted SWMP, or directed or permitted by the Engineer. Removal of temporary controls shall be only after permanent controls are in place and functioning properly. The removal of all controls shall be followed by the immediate stabilization of the area as directed by the Engineer.

665.04 Method of Measurement.

(a) TEMPORARY SEEDING.

Temporary Seeding (Item 665-A) will be measured in acres {hectares} computed from surface measurements taken parallel to the treated surface. Computations will be to the nearest 0.1 of an acre {0.01 ha}.

(b) TEMPORARY MULCHING.

Temporary Mulching (Item 665-B) will be measured in units of tons {metric tons}. Proof of material weight shall be provided to the Engineer by the Contractor upon delivery of the materials to the project site. The weight ticket shall contain all items required in Subarticle 109.01(h)2. with the exception of the name of the producer and the truck number.

(c) TEMPORARY PIPE.

Temporary Pipe (Item 665-C) will be measured in linear feet {meters} to the nearest foot {0.1 m} with measurements taken along the center line of the pipe.

(d) POLYETHYLENE.

Polyethylene sheets (Item 665-E) will be measured in square yards {square meters} computed from surface measurements of the area treated. Computations will be to the nearest 0.1 square yard {0.1 square meter}.

(e) TEMPORARY EARTH BERMS.

Temporary Earth Berms (Item 665-T) will be measured in linear feet {meters} to the nearest foot {0.1 meter} with measurements taken along the top of the berm. Aggregate or polyethylene protection will be paid separately if directed or permitted by the Engineer. There will be no direct payment for berms not meeting requirements given in this Section or shown in the plans.

(f) TEMPORARY COARSE AGGREGATE.

Temporary Coarse Aggregate (Item 665-N) will be measured in units of tons {metric tons}.

(g) TEMPORARY RIPRAP.

Temporary Riprap (Item 665-I) will be measured in units of tons {metric tons}. Geotextile installed both as underlayment and as a choker for riprap ditch checks shall be measured separately and payment made in accordance with the requirements given in Section 610. If provided in the plans, stone used for choking shall be measured separately and paid in accordance with the appropriate pay item.

(h) HAY BALES.

Hay Bales (Item 665-F) will be measured per each bale unless used in Stage 4 Inlet Protection.

(i) SAND BAGS.

Sand Bags (Item 665-G) will be measured per each bag unless used in Stage 3 or 4 Inlet Protection.

(j) SILT FENCE AND SILT FENCE REMOVAL.

Silt Fence (Item 665-J) and Silt Fence Removal (Item 665-O) will be measured along the top of the fence fabric in linear feet {meters} to the nearest foot {0.1 m}.

(k) WATTLES.

Wattles (Item 665-Q) will be measured after installation in linear feet {meters} to the nearest 0.1 foot {0.01 meter} with measurements taken along the top of the wattle installation unless used in Stage 3 or 4 Inlet Protection. Wattles installed as sediment barriers or ditch checks shall have a diameter of 20 inches {500 mm} verified by measurement of the circumference anywhere along the length of the wattle which shall be at least 56 inches {1.42 m}. Payment for stacked wattles will be made at the contract price for a single 20 inch {500 mm} diameter wattle. Wattles installed as slope interrupters shall have a diameter of 9 inches {230 mm} verified by measurement of the circumference anywhere along the length of the wattle which shall be at least 25 inches {0.64 m}. Field measurements will be used to verify lengths shown on shipping documentation. The lesser of the two lengths will be used for payment. Geotextile installed as underlayment for wattle ditch checks shall be measured separately and payment made in accordance with the requirements given in Section 610.

(l) SILT DIKES.

Silt Dikes (Item 665-R) will be measured in linear feet {meters} to the nearest 0.1 foot {0.01 meter} with measurements taken along the top of the dike.

(m) BRUSH BARRIERS.

Brush Barriers (Item 665-S) will be measured in linear feet {meters} to the nearest foot {0.1 meter} with measurements taken along the top of the barrier. Geotextile installed both as

underlayment and as a choker will be measured separately and payment made in accordance with the requirements given in Section 610.

(n) INLET PROTECTION.

Materials used to construct Stage 1 and 2 Inlet Protection will be measured for payment as appropriate for items such as silt fence, wattles, hay bales, etc. This also applies to curb inlet protection necessary beyond Stage 2.

Stages 3 and 4 Inlet Protection (Item 665-P) for drop inlets will be measured per each stage of each inlet protected if protected in accordance with the details shown on the plans.

(o) DRAINAGE SUMP EXCAVATION.

Drainage Sump Excavation (Item 665-K) will be measured in cubic yards {cubic meters} computed from dimensions of the sump size and depth approved by the Engineer. Material removed during sump maintenance operations will be measured for payment as Drainage Sump Excavation to the nearest cubic yard {0.1 cubic meter}. No measurement will be made for material used as backfill when the sump is closed.

Removal of sediment collected by sedimentation basins, sediment retention barriers, ditch checks and inlet protection will be measured as drainage sump excavation if soil erosion is being prevented to the maximum extent practicable.

If the proposal does not contain this item, measurement and payment will be made under the Item of Unclassified Excavation. Material removed will not be paid as muck excavation regardless of the consistency.

(p) SEDIMENTATION BASINS.

Each component and work item required for the construction of a Sedimentation Basin will be measured individually for payment. Excavation and embankment will be measured as Unclassified Excavation. Removal of captured sediment will be measured as Drainage Sump Excavation. Typical items required to construct the sedimentation basin may include unclassified excavation, aggregates, riprap, filter fabric, polyethylene, flow baffles, rolled erosion control products, seeding, basin dewatering device, temporary pipe, etc. Access roads to sedimentation basins, as shown in the plans or as directed by the Engineer, will be measured separately and payment made as Temporary Coarse Aggregate (Item 665-N) and geotextile in accordance with the requirements given in Section 610, unless otherwise specified in the plans. No measurement will be made for access roads installed without the approval of the Engineer.

(q) FLOW BAFFLES.

Flow Baffles (Item 665-H) will be measured along the top of the baffle material in linear feet {meters} to the nearest foot {0.1 m}.

(r) BASIN DEWATERING DEVICES.

Basin Dewatering Devices (Item 665-X) will be measured per each. Elevated device rest, outlet pipes, valves, and end treatments serving the basin dewatering device are considered to be a part of the device and will not be measured separately for payment.

(s) TEMPORARY PIPE END TREATMENTS.

Temporary Pipe End Treatments (Item 665-D) will be measured per each.

(t) FLOATING BASIN BOOMS.

Floating Basin Booms (Item 665-L) will be measured in linear feet {meters} to the nearest 0.1 foot {0.01 meter} with measurements taken along the top line of the boom.

665.05 Basis of Payment.

(a) UNIT PRICE COVERAGE.

The unit price for all temporary erosion and sediment control items, except drainage sumps and silt fence, shall be full compensation for furnishing all materials unless otherwise noted, the

construction and installation of the materials into complete erosion or sediment control measures, and shall include all equipment, tools, labor and incidentals necessary to complete the work, to perform maintenance to keep work in an acceptable condition, and to remove the items when no longer needed as directed by the Engineer. The excavation of sediment collected by drainage sumps, ditch checks, sediment barriers and other sediment control BMPs will be considered for payment as Drainage Sump Excavation as long as erosion is being controlled to the maximum extent practicable. Direct payment will be made for the removal of silt fence.

Payment for Stage 3 and Stage 4 Inlet Protection shall include the installation and maintenance of all items at quantities shown on the plans as being required or permitted.

Payment for sedimentation basins will be made for individual components and work items required for construction and shall be full compensation for the installation, maintenance and removal of all components of the sedimentation basin as constructed in accordance with requirements shown on the plans. Payment for access roads to sedimentation basins will be made for individual components required for the construction and shall be full compensation for the installation, maintenance and removal when no longer needed as directed by the Engineer.

In the event that additional temporary or permanent erosion and sediment control measures become necessary due to the negligence or actions of the Contractor, or for the contractor's convenience the temporary work shall be performed at the Contractor's expense. Temporary or permanent erosion control measures installed in previously stabilized areas that are necessary due to required work sequencing will be paid as outlined in this section.

Payment will not be made for any temporary erosion or sediment control measures installed due to the methods chosen by the Contractor to perform the required work. Measures include those utilized for convenience, for access to the work (work bridges or platforms, stream crossings, access roads, haul roads), those utilized for treating or handling water in order to assist the Contractor in the execution of the work (diversions, dewatering, conveyances) or those utilized for protecting the Contractor's work or staging areas. Payment will also not be made for measures installed outside of the right of way or easements such as material pits, haul or access roads, plant sites, and staging areas.

(b) PAYMENT WILL BE MADE UNDER ITEM NO.:

- 665-A Temporary Seeding - per acre {hectare}
- 665-B Temporary Mulching - per ton {metric ton}
- 665-C Temporary Pipe - per linear foot {meter}
- 665-D Temporary Pipe End Treatment - per each
- 665-E Polyethylene - per square yard {square meter}
- 665-F Hay Bales - per each
- 665-G Sand Bags - per each
- 665-H Flow Baffle - per linear foot {meter}
- 665-I Temporary Riprap, Class ____ - per ton {metric ton}
- 665-J Silt Fence - per linear foot {meter}
- 665-K Drainage Sump Excavation - per cubic yard {cubic meter}
- 665-L Floating Basin Boom - per linear foot {meter}
- 665-N Temporary Coarse Aggregate, ALDOT Number ____ - per ton {metric ton}
- 665-O Silt Fence Removal - per linear foot {meter}
- 665-P Inlet Protection, Stage 3 or 4 - per each
- 665-Q Wattle - per linear foot {meter}
- 665-R Silt Dike - per linear foot {meter}
- 665-S Brush Barrier - per linear foot {meter}
- 665-T Temporary Earth Berm - per linear foot {meter}
- 665-X Basin Dewatering Device - per each



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: November 16, 2016

Special Provision No. 12-0426(3)

EFFECTIVE DATE: January 1, 2017

SUBJECT: Liquidated Damages.

Alabama Standard Specifications, 2012 Edition, SECTION 108 shall be amended as follows:

SECTION 108 PROSECUTION AND PROGRESS

108.11 Schedule of Liquidated Damages.

This Article (108.11) shall be replaced by the following:

108.11 Schedule of Liquidated Damages.

Original Contract Amount		Liquidated Damages Daily Charge	
More Than	To and Including	Calendar Day or Fixed Date	Work Day
\$ 0	\$ 200,000	\$ 550	\$ 1100
200,000	500,000	750	1500
500,000	1,000,000	950	1900
1,000,000	2,000,000	1250	2500
2,000,000	5,000,000	1650	3300
5,000,000	10,000,000	1850	3700
10,000,000	-----	2500	5000

When the contract time is on the calendar day or date basis, the schedule for calendar days shall be used. When the contract time is on a work day basis, the schedule for work days shall be used.



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: December 18, 2012

Special Provision No. 12-0521

EFFECTIVE DATE: March 1, 2013

SUBJECT: Definition of Terms.

Alabama Standard Specifications, 2012 Edition, SECTION 101 shall be revised as follows:

SECTION 101 DEFINITION OF TERMS

101.01 Definitions.

This Article (101.01) is revised by replacing the definition of "Engineer" with the following:

Engineer. A qualified Department staff member designated by the Director, acting either directly or through his authorized assistants or representatives, who is responsible for engineering supervision of construction activities.



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: January 3, 2013

Special Provision No. 12-0530

EFFECTIVE DATE: August 1, 2013

SUBJECT: Preparation of Proposals

Alabama Standard Specifications, 2012 Edition, SECTION 102 shall be revised as follows:

SECTION 102 PROPOSAL REQUIREMENTS AND CONDITIONS

102.06 Preparation of Proposal.

(b) DETAILS.

The first paragraph of Subarticle 102.06 (b) shall be replaced with the following:

All bids shall be submitted using a computer bid system prescribed by the Department, via either bidder furnished digital storage media (CD-ROM, DVD-ROM, or USB flash drive), or the Department's approved Internet Bidding Service Provider. Bids submitted using any other form, format, or means will be rejected. The digital storage media used to submit the bid shall become the property of the State of Alabama.



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: January 8, 2013

Special Provision No. 12-0547

EFFECTIVE DATE: July 1, 2013

SUBJECT: Welded Steel Encasement Pipe

Alabama Standard Specifications, 2012 Edition, SECTION 862 shall be revised as follows:

SECTION 862 UTILITY ENCASEMENT PIPE

862.01 Welded Steel Encasement Pipe.

This article (862.01) shall be replaced by the following:

862.01 Welded Steel Encasement Pipe.

Welded steel encasement pipe shall comply with the appropriate requirements for the size shown in the following table unless local codes or ordinances are more stringent:

Pipe Diameter inches {mm}	Minimum Wall Thickness inches {mm}	Pipe Requirements
< 4 {101.6}	Sch. 40	ASTM A 53, Grade B
4 - 12 {101.6 - 304.8}	0.188 {4.78}	ASTM A 252, Grade 2
>12 - 24 {>304.8 - 609.6}	0.250 {6.35}	ASTM A 252, Grade 2
>24 {609.6}	0.375 {9.525}	ASTM A 252, Grade 2

All pipe shall be coated inside and out with at least one shop coat of an approved primer paint. In addition, the external surface shall be treated with one coat of asphaltum paint, meeting the requirements of Federal Specification TT-C-494B Type II, Composition G. Fusion-Bonded Epoxy Coating, meeting the requirements of AWWA C213, may be used as an alternative to the shop coat primer and asphaltum paint. Other approved protection material may be used with prior approval by the Department. Hydrostatic pressure test is not required for this pipe.



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: August 14, 2017

Special Provision No. 12-0599(2)

EFFECTIVE DATE: September 1, 2017.

SUBJECT: Asphalt Materials

Alabama Standard Specifications, 2012 Edition, shall be revised by replacing SECTION 405, and SECTION 407 with the following:

SECTION 405 TACK COAT

405.01 Description.

The work under this Section shall cover the furnishing and placing of a bituminous tack coat on an existing surface which is to be covered by a bituminous plant mix material in accordance with these specifications and in reasonably close conformity with the lines shown on the plans or directed by the Engineer.

The work shall include cleaning the existing surface prior to application of the tack coat.

The area of treatment and the rate of application of a tack coat shall be based on the plans and specifications after evaluating the actual surface condition on which the plant mix overlay is to be placed.

405.02 Materials.

Bituminous material for tack coat shall be Emulsified Asphalt or one of the Performance Graded (PG) Asphalt Binders shown in Article 804.07. The cationic grades CRS-1h, CRS-2, CRS-2h, CMS-1hp, CSS-1, CSS-1h, CQS-1h, CQS-1hp, CRS-2p, CRS-2l, CBC-1HT, or CNTT-1hs; or the anionic grade NTSS-1HM; or the non-ionic grade NTQS-1HL shall be used. Emulsified Asphalts shall not be diluted prior to application.

Unless shown otherwise on the plans, the contractor shall have the option of using any of the allowable bituminous materials, subject to other limitations of these specifications. In making the selection of materials, the Contractor shall take into consideration seasonal, weather, temperature, and other placement conditions, while keeping in mind that SS stands for slow setting, RS stands for rapid setting, and QS stands for quick setting (QS is the faster setting or breaking emulsion). Low temperatures and humid or damp conditions will retard the breaking or setting of all emulsions. The mixing of a cationic and an anionic emulsion will result in failure of emulsion materials.

All materials shall meet the requirements of Section 804.

405.03 Construction Requirements.

(a) EQUIPMENT.

In general it shall be the Contractor's responsibility to select the proper size and amount of equipment to provide the desired results. Equipment furnished shall meet the requirements of Subarticle 401.03(a).

(b) SEASONAL, NIGHTTIME, WEATHER, AND TEMPERATURE LIMITATIONS.

1. SEASONAL LIMITATIONS FOR THE PLACEMENT OF TACK.

Grades CSS-1 and CSS-1h Emulsified Asphalts shall not be placed between the dates of October 1 and May 1 in North Alabama and between the dates of November 1 and April 1 in South Alabama regardless of weather conditions. For the purpose of identification, South Alabama shall be referred to for projects lying partly or wholly in the area of the State lying south of latitude 33 °N, with North Alabama encompassing the remaining portion of the State. These seasonal limitations shall not apply to

the placement of other bituminous materials for tack allowed by Article 405.02. The tack may be placed if allowed by the Engineer when the pavement temperature is 40°F and rising.

2. NIGHTTIME LIMITATIONS FOR THE PLACEMENT OF TACK.

Grade CSS-1 and CSS-1h Emulsified Asphalts shall not be used for tack during nighttime paving operations.

3. WEATHER LIMITATIONS FOR THE PLACEMENT OF TACK.

Tack material shall not be applied on a wet surface or when in the Engineer's opinion weather conditions are not suitable. NTSS-1HM may become slippery when wet.

4. TEMPERATURE LIMITATIONS FOR THE PLACEMENT OF TACK.

Temperature limitations for the placement of tack coat material shall be the same as specified in Subarticle 410.03(b) for plant mixed pavements. NTSS-1HM material shall not be used for cold applied asphalt pavement.

(c) PREPARATION OF EXISTING SURFACE.

Loose material, dust, dirt, and all foreign matter shall be removed from the surface to be treated. All existing surfaces (new pavement, milled pavement, old pavement, or concrete) shall be clean and dry prior to the tack coat application. Cleaning operations can be achieved either through mechanical brooming, by flushing with water, vacuuming, blowing off debris using high-pressure air or other methods as determined by the contractor, unless otherwise shown on the plans. The existing surface shall be approved by the Engineer before application of the tack material.

(d) APPLICATION.

Tack coat material application rate shall meet the requirements given in the table below:

Material Type	Undiluted Application Rate gal/yd ²	Application Temperature °F
Emulsified Asphalt	0.08 - 0.12	Cationic 130-170 Anionic 150-180 Non-Ionic 150-180
PG Asphalt Binder	0.05 - 0.07	275-375

Tack coat shall be applied uniformly to the pavement surface to obtain full coverage. Tack coat applications that are streaky or striped in appearance will not be allowed and shall be reapplied.

An asphalt distributor shall be provided for use on all accessible areas; inaccessible areas such as around manholes, etc. may be coated by other methods, approved by the Engineer.

When applying tack coat, it shall be applied to all contact surfaces of curbs, gutters and manholes. Tack shall also be applied to all adjacent pavement edges except the pavement edges where joint sealant is required. Adjacent surfaces, such as gutters and the like, that are not to be in contact with the mix shall be adequately protected from the spray by means of heavy paper securely fastened in place or by other satisfactory means. Any such surface soiled by tack coat material shall be cleaned and restored to its previous condition without additional compensation.

(e) CURING

Tack coat materials shall be fully cured before application of the overlying asphalt pavement layer is placed. Emulsified asphalt materials are considered as cured when the emulsion color has completely turned black. The NTSS-1HM asphalt emulsion shall be covered as soon as practical.

Tack coat material shall be spread only far enough in advance to permit the construction to progress consistently, uniformly, and continuously after the curing period and shall not be applied so far in advance that the viscous quality will be reduced by traffic prior to construction thereon. Tack coat that loses its viscous quality before being covered shall be renewed and any which has been damaged shall be replaced without extra compensation.

405.04 Method of Measurement.

The amount of bituminous material used as directed for tack coat will be measured in gallons {liters}, as specified in Article 109.02.

405.05 Basis of Payment.

(a) UNIT PRICE COVERAGE.

The amount of bituminous material used as directed for tack coat, measured as noted above, will be paid for at the contract unit price bid per gallon {liter} which shall be full compensation for furnishing the bituminous material, hauling, heating, application, curing, and maintaining and for all equipment, tools, labor, and incidentals necessary to complete the work.

(b) PAYMENT WILL BE MADE UNDER ITEM NO.:

405-A Tack Coat - per gallon {liter}

**SECTION 407
JOINT SEALANT FOR HMA PAVEMENT**

407.01 Description.

This Section shall cover the sealing of longitudinal joints in hot mix asphalt pavements by the spraying or rolling of joint sealant on the vertical face of the joint ahead of the asphalt spreader. Joint sealant application shall be a separate construction operation from the tack coat application

Joint sealant shall not be applied to the joints between HMA pavement and paved shoulders unless shown otherwise on the plans. Joint sealant shall not be applied to the joints between HMA pavement and curbs unless shown otherwise on the plans.

407.02 Materials.

A sample of the sealant will be taken by the Engineer and tested in accordance with the requirements established by the Department for sampling and testing Bituminous Surface Treatments given in Section 401.

The Contractor shall have the option of using the following materials for the joint sealant:

- PG 64-22 performance graded asphalt binder;
- PG 67-22 performance graded asphalt binder
- CRS-1H emulsified asphalt
- CMS-1HP emulsified asphalt
- CQS-1HP emulsified asphalt;
- CBC-1HT emulsified asphalt;
- NTSS-1HM emulsified asphalt;
- NTQS-1HL emulsified asphalt;
- Pavon™;
- Crafcoc™ Pavement Joint Adhesive Part No. 34524.

PG 64-22 shall meet the material requirements given in Table 2 of Section 804.

PG 67-22 shall meet the material requirements given in Table 3 of Section 804.

NTQS-1HL, NTSS-1HM, CQS-1HP, CMS-1HP, CBC-1HT, and CRS-1H shall meet the requirements given in Table 5 of Section 804.

CQS-1HP shall be a cationic emulsion blended with a minimum of 1.2 % polymer meeting the requirements given in Article 811.03 and the requirements given in the following tables. Pavon™ is a proprietary product that shall also meet the requirements given in the following tables.

REQUIRED PROPERTIES FROM THE TESTING OF Pavon™			
Parameter	Test Method	Value	
Residue % By Distillation	ALDOT 415	60 % Min.	-
Viscosity, SF @ 77 °F, sec.	AASHTO T 59	20 SF Min.	100 SF Max.
Sieve Test, %	AASHTO T 59	-	0.1 % Max.
Particle Charge	AASHTO T 59	Positive	

REQUIRED PROPERTIES FROM THE TESTING OF DISTILLATION RESIDUE FROM Pavon™			
Parameter	Test Method	Value	
Penetration, 100 g, 5 secs. @ 77 °F	AASHTO T 49	60 mm Min.	130 mm Max.
Ductility, cms., @ 39.2 °F	AASHTO T-51	40 cms Min.	-
Elastic Recovery @ 50 °F, %	AASHTO T-301	50 % Min.	-

Crafco™ Pavement Joint Adhesive Part No. 34524 is a proprietary product that shall meet the requirements given in the following table.

REQUIRED PROPERTIES FROM THE TESTING OF Crafco™ PAVEMENT JOINT ADHESIVE PART NO. 34524		
Parameter	Test Method	Value
Cone Penetration, 77 °F	ASTM D5329	60-100
Flow, 140 °F	ASTM D5329	5 mm-Maximum
Resilience, 77 °F	ASTM D5329	30 %-Minimum
Ductility, 77 °F	AASHTO T51	30 cm-Minimum
Ductility, 39.2 °F	AASHTO T51	30 cm-Minimum
Softening Point	AASHTO T53	170 °F Minimum

407.03 Construction Requirements.

Unless shown otherwise on the plans, joint sealant shall only be applied to the joints in the wearing layers of Section 424 (Superpave) and Section 423 (Stone Matrix Asphalt) mixes and to the joints in the surface layers between existing HMA pavement and new HMA pavement. Joint sealant shall not be applied to the joints between HMA pavement and paved shoulders unless shown otherwise on the plans. Joint sealant shall not be applied to the joints between HMA pavement and curbs unless shown otherwise on the plans.

As a separate application from the tack coat, the sealant shall be applied by being sprayed or rolled on the face of the vertical joint of the previously placed asphalt layer ahead of the asphalt spreader to seal the joint between the previously placed layer and the newly placed layer.

Joint sealant shall be placed at the rates and temperatures given in the following table.

JOINT SEALANT APPLICATION RATES AND TEMPERATURE		
Joint Sealant	Application Rate	Application Temperature
PG 64-22	24 gallons per mile per inch of lift with a +/-10 % tolerance	212 °F to 230 °F
PG 67-22	24 gallons per mile per inch of lift with a +/-10 % tolerance	275 °F to 350 °F
CRS-1h CMS-1HP NTQS-1HL	40 gallons per mile per inch of lift with a +/-10 % tolerance	120 °F to 170 °F
CBC-1HT NTSS-1HM	40 gallons per mile per inch of lift with a +/-10 % tolerance	165 °F to 170 °F
CQS-1hp Pavon™	40 gallons per mile per inch of lift with a +/-10 % tolerance	Ambient Temperature
Crafco™ Pavement Joint Adhesive Part No. 34524	70 gallons per mile per inch of lift with a +/- 10 % tolerance	380 °F ± 20 °

The Engineer will limit the length of placement ahead of the asphalt spreader (usually no more than 1000 feet) to reduce the possibility of damage to the sealant. The Engineer will also require the placement of CBC-1HT emulsified asphalt, CQS-1HP emulsified asphalt, NTSS1HM emulsified asphalt, NTQS-1HL emulsified asphalt, and Pavon™ far enough ahead of the asphalt spreader to allow the curing of the sealant.

407.04 Method of Measurement.

The application of joint sealant will be measured by the mile for each joint.

407.05 Basis of Payment.

(a) UNIT PRICE COVERAGE.

Joint sealant will be paid for at the contract unit price per mile for each joint which shall be full compensation for furnishing the joint sealant material, applying the sealant and for all equipment, tools, labor, and incidentals necessary to complete the work.

(b) PAYMENT WILL BE MADE UNDER ITEM NO.:

407-B Joint Sealant for Hot Mix Asphalt Pavement - per mile



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: March 14, 2013

Special Provision No. 12-0604

EFFECTIVE DATE: July 1, 2013

SUBJECT: Extension of Contract Time.

Alabama Standard Specifications, 2012 Edition, SECTION 108 shall be amended as follows:

SECTION 108 PROSECUTION AND PROGRESS

108.09 Extension of Contract Time.

(a) GENERAL.

This Subarticle [108.09(a)] shall be replaced by the following:

(a) GENERAL.

An extension of contract time will be granted in the event the total cost of the completed work exceeds the total contract bid price. For the purpose of this item, the following costs will be excluded from the computation for total cost:

- supplemental agreements, regardless of whether or not time extensions are allowed on the agreements ;
- bituminous material price adjustments;
- adjustments due to the cost of construction fuel for HMA production;
- liquidated damages;
- incentive or disincentive payments;
- price adjustments for pavement rideability;
- compensation for delay claims.

The extension of contract time shall be in the same ratio as the increase in the total cost.

If the Contractor finds it impossible for reasons beyond his control to complete the work within the contract time as specified or as extended in accordance with the provisions of this Article, he may at any time prior to the expiration of the contract time as extended, make a written request to the Engineer for an extension of time setting forth therein the reasons which he believes will justify the granting of his request. The Contractor's plea that insufficient time was specified is not a valid reason for extension of time. If the Engineer finds that the work was delayed because of conditions beyond the control and without the fault of the Contractor, he may extend the time for completion in such amount as the conditions justify. The extended time for completion shall then be in full force and effect the same as though it were the original time for completion. If the Contractor disagrees with the decision of the Engineer, he may appeal directly, in writing, to the Director. The Director shall have final authority to approve or disapprove the request for an extension of time. The Director may, at his discretion, refer the appeal to the Claims Committee for a recommendation before making his decision. Reference is made to Section 110, Claims. Time extension requests will not be referred to the Claims Appeal Board.



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: March 18, 2013

Special Provision No. 12-0607

EFFECTIVE DATE: July 1, 2013

SUBJECT: Contractor's Advertisement of Completion.

Alabama Standard Specifications, 2012 Edition, SECTION 105 shall be amended as follows:

SECTION 105 CONTROL OF WORK

105.15 Acceptance.

(c) FINAL ACCEPTANCE.

5. CONTRACTOR'S ADVERTISEMENT OF COMPLETION.

This Item [105.15(c)5] shall be replaced by the following:

5. CONTRACTOR'S ADVERTISEMENT OF COMPLETION.

The Contractor, immediately after receiving Notice of Acceptance for Maintenance, shall give notice of said completion by an advertisement for a period of four successive weeks in some newspaper in general circulation published within the county in which the project is located. If the project is located in more than one county, an advertisement shall be given in a newspaper of general circulation published within each county in which the project is located. Proof of publication of said notice shall be made by the Contractor to the Director, by affidavit of the publisher. If a newspaper is not published in a county where work is done, the notice may be given by posting at the Court House for 30 days and proof of same shall be made by the Probate Judge or Sheriff and the Contractor.



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: March 8, 2017

Special Provision No. 12-0643(2)

EFFECTIVE DATE: May 1, 2017

SUBJECT: Bituminous Material Price Adjustments and Construction Fuel for HMA Production

Alabama Standard Specifications, 2012 Edition, SECTION 109 shall be amended as follows:

SECTION 109 MEASUREMENT AND PAYMENT

109.03 Scope of Payment.

(e) Bituminous Material Price Adjustments.

2. Usage and Payment.

Item 109.03(e) 2 shall be replaced with the following:

2. Usage and Payment.

Adjustments in compensation will be computed each month that bituminous materials are used in the work. Bituminous plant mix bases and pavements, surface treatments and tack coat are the only types of bituminous materials for which a price adjustment will be computed. Adjustments in compensation will be based on an index that is a monthly price per gallon for the bituminous material.

Before the expiration of contract time (plus approved time extensions) the dollar amount of adjustment will be determined by multiplying the increase or decrease of the current (current estimate month) index from a "base index" by the number of gallons of bituminous material used in the work during the period covered by the monthly estimate. The base index will be the value of the index for the month in which the project is let. This same base index will apply to bituminous materials added to the contract by supplemental agreement after letting.

After the expiration of contract time (plus approved time extensions) two calculations of a potential price adjustment will be made. The first calculation will be made using the current index and the base index. The second calculation will be made using the index during the month that contract time (plus approved time extensions) expired and the base index. The amount of the price adjustment for the current estimate period will be the smallest amount of an increase in compensation if both calculations are an increase in compensation. The amount of the price adjustment will be the largest amount of a decrease in compensation if both calculations are a decrease in compensation. The amount of the price adjustment will be the decrease in compensation if one of the calculations is an increase in compensation and the other calculation is a decrease in compensation.

The amount of asphalt will be calculated as follows:

- **Bituminous Plant Mix Bases and Pavements** - the number of gallons {liters} of new bituminous material required by the approved job mix formula. A conversion factor of 8.51 pounds per gallon {1.02 kg/L} will be used for figuring quantities. No measurement for adjustment will be made for the amount of asphalt rejuvenator used or for the amount of bituminous material recovered and used in surface recycling operations.

- **Surface Treatments** - actual gallons {liters} of asphalt used within specification requirements with volumetric correction to 60 °F {16 °C} as per Subarticle 109.02(c).

- **Tack Coat** - actual gallons {liters} of asphalt used within specification requirements with volumetric correction to 60 °F {16 °C} as per Subarticle 109.02(c).

(f) Adjustments due to Cost of Construction Fuel for HMA Production.

Subarticle 109.03(f) shall be replaced with the following.

(f) Adjustments due to Cost of Construction Fuel for HMA Production.

Changes in the compensation due the Contractor will be made by the Engineer to address changes in the cost of fuel required for the production of Hot Mix Asphalt (HMA) in a plant. The changes in compensation will be made based on a monthly index of the cost of fuel determined by the Department.

A monthly HMA production fuel index will be established based on the average area terminal price reports for No. 2 fuel and No. 6 (3.0 % S) fuel of the "Platts Oilgram Price Report" published during the week in which the first day of the month occurs.

Before the expiration of contract time (plus approved time extensions) the dollar amount of adjustment will be determined by multiplying the increase or decrease of the current (current estimate month) index from the base index by the number of gallons of fuel that are used in the production of the HMA during the period covered by the monthly estimate. The number of gallons of fuel required for the production of the HMA shall be 2.0 gallons per ton {8.3 L per metric ton} of HMA produced during the estimate period. The base index will be the value of the index for the month in which the project is let.

After the expiration of contract time (plus approved time extensions) two calculations of a potential price adjustment will be made. The first calculation will be made using the current index and the base index. The second calculation will be made using the index during the month that contract time (plus approved time extensions) expired and the base index. The amount of the price adjustment for the current estimate period will be the smallest amount of an increase in compensation if both calculations are an increase in compensation. The amount of the price adjustment will be the largest amount of a decrease in compensation if both calculations are a decrease in compensation. The amount of the price adjustment will be the decrease in compensation if one of the calculations is an increase in compensation and the other calculation is a decrease in compensation.

Changes in compensation will be made for the number of tons {metric tons} of HMA placed and paid for in accordance with the requirements given in the following Sections:

- Section 327, Plant Mix Bituminous Base;
- Section 404, Paver-Laid Surface Treatment;
- Section 420, Polymer Modified Open Graded Friction Course;
- Section 423, Stone Matrix Asphalt;
- Section 424, Superpave Bituminous Concrete Base, Binder, and Wearing Surface Layers.

ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: July 6, 2016

Special Provision No. 12-0676(3)

EFFECTIVE DATE: September 1, 2016

SUBJECT: Structural Portland Cement Concrete.

Alabama Standard Specifications, 2012 Edition, shall be amended by replacing SECTION 501 and by modifying SECTION 510, and SECTION 815 as follows:

SECTION 501 STRUCTURAL PORTLAND CEMENT CONCRETE

501.01 Description.

The work under this Section shall cover the furnishing of portland cement concrete to be used in constructing concrete structures. Structures shall include but are not limited to bridges of all types, box culverts, headwalls, retaining walls, and other miscellaneous structures.

501.02 Materials.

(a) General.

Handling, storage, and control of materials shall comply with appropriate portions of Section 106. All materials shall conform to the requirements set forth in Division 800, Materials. Specific reference is made to applicable portions of the following Sections:

- Section 801 - Coarse Aggregate
- Section 802 - Fine Aggregates
- Section 806 - Mineral Admixtures
- Section 807 - Water
- Section 808 - Air Entraining Admixtures for Concrete
- Section 809 - Chemical Admixtures for Concrete
- Section 815 - Cement
- Section 830 - Concrete Curing Material
- Section 832 - Concrete Joint Fillers, Sealers and Waterstop Material
- Section 835 - Steel Reinforcement

(b) Special Requirements.

Aggregates from different sources, which are to be used for concrete Class A and Class C as specified in Item 501.02(c)2, may be stockpiled together provided material from each source meets the requirements of Section 801 and the specific gravity of the aggregates from each source does not vary more than plus or minus 0.05.

In the event the coarse aggregate shows a tendency to segregate in the stockpile, the Engineer may order the coarse aggregate be furnished and batched in two fractions from two separate stockpiles.

The Contractor may be required to adjust the size of coarse aggregate for the concrete used around steel reinforcement of heavily reinforced members.

(c) Proportioning Materials.

1. Mixture Design.

The Contractor's concrete producer shall establish the proportion of materials for each class of concrete following the guidelines described in ALDOT-170, "Method of Controlling Concrete Operations for Structural Portland Cement Concrete". It shall be the responsibility of the concrete producer to request approval of concrete mixture design(s) for use in Department's projects. The Contractor shall submit the proposed concrete mixture no later

than 65 Calendar Days after the date of Notice to Proceed. The Department shall be allowed 28 Calendar Days to complete the review and approval of the concrete mixture.

2. Prequalification Requirements for Concrete Mixture Design.

PREQUALIFICATION REQUIREMENTS FOR CONCRETE MIXTURE DESIGN				
Concrete Class	Class A	Class B	Class C	Class D
Minimum 28-Day Compressive Strength (psi) {Mpa}	3,000 {21}	4,000 {28}	3,000 {21}	3,000 {21}
Maximum Water/Cementitious Materials Ratio	0.50	0.45	0.55	0.45
Range of Total Air Content (%)	2.5 - 6.0	2.5 - 6.0	2.5 - 6.0	2.5 - 6.0
Slump (in) {mm}	3.0 {75}	3.5 {90}	3.0 {75}	7.0 {180}
Maximum 28-Day Drying Shrinkage (%)	--	0.040	--	--
Largest Nominal Maximum Aggregate Size (in) {mm}	1.0 {25}	1.0 {25}	1.0 {25}	1.0 {25}
Notes	1, 4	1, 4	1, 4	1, 2, 3, 4

The following notes are applicable to the table of PREQUALIFICATION REQUIREMENTS FOR CONCRETE MIXTURE DESIGN:

Note 1. Concrete mixtures used in marine environment, within 10 miles {16 kilometers} from coastline, completely or partially submerged in seawater, located within the tidal and splash zones, exposed to seawater spray, exposed to brackish water, or as shown on the plans shall have a maximum permeability of 2,000 coulombs and shall include mineral admixtures

Note 2. Seal concrete placed as an integral part of a bridge support system shall have Type II cement. Class "F" fly ash and/or ground granulated blast furnace slag shall be used as a substitute for a portion of the required Type II cement. The minimum substitution rate shall be 20 % for fly ash and 25 % for ground granulated blast furnace slag.

Note 3. Anti-washout admixtures shall be used when placing these mixtures through water.

Note 4. Coarse and fine aggregate gradations used shall meet the gradation requirements given in Section 801 and Section 802. Optimized gradations that do not meet the gradation requirements given in Section 801 and Section 802 shall be submitted to the Materials and Tests Engineer for approval prior to use.

Cementitious content (lbs) {kg}: 620 {368}

Maximum water content (gallons) {liters}: 33 {163}

Fine aggregate (lbs) {kg}: 1097 {651}, where specific gravity = 2.65

Coarse aggregate (lbs) {kg}: 1857 {1102}, where specific gravity = 2.60

3. Class of Concrete Required for Specific Structures.

Class A - Retaining walls, concrete safety barriers, headwalls, and inlets.

Class B - Box culverts, bridge superstructures and bridge substructures.

Class C - Machine laid curbs, gutters, combination curbs and gutters, slope paving, and miscellaneous concrete units.

Class D - Underwater concrete.

4. Substitution of Higher Strength Concrete and Aggregate Requirements.

Substitution of a higher strength mixture for one of a lower strength may be permitted provided all the prequalification requirements of the higher strength mixture are met and the proposed substitution is requested and approved in writing.

If requested in writing and approved by the Materials and Tests Engineer, the use of No. 357 or No. 467 aggregates may be permitted in Class D mixtures.

5. Mixture Design Prequalification Tests.

For concrete mixtures using portland cement only, the concrete producer shall submit data showing that the total alkali contribution from the cement in the concrete does not exceed 4.00 lb/yd³ when calculated as follows:

$$\text{lb of alkali per Yd}^3 = \frac{(\text{lb of cement per Yd}^3) \times (\% \text{ Na}_2\text{O equivalent in cement})}{100}$$

Permeability tests shall be performed in accordance with the requirements given in AASHTO T 277, "Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration", using a moist-curing period of 56 days.

The 28-day shrinkage test shall be performed in accordance with the requirements given in AASHTO T 160, "Length Change of Hardened Hydraulic Cement Mortar and Concrete", using concrete prisms exposed to drying at a concrete age of 7 days. Three concrete prisms that are 3 x 3 x 11.25 inches {75 x 75 x 286 mm} in size shall be used. The initial reading for drying shrinkage calculations shall be the reading taken at the start of drying at a concrete age of 7 days ± 0.5 hours.

Compressive strength testing shall be performed in accordance with the requirements given in AASHTO T 22, "Compressive Strength of Cylindrical Concrete Specimens", using 6 x 12 inch {152 x 305 mm} cylinders.

Total air content shall be performed in accordance with the requirements given in AASHTO T 152, "Air Content of Freshly Mixed Concrete by the Pressure Method", using a Type "B" meter.

Slump test shall be performed in accordance with the requirements given in AASHTO T 119, "Slump of Hydraulic Cement Concrete".

6. Chemical Admixtures for Concrete.

Any chemical admixtures used in the concrete mixture shall be included in the mixture design proposal. Only approved chemical admixtures listed in List II-1, "Chemical Admixtures for Portland Cement Concrete", of the MSDSAR manual shall be used in Department concrete mixtures. The dosage of chemical admixtures may be adjusted in the field to obtain the desired results, provided the manufacturer's recommended dosage is not exceeded. The use of calcium chloride will not be permitted.

7. Air-Entraining Admixtures for Concrete.

Approved air entraining admixtures are listed in the MSDSAR manual, List II-1, "Chemical Admixtures for Portland Cement Concrete". The total air content shall be within the range of 2.5% to 6.0 % at the point of delivery.

Air content less than 2.5 % will be acceptable for structures that are completely embedded below the ground line or mud line.

The total air content of freshly mixed concrete shall be measured in accordance with the requirements given in AASHTO T 152 using a Type "B" pressure meter. All pressure meters used for measuring the total air content shall be calibrated prior to the beginning of concrete placement. The calibration of pressure meters shall be verified at least twice a week and anytime a questionable result is obtained.

8. Mineral Admixtures for Concrete.

Mineral admixtures may be used in any mixture design except where noted to be prohibited elsewhere. Substitution percentages are calculated by weight.

The maximum substitution of portland cement with mineral admixtures shall not exceed 50 percent. The following table shows the maximum substitution of portland cement with any one mineral admixture substitution.

MAXIMUM PERCENT MINERAL ADMIXTURE SUBSTITUTION FOR PORTLAND CEMENT (substitution by weight)	
MINERAL ADMIXTURE	PERCENTAGE SUBSTITUTION
Class C or Class F Fly Ash (See Note 1)	30 %
Ground Granulated Blast Furnace Slag (See Note 2)	50 %
Microsilica	10 %

Notes to the table of MAXIMUM PERCENT MINERAL ADMIXTURE SUBSTITUTION FOR PORTLAND CEMENT:

Note 1. Class "F" fly ash shall be used when fly ash is required to reduce the heat of hydration.

Note 2. The maximum substitution rate shall be twenty-five percent by weight {mass} when the ambient temperature is 45 °F or below.

9. Slump.

The Engineer may accept any concrete mixture delivered to the field with a slump less than the specified slump if the concrete mixture is workable.

A tolerance of plus 1.0 inches {25 mm} will be acceptable for the mixture delivered at the work site.

Approved Type "F", chemical admixtures may be used to chemically increase the slump of the concrete mixture from the maximum slump specified to a maximum slump of 6.0 inches {150 mm} for Class A, Class B, and Class C concrete. The plus 1.0 in {25 mm} tolerance will not be allowed when Type "F" chemical admixtures are used.

In no case shall the water to total cementitious material ratio specified be exceeded in order to increase the slump and/or adjust the mixture.

Slump shall be measured in accordance with the requirements given in AASHTO-T-119.

10. Concrete Production.

During the progress of the work, the relative proportions between the fine and coarse aggregates, and between aggregate and water, may be varied as needed for best results, but the water to total cementitious material ratio shall not be changed except as noted below:

If it is impossible to produce concrete having the desired consistency the total amount of cementitious material may be increased to achieve the desired consistency provided that the maximum water to total cementitious material ratio is not exceeded and there is no additional cost to the Department.

If the Engineer finds it advisable to increase the minimum design strength of the concrete and orders the cementitious factor increased, the State will reimburse the Contractor for the actual amount only of the additional cementitious material used, based on actual f.o.b. destination, with the additional quantity calculated from the theoretical cementitious factor determined by the Engineer and not from count of bags or weight {mass} used.

The concrete mixture designs shall use Type I, II, or Type I/II portland cement unless otherwise specified. The Contractor may, for his own convenience and without additional compensation, substitute Type III portland cement, provided prior approval is given by the Materials and Tests Engineer.

It shall be the Contractor's responsibility to carry out uniform construction practices, which will produce concrete with the specified plastic concrete properties and of not less than the minimum specified compressive strength. Concrete with compressive strength below the minimum specified compressive strength will be investigated in accordance with ALDOT-170 prior to repairing or removing the affected concrete. Should low compressive strength occur consistently, the Materials and Tests Engineer may order corrective action as deemed necessary, without additional cost to the Department.

Where the conditions require the use of low tricalcium aluminate cement, the plans or proposal will designate Type II portland cement. In such case, if requested and approved in writing, Type I or Type I/II portland cement containing a maximum of eight percent

tricalcium aluminate may be used. Should Type III portland cement be permitted, a maximum of eight percent tricalcium aluminate shall still apply.

(d) Sampling and Inspection.

Production of required aggregate gradation in the concrete mixture shall be the Contractor's responsibility.

Cement, aggregates, water, and chemical and mineral admixtures shall be accepted on the basis of requirements currently listed in the Department's Testing Manual.

The Department reserves the right to take samples of aggregates from stockpiles, cementitious materials from storage bins, and chemical admixtures from storage tanks at the mixing or batching plant and to make further tests as needed as the basis for continued acceptance of the materials.

The Contractor shall furnish, without extra compensation, samples of the materials and the concrete mixture for making tests and test specimens as required to comply with the Department's Testing Manual. Additional testing may be required if deemed necessary by the Engineer.

The Contractor shall furnish, without extra compensation, a protected environment for all concrete test cylinders produced incidental to any placement of concrete. This shall be accomplished by supplying a cylinder curing box with a minimum capacity of 22 test cylinders 6" X 12" {150 mm X 300 mm} in size, equipped with heating/cooling capabilities, automatic temperature control, and a maximum/minimum (high/low) temperature readout. The protective environment shall be capable of protecting all specimens within the following specification requirements and it shall be available at each site when concrete is placed and then maintained until such time that all specimens have been transported from the project to the testing facility. The Engineer, prior to beginning any concrete placement, shall approve each protective environment.

Immediately after being struck off, the concrete test specimens shall be moved to the protective environment where they shall remain for an initial curing period of not less than 24 hours or more than 48 hours. During the initial curing period, the specimens shall be stored in a moist environment at a temperature range between 60 °F to 80 °F {16 °C to 27 °C}, preventing any loss of moisture for up to 48 hours. At all times the temperature in and between concrete specimens shall be controlled by shielding the specimens from cooling/heating devices and direct rays of the sun.

A temperature record of the specimens shall be established by means of maximum/minimum (high/low) thermometers supplied by the Contractor. Only plastic molds shall be used for concrete specimens to be immersed in water.

Concrete specimens that are to be transported to the laboratory for standard curing within 48 hours shall remain in the molds in a moist environment, until they are received in the laboratory, removed from molds, and placed in standard curing.

Concrete specimens that are not transported to the laboratory for standard curing within 48 hours shall be removed from the molds within 24 ± 8 hours and standard curing used until transported to the laboratory. During the standard curing period, the specimens shall be stored at a temperature of 73 ± 3 °F { 23 ± 2 °C} using the cylinder curing box defined above. Standard curing shall comply with AASHTO T 23 "Making and Curing Concrete Test Specimens in the Field", Standard Curing section.

501.03 Construction Requirements.

(a) General.

All materials, labor, equipment, tools, and machinery necessary for forming, mixing, placing, finishing, and curing shall be available as required and all necessary equipment for the proper construction and completion of any section of the work shall be in satisfactory working condition before the Contractor will be permitted to start placing concrete.

All concrete batching plants supplying concrete shall be on List I-7, "Portland Cement Concrete Producers", of the MSDSAR manual. The concrete producer shall submit a valid BMT-75 and proof of NRMCA certification to the Division Materials Engineer prior to batching concrete.

All batching plants shall meet the requirements of the Specifications and ALDOT-352. Producers who request that their batching plants be placed on the list of evaluated ready-mix concrete plants will be charged a fee as specified by ALDOT-355, "General Information Concerning Materials, Sources, and Devices with Special Acceptance Requirements".

(b) Equipment.

1. General.

The Contractor shall furnish equipment capable of producing concrete meeting the requirements noted in this Section in sufficient quantities to provide for orderly construction of the project. All equipment must be in good working order and so maintained throughout the requirement for its use.

Specific requirements for certain types of equipment are designated in subsequent items of this Subarticle.

2. Mixing and Transporting Equipment.

Concrete for all major structure work (bridges, culverts, retaining walls, etc.) shall be "ready-mixed" concrete. Ready-mixed concrete is defined as portland cement concrete manufactured for delivery and delivered to the work site in accordance with AASHTO M 157 "Ready-Mixed Concrete" Modified* and the requirements written herein in other parts of these specifications. In case of discrepancy these specifications shall govern.

*Modification of AASHTO M 157 is as follows:

The requirements of Paragraph 8.1 shall include the following: Should this method of measuring fly ash or other cementitious materials cumulatively with cement produce unsatisfactory results, it shall be discontinued and separate scales and hoppers provided for these ingredients.

Concrete for minor structure work (headwalls, inlets, junction boxes, and other miscellaneous individual concrete units requiring three cubic yards {3 cubic meters} or less of concrete, along with such items as slope paving, sidewalks, curbs, gutters, and combinations thereof) may be mixed in mixers as noted above or an approved type of mobile mixing plant designed with separate bins for fine aggregate, coarse aggregate, cement, water, additives, etc. that will automatically proportion all concrete aggregates either by weight {mass} or volume and be capable of combining the ingredients into a uniform mass and discharging such without segregation. It shall have approved equipment that will determine the volume of concrete dispatched. Said alternate type mobile mixing plant shall be capable of providing concrete complying with the mixture design requirements noted in Article 501.02. Prior written approval of such alternate equipment shall be obtained before it is allowed on the project. Basis for this approval will be upon the satisfactory performance of the equipment when checked in accordance with the provisions of AASHTO M 241 "Concrete Made by Volumetric Batching and Continuous Mixing". The costs of all materials and labor furnished to perform the above mentioned test shall be absorbed by the Contractor,

If the Contractor requests to use portable concrete mixers equal or less than 15 cubic feet {0.5 cubic meter}, the Materials and Tests Engineer may approve their use and will furnish written requirements covering such mixers.

All mixing and transporting equipment shall be supplied in sufficient amounts to provide continuous delivery of the concrete as needed for an acceptable, satisfactory operation. The volume of concrete mixed or transported in a concrete truck mixer shall not be less than 15% of the gross volume of the drum.

Concrete transit mixers shall be equipped with either an in-line water meter or a sight gauge to accurately measure the amount of water discharged into the drum. In-line water meters shall be accurate to within $\pm 1.0\%$ of the designated quantity; sight gauges shall be accurate to within ± 1.0 gallon. Water measuring devices shall be considered acceptable if the truck has been certified by NRMCA as part of their Delivery Fleet Inspection. The NRMCA Delivery Fleet Certification Card shall be affixed in a prominent location on the truck, such as the windshield or driver's side door. Trucks shall be recertified annually, in accordance with NRMCA policy. The concrete producer shall maintain a record of their NRMCA certified trucks, available for review by the Department at any time. Additionally, the accuracy of water meters and sight gauges shall be verified in accordance with ALDOT-407, "Verification of Water-Measurement Devices for Concrete Delivery Vehicles".

Each transit mixer shall be equipped with an approved automatic counter that will record the number of drum revolutions regardless of the drum speed.

3. Vibrators.

Vibrators shall be of an approved internal vibrating type and design, unless the Engineer gives special authorization for other types. Vibrators shall be capable of transmitting

vibrations to the concrete at frequencies of not less than 4500 impulses per minute. The Contractor shall provide a sufficient number of vibrators to properly compact each batch immediately after it is placed in the forms. At least one standby vibrating unit in workable order shall be available before the start of any placement of concrete.

(c) Addition of Water at Jobsite.

Field addition of water to concrete shall be allowed only upon arrival of the truck at the jobsite, if slump tests indicate the mix is too stiff. If water is added, the drum shall be turned an additional 30 revolutions prior to discharging any more concrete. In no instance shall the maximum water-cementitious ratio of the mixture design, or the maximum slump be exceeded. Tests for slump, total air content, temperature & compressive strength shall be run after the addition of water at the jobsite, regardless of any previous testing.

(d) Time, Light and Weather Limitations.

1. Time of Hauling and Placing Concrete.

The delivery and placement of ready-mixed concrete shall be completed within the time frames listed in the following table. These times are measured from the time at which water is added to the cement until the time at which placement of the load is completed.

TIME LIMITATIONS FOR THE DELIVERY AND PLACEMENT OF CONCRETE		
Temperature of the Concrete	Mixtures without Retarding Admixtures	Mixtures with Retarding Admixtures
Less than 85 °F {30 °C}	1 Hour	1 Hour and 45 Minutes
85 °F {30 °C} or More	45 Minutes	1 Hour and 15 Minutes

If Type III portland cement is used, the time limits shall be reduced by 15 minutes. If requested, and approved in writing by the Materials and Tests Engineer, a hydration stabilizer can be used to extend the retardation of set time of concrete.

The Materials and Tests Engineer may permit mixing and the adding of the cement and additives at the work site in truck mixers, in order to meet the time limitation requirements.

When a ready-mixed truck is used for concrete delivery, the concrete shall be completely discharged from the mixing drum before the truck mixer has completed 300 revolutions and or before the above time limitations for placement have been exceeded; whichever happens first.

2. Light.

All concrete shall be placed and finished during daylight hours, unless written permission to the contrary is given. Such permission will not be given unless an adequate approved lighting system is available for all operations after sundown.

3. Weather.

a. General.

The temperature of the concrete, at the time of placing in the forms shall not be less than 50 °F {10 °C} nor more than 95 °F {35 °C}, except that for bridge deck slabs the temperature of the concrete at the time of placing shall not be more than 90 °F {32 °C}, unless otherwise provided or directed.

b. Cold Weather Operations.

No concrete shall be placed when the ambient air temperature is below 40 °F {5 °C} without written permission of the Engineer. If the Contractor proposes to place concrete during seasons when there is a probability of temperatures lower than 40 °F {5 °C}, the Contractor shall have available on the project such suitable approved equipment and materials as necessary to enclose the uncured concrete and keep the air temperature inside the enclosure within the following ranges and for the minimum times noted hereinafter.

If there are indications there will be temperatures below 40 °F {5 °C} during the first three days after placement of concrete, it shall be protected from cold temperatures by keeping the surface at a temperature above 50 °F {10 °C} for the first 72 hours after placement and above 32 °F {0 °C} an additional 72 hours. However, the

protective covering shall be retained in place until the temperature inside the protective covering reaches that of the surrounding atmosphere.

When the Contractor is permitted to place concrete at temperatures below 40 °F {5 °C}, the aggregates and/or mixing water shall be heated as necessary to keep the temperature of the plastic concrete above 50 °F {10 °C} from the time of placement to the time of initial set; however, in no case shall the materials be heated in excess of 150 °F {65 °C}, nor shall aggregates from frozen stockpiles be incorporated into the mixture. Materials entering the mixer shall be free from ice, snow, or frozen lumps. Salts, chemicals, or other materials shall not be incorporated in the concrete to prevent freezing. Care shall be taken to heat all materials uniformly and avoid hot spots that will burn or overheat the materials.

The Contractor shall assume all risk and added cost connected with mixing, placing and protecting of concrete during cold weather. Permission given by the Engineer to place concrete during such time will in no way relieve the Contractor of responsibility for satisfactory results. Should it be determined at any time that concrete placed under such conditions is found to be unsatisfactory, it shall be removed and replaced with satisfactory concrete by the Contractor without extra compensation.

c. Hot Weather Operations.

The following hot weather operations practices shall be followed for all concreting done between June 1 and September 15 of each year, and any other time when the temperature of the concrete may be above 95 °F {35 °C} or 90 °F {32 °C} for bridge deck slabs.

The Contractor shall submit in writing a proposed plan for controlling the concrete mixture temperature during hot weather operations. The hot weather concrete plan shall outline the Contractor's procedures to maintain the temperature of the concrete at or below the temperature requirements noted above, and the Contractor's procedures for transporting, handling, placing, finishing, and curing concrete during hot weather. The hot weather concrete plan shall be submitted at the pre-construction conference to the Division Materials Engineer for approval before any concrete placement is allowed.

During hot weather operations an approved retarder admixture shall be used in the concrete mixture, and the concrete shall be properly placed and finished with the procedures previously submitted by the Contractor. Cooling of the mixing water and/or aggregates or placement during the cooler part of the day may be required to meet the above maximum temperature requirements. In no instance shall a concrete bridge deck slab mixture be placed when the temperature of the plastic concrete is above 90 °F {32 °C}. When the temperature of the steel is greater than 120 °F {50 °C}, the steel forms and reinforcement steel shall be cooled prior to concrete placement. Conveying and placing equipment shall be cooled if necessary to maintain proper concrete placing temperature.

(e) Handling and Placing Concrete.

1. General.

In preparation for the placing of concrete, all sawdust, chips, and other construction debris and extraneous matter shall be removed from the interior of forms. Temporary struts, stays, or braces serving to hold the forms in place until the concrete is placed shall be removed prior to being encased in the concrete. All permanent struts, stays, or braces shall be precast concrete struts or, at the Contractor's option, approved steel struts; no wooden struts shall be permitted.

During the placing of concrete, the Contractor shall continuously check the alignment of forms and immediately correct any yielding of the forms or falsework.

Concrete shall be deposited continuously for each monolithic section of the work by placing the fresh concrete in horizontal layers of approximately 12 inches {300 mm} in thickness. Each additional layer shall be placed and compacted before the preceding layer has taken its initial set, 45 minutes for mixtures without retarder and 60 minutes for mixtures with retarder.

For vertical members the maximum height of concrete placement shall not exceed 20 feet {6 m}, except for underwater concrete or when steel forms are used. When structurally sound steel forms are used, concrete placement may be made up to 30 feet {9 m} in height

provided that an approved mortar tight downspout of sufficient length to reach within 5 feet {1.5 m} of the bottom of the placed concrete and a vibrator of sufficient length to provide good consolidation throughout the concrete placement are used. Any vertical member exceeding 20 feet {6 m} in height shall be broken into two or more approximately equal concrete placements unless the preceding requirements are met.

When succeeding concrete placements are necessary, the next concrete placement will not be permitted until the concrete in the underlying placed concrete has aged at least 12 hours or attained a minimum compressive strength of 2400 psi {17 MPa} from cylinders prepared in conformity with AASHTO T 23. When a set retarding admixture is used in the preceding concrete placement, the next concrete placement shall not be permitted until a 2400 psi {17 MPa} cylinder strength is attained.

The forms shall not be jarred nor shall any strain be placed on reinforcing bars partially encased in concrete that will cause damage to bond. All accumulations of mortar splashed on the reinforcing steel and surfaces of forms shall be removed before the next concrete placement.

When it is necessary to pump water from the excavation during placing of concrete to deposit the concrete in the dry, the sump for the intake hose shall be located outside the forms.

The use of aluminum pipes, chutes, or other devices made of aluminum that come into direct contact with the concrete shall not be utilized in the handling and placing operations.

a. Use of Chutes, Pipes or Belts.

Concrete shall not be dropped a distance of more than 5 feet {1.5 m} unless confined in an approved mortar tight downspout of not less than 4 inches {100 mm} in diameter. Downspouts shall be equipped with suitable hoppers at their inlet end and shall be provided in sectional lengths that will permit adjustment of the level of the outlet during placement.

The number of downspouts furnished shall be sufficient to ensure the concrete placement in horizontal layers. Depositing large quantities of concrete at one point in the form and running, flowing, or working the concrete along the forms will not be permitted.

In wall sections where a 4 inch {100 mm} downspout cannot be utilized without displacing the reinforcing steel, the concrete may be dropped in excess of the 5 feet {1.5 m} previously noted, provided such does not displace the reinforcing steel nor produce segregation of the concrete.

(1) Chutes, pipes, or power belts may be used to convey concrete from the concrete mixer or transporting vehicle to the forms, and they shall convey it to its final position without segregation and without displacing the reinforcing steel. If the use of this equipment results in honeycombed or otherwise substandard concrete, the Engineer will require it to be changed or its use discontinued.

(2) Chutes, pipes, and power belts shall be flushed with water after each run and this water shall be discharged free of the freshly placed concrete. All hardened concrete shall be promptly removed.

b. Pumping.

Direct placement of concrete by an approved pumping device will be permitted. The equipment shall be so arranged that no vibration result that might damage freshly placed concrete. The operation of the pump shall be such that a continuous stream of concrete without air pockets is produced. When pumping is completed, the concrete remaining in the pipeline, if it is to be used, shall be ejected in such a manner that there will be no contamination of the concrete or separation of the ingredients. After each placement the equipment shall be cleaned to prevent improper results on subsequent operations.

c. Compacting and Vibrating.

Concrete, except underwater concrete, shall be thoroughly compacted by mechanical vibration applied internally, during, and immediately after depositing.

The application of a vibrator or vibrators shall be at points uniformly spaced and not farther apart than twice the radius over which the vibration is visibly effective. Vibrators shall be manipulated so as to thoroughly work the concrete around the reinforcement

and embedded fixtures and into the corners and angles of the forms. Vibration shall be supplemented by as much spading as is necessary to ensure smooth surfaces and dense concrete.

The vibrators shall be methodically inserted and withdrawn from the concrete. The vibration shall be of sufficient duration and intensity to thoroughly compact the concrete, but vibrators shall be withdrawn before segregation and localized areas of grout result.

Vibration shall not be applied directly or through reinforcement to sections or layers of concrete that have hardened to the degree that the concrete ceases to be plastic under vibration. Vibrators shall not be used to make concrete flow in the forms over distances so great as to cause segregation.

2. Culverts.

See Section 524 for specific details not covered in this Section.

3. Retaining Walls.

See Section 529 for specific details not covered in this Section.

4. Bridges.

See Section 510 for specific details not covered in this Section.

5. Depositing Concrete under Water.

a. General.

Concrete shall not be deposited in water unless provided for on the plans, or authorized as provided in Subarticle 503.03(g). Concrete placed under water shall be placed as hereinafter provided.

b. Control.

Seal concrete shall be placed continuously from start to finish ensuring the concrete placement being monolithic. The surface of the concrete shall be kept as nearly horizontal as practicable at all times. To ensure bonding, each succeeding layer of seal or foundation concrete shall be placed before the preceding layer has initially hardened. All laitance or other foreign matter shall be removed from the top surface of the concrete, and bonding of construction joints performed in accordance with the requirements given elsewhere in this Section.

c. Placing Methods.

Concrete specified to be deposited in water shall be seal concrete as provided in Article 501.02. To prevent segregation, it shall be carefully placed in a compact mass in its final position by means of a tremie, a bottom dump bucket, pumping, or other approved method. Concrete shall not be disturbed after being deposited. Still water shall be maintained at the point of deposit as nearly as practical.

(1) Use of Tremie.

A tremie shall consist of a rigid, watertight tube of sufficient strength to withstand the stress to which it is subjected and be at least 8 inches {200 mm} in diameter. The tremie shall be supported so as to permit rapid lowering when necessary to retard or stop the flow of concrete. The tremie shall be plugged at the start of work with an approved device capable of separating the concrete from the water until the tube is filled with concrete. The tremie tube shall be kept partially filled with concrete at all times during the concrete placement. When a batch is dumped into the hopper, the flow of concrete shall be induced by slightly raising the tremie, always keeping the discharge end in the deposited concrete. The flow shall be as nearly continuous as possible and in no case shall it be intentionally interrupted until the entire seal concrete foundation work is completed.

(2) Use of Bottom Dump Bucket.

The bottom dump bucket shall have a capacity of not less than 0.5 cubic yards {0.5 m³} and be mechanically equipped to prevent dumping until it rests on the foundation or previously placed concrete. The bucket shall be completely filled and lowered very carefully until it rests upon the foundation or concrete already placed so as not to get a wash over the bucket top. It shall then be raised very slowly during the discharge travel, the intent being to maintain as nearly as possible, still

water at the point of discharge and to avoid agitating the mixture; also to allow the concrete to be deposited by the time the bucket emerges from the concrete already on the foundation.

(3) Pumping.

In addition to the requirements given elsewhere in this Section, the following shall also apply for placing concrete under water by pumping. Concrete may be pumped into a tremie, or directly to the point of placement. If the concrete is pumped directly to the point of placement, a rigid pipe shall be provided that must extend a minimum of 5 feet {1.5 m} above the water level when resting on the bottom of the excavation. A flexible hose suitable for pumping concrete may be used from the top of the rigid pipe to the concrete pump. The method of placing and handling the concrete shall be as described elsewhere in this Section.

(f) Construction Joints.

1. General.

Construction joints shall be placed only at the locations shown on the plans or as directed. In case of an emergency, if a construction joint is permitted, it shall be placed as approved by the Engineer.

2. Horizontal Joints.

Generally, horizontal joints shall be made by placing the concrete slightly above the grade of the construction joint, and after the surface has reached its final set, the surface shall be prepared as outlined in Item 4 below. Insert formwork shall be used to obtain neat, horizontal lines.

3. Vertical Joints.

Vertical joints shall be formed with substantial bulkheads or headers as required. Feather-edged joints will not be permitted.

4. Bonding.

Before placing concrete against any construction joint, the surface of the hardened concrete shall be scarified in such a manner that all foreign matter, laitance, and loose material is removed to expose sound concrete. The prepared concrete at the construction joint shall be kept wet for a minimum of one hour prior to placing concrete against it. An approved epoxy, listed in the MSDSAR manual, List II-7, "Epoxy Resin Systems for Use with Portland Cement Concrete", shall be placed for bonding freshly mixed concrete to hardened concrete. Keyways and dowels shall be placed as shown on the plans or directed.

5. Water Stops.

Water stops shall be furnished and placed as required by the plans. They shall form continuous watertight joints.

(g) Expansion Joints.

All joints shall be constructed according to details shown on the plans, providing the design width designated for the expansion joint. The insertion and removal of joint forming material shall be accomplished without chipping or breaking the corners of the concrete. Expansion material, when required, shall be placed as shown on the plans.

(h) Forms.

1. General.

Reference is made to Article 105.02 concerning working drawings and other details that require submission.

Forms shall be substantial and unyielding and so designed and constructed that the finished concrete will conform to the plan dimensions and contours within tolerances listed in other portions of these Specifications.

Basic bridge plan design is for removable forms and plan concrete quantities computed accordingly. Hence, removable forms are to be used unless stay-in-place forms are allowed by contract plan notes and details. When shown by contract plan details, the Contractor will be allowed the option of using permanent steel forms under deck slabs between girders, beams or stringers provided the cost of extra concrete and materials required by this type of form is at the Contractor's expense.

2. Design.

a. Removable Forms.

All removable forms shall be designed so that they may be removed without damage to the concrete. Forms shall be so constructed that portions where finishing is required can be removed for that purpose without loosening supports or disturbing portions of forms that must still remain in place.

b. Permanent Steel Bridge Deck Forms.

The forms and supports shall be zinc coated (Galvanized) steel conforming to ASTM A 653 with coating Class of G165 according to ASTM A 525 and shall otherwise meet all requirements relevant to permanent steel forms and the placing of concrete as specified herein and as noted on the plans. Miscellaneous fastener hardware (bolts, nuts, metal screws, and washers) shall be common stock hardware items galvanized to provide a zinc coating equal to or better than that required by ASTM B 633.

The following criteria shall govern the design of permanent steel bridge deck forms:

- (1) The steel forms shall be designed on the basis of dead load of form, reinforcement, and plastic concrete plus 50 pounds per square foot {2.4 kN/m²} for construction loads. The unit working stress in the steel shall not be more than 0.725 of the specified minimum yield strength of the material furnished, but not to exceed 36,000 pounds per square inch {250 MPa}. The uncoated thickness of the forms shall not be thinner than 0.0359 inch {0.9 mm}.
- (2) Deflection under the weight {mass} of the forms, the plastic concrete, and reinforcement shall not exceed 1/180 of the form span or 0.5 inches {13 mm}, whichever is less, but in no case shall this loading be less than 120 pounds per square foot {5.7 kN/m²} total.

The permissible form camber shall be based on the actual dead load condition. Camber shall not be used to compensate for deflection in excess of the foregoing limits.

- (3) The design span of the form sheets shall be the clear span of the form plus 2 inches {50 mm} measured parallel to the form flutes.
- (4) Physical design properties shall be computed in accordance with requirements of the American Iron and Steel Institute Specification for the Design of Cold Formed Steel Structural Members, latest published edition.
- (5) The plan dimensions of both layers of primary deck reinforcement from the top surface of the concrete deck shall be maintained. A minimum concrete cover of 1 inch {25 mm} shall be maintained for the bottom slab steel.
- (6) Forms shall not be welded to any part of the structural steel main members (the definition of "main members" is given in Section 836. The installation of forms may be done by welding attachment straps together if backing plates are installed under the straps. The backing plates shall be thick enough to prevent burn-through. The width of the backing plates shall be at least one inch wider than the width of the welded attachment straps so that the backing plates extend out at least one half inch beyond each edge of the welded straps.

3. Construction.

a. Removable Forms.

(1) Forms shall be mortar tight and placed and maintained true to designated lines and grades until the concrete has been placed and hardened. Forms found unsatisfactory in any respect shall not be used and, if rejected, shall be removed from the immediate work site.

(2) All moldings, panel work, and bevel strips shall be straight and true with neatly mitered joints and all corners in the finished work shall be true, sharp, and clean cut and of good workmanship. Forms shall be filleted and chamfered at all sharp corners except where angles exceed 90°, such as at the face of bridge curbs and deck overhangs. Unless otherwise shown on the plans, the equal sides on triangular molding or chamfer shall be 0.75 inches {19 mm}, except that for small members the width shall be 0.5 inches {13 mm}.

(3) For narrow walls, columns, et cetera, the Engineer may require daylight and inspection holes at vertical intervals as directed.

(4) Bolts or ties shall be used to prevent forms from spreading. All such bolts or ties shall be arranged so that at least 1 inch {25 mm} of that part adjacent to the concrete surface can be removed or broken off.

(5) Anchor devices may be cast in the concrete for later use in supporting forms only if they are detailed on approved formwork or falsework plans.

(6) The inside of all forms shall be coated with a non-staining oil or other approved material to prevent the concrete adhering to them. Extreme care shall be exercised to ensure that form oil does not come in contact with structural or reinforcing steel.

(7) The forms shall be inspected before placing the concrete and the interior dimensions carefully checked to ensure that the concrete will be of the form and dimensions shown on the plans. The inside faces of the form shall be thoroughly examined and any projections, ridges, depressions, offsets, spaces or other unevenness corrected so that the surface of the concrete will be smooth, even and true, and mortar tight. All forms shall be wetted immediately prior to placing the concrete, but no excess water shall remain in the forms.

(8) To permit proper surface finishing, forms shall be removed as soon after the concrete has set as is practicable and safe. In the determination of the time for the removal of forms, except those listed elsewhere in this Section, consideration shall be given to the location and character of the structure, the weather and other conditions influencing the setting of the concrete, and the material used in the mixture. Methods of form removal likely to cause over-stressing of the concrete shall not be used. Forms shall not be removed without the approval of the Engineer.

b. Permanent Steel Bridge Deck Forms.

- (1) All forms shall be installed in a manner acceptable to the Engineer.

(2) On steel members, form sheets will not be permitted to rest directly on the top of the stringer or floor beam flanges. Sheets shall be securely fastened to form supports and shall have a minimum bearing length of 1 inch {25 mm} at each end. Form supports shall be placed in direct contact with the flange of stringer or floor beam. The installation of attachment straps, shelf angles, and forms shall be carefully monitored to make sure that no welding (weld, arc strike, etc.) is done to the structural steel.

On concrete girders, form supports to be cast into the girders shall be shown on the shop drawings. All attachments to form supports shall be made by permissible welds, bolts, clips, or other approved means. Attachment by welding to form supports may be performed by non-ALDOT qualified welders with welding electrodes recommended by the form manufacturer.

All form welds shall be cleaned of slag and wire brushed just prior to placing of the deck concrete.

(3) Any permanently exposed form metal where the galvanized coating has been damaged shall be thoroughly cleaned, wire brushed, and painted with two coats zinc oxide-zinc dust primer, Federal Specification TT-P-641, Type II, no color added, to the satisfaction of the Engineer. Minor heat discoloration in areas of welds need not be touched up.

(4) Transverse construction joints shall be located at the bottom of a flute and 0.375 inch {10 mm} weep holes shall be field drilled at not more than 12 inches {300 mm} apart along the line of the joint. If a bridge is on a skew, or in a curve, a weep hole shall be drilled in the bottom of each flute the joint crosses.

(i) Falsework.

1. Design and Construction.

a. General.

For the purpose of this specification, falsework shall be divided into two classes as follows:

Class 1 - Common or simple falsework such as temporary bracing to provide stability for bridge girders, permanent steel bridge deck forms, deck overhang supports, screed rail support systems, or substructure supports attached to permanent parts of the structure (i.e. drilled shafts, columns, caps, etc.).

Class 2 - Unique or complex falsework such as that required for box girder construction, RCDG construction, structural cofferdams, or any falsework used in connection with steel erection.

The Contractor shall be responsible for designing and constructing safe and adequate falsework which provides the necessary strength and rigidity, supports all loads imposed, and produces a finished structure with lines and grades shown on the plans. Falsework shall be designed and constructed to withstand all imposed loads during erection, construction, usage, and removal.

The Contractor shall submit to the Construction Engineer working drawings and design calculations for falsework in accordance with Article 105.02.

For both classes of falsework drawings, the Construction Engineer will verify that the licensed Professional Engineer signature and stamp requirements of Subarticle 105.02(d) are met. Class 1 drawings will be stamped for distribution and then distributed. Class 2 drawings will be forwarded to the Bridge Engineer for review to determine if the results of the licensed Professional Engineer's calculations are in compliance with design criteria. If the design criteria are met, the submittal will be returned to the Construction Engineer to be stamped for distribution and then distributed.

All falsework will be inspected by the Project Manager using the distributed drawings. For all Class 2 falsework, the licensed Professional Engineer who signed the falsework submittal shall verify that the falsework as constructed meets all design criteria prior to any load being placed thereon. A signed statement from the licensed Professional Engineer covering the verification shall be furnished to the Project Manager by the Contractor.

When falsework of either class is to be used over highway, pedestrian, or railroad traffic, additional details will be required to provide for special protection to prevent debris from falling on the traffic below. These additional details will be required for both removal and construction work.

All falsework drawings shall include a description and size of all members, connections, and miscellaneous hardware. When pre-manufactured assemblies are used, all parts shall be easily identified as those shown on the drawings.

All falsework shall be designed and constructed to provide the necessary rigidity and to support the loads without appreciable settlement or deformation. Screw jacks and/or hardwood wedges shall be used to take up any settlement in the formwork either before or during the placing of concrete.

Any part of the permanent structure to which falsework will be attached shall attain a minimum compressive strength of 2400 psi {17 MPa} from cylinders prepared in conformity with AASHTO T 23 prior to the attachment.

Falsework that cannot be founded on a satisfactory footing shall be supported on piling, which shall be spaced, driven, and removed in an approved manner.

All spans shall be given a temporary camber to allow for deflection, shrinkage, and settlement. Bridges shall have a permanent camber only where so shown on the plans or directed.

b. Design Criteria.

Falsework shall be designed to withstand all imposed loads during erection, construction, usage, and removal. Designs shall be based on minimum loads, maximum stresses and deflections, and conditions in the following paragraphs. Allowable stresses are based on use of undamaged, high quality materials. The contractor shall reduce stresses if lesser quality materials are used.

Design Loads for falsework shall consist of the sum of dead and live vertical loads and assumed horizontal loads. Minimum total design load for any falsework shall not be less than 100 pounds per square foot {4.8 kN/m²} for the combined live and dead load regardless of slab thickness.

Dead Loads shall include weight {mass} of concrete, reinforcing steel, forms, and falsework. Weight {mass} of concrete, reinforcing steel, and forms shall not be assumed to be less than 160 pounds per cubic foot {25 kN/m³}.

Live Loads shall consist of the actual weight {mass} of any equipment to be supported by falsework applied as concentrated loads at the points of contact and a uniform load of not less than 20 pounds per square foot {0.960 kN/m²} applied over the area supported plus 75 pounds per linear foot {1.1 kN/m} applied at the outside edge of deck overhangs.

Horizontal Loads applied shall be the sum of the actual horizontal loads due to equipment, construction sequence, or other causes and an allowance for wind, but in no case shall the design horizontal load to be resisted in any direction be less than two percent of the total dead load. Falsework shall be designed of sufficient rigidity to resist the design horizontal load prior to placement of concrete.

Falsework Foundations shall be designed to carry the loads imposed on them without exceeding allowable soil bearing values and anticipated settlements.

Maximum allowable stresses, loadings, and deflections used in design of falsework shall be as follows:

TIMBER	
Compression perpendicular to the grain (Dense Select Structural Grade Southern Pine)	450 psi {3 MPa}
Compression parallel to the grain but not to exceed 1600 psi {11 MPa}	$480,000/(L/D)^2$ psi { $3300/(L/D)^2$ MPa}
Flexural stress reduced to 1500 psi {10 MPa} for members with a nominal depth of 8 inches {200 mm} or less.	1800 psi {12 MPa}
Horizontal shear (Dense Select Structural Grade Southern Pine)	90 psi {0.620 MPa}
Deflection due to weight {mass} of concrete.	1/240 of clear span irrespective of the fact that the deflection may be compensated for by camber strips.
Timber piles, maximum loading (12 inch {300 mm} Butt Diameter)	24 tons {213 kN}

STEEL	
Deflection due to weight {mass} of concrete irrespective of the fact that the deflection may be compensated for by camber strips.	1/240 of clear span
Stresses shall not exceed those specified in the Manual of Steel Construction as published by the AISC. When the grade of the steel cannot be positively identified, design stresses shall conform to either those specified in said AISC Manual for ASTM A 36 steel or the following:	
Tension, axial and flexural.	22,000 psi {152 MPa}
Compression, flexural (But not to exceed 22,000 psi {152 MPa})	$12,000,000 / (LD/bt)$ psi { $83\ 000 / (LD/bt)$ MPa}
Compression, axial. (Except L/r shall not exceed 120.)	$16,000 - 0.38(L/r)^2$ psi { $110 - 0.38(L/r)^2$ MPa}
Shear on gross section of the web of rolled shapes.	14,500 psi {100 MPa}
Web crippling for rolled shapes	27,000 psi {186 MPa}

In the foregoing formulas, L is the unsupported member length, D is the least dimension of rectangular columns, or the width of a square or equivalent cross sectional area for round columns, or the depth of beam, b is the width of member, t is the thickness of the compression flange and r is the radius of gyration of the member. E, modulus of elasticity, used for timber shall be 1.6×10^6 psi {11 GPa} and for steel shall be 30×10^6 psi {200 GPa}.

Any additional design criteria, which may be needed, shall be developed by the Contractor's licensed Professional Engineer designer and included with the calculations of the falsework submittal.

Falsework over or adjacent to roadways or railroads which are open to traffic during construction shall be designed and constructed such that it is stable if subjected to vehicular impact or features shall be provided to protect falsework supports from vehicular impact. Protection shall be designed such that it does not present a hazard to vehicular traffic.

Design criteria for permanent steel bridge deck forms shall be as shown elsewhere in this Section.

2. Removal of Falsework.

No falsework supporting concrete shall be removed or wedges loosened without the consent of the Engineer.

If adequate test cylinders have been made, falsework may be removed when the cylinders indicate that the concrete has developed a minimum compressive strength of 2400 psi {17 MPa}, otherwise falsework shall be removed according to the following time limitations.

Falsework may be removed after expiration of 14 days exclusive of days when for four hours or more the temperature is below 40 °F {5 °C}. Falsework under slabs of less than 6 foot {2 m} span may be removed after seven days with the same temperature limitations.

Falsework shall be gradually and uniformly released in such a manner as to avoid injurious stresses in any part of the structure. Wedges shall be removed first under slabs and transverse beams, starting at the center of the span and working both ways; then wedges under longitudinal girders and beams shall be removed also starting at the center of the span and working both ways simultaneously.

All falsework piles, at the time of removal or cleanup, shall be pulled out or cut off at an elevation not more than 6 inches {150 mm} above the bed of the stream. Piles not in water shall be removed or cut off flush with or below the ground surface of stream bed. Piles within roadbed limits shall be cut off at least 3 feet {1 m} below subgrade elevation. Other piles within roadway limits shall be cut off at least 12 inches {300 mm} below the finished surface of the front slope, ditch, or backslope.

(j) Curing Concrete.

1. Exposed Surfaces.

Whenever the Engineer determines that weather conditions are such that evaporation from the surface may cause shrinkage cracking, a fog or mist spray may be required at intervals as needed during and after finishing until curing material can be applied so that the surface will be at all times damp but not excessively wet.

The Contractor shall give careful attention to the proper curing of the concrete. All surfaces not covered by forms shall be protected with an approved membrane curing compound, from List II-30 of the MSDSAR manual, dampened burlap, Polyethylene Film* (White Opaque), White Burlap -Polyethylene Sheet*, cotton mats, or wetted sand, as soon after placing the concrete as possible without marring the surface, except for bridge deck slabs which shall be treated as noted in Item 2 below. Immediately upon removal of forms, other surfaces shall be treated by one of the approved curing methods.

Unless membrane curing compound is used, all curing materials shall be kept wet and shall remain in place for seven days, except that small portions may be temporarily removed during actual finishing operations.

*NOTE: When polyethylene film or white burlap-polyethylene sheeting is used, it shall be installed and maintained in such a manner that a complete, moisture-tight enclosure over the surface to be cured will be provided. These materials shall meet the requirements noted in Section 830.

2. Bridge Deck Slabs.

a. General.

Prior to placing a bridge deck slab, the evaporation rate shall be determined by use of the graph in Figure 1, "Evaporation Rate of Surface Moisture", and recorded on form BMT-171, "Evaporation Rate Record". The Contractor shall furnish the equipment necessary to measure the air temperature (ambient), wind velocity, and humidity. The equipment or a manufacturer's certificate of calibration showing the equipment's model number and serial number shall be submitted to the Division Materials Engineer no less than 14 days prior to their use. The equipment shall consist of the following instruments with the following specifications.

1. Anemometer: Range - 0-25mph {0-40 km/hr}.
Accuracy - plus or minus 1.5%.
Units - U.S. Customary and Metric.
2. Hygrometer: Range - 10-95% relative humidity.
Accuracy - plus or minus 1.5%.
Units - U.S. Customary and Metric.
Certified and traceable to N.I.S.T.
3. Thermometer: range - 0-140 °F {0-60 °C}.
Accuracy - plus or minus 2 °F {plus or minus 1 °C}
Units - U.S. Customary and Metric.

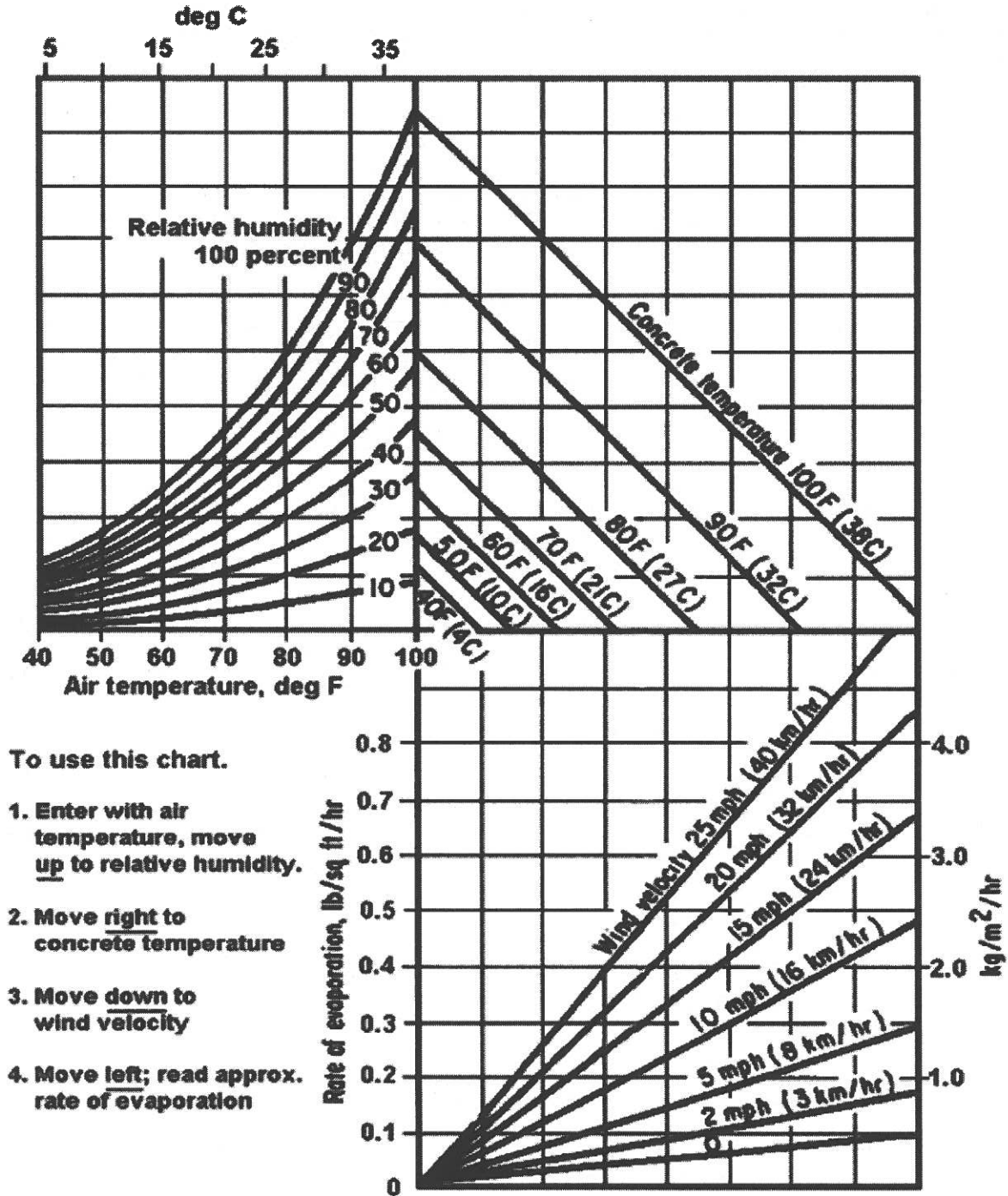
Combination instruments such as anemometer and thermometer or hygrometer and thermometer will be accepted provided they meet the above requirements.

If the placement is expected to last more than two hours, the evaporation rate shall be checked and recorded on form BMT-171 at two-hour intervals or less. To prevent plastic shrinkage cracking, the expected evaporation rate shall not exceed 0.2 pounds per square foot per hour {1.0 kg/m²/hour}. When the evaporation rate exceeds this amount, the Contractor shall be required to effectively reduce the rate to within the allowable limits by taking one or more of the following actions:

- (1) Construct windbreaks or enclosures to effectively reduce the wind velocity throughout the area of placement.
- (2) Use fog sprayers or sprinklers upwind of the placement operation to effectively increase the relative humidity.
- (3) Reduce the temperature of the concrete.

The Department will evaluate plastic shrinkage cracks that occur. Remedial measures shall be performed as directed by the Engineer. Plastic shrinkage cracks shall never be troweled over or filled with slurry.

FIGURE 1. Evaporation Rate of Surface Moisture



b. Evaporation Control After Screeding.

Continuous fogging or an evaporation barrier (monomolecular) material shall be used for all bridge deck curing beginning immediately after the screeding operations have been completed for sections of the deck not to exceed five feet from the starting location.

If fogging is to be used, a continuous fog or mist spray shall be maintained until the moist curing procedures described elsewhere in this Section begin. Intermittent fogging is not acceptable if there is drying of the concrete surface. If water begins to pond on the deck, the Contractor shall adjust the rate of fogging to minimize the ponding of water.

If an evaporation barrier material is to be used, it shall be applied immediately behind the screeding operation and in accordance with the manufacturer's recommendations. The

entire top portion of the concrete slab shall be covered with the barrier material applied under pressure at a rate of one gallon {liter} to not more than 200 square feet {5 m²} of fresh concrete. Application shall be done with an industrial type sprayer in such a manner as to cover the surface being treated with a uniform film.

c. Moist Curing After Finishing.

Immediately after the finishing operation, concrete bridge decks shall be moist cured for seven days by maintaining a moist condition for the entire curing period. This may be accomplished by one of the following methods:

(1) Fog spraying or sprinkling with nozzles or sprinklers. When using this method, the Contractor shall maintain a complete and continuous moist condition of the concrete surface. Intermittent sprinkling is not acceptable. Care shall be taken that erosion of the surface does not occur.

(2) Saturated burlap, saturated plastic coated burlap, or cotton mats. These curing materials shall be clean and free from any injurious substances that can cause deleterious effects to the concrete or cause discoloration. The burlap or cotton shall be completely saturated before being placed on the concrete and shall be maintained in that condition for the entire curing period. Should tears or holes appear in the mat sheets, they shall be repaired immediately. All edges of burlaps and mats shall extend at least 18 inches {450 mm} beyond the concrete surface. Where two individual sheets join, their edges shall overlap at least 12 inches {300 mm}. All edges and overlaps shall be secured to ensure that the concrete surface is completely covered during the entire curing period. These curing materials shall be kept in contact with the concrete surface at all times. Alternate cycles of wetting and drying shall be avoided because this may result in pattern cracking.

Prior to the start of the curing operation, the contractor shall have an approved curing system that ensures continuous moist curing of the concrete for 24 hours per day.

If water or the chosen curing material stains or discolors concrete surfaces, which are permanently exposed, the contractor shall be responsible for cleaning the surfaces. When wooden forms are left in place during curing, they shall be kept wet at all times. If steel forms are used in hot weather, non-supporting vertical forms shall be broken loose from the concrete and curing water continually applied in this void. If the forms are removed before the end of the curing period, curing shall be carried out as on unformed surfaces.

3. PROTECTION OF CONCRETE DURING CURING.

Green concrete shall be protected against jarring or other movement that might cause damage. No traffic or other superimposed load will be permitted over bridges or culverts until the following criteria have been met:

(1) Bridges - The deck concrete shall have reached a minimum 4000 psi {28 MPa} compressive strength as determined from test cylinders.

(2) Culverts - The culvert concrete shall have reached a minimum of 4000 psi {21 MPa} compressive strength as determined from test cylinders or 28 days have passed since the last concrete was placed exclusive of days when for 4 hours or more the temperature is below 40 °F {5 °C}.

(k) FINISHING CONCRETE.

1. GENERAL.

The details set forth hereinafter in this Subarticle cover the requirements for the several classes of surface finishes which shall be applied to the various parts of concrete structures.

These various classes of surface finishing will be used in accordance with the following:

Class 1 - required on all concrete surfaces except wearing surfaces and surfaces placed in direct contact with natural ground or embankment.

Class 2 - required on all exposed concrete surfaces within the requirements noted elsewhere in this Section unless another class is specified.

Class 3 - may be used on designated bridge structures when specified by plan details.

Wearing surface finish for bridge deck travelway shall be as specified in Subitem 510.03(c)6.c. and for sidewalks as specified in Item 510.03(c)7.

Exposed surfaces or sidewalks, driveways, curbs, and gutters shall have a textured finish obtained by the use of a burlap or cotton drag, brush, or broom so that a uniform gritty texture is obtained. Exposed surfaces of concrete flumes and slope paving shall have a float finish.

2. CLASS 1 FINISH (ORDINARY SURFACE FINISH).

This class finish will require the concrete surface to be free from objectionable projections, swells, fins, ridges, depressions, waves, holes, and other defects. This will require that immediately after the forms are removed, metal ties shall be removed for a minimum depth of 1 inch {25 mm} from the face of the concrete. All cavities or depressions resulting from this removal, or from other causes, shall be carefully filled and pointed with a mortar of sand and cement, and the surface left smooth and even. The proportion of cement to sand, measured by volume, shall be one to two unless otherwise specified. The surface film of all pointed areas shall be carefully removed before setting occurs. Any fins, ridges, or projections shall be struck off smooth with the surface of the concrete. Particular care shall be taken throughout the progress of this operation to use one of the curing methods covered elsewhere in this Section.

If a Coated Surface Finish is to be applied in a later finishing operation, the coating material may be used in lieu of mortar to fill small air holes in the concrete surface; however, this must be given time to take a set prior to applying the Coated Surface Finish.

3. CLASS 2 SURFACE FINISH.

a. General.

This class surface finish requires that, in addition to a Class 1 finish, the exposed surfaces of bridges, culverts, headwalls, inlets, etc. as defined in the Subitem d. below, receive an additional surface finish in accordance with the following:

If only one brand and type of cement from the same mill is used in a structure or unit (substructure or superstructure), the Contractor may elect to either apply a Rubbed Surface Finish or apply an approved coated Surface Finish.

If more than one brand of cement is used in a structure, the Contractor shall apply a Coated Surface Finish.

The same type of surface finish shall be used throughout the entire structure unless otherwise authorized in writing by the Engineer.

b. Rubbed Surface Finish.

As soon as the Class 1 surface finish has been completed and the pointing has set sufficiently to permit it, the entire surface except chamfers shall be wetted with a brush and rubbed with a No. 16 carborundum stone or an abrasive of equal quality, bringing the surface to a paste. The rubbing shall be continued sufficiently to remove all form marks and projections, producing a smooth dense surface without pits or irregularities. The material, which in the above process has been ground to a paste, shall then be carefully spread or brushed uniformly over the entire surface and allowed to take a reset. Curing shall continue on this surface as noted to be required elsewhere in this Section.

The final finish shall be obtained by a complete rubbing with a No. 30 carborundum stone or an abrasive of equal quality. This rubbing shall continue until the entire surface is of a smooth texture and uniform in color.

c. Coated Surface Finish.

Only Departmental approved coated finishing materials may be used. The coating material shall be one of the coating materials shown on List III-3, "Surface Coatings for Portland Cement Concrete". This list is given in the Department's Manual, "Materials, Sources, and Devices with Special Acceptance Requirements".

The application of the coating shall be in an approved manner (normally in accordance with the manufacturer's recommendations) by competent and experienced personnel. The overall coated finish shall be uniform in coverage, texture, and color after the coating material has taken set and cured. Failure to obtain uniformity of coverage, texture, and color shall be cause for the Engineer to require such remedial action as deemed necessary to obtain the desired results.

The following actions shall be taken before the application of any coated finish:

A Class 1 surface finish applied and all pointing completely set.

Surface clean and free from foreign matter.

If membrane curing compound was used to cure the concrete, the curing compound shall have weathered for a minimum time period of six weeks. Special care shall be taken to ensure that areas not to be treated are protected to prevent treatment from overlapping onto these designated areas.

d. Exposed Surfaces.

Exposed surfaces for this class finish is defined as all surfaces, including bottom chamfers and fillets except (1) the wearing surface of roadway slabs and sidewalks, (2) those surfaces having immediate contact with embankment or excavation, (3) those surfaces below low water level and/or below newly established ground line after backfilling excavation or excavated channels, (4)

underside and interior faces of girders, beams, and slabs, and underside of sidewalks where the edge beam extends 3 inches {75 mm} or more below the bottom of the sidewalks, (5) top and bottom surfaces of all type caps, and (6) those parts of minor structures, box culverts, and bridge culverts that are not readily visible from a travelway.

4. CLASS 3 SURFACE FINISH.

This class surface finish requires that, in addition to the Class 1 surface finish, only the designated exposed surfaces of a bridge structure noted below be given an additional finish of either a rubbed or coated finish in accordance with the requirements given elsewhere in this Section.

Exposed surfaces shall be defined as the inside, top, and outside surfaces of barrier rail to bottom of slab overhang, and all portions of the bridge abutments outside the edge of the exterior girders that are not in immediate contact with embankment or excavation. All other structure surfaces, exposed and unexposed, shall receive a Class 1 finish immediately after the forms are removed.

(I) CONCRETE FOR PRECAST NON-PRESTRESSED AND PRESTRESSED MEMBERS.

Concrete for precasting shall meet the requirements given in this Section unless amended by concrete requirements given in other Sections.

Additional requirements are given in Section 512 and ALDOT-367 for the concrete required for precast non-prestressed concrete bridge members. Additional requirements are given in Section 513 and ALDOT-367 for the concrete required for precast prestressed concrete bridge members.

501.04 Inspection.

(a) GENERAL.

The Contractor shall give the Engineer sufficient advance notice before starting to place concrete in any section of a structure to permit the inspection of forms, placing of steel reinforcements, and of preparation for placing. Any defective falsework or forming shall be corrected, or removed and replaced as necessary to the satisfaction of the Engineer, all at the expense of the Contractor.

Authorization of the Engineer shall be secured before concrete is placed in any portion of a structure. Any concrete placed in violation of this provision, or in the absence of the Inspector, shall be removed and replaced at no additional cost to the State.

(b) REMOVABLE FORMS.

After the forms have been removed, any defective work discovered shall be removed and replaced in a satisfactory manner. If the surface of the concrete is bulged, sagged, uneven, or honeycombed to such an extent that it cannot be satisfactorily repaired, the entire section shall be removed and replaced, at no additional cost to the State.

(c) STAY IN PLACE STEEL FORMS.

After the deck concrete has been in place for a minimum period of two days, the concrete, if deemed necessary by the Engineer, shall be tested for soundness and bonding of the forms by sounding with a hammer as directed by the Engineer. The number and locations of the forms to be tested shall be as selected by the Engineer. If areas of doubtful soundness are disclosed by this procedure, the Contractor will be required to remove the forms from such areas for visual inspection after the concrete has attained a minimum compressive strength of 2400 psi {17 MPa}. Care shall be exercised to distinguish the sound of broken bond from the sound of defective concrete.

At locations where sections of the forms are removed, the Contractor will not be required to replace the forms, but the adjacent metal forms and supports shall be repaired to present a neat appearance and assure their satisfactory retention. As soon as the forms are removed, the concrete surfaces will be examined for cavities, honeycombing, and other defects. If irregularities are found, and in the opinion of the Engineer these irregularities do not justify rejection of the work, the concrete shall be repaired as the Engineer may direct. If the concrete where the forms are removed is unsatisfactory, additional forms, as necessary, shall be removed to inspect and repair the slab, and the Contractor's methods of construction shall be modified as required to obtain satisfactory concrete in the slabs. All unsatisfactory concrete shall be removed or repaired as directed by the Engineer.

The Contractor shall provide all facilities as are reasonably required for the safe and convenient conduct of the Engineer's inspection procedures. No additional compensation will be allowed the Contractor for compliance with the above inspection procedures.

501.05 Acceptance of Concrete.

(a) GENERAL.

Certified Concrete Technicians, as required by the Department, shall perform all concrete inspections and testing. Procedures for technician certifications and laboratory qualifications are described in ALDOT-405, "Certification and Qualification Program for Concrete Technicians and Concrete Laboratories".

Fresh concrete will be accepted on the basis of slump, total air content, and temperature meeting the requirements specified for the Class of concrete.

Hardened concrete shall be accepted on the basis of compressive strength meeting the requirements specified in Item 501.02(c)2 for that Class of concrete.

Compressive strength from concrete cylinders will be accepted when the average of two consecutive cylinder test results, obtained at the same age, equals or exceeds the specified 28-day compressive strength, and neither cylinder test result is below 95% of the specified 28-day compressive strength.

(b) SUBSTANDARD CONCRETE.

1. GENERAL.

The Department will investigate any concrete not meeting the acceptance requirements outlined in Subarticle 501.05(a). Concrete investigations will be used to determine the suitability of potentially substandard concrete. This investigation may include any or all of the procedures outlined in ALDOT-170.

The combined results of the Department's investigations will be used to assess the acceptability or rejection of potentially substandard concrete.

If the investigation results show that the concrete fails to meet the contract requirements, the Contractor shall be responsible for the cost of the investigation to include, but not limited, to per-diem, travel expenses, and sampling and testing.

2. IN-PLACE COMPRESSIVE STRENGTH.

If the Department deems it necessary to evaluate only the in-place compressive strength of substandard concrete, a core investigation as described in ALDOT-170 will be performed.

Price adjustments will be applied to the applicable pay item for the number of cubic yards represented by the low cylinder breaks and will be determined as follows.

If the average compressive strength of the cores is equal to or greater than 100% of the specified 28-day compressive strength, the concrete will be accepted with no price adjustment.

If the average compressive strength of the cores is 85% or greater but less than 100% of the specified 28-day compressive strength, and the Bridge Engineer deems the concrete to be structurally acceptable, the concrete will be accepted with a price adjustment. The price adjustment will be applied to the applicable pay item for the number of cubic yards represented by the low breaks. The price adjustment shall be determined from the following formula:

$$\text{Price Adjustment (In Percent)} = 100 \times (1.0 - [(f'c - f_c \text{ AVG}) / (0.30 f'c)])$$

$f'c$ = Required 28-day Compressive Strength (psi) {MPa};

$f_c \text{ AVG}$ = Average Compressive Strength of Test Cores (psi) {MPa};

The price adjustment shall be rounded to the nearest tenth of a percent;

The price adjustment is valid where: $50\% \geq \text{Price Adjustment} < 100\%$.

SECTION 510 BRIDGES

510.05 Basis of Payment.

(d) Payment will be made under Item No.:

Subarticle 510.05 (d) shall be replaced by the following:

(d) Payment will be made under Item No.:

510-A Bridge Substructure Concrete - per cubic yard {cubic meter}

510-B Bridge Concrete, Class ___ - per cubic yard {cubic meter}

510-C Bridge Concrete Superstructure, __, __, ___ - per lump sum

510-E Grooving Concrete Bridge Decks - per square yard {square meter}

* Station Number, Bridge Identification Number (BIN), Ramp Number, etc.

** Lane, if applicable

*** Approximate quantity of superstructure concrete in cubic yards {cubic meters}

SECTION 815 CEMENT

Section 815 shall be replaced with the following:

SECTION 815 CEMENT

815.01 Type I Portland Cement.

Type I Portland Cement shall meet the requirements of AASHTO M 85 and the additional requirements shown below.

815.02 Type II Portland Cement.

Type II Portland Cement shall meet the requirements of AASHTO M 85 and the additional requirements shown below.

815.03 Type III Portland Cement (High Early Strength).

Type III Portland Cement shall meet the requirements of AASHTO M 85 and the additional requirements shown below.

815.04 Type IS Portland Blast Furnace Slag Cement.

Type IS Portland blast furnace slag cement (for use in soil-cement stabilization) shall meet the requirements of AASHTO M 240, Blended Hydraulic Cement.

815.05 Blank.

815.06 Masonry Cement.

Masonry cement shall meet the requirements of ASTM C 91.

815.07 Chemical Properties.

The Specifications for all cements as covered by Articles 815.01 to 815.06, inclusive, are amended to the effect that the total alkali content of any cement used, calculated as the percentage of sodium oxide (Na₂O) plus the product of 0.658 times the percentage of potassium oxide (K₂O), shall not exceed 0.60 percent.

In addition to the above, for Type II cement covered by Article 815.02, the standard chemical requirement shown in Table 1 of AASHTO M 85 for Tricalcium Silicate (C₃S) is hereby waived.

815.08 Testing of Cement.

All cement furnished for use shall be tested before use or be from an approved producer meeting the requirements of ALDOT-227, Quality Control of Portland and Blended Hydraulic Cements, and listed on List I-2, PRODUCERS OF PORTLAND AND BLENDED CEMENT, of the Department's "Materials, Sources, and Devices With Special Acceptance Requirements" Manual. Refer to Subarticle 106.01(f) and ALDOT-355 concerning this list.

815.09 Flash Set And False Set.

Flash set and false set, as determined by ASTM C 451, shall be cause for rejection of the cement.

815.10 Unusual Appearance.

Unusual appearance as to color, etc. shall be sufficient grounds for rejection of the cement.

815.11 Use, Care, And Handling.

(a) USE.

1. Bulk cement will be permitted provided the bulk cement is handled as follows:
 - a. Portland cement shall be measured by weight {mass}, considering that one bag of cement is equivalent to 94 pounds {42 kg} net of cement.
 - b. Handling equipment and the equipment used for weight {mass} determination shall be inspected by the Engineer prior to use. Cement shall be fully protected from contamination or damage during handling.
 - c. Bulk cement shall be batched by weight {mass}, and scales may be of either the beam or springless dial type and shall be the product of a reputable manufacturer. Scales shall be accurate to within a tolerance of 5 pounds per 1000 pounds {2 kg per 455 kg} net load in the hopper. The value of the minimum gradation of any scale shall not be greater than 0.1 percent of the scale capacity.
 - d. Provisions shall be made to indicate to the operator that the required load in the hopper or container is being approached, such as a springless dial indicator or tare beam. Such device shall indicate at least the last 50 pounds {22 kg} of load.
 - e. After the required weight {mass} of the cement is batched, it shall be protected from loss in handling or in transit.
2. Only cement of the same "Type" shall be used in the construction of any structure or unit (substructure or superstructure) except as permitted in writing. All cement in any container having lumps of cement or caked cement, or cement which for any reason has become damaged or partially set, shall be rejected. Cement salvaged from discarded or used bags shall not be used. Cement shall not be used while its temperature is more than 150 °F {65 °C}.
3. The Contractor shall keep accurate records of the deliveries of cement and its use in the work including that from ready-mix plants. Copies of these records shall be furnished the Engineer at the close of each day's work or 8 hour run, in such form as he may require, showing the quantity used during the day or run at each part of the work.

(b) CARE AND HANDLING.

1. The Contractor shall provide suitable means for storing and protecting the cement against dampness. Cement not for immediate use shall be stored in suitable weather proof buildings. Buildings shall be placed in approved locations. Provisions for storage shall be ample and the shipment of cement as received shall be separately stored in such a manner as to provide easy access for identification and inspection of each shipment. On small structures, storage in the open may be permitted by authorization, in which case a raised platform and ample waterproof covering shall be provided. Stored cement shall meet the test requirements at any time after storage when a retest is ordered.
2. Cement of different types, even if tested and approved, shall be stored separately and shall not be mixed.



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: November 6, 2014

Special Provision No. 12-0737(2)

EFFECTIVE DATE: January 1, 2015

SUBJECT: Structures for Traffic Control Devices and Highway Lighting.

Alabama Standard Specifications, 2012 Edition, SECTION 718 shall be revised as follows:

SECTION 718 STRUCTURES FOR TRAFFIC CONTROL DEVICES AND HIGHWAY LIGHTING

718.03 Design.

(a) GENERAL.

Subarticle 718.03(a) shall be replaced with the following:

(a) GENERAL.

1. Design Data.

The details of pole foundations for Traffic Signals (Section 730) and Roadway Lighting (Section 750) are shown on the plans. When details of a structure or foundation are not shown on the Plans, or if the Contractor proposes alternate structure or foundation details, the Contractor shall submit complete designs and details.

Geotechnical borings may be shown on the plans. These borings may not be representative of the actual conditions encountered throughout the project. The Contractor shall be responsible for any assumptions made from these borings. The Contractor shall obtain any additional geotechnical data that is necessary for determining the actual subsurface conditions.

2. Design Requirements.

All structures shall be designed in accordance with the requirements given in the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 2009 Edition*, and the requirements given in this Section. Fatigue importance factors shall be as follows:

STRUCTURE	FATIGUE IMPORTANCE FACTOR CATEGORY
Strain Poles	No Fatigue
Mast Arm Poles / Lighting Poles less than 45 ft. in height	Category II with 25 year service life
High Mast Poles / Sign Structures / Overhead Sign Bridges / Lighting Poles 45 ft. or greater in height	Category I

Wind pressures shall be calculated in accordance with "Appendix C: Alternate Method for Wind Pressures". Minimum design wind speed shall be 100 miles per hour {165 km/hr} for Mobile and Baldwin Counties and 80 miles per hour {130 km/hr} elsewhere in the State.

The Combined Stress Ratio (CSR), shall be less than or equal to 0.9, for all load cases.

3. Foundations.

Foundations shall be located to avoid damaging existing underground installations and avoid conflicting with known future installations such as pipes, conduits, guardrail posts, lighting standards, etc.

The design shall be sufficient to provide a minimum factor of safety of 2.0 against overturning and torsion induced displacement.

ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: August 23, 2016

Special Provision No. 12-0769(2)

EFFECTIVE DATE: November 1, 2016.

SUBJECT: Extra and Force Account Work.

Alabama Standard Specifications, 2012 Edition, SECTION 109 shall be revised as follows:

SECTION 109 MEASUREMENT AND PAYMENT

109.04 Extra and Force Account Work.

(a) General.

The Contractor will receive and accept payment for work performed under his contract either as contract items of work or as extra work. Contract items of work will be paid for at the unit prices stipulated in the contract. Extra work will be paid for at the unit prices or lump sum stipulated in supplemental agreement, or on a force account basis. Supplemental agreements shall be executed in accordance with Subarticle 104.03(b). When prices are negotiated for payment by supplemental agreement, satisfactory proof of administrative markups for profit, overhead, and other costs may be required by the engineer. Extra work performed on a force account basis will be compensated for in the following manner.

(b) Force Account Basis.

1. Labor.

For all labor, foremen, and superintendents, employed on the force account work, the Contractor shall receive the agreed hourly wages or scale for the number of hours the said laborers, foremen, and superintendents were actually engaging in or directly supervising such work. No allowance will be made for general superintendence. Hourly wages for salaried employees will be based on a 40-hour work week. The wages or scale shall be comparable to the wages or scale paid by the Contractor for work of a like nature on his contract pay items and shall be agreed upon in writing by the Contractor and Engineer before the said force account work is begun.

To this sum shall be added an amount equal to 25 percent thereof.

No additional pay beyond the agreed hourly scale will be allowed for "overtime work" unless such overtime work is authorized in writing by the Engineer.

Labor costs will be allowed for travel time to and from the jobsite when that travel is specifically for the purpose of accomplishing force account work. Travel time shall be established and approved by the Engineer prior to beginning of the work. Travel time costs shall be validated with certified payrolls.

Per diem or daily subsistence will be allowed when those costs are directly related to force account work and a part of the Contractor's usual and customary expenses. An additional 5 percent will be added to the per diem or daily subsistence costs.

2. Bond, Insurance and Tax.

For public liability and property damage insurance and workmen's compensation insurance premiums, increased bond premiums, unemployment insurance contributions and social security taxes, the Contractor shall receive the actual cost, to which no percent shall be added; in addition on projects which the State Gross Receipt Tax is applicable, may include said tax. The Contractor shall furnish satisfactory evidence of the rates paid for such bond, insurance, and tax.

3. Materials.

For materials accepted by the Engineer and used, the Contractor shall receive the actual cost of such materials delivered on the work (exclusive of machinery rentals as herein set forth) to which cost 15 percent will be added.

4. Equipment.

For rental rates of equipment (other than small tools) authorized by the Engineer for use on force account work, the Engineer will use the latest publication of EquipmentWatch Cost Recovery (formerly Rental Rate Blue Book), by EquipmentWatch, a division of Penton Business Media, Incorporated to determine payment to the Contractor. Payment will be made for the actual time that the authorized equipment is in operation on the force account work, including travel time to and from the jobsite, when that travel is specifically for the purpose of accomplishing force account work. The hourly rate for each piece of equipment will be the monthly rate shown in the equipment table divided by 176. Weekly and daily rates will not be used. In addition, for equipment solely dedicated to the force account work, consideration will be given to paying standby cost. Operating rates and standby rates for computing the equipment payment will be determined as follows:

Operating rates. The hourly rate will be multiplied by the appropriate rate adjustment factor and regional factor shown in the Rate Adjustment Table and on the Regional Adjustment Map, respectively, to obtain the adjusted hourly rate. The estimated operating cost/hour from the equipment table will be added to the adjusted hourly rate to establish the operating rate.

Standby rates. The use of a standby rate is appropriate when equipment has been ordered to be available for force account work but is idle for reasons which are not the fault of the Contractor. The standby rate will be determined by multiplying the adjusted hourly rate by 0.50.

Operating rates will be used only when the equipment is actually being used. Standby rates will be used under the following conditions:

- a. The equipment must be totally dedicated to the force account work and not used intermittently on other work.
- b. Standby cost will not be considered until after the equipment has been operated on the force account work.
- c. If the equipment is dedicated for force account for a full calendar work week, the standby time will be 40 hours minus the operating time for the week. If the difference in these two figures is zero or less, there will be no payment for standby.
- d. If the equipment is dedicated for force account for a partial week, the standby time will be computed on a daily basis. The standby time per day will be 8 hours minus the operating time for the day. If the difference in these two figures is zero or less, there will be no payment for standby.

The above will apply without further adjustment if overtime work is approved by the Engineer.

The above shall be full compensation for all equipment costs except operator cost. Payment for operators will be under Item 109.04(b)1, Labor.

If equipment is required that is not listed in the Rental Rate Blue Book, then payment will be made for that equipment based on a certified or paid invoice for the period of time covered by the invoice. In this case, the equipment must be totally dedicated to the force account work and no distinction will be made between operating cost and standby cost. If this equipment is owned by the Contractor, then rental rates for operating and standby costs shall be agreed upon between the Contractor and Engineer prior to its use.

5. Professional Services

Compensation for professional services shall be on an invoice basis. Labor and equipment costs will not be calculated separately for professional services.

6. Costs not allowed.

No allowance shall be made for the use of small tools or for other costs for which no specific allowance is herein provided.

7. Administrative Allowance.

When force account work is accomplished by an approved subcontractor or professional service, the Contractor shall receive, as compensation for administration costs, an amount equal to five percent of the total amount paid under items 1, 2, 3, and 4 of this Subarticle for force account work accomplished by an approved subcontractor or professional service.

8. Compensation.

The compensation as set forth in this Subarticle shall be received by the Contractor as payment in full for extra work done on a force account basis. Said compensation shall cover all work, profit, administrative costs, and incidental costs of whatever nature incurred in the work whether performed by the Prime Contractor or an approved subcontractor. At the end of each day, the Contractor's representative and the Inspector shall compare records of the cost of work done as ordered on a force account basis.

9. Statements.

No payment will be made for work performed on a force account basis until the Contractor has furnished to the Engineer duplicate itemized statements of the cost of such force account work, detailed as to the following:

- a. Name, classification, date, daily hours, total hours, rate, and extension for each laborer and foreman.
- b. Designation, dates, daily hours, total hours, rental rate and extension for each truck and other unit of machinery and equipment.
- c. Quantities of materials, prices, and extensions.
- d. Transportation of materials.
- e. Travel time for equipment.
- f. Cost of public liability and property damage insurance and workmen's compensation insurance premiums, increased bond premiums, unemployment insurance contributions, and social security tax.

Statements shall be accompanied and supported by original receipted invoices for all materials used and transportation charges, provided that, if materials used on the force account work are not specifically purchased for such work but are taken from the Contractor's stock, then in lieu of the original invoices the statements shall contain or be accompanied by an affidavit of the Contractor certifying that such materials were taken from his stock, that the quantity claimed was actually used, and that the price and transportation claimed represent the actual cost to the Contractor.



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: June 3, 2016

Special Provision No. 12-0798(2)

EFFECTIVE DATE: September 1, 2016

SUBJECT: Structural Materials for Traffic Control Devices and Highway Lighting.

Alabama Standard Specifications, 2012 Edition, SECTION 891 shall be replaced by the following:

SECTION 891 STRUCTURAL MATERIALS FOR TRAFFIC CONTROL DEVICES AND HIGHWAY LIGHTING

891.01 General.

All materials used in the fabrication of overhead roadway sign, traffic signal, luminaire and traffic surveillance structural supports shall meet the requirements of the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 2009 Edition* (hereinafter referred to as the AASHTO Sign Specifications). AASHTO material specifications shall govern in lieu of ASTM material specifications when an AASHTO equivalent specification exists for all references within any referenced specification.

891.02 Steel.

(a) General.

All grades of steel listed in the AASHTO *Standard Specifications for Highway Bridges* are applicable for welded structural supports for overhead roadway signs, luminaries, traffic signals and traffic surveillance and shall have a specified yield strength not less than 35 ksi {241 MPa}, unless otherwise specified on the contract plans, or within this Section. The specifications for steels other than ASTM and AASHTO shall be submitted to the Bridge Engineer for approval, prior to design. The contractor shall supply the Bridge Engineer with a copy of the steel specification corresponding to the steel that is being used if the steel is not covered by ASTM or AASHTO specifications.

(b) Fabrication.

Within 30 days after the award of the contract, the Contractor shall notify the Bridge Engineer in writing of the name and address of the fabricator of the structural steel. The notification shall include the fabricator's proposed fabrication schedule. Evidence of the fabricator's qualifications and experience shall be furnished if requested by the Bridge Engineer.

No material shall be fabricated before the Department has been notified where the fabrication order has been placed and the shop drawings have been reviewed and approved for distribution. The Fabricator is responsible for notifying the Bridge Engineer of any fabrication work to be done outside of their facility, the name and address of the outside fabricator, and the proposed fabrication schedule.

The Fabricator of the structures shall give the Bridge Engineer at least 30 days' notice by submittal of a BBF-11 Form (Notice of Intent to Begin Fabrication) prior to the beginning of fabrication to allow time for arrangements to be made for an ALDOT inspector to be present during fabrication.

All steel structures shall be fabricated in a plant certified by the American Institute for Steel Construction for "Standard for Bridge and Highway Metal Component Manufacturers (CPT)".

Welding of steel members shall be in accordance with the AWS D1.1/D1.1M: 2015 Structural Welding Code—Steel 23rd Edition (hereinafter referred to as the AWS Structural Welding Code).

Welders shall be certified in accordance with the AWS Structural Welding Code. All welds shall be visually inspected and be free of cracking and undercutting. High Mast lighting assembly pole to base plate welds shall be magnetic particle or ultrasonically tested. Circumferential butt welds shall not be allowed on overhead roadway sign structure uprights. All circumferential welds on steel poles shall be tested by ultrasonic for wall thickness of 5/16 inch {8 mm} or greater, or radiographic testing for wall thickness less than of 5/16 inch {8 mm}. All requirements of Section 1.4.2 of the AASHTO Sign Specifications shall be observed when welding and testing the poles. The longitudinal weld on the female section of lap splices shall be either one hundred percent full penetration, with quality assurance by ultrasonic inspection per the AWS Structural Welding Code, or shall be reinforced externally to ensure the development the full yield stress of the pole.

The handling and storing of materials, during and after fabrication, shall be done in such a manner that the metal or galvanized finish is not damaged. Material that is damaged may be rejected. Material shall be stored off the ground and properly drained. Loose members and fasteners shall be stored in boxes, crates, kegs or barrels.

Support structures shall be free from sharp edges and irregularities, and any misfits or structural deficiencies. All members must fit together well and make for an easy and quick erection. All components shall be protected from damage during fabrication, handling and transportation to the site. Unless approved by the Engineer, none of the components shall be delivered to the site until such time as the entire structure (less sign faces) can be erected.

(c) Overhead Roadway Sign Structures.

Material for overhead roadway steel sign structures shall be structural carbon steel or structural low alloy steel meeting the requirements of the AASHTO *Specifications for Highway Bridges*, latest edition. Steel pipe shall be in accordance with ASTM A 53, Grade B, Schedule 40 or stronger. Nuts, bolts, and washers used in structural joints shall be in accordance with ASTM A 325 and shall be installed in accordance with Item 508.03(d)6. Nuts and bolts used in non-structural joints shall be in accordance with ASTM A 307. Washers used in non-structural joints shall comply with the requirements of ASTM F 844.

All components of the structure assembly shall be galvanized with zinc after fabrication in accordance with AASHTO M 111 and AASHTO M 232, for fasteners. Hollow sections shall be galvanized on both exterior and interior surfaces. Closed hollow sections shall have appropriate sized galvanizing vent holes at each end of a member. Damage to galvanization or any bare areas developed before or during erection shall be painted with two coats of approved galvanizing coating in accordance with Article 855.15.

A uniform camber, in accordance with Section 9 of the AASHTO Sign Specification, shall be provided for all horizontal members of the sign structure. The minimum camber shall be equal to the dead load deflection + L/1000 (L in inches {millimeters}). The maximum permissible camber shall be L/240 (L in inches {millimeters}).

1. Facilities for Inspection.

The Contractor/Fabricator shall provide ALDOT with adequate, suitable office facilities and equipment when required for the inspection of materials and workmanship in the fabrication plant. This office shall be conveniently located near the fabrication plant or work site, shall be private and not shared with any other agency and shall be equipped so that it may be locked. It shall be climate controlled, water tight and include necessary office furnishings such as desk/table, chairs and file cabinet. (Telephone is optional).

2. Quality Control and Non-Destructive Testing.

A current written copy of the fabricator's quality control manual, along with a listing of qualifications of personnel qualified to perform inspections and/or non-destructive testing shall be submitted prior to any fabrication work. All nondestructive testing personnel shall meet the requirements set forth in ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel (ANSI/ASNT CP-105-2011).

No materials or members will be accepted by the Bridge Engineer's representative, or partial payments made, until the Department's BBF-1 form, the supporting mill test reports and galvanization certificates for the materials have been furnished and approved by

the Department. This information shall be submitted for approval. The BBF-1 form shall be signed by a company official and notarized.

The contractor shall furnish certified copies of mill test reports covering steel materials. These reports shall include chemical determinations and physical characteristics.

The fabrication shop shall have and maintain a master tape, calibrated by the National Institute of Science and Technology. All tapes shall be calibrated with the master tape before being used on the project. Any master tape found damaged or with a certification over two years old shall be replaced or recalibrated.

A Certified Welding Inspector (CWI) shall be present on all shifts where welding is ongoing.

3. Handling, Transportation and Storage Of Materials

The handling and storing of materials, during and after fabrication, shall be done in such a manner that the metal or galvanized finish is not damaged. Damaged material may be a cause for rejection. Material shall be stored off the ground and properly drained. Loose members and fasteners shall be stored in boxes, crates, kegs or barrels and kept dry.

4. Workmanship, Finish and Detailing.

All work shall be performed in a neat workmanlike manner.

A buffer and/or shield shall be utilized during fitting operations to protect base metals from damage caused by fitting tools or devices. Any damage incurred may be cause for rejection of the material.

Heat straightening or hot bending is allowable provided the metal is not heated above 1100 °F {590 °C}. The maximum heat applied shall be controlled by the use of heat crayons or other approved means. After straightening or bending, the metal shall not be artificially cooled until the temperature of the metal reaches 600 °F {315 °C} or less. Water or spray misting shall not be used as a means of artificial cooling. Heat cambering will only be permitted when making minor adjustments to the actual camber in a member.

Steel may be thermal cut, provided a smooth surface is secured by the use of a mechanical guide. Thermal cutting by hand shall be done only when approved. The surface shall be smoothed by planing, chipping or grinding. Other methods of cutting steel may be considered for use.

Sheared edges of plates more than 5/8 inch {16 mm} in thickness shall be planed to a depth of 1/4 inch {6 mm}. Plates 5/8 inch {16 mm} in thickness, or less, shall be ground to remove sharp corners and edges.

Vent holes, if required, shall be cylindrical, without ragged or torn edges or corners. If vent holes are installed with a thermal cutting process, they shall be reamed.

5. Accuracy of Reamed or Drilled Holes.

Reamed or drilled holes shall be cylindrical and perpendicular to the member.

Holes may be punched with a full-size die provided the thickness of the material is not greater than the nominal diameter of the fasteners being used nor greater than 3/4 inch {20 mm} for carbon steel, 5/8 inch {16 mm} for high strength steel, nor 1/2 inch {12 mm} for quenched and tempered alloy steel. Holes shall be clean cut and free of torn or ragged edges. Plug welding of any holes that are too large or slightly off location is prohibited. Completed holes shall be 1/16 inch {1.6 mm} larger than the nominal diameter of the fastener being used.

All holes may be oversized or slotted by 1/32 inch {0.8 mm}, maximum. In any connection, no more than ten percent of all holes may be oversized or slotted 1/16 inch {1.6 mm}.

Edge distances of fasteners shall be as shown below.

- The minimum distance from the center of any fastener to a sheared or flame cut edge shall be: 1" Fastener: 1-3/4" {45 mm}; 7/8" Fastener: 1-1/2" {38 mm}; 3/4" Fastener: 1-1/4" {32 mm}; 5/8" Fastener: 1-1/8" {29 mm}.
- The minimum distance from the center of any fastener to a rolled or planed edge, except in flanges of beams and channels, shall be: 1" Fastener: 1-1/2" {38 mm}; 7/8" Fastener: 1-1/4" {32 mm}; 3/4" Fastener: 1-1/8" {29 mm}; 5/8" Fastener: 1" {25 mm}.

- In the flanges of beams and channels the minimum distance from the center of the fastener to a edge shall be: 1" Fastener: 1-1/4" {32 mm}; 7/8" Fastener: 1-1/8" {29 mm}; 3/4" Fastener: 1" {25 mm}; 5/8" Fastener: 7/8" {22 mm}.

The distance between the edges of adjacent holes that are enlarged or slotted shall not be less than three times the diameter of the fastener minus the nominal diameter of the hole. The edge distance shall not be less than that given for Minimum Edge Distance minus one half the nominal diameter of the hole.

6. Welding.

- All welding shall be inspected for defects in accordance with the requirements stated herein. Any worker, welder or weld inspector who, in the opinion of the Engineer, produces inferior work, may, under the provision of Article 108.06, be disqualified from performing ALDOT work.
- All shop welding shall be performed under cover of a permanent structure and/or building capable of protecting the material and welding operation from inclement weather.
- Intersecting welds, unless shown on the plans or approved shop drawings, are prohibited.
- Tack welds, not incorporated in the final weld, shall not be used. Cracked tack welds shall be removed and the area of base material examined by MT or PT.
- Complete penetration, circumferential welded splices, in any component of an upright member is prohibited within overhead sign structures.
- Undercut is limited to 1/32" {0.8 mm} on secondary members and to 0.01" {0.25 mm} on main members.
- Excessive arc strikes and/or gouges will be assessed by the ALDOT representative to determine if repairs are required or if the material should be rejected.
- Carbon arc or thermal cut boundaries and back gouged surfaces for groove welds shall be ground to a smooth, bright surface, before welding.
- Drying and storage ovens shall be electric and of sufficient size to accommodate a one day supply of electrodes. Drying ovens shall be equipped with a recording thermometer. Storage ovens shall have a visible thermometer.
- Each welding machine shall have its approved welding procedure posted in a conspicuous area on or near the machine
- The Contractor shall furnish a written welding procedure specification (WPS) for each process and joint to be used in shop welding. The WPS number shall appear in the tail of the weld symbol on the shop drawings.
- All shop welds shall be temporarily marked in such a manner that allows identification of the welder.
- A complete list of qualified welders and copies of the qualification records shall be provided by the fabricator. Welders that do not have satisfactory pre-qualification, may be required to qualify in the presence of an ALDOT representative or a third party Certified Welding Inspector (C.W.I.).

(d) Steel Poles for Traffic Signal, Luminaire and Traffic Surveillance Support Structures.

The shafts shall be fabricated from basic oxygen or open hearth sheet steel, of a single ply, and having only one longitudinal seam weld. Circumferential welded splices may be used, provided none of the spliced pieces, except for the top piece, are less than ten feet in length. All circumferential welds shall be ground flush with the material surfaces. In lieu of circumferential welds, a two piece section, slip joint shaft pole (for poles without horizontal welds) will be permitted when the plans or approved shop drawings require poles longer than the manufactured length capability.

Steel poles shall be anchored with a one piece cast steel anchor base or a welded steel plate anchor base that is of sufficient strength to develop the yield strength of the pole. When the anchor

base is attached to the shaft it shall develop the full strength of the shaft section to resist bending action. The base shall be provided with four slotted holes for attachment to the foundation with four anchor bolts. The complete pole assembly shall be hot-dipped galvanized after fabrication in accordance with AASHTO M 111. Each assembly must be completely coated in a single dip. All miscellaneous hardware shall be galvanized per AASHTO M 232. Mill certifications shall be supplied.

891.03 Glass Fiber Reinforced Polymers (GFRP).

GFRP poles shall be heavy duty class, conforming to the American National Standard for Roadway Lighting-Fiber-Reinforced Plastic (FRP) Lighting Pole (ANSI C136.20 - latest edition). GRFP poles shall be manufactured by using a thermosetting polyester resin containing a minimum of 65% fiberglass by weight. The resin shall be ultraviolet resistant and pigmented the same color as the final coating to be applied. The resin shall not contain clay fillers. The pole color shall be uniform throughout the entire wall thickness of the pole. The finish of the pole shall be smooth. A 1-1/2 mil dry film thickness of weather resistant polyurethane shall be coated to the surface of the pole for additional ultra-violet protection.

Direct burial poles shall have a 4 inch by 6 inch {102 mm by 153 mm} hand hole with a non-aluminum cover provided at 18 inches {458 mm} above the ground line. The conductor entrance shall be two each 2 inch by 6 inch {51 mm by 51 mm} entrance holes located 2 feet {610 mm} below the ground line and one hundred and eighty degrees apart.

The poles shall be delivered pre-drilled to accommodate luminaires and lowering devices. Pole top tenons shall be permanently bonded to the shaft and shall be aluminum or hot dipped galvanized steel.

891.04 Aluminum.

Aluminum material shall meet the requirements of the AASHTO Sign Specifications, Section 5.

Welding shall be in accordance with the provisions of Section 5 of the AASHTO Sign Specifications.

The shaft of aluminum poles shall be one piece seamless round tapered tube full length heat-treated after welding on the base flange to produce the T6 temper. The base shall be one-piece cast aluminum. All nuts, bolts and washers used shall be stainless steel Grade 18-8 or stronger, and shall meet the requirements of ASTM F 593. Each pole will have an internal grounding lug. A pole vibration damper shall be provided.

The contractor shall furnish copies of certified mill test reports attesting to the fact that the aluminum material submitted for approval meets the contract requirements. These reports shall include chemical determinations and physical characteristics.

891.05 Prestressed Concrete Poles.

Concrete, reinforcing steel and prestressing steel for prestressed concrete poles shall meet the requirements given in Section 513. The concrete shall have a minimum 28 day compressive strength of 5000 psi {35 MPa} or as shown on the plans.

The prestressed concrete pole manufacturing plant shall follow the applicable requirements in ALDOT-367, Section 2, except that plant certification by the Precast/Prestressed Concrete Institute Plant Certification Program will not be required.

Within 30 days after the award of the contract, the Contractor shall notify the Materials and Tests Engineer in writing of the name and address of the fabricator of the poles.

Fabrication will not be allowed to begin until two weeks after the Materials and Tests Engineer has all of the approved details and submittals that are required for a representative of the Department to adequately inspect the fabrication of the poles. The Contractor shall arrange for a representative of the Department to conduct an inspection of the plant facilities and review the plant's Quality Control/Quality Assurance manual during this two week time period.

891.06 Breakaway Supports.

A Federal Highway Administration approved breakaway support shall be installed on each luminaire assembly when indicated on the plans. The pole shall meet the 1985 AASHTO breakaway requirements and FHWA certification of testing must be submitted. The Contractor shall assure the compatibility of the pole base, breakaway support and foundation.

Transformer bases shall be used only as a replacement of a like item on an existing installation unless specifically shown otherwise on the plans.

891.07 Mast Arms.

Mast arms shall be fabricated from steel tubes (except for aluminum poles, which shall have aluminum mast arms) to the lengths specified on the plans and approved shop drawings. Mast arm shafts shall be of one continuous piece without intermediate splices or couplings, provided with rain-tight connections to the shaft of the pole and designed to rotate three hundred and sixty degrees in the horizontal plane.

A two piece section, slip joint shaft mast arm will be permitted when plans or proposal require mast arms longer than the manufacturer's length capability.

All hardware, except split pole clamps, shall be stainless steel or anodized aluminum. The end of the arm shall be furnished with the type of fitting required by the plans.

All connecting joints for attachments for mast arms, shaft extensions and luminaire arms shall be of the design indicated by plan details or approved by the Engineer and shall develop full strength of the joint.

891.08 Anchor Bolt Assemblies.

Anchor bolt assemblies (anchor bolts, nuts, and washers) shall be in accordance with AASHTO M 314, Grade 36 or Grade 55, except maximum tensile strength on all grades is waived, and capable of transferring the load safely from the structure base plate to the foundation. The exposed end of the anchor bolts shall be threaded (rolled or cut type) and provided with appropriate nuts, including lock nuts and flat washers. The anchor bolts, nuts, and washers shall be hot-dipped galvanized in accordance with AASHTO M 232, however, galvanization of the bolt below 6 inches {152 mm} from the top of the embedment line will not be required. The nuts shall be lubricated with a lubricant containing a visible dye so that a visual check can be made for proper lubrication prior to installation. Special care shall be taken when storing galvanized bolts with a water soluble lubricant.

Anchor bolts for overhead roadway sign structures and high mast lighting assembly poles only, shall meet the requirements provided in AASHTO T 244 for Charpy V-Notch testing. Notch toughness tests on specimens shall be performed in accordance with Test Frequency P (Piece Testing) of AASHTO T 243 with a minimum average value of 15 ft-lb. at 40 °F {20 J at 4.4 °C} and the notch shall be oriented perpendicular to the longitudinal axes of the anchor bolt. In order to meet the Charpy V-Notch impact requirements, the steel may require heat treatment. The Charpy V-Notch testing equipment shall be calibrated once each year using a National Institute of Standards and Technology check sample. Certification of the annual calibration shall be available to the Department when requested.

891.09 Pedestals.

If specified by the plans, pedestals shall be furnished for steel and aluminum poles according to the overall length (including cap and base) shown on the plans. Pedestal shafts shall be a one piece, continuous taper or parallel wall, circular shaft. Steel shafts shall be of not less than 1/8 inch {3 mm} wall thickness and of a size at the top designed to fit a standard 4 inch {102 mm} slip-fitter attachment. Steel shafts shall have a polished or galvanized finish, which shall be protected during storage and shipment by a suitable protective covering. The covering shall remain on the shaft until installation begins. A one piece base shall be provided which, when attached to the shaft, will develop the full strength of the shaft to resist bending action. The base shall be provided with four slotted holes for attachment to the base of the foundation. The anchor bolts shall be recessed and ornamental covers provided. A handhole with cover, approximately 4 inches by 6 inches {102 mm by 153 mm} in dimension, shall be provided in the base of the pedestal shaft. A cap for any exposed open end of a pedestal shaft shall be provided. The cap shall be of cast aluminum and of the nipple or tenon mounting type.

ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: January 7, 2014

Special Provision No. 12-0879

EFFECTIVE DATE: August 1, 2014

SUBJECT: Award and Execution of Contract.

Alabama Standard Specifications, 2012 Edition, SECTION 103 shall be revised as follows:

SECTION 103 AWARD AND EXECUTION OF CONTRACT

103.02 Award of Contract.

This Article (103.02) shall be amended by adding the following Subarticle (d) as follows:

(d) ALABAMA IMMIGRATION LAW

By signing this contract, the contracting parties affirm, for the duration of the agreement, that they will not violate federal immigration law or knowingly employ an unauthorized alien within the State of Alabama. Furthermore, a contracting party found to be in violation of this provision shall be deemed in breach of the agreement and shall be responsible for all damages resulting therefrom.

The Contractor shall submit a certificate of compliance form to the Department for each contract prior to award. This form must have an original signature, and the project will not be awarded without the form. The certificate of compliance form is available on ALDOT's website (<http://www.alletting.dot.state.al.us>) and shall be furnished to the Alabama Department of Transportation by the apparent low bidder within ten (10) days of the letting at the following address:

Alabama Department of Transportation
Bureau of Office Engineer, Contracts/Administrative Section
1409 Coliseum Boulevard, Room E-101
Montgomery, Alabama 36110



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: July 23, 2014

Special Provision No. 12-1108

EFFECTIVE DATE: December 1, 2014

SUBJECT: Planting Zones.

Alabama Standard Specifications, 2012 Edition, SECTION 860 shall be revised as follows:

SECTION 860 ROADSIDE IMPROVEMENT MATERIALS

860.01 Seed

(c) PLANTING ZONES.

Subarticle 860.01(c) shall be replaced by the following:

(c) PLANTING ZONES.

The State of Alabama is divided into three planting zones as shown in the following table:

ZONE 1		ZONE 2		ZONE 3	
Blount	Lauderdale	Autauga	Montgomery	Baldwin	Marengo
Calhoun	Lawrence	Bibb	Perry	Barbour	Mobile
Cherokee	Limestone	Bullock	Pickens	Butler	Monroe
Clay	Madison	Chambers	Russell	Choctaw	Pike
Cleburne	Marion	Chilton	Sumter	Clarke	Washington
Colbert	Marshall	Coosa	Tallapoosa	Coffee	Wilcox
Cullman	Morgan	Dallas	Tuscaloosa	Conecuh	
Dekalb	Randolph	Elmore		Covington	
Etowah	Shelby	Greene		Crenshaw	
Fayette	St. Clair	Hale		Dale	
Franklin	Talladega	Lee		Escambia	
Jackson	Walker	Lowndes		Geneva	
Jefferson	Winston	Macon		Henry	
Lamar				Houston	



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: March 4, 2015

Special Provision No. 12-1265

EFFECTIVE DATE: June 1, 2015

SUBJECT: Sanitary Sewers.

Alabama Standard Specifications, 2012 Edition, SECTION 645 and SECTION 853 shall be revised as follows:

SECTION 645 SANITARY SEWERS

645.01 Description.

This Section shall cover the work of the following:

- furnishing and installing new sanitary sewers, force mains, and manholes
- removing, replacing, and resetting existing sanitary sewers, force mains, and manholes
- constructing connections to existing sewers and manholes

All work performed and materials used shall be in accordance with ALDOT plans and specifications and the Utility's requirements. In the event that there is a conflict between the ALDOT specifications and the Utility's requirements, the more stringent requirement shall govern.

645.02 Materials.

Materials furnished for use shall conform to the requirements of Section 853 and other appropriate Sections of Division 800, Materials.

The pipe strength shall be in accordance with the requirements of Section 853 unless otherwise noted by the project plans or determined by the actual laying conditions.

Concrete used for construction of sanitary sewers, force main, and manholes shall be Class A concrete in accordance with the requirements given in Section 501.

645.03 Construction Requirements.

(a) General.

1. Sanitary Sewer.

Pipe shall be laid in the presence of the Inspector, and shall not be covered until allowed by the Project Manager. Pipe that is damaged or deemed unfit for use by the Department due to negligence, improper handling, or improper installation shall be replaced by the Contractor without additional compensation.

All new pipes shall be handled in such a manner as to prevent damage to the pipe and pipe lining. The interior of all pipes shall be free from dirt and debris. All material shall be stored in the appropriate manner to protect the materials from damage by freezing and subsequent handling.

The construction methods employed in the adjustment, relocation, and placement of the sewer lines shall be in accordance with the current codes and practices of the Utility Company involved.

Work required for the adjustments of sewer mains, fittings, and service lines shall be performed by the Contractor in such a manner that shall limit interruption of the service for a minimum period of time. Notice shall be made by the Contractor to the Customers affected by the service interruption at least four hours but not more than 72 hours prior to service interruption.

When installing non-metallic sewer force main pipe, the Contractor shall install a metallic tape on the pipe or provide other suitable means to allow for location by electronic detection devices.

When ductile iron sewer pipe and fittings are located in potentially corrosive soil conditions, the pipe shall be wrapped in polyethylene sheath meeting AWWA C105.

Air and vacuum valve assemblies shall be installed in the force main to allow for the release of potentially trapped air along elevation changes in the force main as shown on the plans. The air and vacuum valve assembly shall be as detailed in the project plans and specifications.

When abandoning an existing sanitary sewer, the sanitary sewer shall be cut, filled with cement mortar flowable backfill (Section 260, Mix 4), and the ends shall be capped.

2. Manhole.

Pre-cast concrete manholes shall be constructed in accordance with AASHTO M 199. Manholes shall be smooth and free from fractures, chips, and honeycombs. Care shall be taken not to damage the manhole sections during handling and installation. The manhole shall be constructed to minimize the number of manhole joints.

The invert and bottom curves of all manholes shall be neatly and accurately built and formed to facilitate the entrance and flow of sewage over them.

When required, a branch pipe consisting of one segment of ductile iron pipe of the required size shall be built into manholes to receive either present or future branch lines. Branch lines for future flows shall have an Engineer approved mechanical plug.

New manholes shall be supplied with Engineer approved cast-in or cored flexible manhole pipe connectors (boots) for each pipe cutout. The flexible manhole pipe connector (boot) shall meet the requirements of ASTM C 923. The connector shall be installed in the manhole wall in accordance with the manufacturer's recommendations.

Existing manholes cored for connection of sewer pipe shall be fitted with Engineer approved flexible manhole pipe connectors (boots). The flexible manhole pipe connector (boot) shall meet ASTM C 923 requirements. The connector shall be installed in the manhole wall in accordance with the manufacturer's recommendations.

All manhole pipe connectors (boots) shall be sized specifically for the pipe material, pipe size, and manhole size being used.

Joints in riser and cone sections shall have a rubber gasket or an approved equal meeting the requirements of ASTM C 443.

Manholes shall be provided with steps, inflow dishes, chimney seals, and linings as required by the project plans and specifications.

3. Abandon Existing Manhole.

Abandoning an existing manhole shall include breaking the manhole off to a depth of three feet below grade, creating holes for drainage in the bottom, furnishing, placing and compacting sand or sand-clay backfill to the original grade, removing and cleaning the frame and cover, and transporting the frame and cover to the Utility.

4. Resetting Manhole Cone-Shaped Top Section (Cone).

Manholes requiring the cone section to be removed and replaced to lower or raise the manhole top elevation more than two feet, to allow for the addition/removal of a manhole unit section, without moving the structure location shall be considered a manhole cone reset. All work shall be done in a workman like manner by competent workmen and the manhole structure re-established in proper working order at its new elevation. Any manhole material broken, destroyed, lost, or rendered unfit for reuse through carelessness, negligence, or improper handling of the work, shall be replaced by the Contractor without extra compensation.

When adjustments to manholes require the removal of a portion of the existing manhole, the Engineer shall designate that portion of the structure to be removed. The removal cost shall be included in the unit price bid for the manhole cone reset.

When required to reach the elevation shown on the project plans, the manhole frame and cover shall be raised or lowered using brick and mortar, concrete "donut" rings, cast iron riser ring, or Engineer approved equal.

The resetting of an existing manhole cone section shall be in conjunction with installation of manhole unit sections.

5. Resetting Manhole Frame and Cover.

Manhole frame and covers that are raised or lowered in top elevation less than 2 feet {600 mm} without removing the manhole cone or moving the structure location shall be considered reset. All work shall be done in a workmanlike manner by competent workmen and the unit re-established in proper working order at its new elevation. Any material broken, destroyed, lost, or rendered unfit for reuse through carelessness, negligence, or improper handling of the work, shall be replaced by the Contractor without extra compensation. Concrete and brick masonry work shall conform to requirements of Sections 620 and 613, respectively. The Manhole frame and cover shall be raised or lowered using brick and mortar, concrete "donut" rings, cast iron riser ring, or Department approved equal.

6. Manhole Drop Connection.

Where required on the plans, a drop connection shall be constructed at manholes as detailed in the project plans and specifications. Piping for drop connections shall be ductile iron except where noted otherwise on the Plans.

(b) Excavation and Foundation.

The trench shall be excavated true to established lines and grades as shown on the project plans. Tunneling will not be permitted unless authorized in writing. Trenches shall be excavated at least 9 inches {230 mm} on each side of the pipe. Trenches shall be properly sheeted or braced wherever needed to prevent cave-in or loose soil from falling into the trench. Sides of the trenches shall be kept as near vertical as possible. Bell holes shall be excavated to insure that the pipe rests upon the bottom of the trench for its full length.

In the event that the bottom of the trench is in rock or is unsuitable material, the trench shall be excavated at a minimum of 6 inches {150 mm} below grade or as directed by the Engineer. The trench shall then be backfilled with crushed stone as specified in Section 853 up to the proper grade elevation.

All excavated material that is not suitable for use as backfill shall be removed from the project site or otherwise satisfactorily disposed.

The trench shall be dewatered to prevent standing or running water, and to allow for proper installation of the sewer.

(c) Laying.

The laying of pipe in finished trenches shall be started at the outlet end and shall be installed up grade with the spigot end pointing in the direction of flow. The pipe shall be laid to the line and grade shown on the project plans. The pipe shall then be examined to make sure that it is free of defects. Pipe shall be fitted and matched to form a sewer with a smooth, uniform invert. The pipe shall be installed in accordance with the pipe manufacturer's recommendations and as directed by the Engineer.

Pipes shall be lowered so as to avoid damage and unnecessary handling in the trench. The hubs and bells shall be clean when laid. The pipe shall be cleaned of debris and dirt when jointing the pipe. The end of the pipes shall be securely closed when laying is stopped for the night to prevent animals and water from entering the pipe.

Wyes or tees shall be installed along with lateral sewer pipe where designated on the project plans to connect existing or future services. When laterals are required on the plans or instructed by the Engineer, the lateral shall extend to the right-of-way line or as directed by the Engineer. When the lateral is not connected to an existing lateral, the end shall be plugged as specified by the Engineer.

Force Mains shall have a minimum cover of 36 inches {910 mm} and 48 inches {1.220 m} when under pavement. Concrete thrust blocks shall be placed along the force main at vertical and horizontal bends and fittings. The thrust block shall be poured against undisturbed earth.

Walking and working on or over the completed sewer line, except as necessary for backfilling and tamping, will not be permitted until at least 1 foot {0.3 m} of backfill is in place over the top of the pipe.

Air and vacuum valves for force mains shall be placed along the force main as required by the project plans.

(d) Joints.

All joints shall be sealed for the entire circumference of the pipe providing an acceptable watertight joint.

The installation of rubber or other type gasket joints shall be in accordance with manufacturer's recommendations and as directed by the Engineer. No joint shall be finished until the two next joints in advance have been placed. Any joint that is disturbed after jointing shall be removed, cleaned, and reinstalled.

Where a restrained joint is required on the project plans, locked mechanical joint retainer glands or restrained joint gaskets of adequate strength to prevent movement of the force main shall be used in addition to the concrete thrust block. Retainer glands shall be the type shown on the plans or designated by the Engineer and shall be installed in accordance with the Utility Company requirements.

(e) Backfilling.

Backfilling shall be performed immediately after inspection as directed by the Engineer to secure the pipe position prior to proceeding to the next section.

All trenches and excavations shall be backfilled with approved natural soil or, when directed by the Engineer, with foundation backfill material.

The backfill material shall be carefully deposited equally on both sides of the pipe in uniform layers not to exceed 6 inches {150 mm} in compacted thickness to a density of not less than 95 percent of AASHTO T99 maximum density. Backfill that is not under roadbeds shall be compacted as directed by the Engineer to be consistent with surrounding materials.

Where roadways and other crossings are disturbed by placing the sewer, the Contractor shall restore them to their original condition and shall replace all surface material and all paving, sidewalks, sod, or other disturbed surfaces, furnishing all necessary new materials without extra compensation except as provided in this section. Topsoil disturbed by excavation across private property shall be replaced as nearly as possible to its original position.

After completing the backfill, the Contractor shall promptly remove all surplus material, rubbish, and all equipment, leaving the site and adjacent areas in a neat and presentable condition.

(f) Connection to Existing Sewer System.

Connection to existing sewer shall be made as shown on the plans and as directed by the Engineer. Connection shall be made to minimize interruption of service. Where required to allow for continuous service, bypass pumping shall be performed and shall be incidental to the installation of the sanitary sewer.

Connection to an existing manhole shall be made by coring the manhole wall and installing a Engineer approved manhole pipe connector (boot). The void space around the boot and manhole shall be filled with non-shrinking grout.

Connection of dissimilar type pipes shall be made with a coupler or adapter as approved by the Engineer.

(g) Testing.

After completion of the installation of the sanitary sewer, all lines shall be tested. All lines shall be cleaned of dirt and debris prior to testing. Debris and dirt shall be removed from the sewer system and not flushed to the next segment of sewer.

The sanitary sewer and force main shall be either air tested or hydrostatic tested as required by the Engineer.

All manholes shall be tested as required by the project plans and specifications. Testing of manholes and structures shall be performed after curing of linings. Any leakage in the manhole or structure, before, during, or after the test shall be repaired by the contractor for no additional compensation.

645.04 Method of Measurement.**(a) Sewer Pipe.**

The actual accepted length of sanitary sewer and force main laid or re-laid will be measured in linear feet {meters} along the center of the line, complete in place.

(b) Fittings.

Ductile iron fittings will be measured by the fitting's weight in pounds {kg}. Bolts and other miscellaneous items will not be included in the weights. Payment will be based on the manufacturer's catalog weight of the supplied fitting.

(c) Stacks and Laterals.

The actual accepted length of service stacks and laterals will be measured in linear feet {meters} along the center of the line, complete in place.

(d) Abandon Existing Sanitary Sewer.

The abandonment of an existing sanitary sewer will be measured per linear foot of sanitary sewer abandoned.

(e) Sanitary Sewer Lateral Cleanout.

A sanitary sewer lateral cleanout will be measured per each complete cleanout required.

(f) Retainer Gland.

Retainer glands will be measured per each retainer gland required.

(g) Manhole.

Manholes will be measured per each as individual units including footing, bottom slab, bench, wall sections, cone, casting, and manhole cover. Manholes shall also include steps, lining, chimney seal, and inflow dish as shown to be required on the plans. The maximum height of the measurement of a manhole for payment will be 6 feet {2 m}. This will be measured from the top of the bottom slab to the top of the cover. The additional height of a manhole above 6 feet {2 m} that is required for raising or lowering a manhole will be measured in manhole units.

(h) Manhole Unit.

Manhole wall sections required to raise or lower an existing manhole, or lower a new manhole, will be measured per each manhole unit. The manhole unit will be in increments of 2 feet {610 mm} and shall match the structure being raised or lowered. Required increments that are less than 2 feet {610 mm} will be measured as a complete manhole unit.

(i) Manhole Cone Reset.

Manhole cone reset will be measured per each as one complete unit of the manhole cone shaped top section and manhole frame and cover requiring removal and replacement when raising or lowering the elevation of an existing manhole.

(j) Manhole Frame and Cover Reset.

Manhole frame and cover reset will be measured per each as one complete unit of the manhole frame and cover requiring removal and replacement when raising or lowering and existing manhole without the addition or removal of manhole units (less than two feet {610 mm}).

(k) Connection to Existing Manhole.

Connection to existing manhole will be measured per each connection.

(l) Abandon Existing Manhole.

The abandonment of an existing manhole will be measured per each manhole abandoned.

(m) Manhole Drop Connection.

Manhole drop connection will be measured per vertical foot {meter} of drop from entrance of the sewer pipe to the invert of the manhole including tee, bends, fittings, and pipe.

(n) Air and Vacuum Valve Assembly.

An air and vacuum valve assembly will be measured per each complete assembly as detailed in the project plans and specifications.

(o) Sanitary Sewer Lift Station.

A sanitary sewer lift station will be measured per each complete lift station.

645.05 Basis of Payment.

(a) Unit Price Coverage.

1. General.

Final acceptance of this work shall be subject to approval by the Utility Company involved, therefore, the Engineer may withhold payment for this work until the Contractor has obtained the Utility's written approval that the work performed complies with the local codes and requirements of the Utility Company.

2. Sewer Pipe.

The accepted length of sanitary sewer and force main laid or re-laid will be paid for at the respective contract unit prices for the types and sizes specified in the proposal including the excavation and backfilling which shall be payment in full for furnishing, hauling, excavating, foundation preparation, laying or relaying, backfilling, compacting, cleaning up, and for all materials, equipment, tools, labor, and incidentals necessary to complete the work except manholes, junction boxes, or like connecting masonry. Sanitary sewer pipe being re-laid shall mean removing and reusing the existing sewer pipe.

The contract unit price shall be for an embedment depth of 6 feet {1.8 m} or less below the existing ground line. The length of sanitary sewer pipe laid or re-laid, measured as provided above, at depths greater than 6 feet {1.8 m} below the existing ground line shall have an adjusted unit price, arrived at by increasing the contract unit price by the percentage indicated in the table below.

Depth Sewer Installed Below Existing Ground Line	Percentage Contract Unit Price Bid to be Increased
More than 6 feet {1.8 m}, but less than 10 feet {3 m}	25%
10 feet {3 m} and more, but less than 12 feet {3.7 m}	50%
12 feet {3.7 m} and more, but less than 16 feet {4.9 m}	75%
16 feet {4.9 m} and more	100%

3. Fittings.

Ductile iron fittings will be paid for at the contract unit price for each pound {kilogram} of fitting specified on the project plans which shall be payment for all labor, materials, equipment and incidentals necessary to furnish and install the size fitting required.

4. Stacks and Laterals.

Stacks and laterals will be paid for at the contract unit price for the types and sizes specified in the proposal and shall include all labor, materials, equipment, and incidentals necessary to extend the lateral from the main to the right-of-way or easement line. The unit price shall also include pipe, fittings, plugs, caps, backfilling, compacting, hauling and excavating.

5. Abandon Existing Sanitary Sewer.

The abandonment of an existing sanitary sewer will be paid for at the contract unit price for the sizes specified in the proposal which shall be payment in full for furnishing all labor material, equipment, tools, and incidentals necessary, including flow able backfill and end caps to abandon an existing sanitary sewer.

6. Sanitary Sewer Lateral Cleanout.

A sanitary sewer lateral cleanout will be paid for at the contract unit price for the size specified in the proposal which shall be payment in full for furnishing all labor material, equipment, tools, and incidentals necessary including single or double sweep tee, pipe, recessed nut cap, traffic loading cap when required, for a complete sanitary sewer cleanout.

7. Retainer Gland.

Retainer glands will be paid for at the contract unit price which shall be payment for all labor, materials, equipment and incidentals necessary to furnish and install one retainer gland. Retainer Glands may be used in lieu of restrained joint pipe upon which payment will be made for restrained joint pipe, not retainer glands.

8. Manhole.

A manhole will be paid for at the contract unit price for the sizes specified in the proposal which shall be payment in full for furnishing, hauling, excavating, backfilling, compacting, cleaning up, and for all materials, equipment, tools, labor, and incidentals necessary to complete the work.

9. Manhole Unit.

A manhole unit will be paid for at the contract unit price for the sizes specified in the proposal which shall be payment in full for furnishing, hauling, excavating, foundation preparation, backfilling, compacting, cleaning up, and for all materials, equipment, tools, labor, and incidentals necessary to complete the work. The removal and replacement of the manhole cone and frame and cover will be paid for under Manhole Cone Reset.

10. MANHOLE CONE SHAPED TOP SECTION (CONE) RESET.

A manhole cone reset, measured as noted above will be paid for at the contract unit price for Manhole Cone Reset, which shall be payment in full for all material, equipment, tools, labor, and incidentals necessary to complete the work herein specified. The unit price shall include the removal and reinstalling of the existing manhole cone section and manhole frame and cover.

11. MANHOLE FRAME AND COVER RESET.

A manhole frame and cover reset will be paid for at the contract unit price for Manhole Frame and Cover Reset, which shall be payment in full for all material, equipment, tools, labor, and incidentals necessary to complete the work.

12. CONNECTION TO EXISTING MANHOLE.

Connection to existing manhole will be paid for at the contract unit price which shall be payment in full for a manhole pipe connector (boot), all labor material, equipment, tools, and incidentals necessary to connect the new sanitary sewer pipe to an existing manhole.

13. ABANDON EXISTING MANHOLE.

Abandon existing manhole will be paid for at the contract unit price which shall be payment in full for all labor material, equipment, tools, and incidentals necessary including backfill to abandon an existing manhole.

14. MANHOLE DROP CONNECTION.

A manhole drop connection, measured as noted above will be paid for at the contract unit price for the type specified, which shall be payment in full for all pipe, tees, wyes, cleanout stack, materials, equipment, tools, labor, and incidentals necessary to complete the work.

15. AIR AND VACUUM VALVE ASSEMBLY.

An air and vacuum valve assembly will be paid for at the contract unit price for the size specified in the proposal which shall be payment in full for all labor, materials, equipment and incidentals necessary to furnish and install one air and vacuum valve assembly which shall include the box/manhole containing the valve.

16. SANITARY SEWER LIFT STATION.

A sanitary sewer lift station will be paid for at the contract unit price for each lift station specified in the proposal which shall be payment in full for all labor, materials, equipment and incidentals necessary to furnish and install one lift station. This shall include all items within the lift station limits shown on the plans including all piping, valves, valve boxes, pumps, wet well, buildings, fencing, grading, and site access when required.

(b) Payment Will Be Made Under Item No.:

- 645-A ___ inch {mm} * Sanitary Sewer ** Pipe Laid (***) - per linear foot {meter}
- 645-B ___ inch {mm} * Sanitary Sewer ** Pipe Relaid (***) - per linear foot {meter}
- 645-C Ductile Iron Fittings - per pound {kg}
- 645-D ___ inch {mm} Retainer Gland - per each
- 645-E ___ inch {mm} **** Stacks and Laterals - per linear foot {meter}
- 645-F Abandon ___ inch {mm} Existing Sanitary Sewer - per linear foot {meter}
- 645-G ___ inch {mm} Sanitary Sewer Lateral Cleanout - per each
- 645-H ___ inch {mm} Manhole - per each
- 645-I ___ inch {mm} Manhole Unit - per each

- 645-J Manhole Cone Reset - per each
- 645-K Manhole Frame and Cover Reset - per each
- 645-L ___ inch {mm} **** Manhole Drop Connection - per linear foot {meter}
- 645-M Connection to Existing Manhole - per each
- 645-N Abandon Existing Manhole - per each
- 645-O ___ inch {mm} Air and Vacuum Valve Assembly - per each
- 645-P Sanitary Sewer Lift Station - per each
- * Show Type of Pipe: Ductile Iron (DI), Polyvinyl Chloride (PVC), High Density Polyethylene (HDPE), High Performance Polypropylene (PP)
- ** Designate One Type: Gravity or Force Main
- *** Designate Restrained Joint if Required
- **** Show Type: Ductile Iron (DI); Polyvinyl Chloride (PVC)

SECTION 853 SANITARY SEWER PIPE, MANHOLES, AND APPURTENANCES

853.01 Ductile Iron Sewer Pipe.

Ductile Iron pipe shall meet the requirements of ANSI/AWWA C 151/A21.51 unless otherwise stated in the project specifications and plans. The pipe shall have an inner cement mortar lining meeting AWWA C 104 and an outer bituminous coating. The push-on joints shall meet the requirements of AWWA C 111. The flanged pipe joints shall meet the requirements of AWWA C 115. Restrained joints shall meet the requirements of AWWA C 110. Lock joint pipe shall meet the requirements of AWWA C 151. The pipe length shall be 18 - 20 feet {5.5 - 6.1 meters}.

853.02 Ductile Iron Fittings.

Ductile Iron fittings shall meet the requirements of AWWA C 110 or AWWA C 151 when approved by the Engineer. Fittings shall have an inner cement mortar lining meeting AWWA C 104 and an outer bituminous coating. The fitting shall have a minimum pressure rating equal to the pipe being installed.

853.03 Polyvinyl Chloride Sewer Pipe (PVC) and Fittings.

Pipe for pressure flow applications shall meet the requirements of ASTM D 2241 for SDR 17 or AWWA C 900 for DR 18 with a minimum cell classification 12454-B as defined in ASTM D 1784. Fittings for pressure flow applications shall be ductile iron meeting the requirements of AWWA C 110. Pipe and fittings for gravity flow applications shall meet the requirements of ASTM D 2665, ASTM D 3034 for SDR 35, or ASTM F949 with a minimum cell classification 12454-B as defined in ASTM D 1784. Marking tape shall be provided for all PVC force mains to allow for locating by location equipment.

853.04 High Density Polyethylene Pipe (HDPE) and Fittings.

HDPE pipe and bends shall meet the requirements of ASTM D 1248, ASTM D 3350 (Grade PE 3408), and ASTM F 714. The HDPE pipe shall have a minimum wall thickness determined by the depth of bury and loading on the pipe.

853.05 High Performance Polypropylene Pipe (PP) and Fittings .

PP pipe and bends shall meet the requirements of AASHTO M330. The PP pipe shall have a minimum wall thickness determined by the depth of bury and loading on the pipe. PP pipe shall be furnished from an approved producer. Approved producers are shown on List I-14, "Producers of High Performance Polypropylene Pipe" in the Department's "Materials, Sources and Devices with Special Acceptance Requirements" manual. Information concerning this list is given in Subarticle 106.01(f).

853.06 Handling and Storage of Pipe.

Pipe shall be handled, transported, delivered, and stored by methods that will not damage the pipe, coatings, or linings. Any pipe damaged or bent will be rejected even though previously inspected and found satisfactory, and shall be replaced or repaired at the Engineer's option, without additional

compensation. Coating or linings scratched shall be repaired in a satisfactory manner with appropriate material.

853.07 Joint Materials for Pipe.

Joint material shall provide a suitable waterproof joint capable of withstanding internal pressure of the system involved and be of an approved type.

853.08 Manholes.

Precast reinforced concrete manholes shall meet the requirements of ASTM C 478. The manhole shall consist of the base, riser, transition, and conical sections and shall have a minimal number of joints. The minimum nominal diameter of manholes shall be 48 inches {1220 mm} for pipe sizes less than 24 inches {600 mm}.

The aggregate shall be calcareous rock. Concrete used to cast manholes shall comprised with Type I/II or Type II cement only. The cone shaped top section shall be either conical or eccentric as required by the project plans and specifications. The top section of manholes less than 6 feet {1.82 m} in depth shall be flat concrete slabs and shall conform to the requirements of ASTM C 478. Basis of acceptance for flat slab tops shall be either proof of design testing or rational design calculations as described in ASTM C 478 and shall be submitted to the Engineer for review. Both cone shaped top sections and flat slab tops shall be designed to withstand a minimum H-20 wheel loading in accordance with AASHTO requirements. A black mastic joint sealer as approved by the Engineer shall be placed on top of the cone section of the manhole before setting the castings to prevent infiltration.

Manholes shall be supplied with pipe cutouts for all incoming and outgoing pipe. The pipe cutouts shall be fitted with flexible manhole pipe connectors (boots) that meet ASTM C 923 and as required by the Engineer.

Cast iron frames and covers shall conform to the Plans in all essentials of design. All castings shall fit the manholes properly. All castings shall be made of clean, even grain, tough gray cast iron. The quality of iron in the castings shall conform to the current ASTM A 48 for Class 30 gray iron castings. Frames and covers shall weigh not less than that shown on the Plans. The castings shall be smooth, true to pattern and free from projections, sand holes or defects and shall properly fit the manhole opening. The portion of the frame and cover which forms the cover seal shall be machined so that no rocking of the cover is possible. The castings shall be coated with coal tar pitch varnish. The cover shall have non-penetrating pick holes. On paved streets, the frame and cover shall be set flush with and in the plane of the paved surface.

Where shown on the plans or directed by the Engineer, sealed castings shall be of the bolted watertight manhole rings and covers and meet the above requirements.

Manhole steps shall be steel rods encased in polypropylene plastic and shall be as approved by the Engineer. Steps may be Type PS-1 or PS-2. Steps shall conform to the requirements of ASTM C 478. Manhole steps shall be driven into the wet wall during manufacture to prevent each from working loose or pulling out.

Manholes shall be constructed in the size, shape, and dimension as detailed in the Utilities Standard Drawings or on the plans.

853.09 Crushed Stone Foundation for Pipe and Manholes.

Crushed Stone shall be screened, washed and 100 percent shall be retained by a 1/4 inch {6 mm} sieve. Crushed stone shall have 100 percent passing a 1 inch {25 mm} sieve and shall be uniformly graded from maximum to minimum size. Foreign matter shall not exceed 3 percent by weight when dry.

853.10 Air and Vacuum Valve.

The air and vacuum valve for sanitary sewer shall permit unrestricted passage of air during filling of the force main and unrestricted entry of air during vacuum of the force main and rated for a minimum of 150 psi {1030 kPa}. The float shall be stainless steel. The valve shall not come into contact with the sewer. The valve shall have a National Pipe Thread (NTP) inlet and shall be fitted with back flushing device. The air and vacuum valve assembly shall be as detailed in the project plans and specifications.

ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: January 7, 2015

Special Provision No. 12-1315

EFFECTIVE DATE: April 1, 2015

SUBJECT: Bituminous Surface Treatments.

Alabama Standard Specifications, 2012 Edition, SECTION 401 shall be revised as follows:

SECTION 401 BITUMINOUS SURFACE TREATMENTS

401.02 Materials.

(a) BITUMINOUS MATERIALS, SECTION 804.

1. PRIME:

Item 1 of Subarticle 401.02(a) shall be replaced with the following:

1. PRIME:

Emulsified Asphalt	AE-P, CRS-1h, CMS-1hp, or NTSS-1HM
Cutback Asphalt	MC 30 or MC 70 for tight bases; MC 250, RC 70 or RC 250 for open bases.
Emulsified Petroleum Resin	EPR *

* This material shall not be used as a prime on processed reef shell base courses, crushed aggregate base courses, or rubblized concrete. This material shall not be left exposed for more than four days before placing a base layer of asphalt over it. This material shall also be supplied from the producer in the form in which it shall be placed. Material in a concentrated form that requires dilution after delivery will not be allowed.



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: April 24, 2015

Special Provision No. 12-1385

EFFECTIVE DATE: October 1, 2015

SUBJECT: Steel and Iron Products (Buy America).

Alabama Standard Specifications, 2012 Edition, SECTION 106 shall be revised as follows:

SECTION 106 CONTROL OF MATERIALS

106.01 Source of Supply and Quality Requirements.

(a) General.

1. Federal Participating Projects.

a. Steel and Iron Products.

Subitem 106.01(a)1a shall be replaced with the following:

a. Steel and Iron Products.

Steel/iron materials from the initial melting and mixing of these materials and all manufacturing processes including the stage of applying a coating to these materials (epoxy coating, galvanizing, painting, or any other coating that protects or enhances the value of the coated material) that are permanently incorporated into the completed project shall be produced domestically (in the United States, its territories, or possessions). If any part of the project (defined by and including the NEPA document) is funded by Federal-aid, then the entire project must meet the Buy America provisions, including utility relocation reimbursements for Federal-aid funds authorized after October 1, 2012.

If the dollar amount of the foreign source steel/iron is less than \$2,500 or 0.1% of the contract amount, whichever is greater, the foreign source steel/iron can be used in the project.

The Contractor shall provide certification that the steel/iron is domestically produced.



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: April 21, 2016

Special Provision No. 12-1597(2)

EFFECTIVE DATE: June 1, 2016

SUBJECT: Preformed Traffic Control Markings.

Alabama Standard Specifications, 2012 Edition, SECTION 703 and SECTION 856 shall be revised as follows:

SECTION 703 TRAFFIC CONTROL MARKINGS AND LEGENDS

703.01 Description.

This Section shall cover the work of placing permanent or temporary traffic control markings and legends at the locations shown on the plans or where directed by the Engineer. Preformed thermoplastic markings may be used for permanent striping, and for other circumstances as designated by the Engineer. This Section shall also cover the removal of existing or temporary traffic control markings and legends.

703.02 Materials.

(a) General.

Materials shall be furnished in accordance with the requirements given in Sections 856 and 857. The required dimensions, color, type of material and reflectivity will be shown on the plans.

The required type of material will be designated by "Class" and "Type" in accordance with the requirements given Section 701

Class 1H, Class 2, and Class 2T materials shall be in compliance with the formulations given in the tables in Section 856 for each class.

Class 1, Class 3, Class W, Preformed Traffic Markings, and Drop On Glass Beads shall be one of the materials shown on List V-3, Temporary Traffic Marking Materials, and List V-4, Permanent Traffic Marking Materials. These lists are in the Department's Manual, "Materials, Sources, and Devices with Special Acceptance Requirements". Information concerning these lists is given in Subarticle 106.01(f) and ALDOT-355.

Preformed traffic markings and legends shall also meet the requirements given in Article 856.09. All preformed traffic markings and legends shall meet the dimensions as shown in the plans and shall meet the tolerance requirements given in Item 703.03(c)1.

703.03 Construction Requirements.

(a) Acceptance Program for Traffic Marking Materials.

The guidelines for the evaluation and acceptance of traffic marking materials are given in the procedure ALDOT-420 "Acceptance Program for Traffic Marking Materials". These guidelines shall be followed in the furnishing and placement of traffic markings and legends.

(b) Temporary Traffic Markings and Legends.

Temporary traffic control markings and legends shall be furnished and placed in accordance with all of the requirements given in Section 701 for Temporary Traffic Stripe except for the placement tolerances for length and width. The length of the markings and legends shall be no greater than 2 inches {50 mm} over or 1 inch {25 mm} under the required length. The width of the markings and legends shall be no greater than 1/2 of an inch {12 mm} over or 1/2 of an inch {12 mm} under the required width.

(c) Permanent Traffic Markings and Legends.

1. **Applicator Applied Traffic Markings and Legends.**

Permanent traffic control markings and legends shall be furnished and placed in accordance with all of the requirements given in Section 701 for permanent traffic stripe except for the following:

- Any type of equipment may be used that produces acceptable results.
- Class 2 thermoplastic shall be placed to produce a minimum uniform thickness of 0.125 inches {3.0 mm}.
- The length of the markings and legends shall be no greater than 2 inches {50 mm} over or 1 inch {25 mm} under the required length.
- The width of the markings and legends shall be no greater than 1/2 of an inch {12 mm} over or 1/2 of an inch {12 mm} under the required width
- Beads may be hand placed.

2. **Preformed Traffic Markings and Legends.**

a. **General**

All preformed traffic markings and legends shall be applied in accordance with the manufacturer's recommendations. Preformed thermoplastic may be applied to asphalt and concrete surfaces. Asphalt pavement shall be allowed to cure for a period of 14 calendar days before the application of the thermoplastic. Concrete pavement shall be allowed to cure for a period of 30 calendar days before the application of the thermoplastic. All preformed traffic markings and legends shall be a minimum uniform thickness of 0.125 inches {3.0mm}.

b. **Surface Preparation Prior to the Application of Preformed Thermoplastic.**

Areas to be striped shall be thoroughly cleaned of all dirt, oil and other debris in a way that will not damage the pavement surface.

Curing compound on concrete surfaces shall be removed by grinding, wire brushing, sand blasting or other effective means.

Striping shall not begin until the Engineer has inspected the pavement surface and has informed the Contractor that striping may begin.

c. **Weather Conditions For The Application Of Preformed Thermoplastic.**

Preformed thermoplastic shall not be placed during rain or mist or if the pavement surface is wet. All preformed thermoplastic markings and legends shall be placed per the manufacturer's recommended directions. The Engineer shall be furnished a copy of these recommendations for installation inspection purposes.

d. **Composition Of Preformed Thermoplastic.**

The preformed thermoplastic shall consist of high quality materials, pigments and glass beads or other reflective material uniformly distributed throughout their cross-sectional area, with a reflective layer of spheres or other reflective material embedded in the top surface.

3. **Specialty Traffic Markings and Legends.**

Specialty Traffic Markings and Legends shall be placed where indicated on the plans and in accordance with the Special Drawings or plan details. Specialty Traffic Markings and Legends shall meet all of the requirements given in Subarticle 703.02(a) and Item 703.03(c)2.

(d) Retroreflectivity of Traffic Markings and Legends.

The white and yellow pavement markings shall attain an initial retroreflectance of not less than 250 mcd/lx·m². All pedestrian crosswalks, bike lane symbols and messages in a proposed bike lane shall attain initial retroreflectivity of not less than 250 mcd/lx·m².

The Engineer will measure the retroreflectivity of emplaced preform thermoplastic material for each color at 5 random locations throughout the project selected in accordance with the requirements given in ALDOT Procedure 210.

If the average of the 5 retroreflectivity measurements is 85 % of the target retroreflectivity, or greater, the stripe will be accepted without a price adjustment for retroreflectivity.

If the average of the 5 retroreflectivity measurements is less than 85 % and greater than 50 % of the target retroreflectivity, the stripe will be paid for at a percentage equal to the percentage determined from the measurements. For example, if the average of the measurements is 65 % of the target retroreflectivity, payment for the stripe will be 65 % of the contract unit price.

If the average of the 5 retroreflectivity measurements is 50 % of the target retroreflectivity, or less, the stripe shall be removed and replaced without extra compensation.

Any portion of the stripe that is determined by the Engineer to be noticeably inconsistent with the overall striping and measures less than 50 % of the target retroreflectivity shall be removed and replaced without extra compensation.

Retroreflectivity measurements will be made in accordance with the requirements given in ALDOT-422 with the exception of the sampling frequency. Measurements will be made between 7 and 30 calendar days after the completion of the placement of all stripe.

(e) Removing Markings or Legends.

The removal of traffic markings and legends shall be done in accordance with the requirements given in Section 701.

703.04 Method of Measurement.

The area of Traffic Control Markings or Legends (Items 703-A, 703-B, 703-H, and 703-I) complete in place and accepted will be the sum of the areas shown on the plans for each marking and legend constructed within the required placement tolerance.

The Removal of Traffic Control Markings or Legends (Item 703-C) shall be measured in the same manner as prescribed above except that it shall cover only the area from which the markings were actually removed.

The area of Temporary Traffic Control Markings or Legends, (Items 703-D and 703-E) complete in place and accepted, will be the sum of the areas shown on the plans for each marking and legend constructed within the required placement tolerance. No measurement for payment will be made for the removal of temporary markings or legends, the removal of such being classified as incidental to the Items of Temporary Traffic Control Markings and Temporary Traffic Control Legends.

703.05 Basis of Payment.

(a) Unit Price Coverage.

The accepted square feet {square meters} of Traffic Control Markings or Legends, Items 703-A, 703-B, 703-H, and 703-I, measured as provided above, will be paid for at the contract unit price bid which shall be full compensation for the item complete in place and includes the cleaning of the pavement, furnishing and applying the markings or legends, and for all materials, equipment, tools, labor and incidentals necessary to complete the work.

The accepted square feet {square meters} of Traffic Control Markings or Legends Removed, Item 703-C, measured as provided above, will be paid for at the contract unit price bid which shall be full compensation for the item complete in place and includes traffic control for removal, all necessary materials, equipment, tools, labor and incidentals necessary to complete the work.

The accepted square feet {square meters} of Temporary Traffic Control Markings or Legends, Items 703-D and 703-E, measured as noted above, will be paid for at the contract unit price bid which shall be full compensation for the item complete in place and includes the cleaning of the pavement, furnishing and applying the markings or legends, traffic control for placing, and for all materials, equipment, tools, labor and incidentals necessary to complete the work.

(b) Payment will be made under Item No.:

703-A Traffic Control Markings, Class _____, Type _____ - per square foot {square meter}

703-B Traffic Control Legends, Class _____, Type _____ - per square foot {square meter}

703-C Removal of Traffic Control Markings or Legends - per square foot {square meter}

703-D Temporary Traffic Control Markings - per square foot {square meter}

703-E Temporary Traffic Control Legends - per square foot {square meter}

703-H Specialty Traffic Control Markings - per square foot {square meter}

703-I Specialty Traffic Control Legends - per square foot {square meter}

SECTION 856 TRAFFIC MARKING MATERIALS

856.01 Acceptance Program for Traffic Marking Materials.

The guidelines for the evaluation and acceptance of traffic marking materials are given in the procedure ALDOT-420 "Acceptance Program for Traffic Marking Materials". These guidelines shall be followed in furnishing traffic marking materials.

856.02 Packaging and Labeling of Containers.

Traffic marking materials shall be shipped in containers that are plainly marked with the weight in pounds per gallon {kilograms per liter}, the volume in gallons {liters}, the color, user information, date of manufacture, lot and batch number. Each batch shall have a unique number. A statement of the percentage composition of the pigment, the proportion of pigment to vehicle, and the name and address of the manufacturer shall also be shown. The label shall contain any instructions for special handling or precautions for use of the material that are recommended by the manufacturer. Containers with inadequate identification and marking will not be accepted for use.

The date of manufacture and the shelf life shall be shown for materials that have a shelf life.

Preformed thermoplastic materials and permanent tape products shall be marked with content, color, date of manufacture and lot number.

856.03 Color and Luminance Factor

The materials for pavement stripe, markings and legends shall meet the performance requirements given in ASTM D 6628 as tested in accordance with the requirements given in ASTM E 1349 with the instrument set to read x, y and Y coordinates with 45 degree/0 degree by-directional geometry, observer angle 2 degrees, and illuminant D65 with the exception of the following:

The initial daytime chromaticity for yellow materials shall fall within the box created by the following coordinates:

Initial Daytime Chromaticity Coordinates (Corner Points)				
	1	2	3	4
X	0.498	0.557	0.479	0.438
Y	0.412	0.442	0.520	0.412

The initial daytime chromaticity for white materials shall fall within the box created by the following coordinates:

Initial Daytime Chromaticity Coordinates (Corner Points)				
	1	2	3	4
X	0.330	0.368	0.340	0.274
Y	0.300	0.366	0.393	0.329

White and yellow materials shall meet the following luminance factor requirements:

White: Daylight luminance factor at 45 degrees/0 degrees - 50 % minimum;

Yellow: Daylight luminance factor at 45 degrees/0 degrees - 35 % minimum.

856.04 Environmental Requirements.

All yellow materials using lead chromate pigments shall meet the criteria of non-hazardous waste as defined by 40 CFR 261.24 when tested in accordance with EPA Method 1311, Toxicity Characteristics Leaching Procedures (TCLP). The striping and marking material, upon preparation and installation, shall not exude fumes which are toxic, or detrimental to persons or property. All material using lead free pigments shall NOT contain either lead or other Resource Conservation and Recovery Act (RCRA) materials, in excess of the standard defined by EPA Method 3050 and 6010.

856.05 Glass Beads.

Glass Beads shall meet the requirements given in AASHTO M 247 and shall not contain greater than 200 ppm (total) for arsenic, 200 ppm (total) for antimony, and 200 ppm (total) for lead when tested according to US EPA Method 3052 and 6010. The manufacturer shall provide independent certified test results that the glass beads meet these requirements. Type 1, 3 and 4 glass beads used for drop on beads shall be coated with a bead coating that is compatible with the traffic marking material to which the glass beads will be applied and will provide adequate moisture proofing, increased adhesion, and optimum embedment of the glass beads. Beads used in the intermix (premixed with paint, thermoplastic or other striping materials) are not required to be coated.

Glass beads shall meet the gradations shown in the following table.

GRADATIONS OF GLASS BEADS, % PASSING DESIGNATED SIEVE						
Sieve Size *	Type of Gradation					
	Type 1	Type 3	Type 4	3M "Reflective Elements" S series	50 % Type 1 and 50 % Type 3 Intermixed	50 % Type 1, 37.5 % Type 3 and 12.5 % 3M "Reflective Elements" Intermixed
10			100	100		100
12		100	95 - 100	85 - 100	100	
14		95 - 100	80 - 95	70 - 96	95 - 100	95-100
16	100	80 - 95	10 - 40	50 - 90	85 - 100	85-100
18		10 - 40	0 - 5	5 - 60	55 - 75	50-75
20	95 - 100	0 - 5	0 - 2	0 - 25	40 - 60	45-55
25		0 - 2			40 - 60	
30	75 - 95			0 - 7	35 - 55	35-50
40						
50	15 - 35				5 - 25	5-20
80						
100	0 - 5				0 - 5	0-5

* Sieve analysis in accordance with the requirements given in ASTM D 1214

856.06 Class 1 Paint.

Class 1 paint shall be one of the materials shown on List V-4, Permanent Traffic Marking Materials. List V-4 is in the Department's Manual, "Materials, Sources and Devices with Special Acceptance Requirements". Manufacturers of Class 1 paint shall participate in ALDOT-420, "Acceptance Program for Traffic Marking Materials".

856.07 Class 1H High Build Paint.

Class 1H paint shall not be used after the expiration of the shelf life. The paint shall be easily stirred and mixed to a uniform consistency prior to use.

Manufacturers of Class 1H paint shall participate in ALDOT-420, "Acceptance Program for Traffic Marking Materials".

Class 1H High Build Paint shall meet the following requirements.

PHYSICAL AND PERFORMANCE REQUIREMENTS FOR HIGH BUILD TRAFFIC PAINT		
PROPERTY	VALUE	TEST METHOD
Acrylic Resin	100 % Rohm & Haas Rhoplex Fastrack HD-21A emulsion with 48.5 - 49.5 % solids content, or Dow DT 400NA acrylic emulsion with 49.5 - 51.5 % solids content, or an approved equal.	ASTM D 2743 Infrared Spectral Analysis
Nonvolatiles in Vehicle	42 % Minimum by Weight	ASTM D 215
No Track Time	Maximum of 10 minutes	ASTM D 711
Volatile Organic Content	Maximum of 1.25 Pounds per Gallon	ASTM D 3960
Pigment Content	Minimum of 55% by Weight Maximum of 62% by Weight	ASTM D 3723
Total Solids Content	Minimum of 73 % by Weight Maximum of 79 % by Weight	ASTM D 2369
White Pigment Content, Rutile Titanium Dioxide	Minimum of 1.0 Pound per Gallon	ASTM D 476
Yellow Pigment Content, Hansa Yellow (11-2400)	% minimum per manufacturer	-
Viscosity @ 77°F (25°C) Kreb Units	78 - 95	ASTM D 562
Density in Pounds per Gallon	White - 13.7 Minimum Yellow - 13.1 Minimum	ASTM D 1475
Scrub Resistance	Pass Minimum 300 cycles	ASTM D-2486
PH	9.6 Minimum	ASTM E 70
Daylight Reflectance %	White - 80 Minimum Yellow - 50 Minimum	ASTM E 1349

856.08 Class 2 and Class 2T Spray Applied Thermoplastic.

Thermoplastic shall be alkyd based materials. Manufacturers of Class 2 and Class 2T Thermoplastic shall participate in ALDOT-420, "Acceptance Program for Traffic Marking Materials".

Reflective glass beads shall be mixed into the thermoplastic as a part of the manufacturing process. The intermixed glass beads shall be either 50 % Type 1 and 50 % Type 3 beads or 50% Type 1, 37.5 % Type 3, and 12.5 % 3M "Reflective Elements". The pigment, glass beads and filler shall be well dispersed in the resin. The composition of Class 2 and Class 2T thermoplastic material shall be in accordance with the following.

COMPOSITION OF CLASS 2 and CLASS 2T THERMOPLASTIC (% BY WEIGHT)				
COMPOSITION	VALUE FOR WHITE	VALUE FOR YELLOW (Lead Free)	VALUE FOR YELLOW (Leaded)	TEST METHOD
Binder	20.0 % minimum	20.0 % minimum	20.0 % minimum	AASHTO T 250
White Pigment TiO ₂ , Type II Rutile	10.0 % minimum	-	1.5 % minimum	ASTM D 476
Glass Beads (Intermixed)	40.0 % minimum	40.0 % minimum	40.0 % minimum	AASHTO T 250
Yellow Pigment, Lead Chromate	-	N/A	5.0 % minimum *	AASHTO T 250
Yellow Pigment, Organic Pigment Yellow 83	-	% minimum per manufacturer **	N/A	-
Calcium Carbonate and Inert Filler (-200 mesh {-75 µm} sieve)	30.0 % maximum	37.5 % maximum	33.5 % maximum	ASTM D 1199
* Note: For yellow leaded thermoplastic markings the pigment shall be silica encapsulated lead chromate yellow, containing a minimum of 42 % lead.				
** Note: For yellow lead free markings the pigment shall be an organic pigment yellow 83. The lead free yellow thermoplastic material shall contain no more than 100 ppm of lead, cadmium, or hexavalent chromium.				

The physical requirements for the thermoplastic shall be in accordance with the following.

PHYSICAL REQUIREMENTS OF CLASS 2 and CLASS 2T THERMOPLASTIC (% BY WEIGHT)			
PROPERTY	MAXIMUM	MINIMUM	TEST METHOD
Water Absorption	0.5 %	-	ASTM D 570
Softening Point	-	195 °F {90 °C}	ASTM D 36
Low Temperature Stress Resistance	-	Pass	AASHTO T 250
Specific Gravity	2.3	1.9	ASTM D 792
Indentation Resistance	75	40	ASTM D 2240* Shore Durometer, A2
Impact Resistance	-	1.0 N·m	ASTM D 256, Method A
Flash Point	-	475 °F {245 °C}	ASTM D 92
*The durometer and panel shall be at 110 °F {45°C} with a 4.4 lb {2.0 kg} load applied. Instrument measurement shall be taken after 15 seconds.			

856.09 Preformed Thermoplastic

Preformed Thermoplastic shall be alkyd based materials. Manufacturers of Class 2 Preformed Thermoplastic shall participate in ALDOT-420, "Acceptance Program for Traffic Marking Materials".

Preformed Thermoplastic shall conform to all physical and composition requirements of Class 2 and 2T Thermoplastic with the exception that preformed Thermoplastic shall contain 30% intermix glass beads.

ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: October 16, 2015

Special Provision No. 12-1625

EFFECTIVE DATE: February 1, 2016.

SUBJECT: Award and Execution of Contract.

Alabama Standard Specifications, 2012 Edition, SECTION 103 shall be revised as follows:

SECTION 103 AWARD AND EXECUTION OF CONTRACT

103.01 Consideration of Proposals.

Article 103.01 shall be amended by adding the following paragraph.

For the purposes of Section 103, if the final calendar day specified falls on a weekend or holiday, the next business day will be the final calendar day.

103.04 Return of Proposal Guaranties.

All proposal guaranties, except those of the 3 lowest bona fide bidders, will be returned without undue delay after proposals have been checked, tabulated, and the relation to the proposals established. The proposal guaranty of the 3 lowest bona fide bidders will be returned as soon as the contract bonds and the contract of the successful bidder have been properly executed and approved. When the award is deferred for a period of time longer than 15 calendar days after the opening of the proposals, all proposal guaranties except those of the potentially successful bidders will be returned. Should no award be made, all guaranties will be returned. Should the successful bidder agree in writing to a stipulated extension in the time limit for award, the Director may, at his discretion, permit the successful bidder to substitute a satisfactory bidder's bond if a cashier's check was submitted with his proposal as a proposal guarantee. The Director reserves the right to return all proposal guaranties by registered mail and his responsibility shall end upon the mailing thereof.

103.05 Requirements of Contract Bonds.

(a) Performance Bond.

Subarticle 103.05 (a) shall be replaced by the following:

(a) Performance Bond.

The bidder to whom the award is made shall, within 15 calendar days after the prescribed forms have been presented to him for signature (i.e. after date of award), furnish and file with the Transportation Director an acceptable surety bond on the form included in the proposal in an amount equal to 100 percent of the contract bid price of the contract as awarded. Said bond shall be furnished by a surety company qualified and authorized to make such bonds in the State of Alabama, and countersigned by an authorized agent resident in the State who is qualified to execute such instruments. The bond shall have attached thereto power of attorney of the signing official unless such power of attorney is already on file in the office of the Department. In case of default on the part of the Contractor, all expense incident to ascertaining and collecting losses suffered by the State under the bond, including engineering, direct administration, and legal services, shall be charged against the contract bond for performance of the work.

(b) Labor, Materials, Services, Insurance, Feed Stuffs, or Supplies Bond.

Subarticle 103.05 (b) shall be replaced by the following:

(b) Labor, Materials, Services, Insurance, Feed Stuffs, or Supplies Bond.

In addition thereto, the bidder to whom the award is made shall, within the same 15 calendar days, execute and file with the Director an acceptable surety bond payable to the State in an amount not less than 100 percent of the contract bid price, with the obligation that the Contractor shall promptly make payment to all persons furnishing him or them with labor, materials, feed stuffs, services, insurance, bond, or supplies for or in the prosecution of the work, and for the payment of reasonable attorneys fees, incurred by successful claimants or plaintiffs in suits on said bond.

103.06 Execution of Contract.

Article 103.06 shall be replaced by the following:

103.06 Execution of Contract.

The contract shall be executed by the bidder to whom award is made, on the form included in the proposal, and returned to the Director with satisfactory contract bonds within 15 calendar days after the prescribed forms have been presented to him for signature (i.e. after date of award). Should extenuating circumstances prevail, the Director may grant an extension in time not exceeding five calendar days for the return of the contract and bonds as provided herein and in Article 103.05.

103.07 Approval of Contract.

Article 103.07 shall be replaced by the following:

103.07 Approval of Contract.

A period of 20 calendar days will be allowed for execution of the contract by the Director and approval of same by the Governor, after its presentation by the successful bidder, unless the successful bidder agrees in writing to a longer period. No contract is binding upon the State until it has been executed by the Director and approved by the Governor of the State. The date of the final execution of the contract shall be the date on which it is signed by the Governor.

ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: November 10, 2015

Special Provision No. 12-1655

EFFECTIVE DATE: March 1, 2016

SUBJECT: Roadway Pipe Culverts.

Alabama Standard Specifications, 2012 Edition, SECTION 530 and SECTION 846 shall be revised as follows:

SECTION 530 ROADWAY PIPE CULVERTS

530.03 Construction Requirements.

(c) Pipe Bedding.

5. Class C-1 Bedding.

Item 530.03(c)5 shall be deleted from the Standard Specifications.

(d) Placing Pipe.

3. Joining Pipe.

a. Rigid Pipe (Concrete, C.I.)

Subitem 530.03(d)3a shall be replaced with the following:

a. Rigid Pipe (Concrete, C.I.)

Rigid pipe may be of bell and spigot, tongue and groove, or other approved design unless a specific type is specified. The method of joining pipe sections shall be such that the ends are fully entered and the inner surfaces are reasonably flush and even.

Joints shall be sealed with bituminous plastic cement, preformed flexible sealant, rubber gaskets, or other type sealers that may be approved. Joints shall be thoroughly cleaned before being sealed and shall be sealed for the full circumference of the joint unless otherwise directed.

When joining round R.C. pipe, only rubber gaskets shall be used unless otherwise approved by the Engineer.

When bituminous plastic cement is used, the interior surface of the hub, beginning at the lip of the normal interior surface of the pipe, shall be coated with a layer of sealing material that will cover at least 0.33 times the distance, measured along the surface of the hub, parallel to the normal length of the pipe. The thickness of the mastic placed shall be such that it will provide a uniform seal between the edges of the pipe sections being joined (approximately 1/2 of an inch {10 mm} on the inside shoulder of the hub and approximately 1/8 of an inch {3 mm} of material on the remaining area to be covered).

When Pre-formed flexible sealant is used it shall be placed according to the manufacturers requirements.

No joint shall be considered satisfactory when the space between the edges of the pipes being joined exceeds 1/2 of an inch {10 mm} for more than 0.33 times the circumference of the pipe. The inside of the joint shall be wiped and finished smooth.

Rubber or other types of gaskets shall be installed as recommended by the manufacturer,

(e) Backfilling Pipe.

1. General.

Item 530.03(e)1 shall be replaced with the following:

1. General.

After the pipe has been installed, the pipe trench shall be backfilled with the best of the suitable material excavated from the trench; if none of this excavated material is suitable, material from the roadway shall be used and paid for as such, or suitable material shall be hauled in and used with payment being made under the classification of the material ordered used. For backfilling above a point 1 foot {300 mm} above the top of the pipe, material from the trench may be used unless unsuitable for embankment.

Backfilling will not be permitted until authorized by the Engineer.

2. Placing and Compaction of Backfill.

Item 530.03(e)2 shall be replaced with the following:

2. Placing and Compaction of Backfill.

The backfill material shall be compacted at near optimum moisture content, in layers not exceeding 6 inches {150 mm} compacted thickness, to a density of not less than 95 percent of AASHTO T 99 density by methods detailed in Section 210. Mechanical tampers shall be used unless another method of compaction is approved in writing; inundation or jetting will not be permitted unless specified on the plans. Care shall be exercised to thoroughly compact the backfill under the haunches of the pipe and to insure that the material is in intimate contact with the pipe. The backfill shall be brought up evenly in layers on both sides of the pipe for its full length until the trench is filled or up to subgrade elevation if the trench is in cut.

When the plans require stone or aggregate backfill, the material will be compacted (in layers not exceeding 6 inches) to the satisfaction of the Engineer. Mechanical tampers or vibrator plate compactors shall be used unless another method of compaction is approved in writing.

When the top of the pipe is exposed above the top of the trench, embankment material shall be placed and compacted for a width on each side of the pipe equal to at least twice the horizontal inside diameter of the pipe, or 12 feet {4 m} whichever is less. The embankment on each side of the pipe, for a distance equal to the horizontal inside diameter of the pipe, shall be of the same material and compacted in a normal manner. All pipe, after being bedded and backfilled as specified in this Section, should be protected by a 3 foot {0.6 m} cover of fill before heavy equipment is permitted to cross during construction of the roadway.

SECTION 846 PIPE CULVERT JOINT SEALERS

846.01 Rigid Pipes.

Article 846.01 shall be replaced by the following:

846.01 Rigid Pipes.

(a) General.

Allowable joint materials will be determined based on the shape of the pipe culvert as given in the table below.

Pipe Culvert Shape	Allowable Joint Materials
Round	Rubber Gasket
Arch, Horizontal Elliptical, and Precast Culverts	Rubber Gasket, Bituminous Plastic Cement, or Preformed Flexible Joint Sealant

Note: The joint sealing material requirements of this specification are provided to insure the installed pipe joints provide a soil tight performance. If a more stringent joint performance requirement is deemed necessary during the design phase, the Engineer may specify other materials or a different combination of materials specified above.

(b) Bituminous Plastic Cement.

Bituminous Plastic Cement meeting the Specifications noted in this Section may be used on joints for Arch and or Horizontal Elliptical Pipe and Precast box culverts.

This Specification covers a bituminous joint sealing compound which may be applied cold for sealing the joints of bell and spigot or tongue and groove storm or culvert pipe. Material furnished shall be composed of a steam-refined petroleum asphalt dissolved in a suitable solvent and stiffened with a mineral filler .

Properties: The Bituminous Plastic Cement shall be a smooth uniform mixture, not thickened or livered, and it shall show no separation which cannot be easily overcome by stirring. The material shall be of such consistency and properties that it can be readily applied with a trowel, putty knife, or caulking compound gun without pulling or drawing. When applied to the joint surfaces, it shall exhibit good adhesive and cohesive properties. The material shall meet the following requirements:

1. When applied in a layer 1/16 to 1/8 inch {1.5 mm to 3 mm} thick on a tinned metal panel and cured at room temperature for 24 hours, the Bituminous Plastic Cement shall set to a tough, plastic coating, free from blisters.		
	Minimum	Maximum
2. Grease Cone Penetration	175	250
3. Unit Weight {Unit Mass}, pounds per gallon {kilograms per liter}	9.75 {1.17}	-
4. Non-Volatile	70	-
5. Ash, by ignition, by weights {masses}	15	45
Tests: Methods of tests shall be in accordance with the following:		
Grease Cone Penetration	AASHTO T 187	
Non-Volatile	ASTM D 2939	
Ash	ASTM D 128	

(c) Preformed Flexible Joint Sealant

Preformed Flexible joint sealant meeting the requirements of this Section may be used on joints for Arch and or Horizontal Elliptical Pipe and Precast box culverts. This material shall meet the latest requirements of ASTM C990 “Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants”. The material shall be installed per the manufacturer’s recommendations.

(d) Rubber Gaskets.

Rubber gaskets shall be used on all round pipe joints. This material shall meet the latest requirements of ASTM C443 “Standard Specification for Joints for Concrete Pipe and Manholes Using Rubber Gaskets”. The material shall be installed per the manufacturer’s recommendations.

(e) Other Types of Joint Sealers.

External wrap joint sealant meeting the Specifications noted in this Section may be used in addition to and combination with joint material as specified in Subarticle (a) above. This material if or when used shall meet the latest requirements of ASTM C877 “Standard Specification for External Sealing Bands for Concrete Pipe, Manholes, and Precast Box Sections”. The material shall be installed per the manufacturer’s recommendations.

Other types of joint sealers or gaskets with proven satisfactory performance records may be considered by the Department for use on individual contracts on a trial basis.



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: August 29, 2016

Special Provision No. 12-1657(3)

EFFECTIVE DATE: November 1, 2016

SUBJECT: Weight (Mass) Measure for Pay Purposes.

Alabama Standard Specifications, 2012 Edition, SECTION 109 shall be revised as follows:

SECTION 109 MEASUREMENT AND PAYMENT

109.01 Measurement of Quantities

(h) Weight {Mass} Measurements

2. Weight {Mass} Measure for Pay Purposes.

Item 109.01(h)2 shall be replaced with the following:

2. Weight {Mass} Measure for Pay Purposes.

If material is shipped by rail, the car weight {mass} may be accepted provided that only the actual weight {mass} of material is paid for and is certified by a car weight {mass} obtained from a certified scale after the unloading. However, car weights will not be accepted for steel reinforcement, structural steel or materials that are to pass through a mixing plant.

Trucks used to haul material being paid by weight shall be measured empty daily, with the driver in the truck, to establish a daily tare weight. Each truck shall also bear a plain legible identification number.

Commercial materials, except reinforcing steel and structural steel, which are measured by weight {mass} for pay purposes shall be measured by a qualified "Weighmaster*" using acceptable weight tickets. As a minimum, the weight ticket shall contain the following:

- 1) Name of the Contractor and material producer.
- 2) Project Number and County.
- 3) Truck number.
- 4) Contract item number and item name.
- 5) Date and time of loading.
- 6) Gross, tare, and net weights.
- 7) Weighmaster's signature (May be electronically generated).
- 8) Any additional information as required of the Contractor or material producer for participation as a Qualified Source as given in the Department's "Materials, Sources and Devices with Special Acceptance Requirements" manual unless furnished on a separate applicable BMT Certificate of Compliance.

For measurement systems capable of measuring net weight directly from the measuring hopper, the gross and tare weights will not be required. In lieu of bulk weight, the Department will accept weights of materials normally sold in bagged form (i.e. fertilizers, cement, etc.).

The Engineer will make at least one unannounced independent weight check for every three months of operation with at least one per project for each material delivered under the weighmaster program. Each check will include a check of both the gross and the tare weights {masses}. For these weight checks, the Contractor shall make necessary arrangements, meeting the approval of the Engineer, for the use of independent scales certified in accordance with Item 109.01(h)1.

It shall be the sole responsibility of the Contractor to insure that a weight {mass} ticket is delivered to the project with each load. Weight tickets will not be accepted after the truck has left the project.

*Weighmasters must be qualified in accordance with the provisions of Section 8, Chapter 16, of the Code of Alabama, 1975, or in case of material purchased out of State complying with the appropriate State laws, rules and regulations for Weighmasters of the State involved. A copy of the "Weighmaster's Certificate" shall be furnished the Engineer and additionally a copy shall be displayed in a conspicuous place in the vicinity of the measuring operations.

ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: January 25, 2016

Special Provision No. 12-1726

EFFECTIVE DATE: February 1, 2016

SUBJECT: Cargo Preference Act (Federal-Aid Projects).

Alabama Standard Specifications, 2012 Edition, SECTION 106 shall be revised as follows:

106.01 Source of Supply and Quality Requirements

(a) General.

1. Federal Participating Projects.

A new Subitem c shall be added as follows:

c. Cargo Preference Act.

Materials or equipment that are acquired solely for a Federal-aid project must comply with the requirements of 46 CFR 381. Clauses 46 CFR 381.7(a)-(b) are hereby incorporated into these Specifications by reference.



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: May 12, 2016

Special Provision No. 12-1799

EFFECTIVE DATE: August 1, 2016.

SUBJECT: Mobilization.

Alabama Standard Specifications, 2012 Edition, SECTION 600 shall be revised as follows:

SECTION 600 MOBILIZATION

600.04 Method of Measurement.

(a) Partial Payment.

Subarticle 600.04(a) shall be replaced with the following:

(a) Partial Payment.

Measurement of the item of Mobilization will be on a unit basis for each project or combination of projects included in a single contract. When more than one project is included in one contract, the amount of payment to be made will be based on the percent complete and amount of the entire contract, not the percent complete and amount of each individual project. Once the amount of payment is determined, based on the entire contract, this amount will then be prepared for payment on each individual project based on the percentage of the total contract of which the project is a part.

Partial Payments for mobilization are based on the amount bid for mobilization and the total original contract amount for all items of work. Payments will be made at the time, and in the amounts shown in the following schedules.

SCHEDULE OF PARTIAL PAYMENTS FOR MOBILIZATION WHEN THE CONTRACT BID PRICE FOR MOBILIZATION IS LESS THAN, OR EQUAL TO 12 % OF THE ORIGINAL CONTRACT AMOUNT (Partial Payments are a % of the Contract Amount for Mobilization)		
TIME OF PAYMENT	AMOUNT OF PAYMENT	ACCUMULATED PAYMENT
First Estimate	20 % of the Bid Price for Mobilization	20 % of the Bid Price for Mobilization
After the First Estimate and Upon Completion of 5 % of the Original Contract Amount Excluding Prior Payment for Mobilization	50 % of the Bid Price for Mobilization	70 % of the Bid Price for Mobilization
After the First Estimate and Upon Completion of 50 % of the Original Contract Amount Including Prior Payment for Mobilization	30 % of the Bid Price for Mobilization	100 % of the Bid Price for Mobilization

SCHEDULE OF PARTIAL PAYMENTS FOR MOBILIZATION WHEN THE CONTRACT BID PRICE FOR MOBILIZATION IS GREATER THAN 12 % OF THE ORIGINAL CONTRACT AMOUNT (Partial Payments are a % of the Original Contract Amount, Except the Final Payment)		
TIME OF PAYMENT	AMOUNT OF PAYMENT	ACCUMULATED PAYMENT
First Estimate	2 % of the Original Contract Amount	2 % of Total Contract Amount
After the First Estimate and Upon Completion of 5 % of the Original Contract Amount Excluding Prior Payment for Mobilization	6 % of the Original Contract Amount	8 % of Total Contract Amount
After the First Estimate and Upon Completion of 50 % of the Original Contract Amount Including Prior Payment for Mobilization	4 % of the Original Contract Amount	12 % of Total Contract Amount
At Acceptance for Maintenance per Item 105.15(c)3.	Remainder of Contract Amount for Mobilization	100 % of Contract Amount for Mobilization

The total sum of all payments shall not exceed the original contract amount bid for the item of Mobilization, regardless of the fact that the Contractor may have, for any reason, shut down his work on the project or moved equipment away from the project and then back again.

ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: October 19, 2017

Special Provision No. 12-2109(2)

EFFECTIVE DATE: December 1, 2017

SUBJECT: Delay Begin Work Date.

Alabama Standard Specifications, 2012 Edition, SECTION 108 shall be amended as follows:

SECTION 108 PROSECUTION AND PROGRESS

108.08 Determination of Contract Time.

(b) BEGINNING AND END OF CONTRACT TIME.

Subarticle 108.08(b) shall be replaced by the following:

(b) BEGINNING AND END OF CONTRACT TIME.

Contract time charges shall begin when the Contractor begins work on a pay item or incidental work that will interfere with traffic, but in no case later than **90 calendar days** after date of issuance of notice to proceed. Time charges shall end upon satisfactory completion of all pay items in the contract.



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: June 21, 2017

Special Provision No. 12-2318

SUBJECT: Cooperation with Utility Companies, Project No. ACOA59443-ATRP (017),
Tuscaloosa County

Alabama Standard Specifications, 2012 Edition, SECTION 105 shall be amended as follows:

SECTION 105 CONTROL OF WORK

105.05 Cooperation with Utilities and Non-Highway Public Facilities.

This Article (105.05) amended by deleting paragraph two and substituting the following in lieu thereof:

The Contractor's attention is directed to the various utilities that are involved on this project as designated on the plans. It shall be the Contractor's responsibility to contact the various utility owners and determine the exact location of all existing utilities on the project, whether shown on the plans or not.

The relocation, adjustment, or retention of all utilities have been authorized, but the nature or conditions on the project are such that it will, or may be, necessary for various utility forces to work on the project while construction of the project is underway. The Contractor shall cooperate with the utility owners and their forces at all times which may require the Contractor to delay or interrupt his work at some locations, shift his forces from one location to another, and exercise such other reasonable means as may be directed to cooperate with the utility forces and prosecute construction of the project at the same time.

Listed below are the utility companies that will be relocating or adjusting their facilities prior to and/or during the construction of this project.

ALABAMA POWER COMPANY

The required relocations, which will be performed by Alabama Power Co., consist of pole and overhead line relocations. Alabama Power has stated that this relocation will be completed prior to construction of the roadway project.

AT & T

The required relocations, which will be performed by AT&T, consist of overhead line relocations. AT&T has stated that this relocation will be completed prior to construction of the roadway project.

COMCAST

The required relocations, which will be performed by Comcast, consist of overhead line relocations and a ground mounted cabinet. Comcast has stated that this relocation will be completed prior to construction of the roadway project.

ALAGASCO

The required relocations, which will be performed by Alagasco, consist to two underground line relocations to avoid a conflicting proposed drainage inlets. Alagasco has stated that this relocation will be completed prior to construction of the roadway project.

The above is considered inherent to the work on this project and no request for time extensions or claims for reimbursement by the Contractor due to any delays, inconvenience, or damages caused by utilities or utility forces, within the noted time frames, will be considered by the Department.

ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: June 26, 2017

Special Provision No. 12-2330

SUBJECT: Ornamental Handrail, Project No. ASOA59443-ATRP(017),
Tuscaloosa County.

Alabama Standard Specifications, 2012 Edition, shall be amended by modifying SECTION 517 as follows:

SECTION 517 BRIDGE AND SIDEWALK HANDRAIL

517.02 Materials.

Article 517.02 shall be replaced by the following:

517.02 Materials.

Materials used in fabrication and installation shall conform to the applicable Section of the Specifications that the structure to which the railing is to be attached was constructed, the details shown on the plans, and the following:

Handrail: If a type of handrail is not shown to be required in the pay item description the handrail shall meet the material requirements shown on the plans.

Galvanized Steel Pipe Handrail: Galvanized steel pipe shall meet the requirements of ASTM A 53, Grade B; this grade of pipe to include rail elements and post.

Steel shapes, plates, and accessories shall be structural or alloy steel galvanized in accordance with AASHTO M 111.

Bolts, nuts, washers, and other fasteners shall be galvanized in accordance with AASHTO M 232, Class C, with nuts tapped after galvanization in accordance with AASHTO M 291 {M 291M}.

Galvanized Steel Handrail: Galvanized steel shall be structural or alloy steel, hot dipped galvanized after fabrication in accordance with AASHTO M 111.

Bolts, nuts, washers, and other fasteners shall be galvanized in accordance with AASHTO M 232, Class C, with nuts tapped after galvanization in accordance with AASHTO M 291 {M 291M}.

Beam Type Handrail. Beam type handrail shall meet the requirements for beam guardrail as provided in Sections 630 and 864.

Ornamental Handrail shall meet the requirements shown on the plans.

Aluminum or Galvanized Steel Sidewalk Handrail: Material for use in aluminum or galvanized steel sidewalk handrail shall meet the requirements specified on the plans.

Concrete Handrail: Concrete handrail shall be cast-in-place type conforming to the appropriate requirements of Section 501 and the details shown on the plans.

Posts for Beam Type Handrail: Steel posts shall meet the requirements of Sections 836 and 864.

Timber posts shall be creosote-treated in accordance with Section 833.

517.05 Basis of Payment.

(b) PAYMENT WILL BE MADE UNDER ITEM NO.:

Subarticle 517.05(b) shall be replaced by the following:

(b) PAYMENT WILL BE MADE UNDER ITEM NO.:

517-A * Handrail - per linear foot {meter}

517-B Beam Type Handrail, Type Posts - per linear foot {meter}

517-C Type Railing Stair Railing - per set

517-D Aluminum/Galvanized Steel Sidewalk Handrail - per linear foot {meter}

* Galvanized Steel, Galvanized Steel Pipe, Cast-In-Place Concrete, Ornamental, etc.,

if required.

ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: June 26, 2017

Special Provision No. 12-2331

SUBJECT: Traffic Signals. Project No. ASOA59443-ATRP(017), Tuscaloosa County.

Alabama Standard Specifications, 2012 Edition, shall be amended by replacing Section 730 and Section 890 as follows:

SECTION 730 TRAFFIC SIGNALS

730.01 Description.

This Section shall cover the work of furnishing and installing of traffic signal control equipment. These requirements may be supplemented or amended by the requirements given elsewhere in the specifications, or on the plans and Special and Standard Highway Drawings.

Descriptions and definitions of the equipment, words and terminology used in the furnishing and installing of traffic signal control equipment are given in the Manual of Uniform Traffic Control Devices (MUTCD) publications of the Institute of Transportation Engineers (ITE), the National Electrical Manufacturers Association (NEMA), the National Electrical Code (NEC), and the International Municipal Signal Association (IMSA).

730.02 Materials.

All materials furnished for use shall conform to the requirements given in Section 890, shown on the plans, or listed in the ALDOT "Materials, Sources, and Devices with Special Acceptance Requirements Manual" (MSDSAR). All furnished materials and equipment shall be new and free from defects. Existing equipment shall only be used if shown on the plans to be re-used.

730.03 Construction.

(a) DESIGN AND CONSTRUCTION CODES AND COORDINATION OF THE WORK.

1. CODES.

All installations shall comply with the regulations of the latest edition of the National Electrical Code and the latest edition of the National Electrical Safety Code, and with the service rules of the Utility Company providing the electricity.

2. STRUCTURE DESIGN AND CONSTRUCTION.

Structures for the support of traffic signal control equipment shall be designed, furnished and installed in accordance with the requirements given in Sections 718 and 891.

3. COORDINATION OF THE WORK.

Coordination of the work with roadway and bridge work will be of prime importance to prevent undue damage to completed items of work and existing facilities. Any damage to existing facilities caused by the installation of the material or equipment required under this Section shall be repaired by the Contractor at no additional cost to the Department.

4. ELECTRICAL POWER.

The entity that will be responsible for the eventual operation and maintenance of the traffic signal unit and intersection lighting will make application for electrical service upon notification that power service will be required. The Contractor shall inform the Engineer when power service is required at least 30 calendar days prior to the need of the power service. This same entity will be responsible for the cost of the service connection and the monthly service billings thereafter. Power shall be single phase, 240 Volt, provided through a transformer that is not tapped to provide power to any other equipment.

(b) TRAFFIC SIGNAL TECHNICIAN.

Technician(s) responsible for the performance of the work shall be certified by the IMSA as an IMSA Traffic Signal Level II Field Technician. The Contractor shall submit a copy of the IMSA certification to the Engineer with the first Material Submittal that is submitted for approval. The technician(s) shall be in possession of the certification at all times and show this certification as often as asked by the Engineer.

Certified Traffic Signal Technicians shall be present and shall have direct involvement with all work required for the installation and operational testing of electrical materials and equipment (conduit, boxes, conductors, etc.). At least one out of every three persons in a crew shall be a certified IMSA Traffic Signal Level II Field Technician.

(c) DRAWINGS AND SPECIFICATIONS.

Omissions from the plans and specifications or errors in the details of work which are evidently necessary to carry out the intent of the plans and specifications or which are customarily performed, shall not relieve the Contractor from performing such omissions and details of work. In any case of discrepancy in descriptions on the plans or in these Specifications, the matter shall be promptly submitted to the Engineer, who will make a determination in writing. Any adjustments in the plans, details, specifications, and proposal by the Contractor without written permission of the Engineer shall be at the Contractor's own risk and expense.

(d) MATERIAL AND EQUIPMENT LISTS, SHOP DRAWING AND APPROVAL.

Material and equipment listings shall be submitted to the Design Bureau's Traffic Design Section for approval within 30 days after the issuance of the "Notice to Proceed". Partial listings and shop drawings will not be accepted for consideration and shall be returned for correction without review.

Five copies of each submittal shall be furnished for review. Material and equipment lists shall include catalog cutouts or published data sheets and shall be completed on the Department's Material Submittal Form. The submittal form shall have each item sequentially numbered, a reference to the Specification Section and/or plan sheet, and a description of the material. The description shall include the type, model number, catalog number, and manufacturer, and shall include a legible manufacturer's catalog cut sheet with each item being submitted clearly identified. All individual components of assembled equipment (cabinets, controllers, etc.) shall be itemized on the submittal form. Submittals shall be clear and complete. Pay Items are not to be referenced on the form.

Unacceptable items on the submittal form will be returned for corrective action. A copy of the approved material and equipment listings will be returned to the Contractor.

Any changes to the approved material and equipment lists must be requested in writing through proper channels.

If requested by the Engineer, the Contractor shall submit for inspection and approval samples of both the specified and proposed substitute items at no cost to the Department. The Department will not be liable for any materials purchased or work done or any delay incurred before such approval. Failure of the Engineer to note unsatisfactory material as received will not relieve the Contractor from responsibility. Manufacturers' warranties and guaranties furnished on equipment used in the work shall be delivered to the Engineer; likewise, instruction sheets and parts lists shall be delivered to the Engineer upon receipt of the equipment.

Throughout the entire project, the same manufacturer shall make all units of any one item, such as poles, signal heads, detectors, controllers, cabinets, etc.

Reference to a particular product by manufacturer, trade name, or catalog number establishes the quality standards of material and equipment required for this installation and is not intended to exclude products equal in quality and similar in design. Whenever any article, material, or equipment is defined by using the name of a manufacturer or vendor, the term "or approved equal" if not inserted, shall be implied.

(e) APPROVED TRAFFIC CONTROL DEVICES AND MATERIALS.

Some materials and equipment required to be furnished under this Section will be standard production type products. Acceptance will be made by the Engineer based on selected confirmation tests, the manufacturer's certification of the materials and equipment, and visual inspection at the job site. The manufacturer shall make available to the Department test data and material samples

from the production runs for use in evaluation of these items. Title 32, Chapter 5A, Subsection 36 of the Code of Alabama states that all traffic control devices shall be approved by the Transportation Director before they can be used, sold, or offered for sale. Approved devices are shown on the Department's MSDSAR.

(f) AS-BUILT DRAWINGS.

After all equipment has been installed and the operational check has been initiated, the Contractor shall submit a set of plans showing in detail all changes on construction from the original plan details with special notation given to conduit location and elevation and schematic circuit diagrams.

(g) OPERATIONAL MANUALS.

Operation manuals and as-built wiring diagrams shall be furnished for all equipment and accessories required in the controller cabinet. These manuals and wiring diagrams shall be mounted to the cabinet in an appropriate manner. In addition, two copies of these manuals and wiring diagrams shall be transmitted to the Department's Area Traffic Engineer.

(h) PRE-INSTALLATION TEST (BENCH TEST).

Before the installation of the traffic control system(s) or unit(s), the Contractor shall perform an equipment bench test. This test shall include all controllers, monitors, and other cabinet equipment as required under signal load conditions for a minimum of seven consecutive days.

The Contractor shall secure an acceptable site, approved by the Engineer, for the bench test and shall perform all work required in the performance of the test. The Contractor shall notify the Engineer of the date that the test is to begin a minimum of seven days before that date. The Engineer will schedule an inspection of the equipment with the Area Maintenance Engineer in coordination with the State Signal Shop. The bench test shall not begin until the Area Maintenance Engineer has given approval after the State Signal Shop has verified and inspected the equipment to be used.

None of the equipment shall be installed on the project until the bench test has been completed and the Contractor has submitted a letter to the Engineer certifying that the equipment performed satisfactorily during the test. Any equipment failure during this time shall be corrected, and the bench test time shall be restarted. There will be no direct payment to the Contractor for the cost of the pre-installation test including the cost of a suitable test site and the setting up of equipment for the test.

(i) REMOVAL OF EQUIPMENT.

All equipment designated or directed to be removed shall be removed in such a manner that the removed equipment will not be damaged. Any damage due to negligence on the part of the Contractor because of lack of proper care of equipment shall be cause for the Engineer to order its replacement. The cost of replacement shall be borne fully by the Contractor. Any equipment or materials not authorized by the Engineer for re-use into a new facility shall be stored by the Contractor until the Engineer directs that they be delivered by the Contractor to the Department at the time and location designated by the Engineer. Storage facilities shall be provided so that the equipment will be protected from the elements and damage by vandalism.

(j) CONCRETE FOUNDATIONS.

The Engineer will inform the Contractor of the exact diameter and depth of concrete foundation required at each signal pole foundation. The Engineer will also inform the Contractor of any changes that are required to the size and number of reinforcing bars required at each signal pole foundation. This information will be given to the Contractor at the completion of the review of the Contractor's submittal of designs and details of the signal pole structures.

All conduit systems, elbows, etc., shall be installed securely and inspected by the Project Manager before concrete is poured.

The Contractor shall contact the utility companies to determine the location of underground utilities in the area where the foundations are to be located and shall be responsible for repairing, to the satisfaction of the utility company, any damaged utilities.

(k) ABANDONING FOUNDATIONS.

All foundations, when abandoned, the top of the foundation, anchor bolts frame and conduit shall be removed to a depth of not less than 12 inches {300 mm} or as directed below the surface of existing pavement. The resulting hole shall be backfilled with material to match the existing surface.

(l) INTERCONNECT CABLE.

1. GENERAL.

Interconnect cable wire shall be installed at locations as shown on the plans or as directed by the Engineer.

Splices shall be made only where shown on the plans or in the controller cabinet.

A minimum of 6 feet {1.8 m} or as directed, of slack shall be provided at each cabinet.

2. UNDERGROUND INTERCONNECT CABLE.

Underground interconnect cable shall be run in conduit.

3. AERIAL INTERCONNECT CABLE.

Aerial interconnect cable shall be supported on new or existing utility poles and/or signal poles as shown on the plans.

Interconnect support cable wire supporting signal control cable only will be sagged to a vertical distance not greater than 2 percent of the length of the span between poles.

When support cable is not an integral part of the interconnect cable, interconnect cable shall be attached to a support wire.

(m) ELECTRICAL POWER SERVICE ASSEMBLY.

The location of the utility service point and power source shown on the Signalization Plans is approximate. The Contractor shall determine the exact location.

When the service equipment is to be installed on a utility-owned pole, the Contractor shall furnish and install conduit, photoelectric control unit, conductors, and other necessary material to complete the installation of the service. The position of the riser and equipment will be determined by the utility.

When a lateral drop is required from the power source to the service pole, the Contractor shall arrange with the serving utility to complete the service connections. The Contractor shall install the conduit, conductors, enclosure and accessories, and service pole.

As a minimum, the electrical power service equipment shall consist of:

- a weatherhead;
- 1 inch {27 mm} metallic conduit from weatherhead to a disconnect switch;
- a disconnect switch installed 6 feet {2 m} high, including, but not limited to the enclosure, load center complete with circuit breaker in a NEMA Type 4 enclosure, Masterlock Size #3, Key #3210 (for Statewide uniform access);
- 1 inch {27 mm} metallic conduit from disconnect switch to a designated depth below the ground line;
- attachment hardware;
- ground rod and related equipment;
- service cables;
- No. 8 AWG service cable for any required luminaires;
- attachment to local utility;
- all incidentals required to provide power service to the controller assembly and luminaires.

(n) SPAN WIRE.

The installation of span wire shall meet all provisions of the National Electric Safety Code (ANSI-C2) regarding clearance from electric lines.

The length of the messenger wire shall be adjusted under the load of traffic control equipment so that the sag at the lowest point shall not be greater than the requirements in Section 718.

(o) VEHICULAR AND PEDESTRIAN SIGNAL HEADS.

Vehicular or pedestrian signal heads shall not be installed until all other signal equipment, including the controller, is in place and ready for operation except that signal heads may be installed if no face of the head is directed toward traffic or if the entire assembly is hooded.

Each signal face shall be so adjusted vertically and horizontally in order that its beams will be of maximum effectiveness to the approaching traffic for which it is intended.

(p) TRAFFIC DETECTION SYSTEMS.

1. INDUCTIVE LOOP.

a. Installation of Loop Wire.

Before cutting required loops into the pavement, any existing loops that are not quadrupole loops shall be sawed in two locations and quadrupole loops shall be sawed in three locations on the long side to prevent false readings when the required loops are placed into the pavement. Loop wire outside the sawcut shall be twisted 3 turns per foot.

Loop wire shall be one continuous run without splices.

Loop wire shall be pushed to the bottom of the saw cut with a non-metallic tool that will not damage the insulation.

Each loop wire shall be placed in its own individual sawcut to the edge of pavement.

No portion of the loop shall be located within 3 feet {1 m} of any conductive material in the pavement such as manhole covers, water valves, and grates, etc.

After installation of the loops, the slots shall be sealed with an approved sealant manufactured specifically for embedding loop detector wire in concrete or bituminous pavements.

All loop connectors shall be connected to a shielded home-run cable located in junction box or when so directed or shown on plans at base of traffic signal strain pole.

b. Sawcuts for Loops.

Slots for installing the loops shall be formed by sawing with approved equipment designed for sawing pavement, to the width and depth indicated by the plan details or directed.

The slot shall be cleaned of all foreign loose debris using compressed air or other approved means before installation of the loop wires.

Sawcut corners shall be cut at a diagonal. No sharp bends shall be accepted.

Loops shall be tested prior to sealing sawcuts. Loop sealant shall be placed in sawcuts in accordance with manufacturer's recommendations.

Loop sealant will not be permitted when there is moisture on the surface, the air temperature is below 40 °F {4.4 °C}, or other conditions exist that in the opinion of the Engineer would affect the bonding of the material.

c. Loop Detector Lead-In.

A separate run of shielded home-run cable shall be provided for each loop unless otherwise directed by the Engineer.

Lead-in cable installed underground shall be in conduit. The lead-in shall be one continuous run from controller to loop connection with no splices.

d. Testing Loops.

The Contractor shall perform a leakage to ground test on all loops using a MEG-OHM meter with 500 V applied. The loops shall also be tested after the lead-ins are pulled to the amplifier to detect any damage done during installation. A State Inspector will perform this same test to check for leakage. Any loop failing to read 100 MEGS or better shall be replaced by the Contractor at no additional cost to the project.

2. VIDEO DETECTION SYSTEM (VDS).

The Contractor shall furnish and install all equipment, materials, software and other miscellaneous items that are required to provide a fully functional Video Detection System for the control of vehicular and pedestrian traffic signals.

The Contractor shall establish the configuration of the required traffic detection zones within each controller cabinet up to a maximum of 26 detection zones per controller. The Contractor shall notify the Engineer prior to software configuration and detector zone setup in ample time to allow the Engineer to observe this work. There will be no additional payment made for the relocation of cameras that may be required to achieve the required configuration.

The VDS shall detect the presence of a vehicle in the zones with at least 95 % accuracy at any time during the day.

The Contractor shall have a qualified representative of the supplier of the VDS to be present at the site of the installation to verify that all equipment and materials are being installed correctly. The representative of the VDS supplier shall be available to address all issues of concern that the Engineer may have.

All coaxial cable and power cable shall be one continuous pull without splices between the camera mounting location and the traffic controller cabinet.

3. RADAR DETECTION SYSTEM.

The Contractor shall establish the configuration of the required traffic detection zones within each controller cabinet. The Contractor shall notify the Engineer prior to software configuration and detector zone setup in ample time to allow the Engineer to observe this work. There will be no additional payment made for the relocation of the microwave sensors that may be required to achieve the required configuration.

All communication, data, and power cabling shall be one continuous pull without splices between the radar mounting location and the traffic controller cabinet or wireless relay point.

4. MAGNETOMETER DETECTION SYSTEM.

The Contractor shall install the required traffic sensors in the roadway to produce the required vehicular detection for each location/zone. Sensors that communicate via a hard-wire connection shall be spliced in the junction box using an approved, water tight splice kit to the home-run cable, without splices, back to the cabinet. For wireless sensors, the Contractor shall verify the communication of the sensors to the system to ensure the sensors are set-up properly before connecting the system to the controller. The Contractor shall notify the Engineer prior to software configuration and detector setup in ample time to allow the Engineer to observe this work. There will be no additional payment made for the relocation or addition of sensors that may be required to achieve the required detection.

5. PEDESTRIAN PUSH-BUTTON SYSTEM.

The Contractor shall install the required pedestrian push-buttons in accordance with the locations shown on the plans. These devices shall be tested to ensure that they are working properly before connecting them to the controller.

6. PRIORITY CONTROL DETECTION SYSTEM, TRAFFIC SIGNAL PREEMPTION.

A priority control detection system shall provide communication to the traffic signal controller that will allow the controller to run a modified signal timing plan to allow an emergency vehicle or another priority vehicle to pass through a roadway intersection with as little delay as possible. The priority control system shall be either acoustically (sound) activated, optically activated, or GPS (Global Positioning System) activated. The system shall include all mounting hardware, wiring, detection sensors, signal control devices and miscellaneous materials required to provide a fully functional priority control system for traffic signal preemption. The system shall be capable of providing preemption information to the standard NEMA TS1, NEMA TS2, Type 170, and Type 2070 traffic controllers used by ALDOT.

A four hour training session shall be provided for as many as ten attendees. The Contractor shall arrange for the training to be provided by a representative of the manufacturer of the priority control detection system. Training shall be instruction in the proper installation, operation, maintenance, and programming of the priority control detection system.

A training course outline shall be submitted to the Engineer for approval by ALDOT Maintenance Bureau Traffic Operations Engineer. Training will not be scheduled by the Engineer until the course outline is approved. Training shall be performed both in the field and in the office. The Contractor shall schedule the training during the time frame designated by the Engineer. The Contractor shall provide a minimum of a seven calendar day advance written notice of the scheduling of the training to allow the Engineer to arrange attendance. A training notebook shall be provided to each trainee in a labeled three-ring binder.

(q) INSTALLATION OF CONDUIT.

Metallic conduit shall be used above ground and may be used below ground.

Non-metallic conduit shall only be used underground.

Where non-metallic conduits join metal conduits, connection shall be made using appropriate couplings to form a watertight raceway. All conduits entering concrete foundations shall be provided with appropriate bushings at the ends. Conduits shall be stubbed approximately 1 inch {25 mm} above concrete and shall be provided grounding type bushings on conduit ends in base of poles with copper bonding jumpers.

Bends and offsets shall be avoided where possible, but where necessary, shall be made with a proper hickey, pipe bender, or conduit bending machine. Conduit that has been crushed or deformed due to improper bending or handling shall not be installed.

Conduits shall be installed in a manner to insure against trouble from collection of trapped condensation where possible.

Conduits shall be capped to prevent entrance of deleterious materials during construction. For underground conduit adjacent to gasoline service stations or other installations of underground gasoline or diesel storage, piping or pumps, and which lead to a cabinet, circuit breaker panel, service or any enclosure where an arc may occur during normal operation, the Contractor shall refer to the National Electrical Code (NEC) for Class 1, Hazardous Locations.

Conduit for future use shall be threaded and capped.

All conduit installed under paved areas shall be encased.

Encasement shall meet the requirements of Section 756 and shall be a Type 1, Type 2, or Type 5 installation as shown on the plans.

If the Contractor should encounter extraordinary circumstances such as major utilities under existing pavement which the location cannot be accurately determined, he may request in writing permission to open cut a trench in lieu of jacking or boring. This request shall also include detailed proposed sequence of excavating, backfilling, method of handling traffic, etc. for the Engineer's consideration. No such work shall be performed without written permission of the Engineer.

All conduit systems shall be completely installed before the conductors are installed.

(r) LUMINAIRES.

The light control surfaces and lens shall be cleaned after installation.

Cleaning shall be performed in accordance with luminaire manufacture's recommendations.

Luminaires shall be leveled, plumbed, and installed as per the manufacturer's recommendations and as directed by the Engineer to achieve the most suitable light pattern.

(s) WIRING INSTALLATION REQUIREMENTS.

Wiring within junction boxes shall be neatly arranged and laced.

Powdered soapstone, talc, or other approved lubricant may be used in pulling cable in conduit.

All cables within a single conduit shall be pulled at the same time.

All ends of cable shall be taped to exclude moisture and shall be so kept until splices are made and terminal appliances attached.

The ends of spare conductors shall be taped.

All conductor splices that will be direct buried in earth and all loop detection conductor splices shall be soldered and encased in an approved splicing kit and with sealing tape.

All other signal conductor splices shall be spliced using a twisted connection made by a suitable wire nut or crimp and then properly covered by insulating tape or other insulating materials.

(t) GROUNDING ENCLOSURES.

All metal enclosures containing electric wires and/or equipment shall be bonded to the chassis ground.

Ground rods shall be installed at all service equipment and traffic signal pole foundations.

Single ground rods shall be driven vertically until the top of the rod is at least 12 inches {305 mm} below the finished grade.

Where a grounding conductor passes through a metal conduit, a suitable grounding bushing shall be placed on each end of the conduit and connected to a ground wire.

Each messenger cable shall be attached to the supporting structure with separate span wire clamps.

(u) EXCAVATING AND BACKFILLING.

All excavation required for the installation and placement of conduits, foundations, junction boxes, poles and other appliances shall be performed in such manner as to cause the least possible

injury to pavement, curbs or other improvements. All conduits required under pavement, sidewalks, etc. shall be in place prior to commencing of base and paving operations. The trenches shall not be excavated wider than necessary for the proper installation of the electrical appliance and foundations. Excavating shall not be performed until immediately before installation of conduit and other appliances. The material from the excavation shall be placed in a position where the least interference with the surface drainage will occur.

Should large rocks be encountered in conduit trenches, they shall be removed to a depth of 3 inches {75 mm} below the proposed elevation and replaced with a 3 inch {75 mm} layer of suitable material. All suitable material removed from the conduit trenches shall be used in backfilling of the trenches; however, no stone larger than 3 inches {75 mm} shall be in contact with any conduit.

All surplus excavated material shall be removed from and disposed of by the Contractor, as directed by the Engineer.

Excavations, after backfilling, shall be kept well filled and maintained in a smooth and well-drained condition until permanent repairs are made.

Compaction shall be accomplished to the extent necessary to prevent future settlement of the backfill.

The Contractor will be required to restore any areas disturbed by his work to their original condition without additional cost to the State.

(v) INSULATION, CIRCUIT CONTINUITY AND GROUND RESISTANCE TESTING.

1. INSULATION TESTING.

Isolation test for testing insulation resistance shall be performed for each conductor in the cable. Testing shall be made using Article 110-19 of the NEC, as a guide. If resistance measured with all protective devices in place is less than 250,000 Ω , the contractor shall remove the defective cable, install new cable, and repeat the test.

For interconnect cable, upon completion of run from one controller installation to the next controller installation, the Contractor shall conduct a test for insulation resistance in the presence of the Engineer.

2. CIRCUIT CONTINUITY TEST.

Each circuit branch shall be temporarily jumpered at its termination and the temporarily loop circuit measured for continuity to assure that no open circuits exist, that the circuit branch is according to plan, that no high resistance connections exist and that each circuit is properly identified. Each circuit shall be marked with typed labels. Lead-in cable for loop detector wire shall be tested before and after the cable is spliced to the loop wire. As an alternative, circuit continuity testing of signal head cable may be done by applying 120 V to each outgoing circuit and observing that only the proper lamps are lighted.

3. GROUND RESISTANCE TEST.

At each ground rod location, a test shall be made. The effectiveness of the ground rod shall be determined by measuring resistance from the pole enclosure to a convenient underground water line, with a 0-50 ohm megger where a water line is available and with auxiliary ground method where the water line is not available. The two auxiliary ground rods shall be not less than 50 feet and 100 feet {15 m and 30 m}, respectively, from the tested rod. If reading is greater than 5 ohms, additional rods shall be installed until a reading of 5 ohms or less is obtained.

(w) OPERATIONAL CHECK AND ADJUSTMENT OF EQUIPMENT.

A full operational check of the installed traffic control system shall be performed under actual traffic conditions. Before the operational check is allowed to begin the Engineer will arrange for an inspection of the installed traffic control equipment by the Maintenance Engineer in coordination with the State Signal Shop. The Engineer will obtain the approval of the Maintenance Engineer to begin the operational check.

The period of operational check shall cover 30 calendar days. During the test period the Contractor shall expeditiously perform any necessary adjustment and replace any malfunctioning parts of the equipment required to place the system in an acceptable operational condition. Once repairs have been started, the Contractor shall have the traffic control equipment in an acceptable operational condition before leaving the project site. No extra compensation will be allowed for any

work so required, such being considered incidental to furnishing and installing a complete operational signal system.

During the test period, time charges shall be suspended if all other work has been completed and acceptance of the work is dependent upon the results of the "operational check." The period of the test shall cover 30 continuous calendar days.

In case of emergency or failure on the Contractor's part to expeditiously pursue repairs, the Department reserves the right to make such repairs as it deems necessary. The cost for this work will be deducted from the contract bid amount for the project. The Department will not assume responsibility for the repairs or alter any of the requirements of the test period because of the repairs. The aforementioned shall in no way relieve the Contractor of his liability or responsibility related to maintaining the traffic signal as required by these specifications.

730.04 Method of Measurement.

(a) REMOVAL OF TRAFFIC CONTROL UNIT.

The removal of all traffic control equipment at an intersection or other location designated on the plans will be measured as a Lump Sum, Removal of Traffic Control Unit. Removal of only some of the equipment will be measured as a Lump Sum, Removal of Traffic Control Unit (Partial). Removal of a temporary installation of traffic control equipment will be measured as a Lump Sum, Removal of Traffic Control Unit (Temporary). (Pay Item 730-A)

(b) FURNISHING AND INSTALLING TRAFFIC CONTROL UNIT.

Where separate pay items are not listed for the traffic control equipment required at a single intersection or other location designated on the plans, all of the traffic control equipment, including the electrical power service equipment, will be measured for payment as a Lump Sum, Furnishing and Installing Traffic Control Unit.

(c) SUMMARY OF TRAFFIC CONTROL EQUIPMENT PAY ITEMS.

Traffic control items of work will be measured for payment in accordance with the following:

- Pay items 730-A, C, S, U and Y will be measured per lump sum.
- Pay items 730-D, E, F, G, J, K, N, O, P, Q, R, and T will be measured per each.
- Pay items 730-H, I, L, and M will be measured per linear foot {meter}.

730.05 Basis of Payment.

(a) UNIT PRICE COVERAGE.

Item 730-A. The accepted work for the removal of existing traffic control units will be paid for at the contract unit price which shall be full compensation for the satisfactory removal and storage of the equipment and materials ordered removed, and shall include all equipment, tools, labor, services, storage facilities and incidentals necessary to complete the work.

Item 730-C. The furnishing and installing the traffic control unit will be paid for at the contract unit price, which shall be full compensation for the furnishing of the equipment, installation in accordance with these Specifications, plans, proposal, and details, and for all tools, equipment, labor, materials, operational facility connected to the local utility.

Item 730-D. LEDs installed to replace incandescent lamps in existing traffic signals will be paid for at the contract unit price which shall be full compensation for the furnishing all materials, equipment, testing, tools, and labor required to install a fully functional LED in an existing traffic signal head.

Item 730-E. A Metal Traffic Signal Pole Foundation will be paid for at the contract unit price (adjusted to account for changes in size and reinforcement) which shall be full compensation for excavation, backfilling, forming, concrete, reinforcing steel, anchor bolts, ground rods, seeding and mulching of disturbed areas, disposal of debris and for all materials, labor, equipment, tools, testing, services and incidentals necessary to complete this item of work.

The bid price shall be for a 3'-0" {910 mm} diameter by 10'-0" {3.05 m} deep foundation. A larger foundation may be required. The reinforcing steel required for a larger foundation is shown on the plans. Compensation for a larger foundation will be made in accordance with the following cost adjustments.

COST ADJUSTMENT MADE TO BID PRICE FOR CHANGE IN FOUNDATION SIZE *			
("+" plus figures are price increases)			
Foundation Depth	Foundation Diameter		
	3'-0" {910 mm}	3'-6" { 1.07 m}	4'-0" {1.22 m}
10'-0" {3.05 m}	\$0	+\$450	+\$1200
11'-0" {3.35 m}	+\$100	+\$600	+\$1400
12'-0" {3.66 m}	+\$200	+\$750	+\$1600
13'-0" {3.96 m}	+\$300	+\$900	+\$1800
14'-0" {4.27 m}	+\$400	+\$1050	+\$2000
15'-0" {4.57 m}	+\$500	+\$1200	+\$2200
16'-0" {4.88 m}	+\$600	+\$1350	+\$2400
17'-0" {5.18 m}	+\$700	+\$1500	+\$2600
18'-0" {5.49 m}	+\$800	+\$1650	+\$2800

* Adjustments include compensation for changes to the reinforcing steel that are shown on the plans for larger foundations.

The bid price adjustment shown above includes compensation for all work and materials (including reinforcing steel) necessary to construct the required foundation in accordance with the plan details. The Engineer may increase the amount of reinforcing steel from what is shown in the plan details. When the amount of reinforcing steel is increased from what is shown in the plan details, the bid price will be adjusted. The adjustment will be \$1.00 per pound { \$2.20 per kg } for the amount of reinforcing steel that is increased.

Item 730-F. A Metal Traffic Signal Pole with Mast Arm Assembly will be paid for at the contract unit price which shall be full compensation for furnishing and installing the metal traffic signal pole and mast arm assembly and for all materials, equipment, tools, labor, services, and incidentals necessary to complete this item of work. The required foundation shall be measured separately with payment being made under Item 730-E.

Item 730-G. A Traffic Signal Strain Pole will be paid for at the contract unit price which shall be full compensation for furnishing and installing the traffic signal strain pole, and for all materials, equipment, tools, labor, services, and incidentals necessary to complete this item of work. The required foundation shall be measured separately with payment being made under Item 730-E.

Item 730-H. Loop Wire will be paid for at the contract unit price which shall be full compensation for the saw cutting, loop wire, loop sealant, trenching, backfilling, electrical connections, splicing, and for all materials, labor, equipment, and tools to provide a complete and operational loop detector.

Item 730-I. Loop Detector Lead-In Cable will be paid for at the contract unit price which shall be full compensation for furnishing and installing the shielded home-run cable, including electrical connections and for all materials, equipment, tools, labor, testing, and incidentals necessary to provide a complete and operational detector loop.

Item 730-J. A Vehicle Loop Detector will be paid for at the contract unit price which shall be full compensation for furnishing and installing the loop detector amplifier, electrical connections and for all materials, equipment, tools, labor and incidentals necessary for a complete and operational loop detector amplifier.

Item 730-K. A Traffic Signal Junction Box will be paid for at the contract unit price which shall be full compensation for furnishing and installing the junction box, excavation, concrete, backfilling, and for all materials, labor, equipment, tools, and incidentals necessary to complete this item of work.

Item 730-L. Conduit will be paid for at the contract unit price which shall be full compensation for furnishing and installing the conduit including fittings, trenching, placing, joining, attaching to structure, backfilling, seeding and mulching of disturbed areas, disposal of debris, and all materials, labor, equipment, tools and incidentals necessary to complete this item of work.

Item 730-M. Interconnect Cable will be paid for at the contract unit price which shall be full compensation for furnishing and installing the interconnect cable with the number of conductors and type as designated by the plans, including all hardware for aerial installation, connecting to

controller assemblies, splicing, electrical connections, and for all materials, testing, labor, equipment, tools, and incidentals necessary for a complete and functional interconnect cable.

Item 730-N. A Luminaire Extension Assembly will be paid for at the contract unit price which shall be full compensation for furnishing and installing the luminaire arm, sodium vapor or LED luminaire, surge arrestor, connections, ground rod, No. 10 AWG, cable, and for all materials, labor, equipment, tools, and incidentals necessary for a complete and operational luminaire.

Item 730-O. Illuminated School Zone, Speed Limit Signs will be paid for at the contract unit price which shall be full compensation for furnishing and installing the illuminated school zone sign including all attachment hardware, connections, and for all materials, labor, equipment, tools, and incidentals necessary for a complete operational illuminated school zone speed limit sign.

Item 730-P. A Vehicular Signal Head will be paid for at the contract unit price which shall be full compensation for furnishing and installing the vehicular signal head, trunnions, brackets, attachment hardware, connections, splicing, and for all materials, labor, equipment, tools, and incidentals necessary for a complete and operational vehicular signal head.

Item 730-Q. A Pedestrian Signal Head will be paid for at the contract unit price which shall be full compensation for furnishing and installing the pedestrian signal head including attachment hardware, electrical connections, splicing, and for all materials, labor, equipment, tools, and incidentals necessary for a complete and operational pedestrian signal head.

Item 730-R. A Controller Assembly will be paid for at the contract lump sum price which shall be full compensation for furnishing and installing the cabinet, controller unit, auxiliary devices, electrical devices, surge protection, terminals, concrete foundation or side mounting hardware, mounting and wiring of controller assembly, and for all materials, labor, equipment, tools, testing, and incidentals necessary for a complete and operational controller assembly.

Item 730-S. Traffic Signal Preemption will be paid for at the contract lump sum price which shall be full compensation for furnishing and installing all mounting hardware, wiring, detection sensors, signal control devices, software (when required), testing and miscellaneous materials required to provide a fully functional priority control system for traffic signal preemption. If software and training is required it will be shown in the pay item description. Payment for training shall be full compensation for training personnel, supplies, equipment, materials, user manuals, handouts, travel, and subsistence necessary to conduct the training.

Item 730-T. A Wood Pole will be paid for at the contract unit price which shall be full compensation for furnishing and installing the wood pole, excavating, backfilling, attachment hardware, grounding, weatherhead, guy wire, and for all materials, labor, equipment, tools, and incidentals necessary to complete this item of work.

Item 730-U. Detection Systems will be paid for at the contract unit price which shall be full compensation for the following systems:

1. Video Detection System. Cameras, lenses, enclosures, mounting brackets, video, communication, and power cabling, power supplies, lightning protection; manuals and documentation and for all labor, materials, tools, equipment, transportation and incidentals necessary for a complete and operational vehicle detection system. The contract unit price shall also be full compensation for furnishing and installing the vehicle detection system processor, interface panel, and for all integration (including software setup and programming and adjusting detection zones).
2. Radar Detection System. Radar units, enclosures, mounting brackets, communication and power cabling, power supplies, lightning protection; manuals and documentation and for all labor, materials, tools, equipment, transportation and incidentals necessary for a complete and operational vehicle detection system. The contract unit price shall also be full compensation for furnishing and installing the vehicle detection system processor, interface panel, and for all integration (including software setup and programming and adjusting detection zones).
3. Magnetometer Detection System. Magnetometers, communication equipment, enclosures, mounting brackets, communication and power cabling, power supplies, lightning protection; manuals and documentation and for all labor, materials, tools, equipment, transportation and incidentals necessary for a complete and operational vehicle detection system. The contract unit price shall also be full compensation for furnishing and installing

the vehicle detection system processor, interface panel, and for all integration (including software setup and programming and adjusting detection zones).

4. Hybrid Detection System. Combination Video/Radar units, enclosures, mounting brackets, communication and power cabling, power supplies, lightning protection; manuals and documentation and for all labor, materials, tools, equipment, transportation and incidentals necessary for a complete and operational vehicle detection system. The contract unit price shall also be full compensation for furnishing and installing the vehicle detection system processor, interface panel, and for all integration (including software setup and programming and adjusting detection zones).

Item 730-Y. Pedestal Pole and Foundation will be paid for at the contract unit price which shall be full compensation for the following:

1. Installation. Furnishing, fabricating, galvanizing, assembling and erecting a complete and operational roadside flashing beacon or a complete and operational illuminated school zone sign; including sign and vehicular signal head or illuminated school zone sign, installing foundations, furnishing and placing anchor bolts, and hardware; controller; wiring, power source; connection to local utility and equipment, materials, labor, tools and incidentals to provide a complete and operational flashing beacon or illuminated school zone sign assembly.
2. Relocation. Removing the flashing beacon assembly or illuminated school zone assembly, removing existing foundations, installing new foundations; furnishing and placing anchors; hardware; excavation and surface placement; furnishing, fabricating, and installing new components as required and replacing the assembly on its new foundation with all manipulations and electrical work; controller; power source; connection to local utility; loading and hauling; and equipment, materials, labor, tools, and incidentals.
3. Removal. Removing the roadside assembly components including the power service equipment; removing the foundations; storing the component to be reused or salvaged; backfilling and surface placement; loading and hauling, and equipment, materials, tools, labor, and incidentals.

(b) PAYMENT WILL BE MADE UNDER ITEM NO.

730-A	Removal of Existing Traffic Control Unit (1) (2) - per lump sum
730-C	Furnishing and Installing Traffic Control Unit (2) - per lump sum
730-D	LED Replacement Lamp - per each
730-E	Metal Traffic Signal Pole Foundation - per each
730-F	Metal Traffic Signal Pole with (3) Mast Arm Assembly - per each
730-G	(4) Traffic Signal Strain Pole - per each
730-H	Loop Wire - per linear foot {meter}
730-I	Loop Detector Lead-In Cable - per linear foot {meter}
730-J	Vehicle Loop Detector - per each
730-K	Traffic Signal Junction Box - per each
730-L	(5), (6), Conduit - per linear foot {meter}
730-M	Interconnect Cable, (7), (8) AWG, (9), (10) - per linear foot {meter}
730-N	Luminaire Extension Assembly, (11) feet {meters} (12) - per each
730-O	Illuminated School Zone Speed Limit Sign - per each
730-P	Vehicular Signal Head, (13) Inch {mm}, (14) Section, Type (15) - per each
730-Q	Pedestrian Signal Head, Type (16) - per each
730-R	Controller Assembly, Type (17), (18) phase - per each
730-S	(19) Traffic Signal Preemption (20) (21) (2) - per lump sum
730-T	Wood Pole - per each
730-U	(22) Detection System (2) - per lump sum
730-Y	(23) Pedestal Pole and Foundation with (24) - per lump sum

- (1) Specify Partial or Temporary if required
- (2) Specify Intersection Location
- (3) Specify Length of Mast Arm
- (4) Specify Type (Metal or Concrete)

- (5) Specify Size (1 inch, 2 inch, or 3 inch) {27 mm, 53 mm, or 78 mm}
- (6) Specify Type (metallic or non-metallic)
- (7) Specify Type (Aerial Self-supporting, Aerial Lashed, or Underground)
- (8) Specify Cable Size (No. 14 AWG or No. 19 AWG)
- (9) Specify Number of Conductors or Pairs (9 Conductors or 6 Pairs)
- (10) Specify (IMSA 20-1, IMSA 20-3, REA PE-22, REA PE-38, or REA PE-39)
- (11) Specify Arm Length in Feet {Meters}
- (12) Specify LED if required
- (13) Specify Lens Size (12 inch) {305 mm}
- (14) Specify Number of Sections (1, 2, 3, 4, or 5)
- (15) Specify Type (Incandescent, Optically Programmed, or LED)
- (16) Specify Type (Incandescent or LED)
- (17) Specify Type (II or III)
- (18) Specify Number of Phases (2, 4, 8, or Master)
- (19) Specify Type (Acoustical, Optical or GPS)
- (20) Specify Whether or not Software is Required (With Software, or Without Software)
- (21) Specify Whether or not Training is Required (With Training, or Without Training)
- (22) Specify Type [Video, Radar, Magnetometer, or Hybrid (Video/Radar)]
- (23) Specify (Furnishing and Installing, Removal of, or Relocation of)
- (24) Specify (Flashing Beacon, or Illuminated School Zone Sign)

SECTION 890 TRAFFIC SIGNAL EQUIPMENT

890.01 General.

The following are the requirements for traffic signal equipment. These requirements may be supplemented or amended by the requirements given elsewhere in the proposal, on the plans, and on the details in the Special and Standard Highway Drawings.

Requirements specified in these specifications shall comply with the latest editions of the NEC, and NESC. All equipment shall conform to the requirements in the NEMA Standards Publication No. TS 1-1989, "Traffic Control Systems" or latest revisions and shall conform to the requirements specified within these specifications. All equipment shall meet the latest NEMA Environmental and Operating Standards. In case of conflict with cited Standard Publications and these specifications, the requirements of these specifications shall govern.

For purposes of these specifications wherever the following terms or abbreviations are used, the meaning shall be interpreted as follows:

A	Amps
AC	Alternating Current
ANSI	American National Standards Institute
ASTM	American Society for Testing Materials
AWG	American Wire Gage
DC	Direct Current
Hz	Hertz
IMSA	International Municipal Signal Association
ITE	Institute of Transportation Engineers
LED	Light Emitting Diode
MUTCD	Manual on Uniform Traffic Control Devices
NEC	National Electrical Code
NEMA	National Electrical Manufactures Association
NESC	National Electrical Safety Code
UL	Underwriters Laboratories
V	Volts
VA	Volt Amps
W	Watts

Descriptions and definitions of the equipment, words, and terminology used in these specifications are given in the MUTCD, the NEMA TS 1-1989 Standards Publication, ITE publications, and the NEC.

890.02 Controller Assembly.

The controller assembly shall be configured and bench-tested prior to installing the controller assembly. A Traffic Signal Technician from the State Signal Shop shall inspect the controller assembly prior to turning on the system.

(a) DESCRIPTION.

A controller assembly shall consist of a controller unit, conflict monitor, auxiliary devices, electrical devices and other equipment as specified in these specifications, plans, or proposal mounted and wired into a cabinet to make a complete operational traffic controller assembly.

(b) CABINET DESIGN.

The cabinet shall be an approved weatherproof enclosure. It shall be designed for base mount or pole mount as shown on the plans. The cabinet shall be clean-cut in design and appearance.

1. FABRICATION MATERIAL.

The cabinet shall be fabricated from cast aluminum or shaped sheet aluminum.

2. CABINET DIMENSIONS.

The cabinet shall be large enough to provide ample space to house the controller unit, conflict monitor, auxiliary devices, electrical devices, and other equipment as specified in these specifications, plans or proposal. The cabinet shall accommodate the largest controller dimensions for the specific number of phases required by the plans or proposal.

The minimum size of pole mounted controller cabinet shall be 41 inches {1025 mm} in height, 28 inches {700 mm} in width, and 16 inches {400 mm} in depth.

The minimum size of base mounted controller cabinet shall be 54 inches {1350 mm} in height, 38 inches {950 mm} in width, and 16 inches {600 mm} in depth.

3. DOORS.

When closed, the doors shall fit closely to gasketing, making the cabinet weather-resistant and dust-tight. Door hinges, bolts, and pins shall be of stainless steel or equivalent corrosion resistant material.

Main Cabinet Door: A hinged main cabinet door shall be provided permitting complete access to the interior of the cabinet. When opened, this door shall be provided with a device designed to hold the door in an opened position.

Auxiliary Cabinet Door: A small, hinged, auxiliary door (police compartment door) shall be provided on the outside of the main cabinet door. The auxiliary door shall permit access to a switch panel, but shall not allow entrance to the controller mechanism nor to exposed electrical terminals.

4. GASKETING.

Gasketing shall be provided on all door openings and shall be dust tight. Gaskets shall be permanently bonded to the metal. The mating surface of the gasketing shall be covered with a silicone lubricant to prevent sticking to the mating.

5. LOCKS AND KEYS.

The main cabinet door shall be equipped with a sturdy brass or stainless steel lock. The lock shall be a traffic industry conventional lock and operate with a No. 2 key. The lock shall be permanently lubricated and shall be covered with a weatherproof tab.

The small auxiliary door (police compartment door) shall be equipped with a lock. The auxiliary door (police compartment door) shall use a standard skeleton key.

Two keys shall be furnished for each lock.

6. SHELVES.

The cabinet shall be supplied with two mounting shelves. One shelf shall be used for storage of the controller and its associated hardware and the other shelf for storage of detectors.

7. FINISH SURFACE PREPARATION.

Unless otherwise shown on the plans, the cabinet shall be aluminum finish.

When painting of the cabinet is specified, the cabinet shall be primed and finished with two coats of high-grade enamel paint, complying with the requirements of Section 855.

8. POLE MOUNT HARDWARE.

A cabinet intended for side-of-pole mounting shall be provided with an adapter (exclusive of lag bolts or banding) necessary to permit mounting to a 4.5 inch {115 mm} diameter or larger pole. The adapter shall accommodate lag bolts up to 3/8 inch {10 mm} diameter or banding up to 1 inch {25 mm} wide. Mounting holes shall be provided at or near the top and bottom of the cabinet.

9. GROUNDING.

Ground electrodes at controllers shall be a copper clad rod 10 feet {3.0 m} in length and 5/8 inch {16 mm} in diameter, driven to a depth of 8 feet {2.4 m} and bonded by copper wire or strap of the same cross sectional area as No. 6 AWG {4.25 mm} wire.

10. CABINET VENTILATION.

Louvered vents shall be located on the main cabinet door. Vents shall allow the release of excessive heat and any explosive gases that might enter the cabinet.

A cabinet vent air filter, minimum size of 16 inches x 12 inches {406 mm x 305 mm}, shall be mounted on door and held in place by a spring.

A thermostatically controlled power vent and fan shall be provided. The thermostat shall activate the fan at 110 °F {43 °C} and de-activate the fan at 90 °F {32 °C} with an accuracy of ± 5 °F { ± 2 °C}.

11. SERIAL NUMBER.

A serial number shall be engraved or stenciled on the cabinet. The serial number shall be the same number as the controller unit serial number.

12. DATA LABEL.

A data label shall be placed on the inside of the cabinet door to provide the following information:

- Manufacturer's name - All equipment installed cabinet
- Date of Manufacture
- Wiring Schematics Number
- Controller Model Number
- Controller Serial Number
- Conflict Monitor Model Number
- Conflict Monitor Serial Number
- Time Base Coordinator Model Number (If applicable)
- Time Base Coordinator Serial Number (If applicable)
- Communication Unit Model Number (If applicable)
- Communication Unit Serial Number (if applicable)
- Master Model Number (If applicable)
- Master Serial Number (If applicable)
- Time Clocks Model Number (If applicable)
- Time Clocks Serial Number (If applicable)
- Project Number or Transportation Department P.O. Number.

(c) AUXILIARY DEVICES.

1. GENERAL.

Auxiliary devices shall conform to the requirements of NEMA Standard Publication No. TS 2-1992, "Traffic Controller Assemblies".

2. SOLID STATE FLASHERS.

The flasher shall be jack mounted.

3. FLASH TRANSFER RELAY.

The flash transfer relay shall be a heavy-duty relay designed for continuous duty. It shall mount on an eight pin spade plug base.

4. SOLID STATE LOAD SWITCH.

The signal load switches and signal load base plate shall be furnished and wired in place for each phase provided.

Load switches shall be triple signal, NEMA input light indicating, rated for 10 A at 165 °F {75 °C}. The actual switching component shall have a minimum 500 V PIV rating.

5. DETECTOR TEST SWITCHES.

When specified, detector test switches shall be furnished to check all detector control circuits.

6. MERCURY CONTACTOR.

A mercury contactor input power relay shall be a 40 A relay for 2 phase and 4 phase controllers and a 60 A relay for 8 phase controllers.

(d) TERMINALS AND FACILITIES.

1. GENERAL.

The following define the performance and construction requirements of cabinet terminals and facilities that are considered to be of the attached or nonplug-in type. These additional specifications cover the physical requirements, electrical requirements, interface, cabling, supporting terminal facilities, and labeling.

2. OPENINGS.

The cabinet shall be provided with necessary openings for mounting and connection as specified.

3. ARRANGEMENT OF DEVICES.

The controller equipment and terminal blocks shall be so arranged within the cabinet that they will not upset the entrance, training, and connection of the incoming conductors.

4. TERMINAL AND PANEL WIRING.

No printed circuit boards will be allowed in the cabinet wiring facility, every panel and terminal shall be hardwired.

Each controller assembly is to be furnished with panels in the cabinet mounted in such a way as to provide visibility and accessibility.

All panel wiring shall be neat, firm, and hardwired.

5. TERMINAL PANEL.

As a minimum, the panel shall be provided with the following terminal blocks:

- Terminal block to provide connections for the circuit breaker and power supply line.
- Terminal block unfused, for neutral side of power supply line.
- Terminal blocks for conductors of signal control cable. One terminal for each signal circuit and one or more terminals for the common conductor shall be provided.

The terminal blocks shall be located at least 6 inches {150 mm} from the bottom of the base mount cabinet and arranged for adequate electrical clearance between terminal blocks.

6. POWER TERMINAL STRIP.

Terminal strip shall be supplied for incoming power.

7. INSERT TERMINALS.

All components, connectors, plug terminals, and insert terminals shall be clearly annotated.

8. TERMINAL STRIP SHIELDING.

If terminal points are located adjacent to a shelf so that possible shorting can be accomplished by shifting of components, the terminal strips shall be shielded.

9. TERMINAL POINTS AND TERMINAL STRIPS.

All terminal points and terminal strips shall be the double tie type and shall be clearly annotated.

There shall be no more than two connections made on any terminal point.

Connections shall be made by using ring tongue terminal connections stamped from one piece of pure copper.

The barrel will be formed with a brazed butted seam and shall be pre-insulated with an appropriate sleeve.

The terminal connections shall be required to be the correct size for the wire and terminal strip bolts.

Terminal connections used on solid wire shall be soldered.

10. WIRING.

Wiring with controller cabinet shall be neatly laced and identified.

All wires shall be cut to a proper length before assembly. No wire shall be doubled back to take up slack.

The outgoing traffic control signal circuits shall be of the same polarity as the line side of the power supply; the common return of the signal circuits shall be of the same polarity as the grounded side of the power supply.

All wiring to AC+ shall be colored black. All wiring to AC- shall be colored white. All wiring to chassis ground shall be colored green.

11. CABLES.

All cables shall be self-contained and have continuous jackets from terminal facility into connector.

The jacket shall be solid flexible sleeving or expandable self-fitting polyester sleeving. Spiral wrap type sleeving will not be accepted.

The position of cables between the components must be such that when the door is closed, it does not press against the cables or force the cables against various components inside the cabinet.

All cables shall be self-contained and shall not be split to feed more than one connector.

12. DETECTOR PANEL.

A separate panel shall be furnished for detector wiring with all NEMA functions available and wired to the terminal strips.

The panel shall also include an earth ground buss with terminal points parallel and adjacent to the loop connection terminals for lightning protection.

A twelve-position double tie blank terminal strip shall be mounted on detector panel for future use.

13. SWITCH PANELS.

An internal switch panel shall be mounted on the inside of the main door. All switch functions shall be permanently and clearly labeled.

14. GROUNDING.

All logic ground, AC neutral, and chassis ground within the equipment and cabinet shall be isolated, split with separate ground buses being required for AC neutral and earth ground.

All lightning protection shall be grounded to the chassis ground. Lightning protection shall be installed before the power service to the cabinet is turned on.

All neutral conductors shall be grounded at the controller and at each terminal point.

15. LINE FILTERS.

Line filters shall be furnished to protect the controller from line voltage surges. Line filters for two phase controllers shall be rated at 25 A and four phase controllers shall be rated at 30 A through eight phase shall be rated at 45 A.

16. RADIO INTERFERENCE SUPPRESSION.

Each cabinet shall be equipped with a radio interference suppressor installed. The suppressor shall be connected to filter interference completely from the controller and associated equipment.

17. CONVENIENCE RECEPTACLE.

A convenience outlet shall be provided as part of the terminals and facilities. The convenience receptacle shall be a duplex, three prong, NEMA Type 5 - 15R grounding type outlet and shall have independent ground fault circuit protection.

18. LIGHT FIXTURE.

Each cabinet shall be provided with a florescent lighting fixture mounted on the inside top of the cabinet near the front edge. The fixture shall be provided with an F15T8 cool - white lamp operated from a normal power factor UL or ETL listed ballast.

19. DOOR ACTUATED LIGHT SWITCH.

A cabinet door actuated switch that turns the light off when the door is closed shall be provided.

20. POLICE PANEL SWITCHES.

The police door switch panel shall contain only two switches, a power ON/OFF switch, and a flash ON/OFF switch.

The power ON/OFF switch shall be a signal head off switch and not an AC power off switch for the cabinet. This switch shall not interrupt the controller power nor interrupt the controller cycling.

The flash ON/OFF switch shall apply a flash mode to the flasher relay and shall neither interrupt the controller power nor interrupt the controller cycling.

There shall be no remote plug-in contained within the police panel area.

21. MAINTENANCE PANEL SWITCHES.

These switches shall be mounted on the inside of the main door, on the back side of the auxiliary compartment (police compartment). All switch functions shall be permanently and

clearly labeled. The switches shall be of a rocker type and protected to prevent accidental switching. The following switches shall be provided: STOP-TIME, Auto/Flash (NEMA TS-2 section 5.5.1), Signal ON/OFF (heads only).

The STOP-TIME switch shall be connected to a three position switch that is labeled as followed: The top position shall be labeled as "STOP-TIME", which shall set the STOP-TIME bit to the controller, stopping the controller cycle, holding it in its current state; the middle position shall be labeled as "DISABLED", which disables the STOP-TIME bit in the monitor; the bottom position shall be labeled as "RUN", which enables the STOP-TIME bit in the monitor.

The Auto/Flash switch be installed and labeled in accordance with the specifications contained in NEMA TS-2, Section 5.5.1.

The Signal ON/OFF switch shall be a two position switch the kills the power to the signal heads, making the intersection dark. This switch shall not interrupt the controller power nor shall it interrupt the controller cycling.

22. MAIN CIRCUIT BREAKERS.

A circuit breaker shall be furnished. Circuit breakers shall be rated at 20 A for two phase controllers, shall be rated at 30 A for three and four phase controllers, and shall be rated at 40 A for five through eight phase controllers.

The main circuit breaker shall turn off all power to the cabinet and shall not be used for the power switch, which is located in the service panel.

23. CONTROLLER CABINET POWER SUPPLY.

Unless otherwise specified the controller unit and associated equipment shall operate reliably on 115 V; 60 Hz single phase alternating current.

Any internal DC voltages required to satisfactorily operate a controller assembly shall be from a regulated power supply designed to generate all DC voltages required, constructed as an integral part of the controller assembly.

The grounded side of the power supply shall be carried throughout the controller in a continuous circuit.

24. TIMER CONNECTIONS.

The electrical connections from the timer to the outgoing and incoming circuits shall be made in such a manner that the timer may be replaced with a similar unit, without the necessity of disconnecting and reconnecting the individual wires leading there from. This can be accomplished by means of a multiple plug and jack, a spring-connected mounting, or equivalent arrangement.

25. SIGNAL LOAD SWITCH ARRESTOR.

The load switch output shall have a metal-oxide varistor, Type V150LA20A.

26. REPLACING LIGHTNING PROTECTION.

All lightning protection devices shall be replaceable without removing any panels.

27. INDICATOR LIGHTS.

Controllers having indicator lights with a design or in circuit life of less than 75,000 hours shall have a micro-switch located on the cabinet door that will extinguish the indicators when the door is closed.

28. NEMA INDICATION WIRING.

All NEMA functions plus NEMA coded status bits and voltage monitor outputs as listed in the NEMA Standards Publication No. TS 1-1989. Outputs shall be brought out and wired to an individual tie point of a terminal strip before further routing.

29. PREEMPTION (PRIORITY CONTROL).

When preemption is required by the plans or proposal, electrical devices, logic circuits and special wiring shall be provided which will assume control over local traffic control equipment to require display of special safety modes giving preferential right-of-way to emergency vehicles or protection at railroad crossings.

(e) CONFLICT MONITOR.

1. TYPE.

Conflict Monitor shall be a NEMA Type 12L and conform to the requirements of NEMA Standards Publication No. TS 1-1989 Section 6, "Conflict Monitor Specifications", or any subsequent publication, plus the following features:

2. MONITOR REMOVAL.

The intersection shall remain in flash operation when the monitor has been removed.

3. BLOWN FUSE MONITOR.

The intersection shall go to flashing operation when the monitor fuse blows.

4. POWER SUPPLY MALFUNCTION.

The intersection shall go to flashing operation when the controller power supply malfunctions.

5. CONTROLLER POWER WITH TRIPPED CONFLICT MONITOR.

The conflict monitor shall not interrupt controller power when tripped.

6. STOP TIMING WITH TRIPPED CONFLICT MONITOR.

The conflict monitor shall apply stop timing on the controller when tripped.

7. INDICATION OF DRIVE FAILURE.

The conflict monitor shall indicate which drive failure has occurred (Red Fail).

8. DISPLAY AND PRINTING.

The unit shall have a LCD display, it must also have a printer port, RS232, and be capable of printing all memory-stored failures, with the type failure and date.

9 CLOCK.

The unit shall have a real time clock.

10. EVENT LOG.

The unit shall have an event log that contains the following data:

- AC power interruption/restoration logging;
- Logs reset after failure;
- Log 24 V values;
- Log CVM failure;
- Load switch failure;
- Log all faults with time and date.

11. EXTENDED MONITORING.

The unit shall have the following extended monitoring:

- Dual indication monitoring per channel;
- Short vehicle clearance detection.

12. DISPLAY OF INTERSECTION STATUS.

The unit shall be capable of displaying intersection status.

13. READBACK.

The unit shall have program card readback.

14. TERMINATION OF UNUSED INPUTS.

All unused inputs will be brought out and terminated on a terminal strip.

15. MONITOR INPUT WIRING.

Monitor inputs shall be wired to field output terminals.

(f) WIRING DIAGRAM.

Three copies of cabinet wiring diagram shall be supplied as well as copies of the following:

- Three each of:
 - Controller circuit diagrams and schematics;
 - Controller Operations Manual;
 - Conflict Monitor diagrams and schematics.
- Two each of:

- Flasher diagrams and schematics;
- Load Relay diagrams and schematics;
- Diagrams and schematics of any external hardware supplied;
- Template of Base Mounting if base mounted.

Cabinet prints shall include flash color change instructions for all phases and all overlaps.

Cabinet prints shall be keyed to show every input and every output from every terminal. If prints use multiple ground and neutral busses, busses shall be numbered. All grounds and neutrals shall be keyed to the busses that they are connected to.

Cabinet prints shall show every connector.

(g) CONTROLLER UNIT.

1. TYPE.

The phase requirements required on the plans will indicate the physical and electrical construction of the controllers; however, controller unit shall conform to NEMA requirements.

Controller units shall be classified in the following categories:

- Type II: Solid State Pre-timed
- Type III: Traffic Actuated Solid State Modular (NEMA)

For Type III controller units, controller indicators as outlined in NEMA Standards Publication No. TS 1-1989, Section 14.3.05 shall contain information which shall be displayed simultaneously for both rings in a dual ring controller.

Unless otherwise described in these specifications, or required by the plans or the proposal, the following requirements are applicable to all controller units.

2. CONTROL LOGIC.

Unless otherwise required by the plans or proposal, all control functions shall be performed by microprocessor logic

3. OVERLAPS.

All overlaps shall be internally generated, available, and programmable.

4. INTERCONNECTION AND COORDINATION.

The controller shall be capable of being interconnected and coordinated in accordance with requirements of the plans or proposal. Any phase shall be capable of being coordinated.

5. OPERATIONAL REQUIREMENTS.

Phase Skip: The controller shall provide the ability to automatically skip any phase when there is an absence of demand.

Signal Operation Plan: The signal operating plan in the plans will determine the number of phases required and the necessary phase sequence requirements of the controller in accordance with NEMA standards.

Changing Operation: Changes from flashing to stop-and-go operation shall be made at the beginning of the major street green interval preferably at the beginning of the common major street green interval, (i.e., when a green indication is shown in both directions on the major street). Programmed changes from stop-and-go to flashing operation shall be made at the end of the common major street red interval, (i.e., when a red indication is shown in both directions on the major street).

Programmable Flashing Operations: Flashing operations shall be programmable by terminal strip jumpers for all phases and all overlaps.

Type III Controller Unit: Type III, traffic actuated solid state controller unit, shall feature one or more of the following timing features as required by the plans or proposal.

- Standard timing;
- Density timing;
- Vehicle Occupancy timing;
- Pedestrian timing;
- Preemption.

Timing for phase modules shall be furnished in accordance with the plans and shall be accomplished by using the digital timing concept.

All phase timing modules shall be provided with dual maximum timing capabilities.

6. TIME BASE COORDINATION.

Electrical devices, logic circuits and special wiring shall be provided which will provide direct supervision of a local controller when time base coordination is shown on the plans.

The time based coordinator shall be a solid state digitally timed microprocessor device.

The unit shall contain a sealed battery capable of maintaining sufficient power to the RAM to protect, intact, any operator programmed data for a period of at least sixty days without AC input to the controller unit. The battery shall be maintained in a fully charged state through a trickle charge during normal operation.

An LED shall be provided to indicate when the voltage of the battery is over or under tolerance levels.

There shall be means for automatic change for daylight savings time.

Local coordination shall be accomplished by utilizing a time base coordinator capable of operating as a (a) yearly programmer with time of day, day of week, week of year programming, (b) sync pulse generator with time of day, day of week, week of year programming, (c) coordinator with time of day, day of week, week of year programming. The unit shall be capable of the following coordination features: four cycle lengths, four split plans, three offsets per cycle, minimum of three permissive periods per split, a minimum of four force-offs per split.

890.03 Master Controller Assembly and Secondary Controller Assembly.

(a) MASTER CABINET AND SECONDARY CABINET.

The following additional requirements shall apply to the cabinet for a master controller assembly and a secondary controller assembly.

The master and secondary controller cabinet shall house a hardwire master interconnect panel to provide for seven wire interconnect 120 V to be complete with three NEMA load switches, and complete with 120 V relays. The required functions provided shall consist of three dials; three offsets and flash; outputs and inputs. Panels shall have all components mounted on 0.125 inch {3.2 mm} sheet aluminum. The panel shall be completely wired in-place to include all necessary harness, and shall be wired to conform to the requirements of the MUTCD for system flash.

Terminal block facilities shall be provided for the interconnection.

(b) MASTER CONTROLLER UNIT.

1. GENERAL.

The master controller for an interconnected traffic control signal system shall be the apparatus required to provide supervisory functions under normal operation as described for interconnected controllers.

2. MOTOR.

The master controller shall be driven by a synchronous motor or be provided with a synchronous control mechanism which will maintain a constant time cycle; however, when it is not necessary to keep a traffic control signal system in step with adjacent systems or adjacent non-interconnected controllers, an induction motor driven master controller may be specified.

3. SUPERVISORY FUNCTIONS.

- Means for automatically establishing offset time relations of local controllers.
- Hand operated switch for turning off completely all traffic control signal lights at interconnected local controllers.
- Hand operated switch for transfer of traffic control signal lights at each local controller to give flashing indications.
- Hand operated switch for selecting offset at which all interconnected local controllers shall operate in accordance with three distinct timing plans.
- Hand operated switch for selecting two or three interval setups on which each of the interconnected local controllers shall operate.

The above requirements of shall be obtainable when specified, by means of an automatic time switch, in which case the automatic switching schedule shall be required.

4. TIME CYCLE.

The variation of the time cycle settings of all interconnected local controllers shall be accomplished by a simple adjustment at the master controller. There shall be at all times an accurate visual indication of the time cycle at which the traffic control signal system is operating.

It shall be possible to accurately set or adjust the time cycle between the limits of 30 and 120 seconds with accurate and definite settings within this range in 5 second steps up to 90 seconds and 10 seconds steps above 90 seconds.

890.04 Surge Protection for Controller Assembly.

(a) PROTECTION OF CONTROLLER ASSEMBLY CABINET.

All controller assembly cabinets shall be furnished with a surge protector on the AC service input, which meets or exceeds the following performance requirements.

- Unit shall be capable of withstanding repeated 20,000 A surges a minimum of 25 times.
- Unit shall have internal follow-current limiters (resistive elements).
- Unit shall contain a minimum of three active clamping stages.
- Unit shall self-extinguish within 8.3 milliseconds after the trailing edge of surge.
- Parallel impedance of limiters shall be less than 0.15 ohms.
- Unit voltage shall be to the circuit breaker before cabinet voltage filters.
- Electrical connections on the unit shall be durable enough to accommodate a No. 6 AWG {4.25 mm} wire.

The unit shall have a mounting plate for easy removal and replacement and shall be mounted in a neat workmanlike manner in the controller cabinet with as short a run as possible from the power input to the circuit breaker.

(b) PROTECTION OF SIGNAL LOAD SWITCHES.

Each load switch shall be furnished with a gas tube or metal-oxide varistor, Type 150LA20A.

Unit shall have an impulse breakdown of less than 1000 V in less than 0.1 microsecond at 10 kV per microsecond.

Unit shall be capable of withstanding 20 A AC for 1 second applied 10 times at 3 minute intervals on either section.

Unit shall have a current rating of 20,000 A (8/impulse) one time.

Unit shall have a striking voltage of 300 to 500 V DC.

Unit shall have a minimum holdover of 155 V DC.

Unit shall be installed across the Triac of each section of the load switch. The center electrode of the gas tube surge protector shall be connected to pin number 12 of the load switch plug. The load switch receptacle pin number 12 shall be wired to a minimum No. 8 {3.35 mm} wire ground buss. The ground buss shall be connected to the chassis ground and a ground rod. Connection terminal shall be provided a minimum distance possible from the physical center of the ground buss.

(c) PROTECTION OF CONTROLLER UNIT AND CONFLICT MONITOR.

Power and neutral for controller and conflict monitor shall be wired through a high-speed approved suppressor. The output of the arrestor to failsafe, controller, etc., shall be through shielded cable or twisted pair to the units AC plus and AC minus inputs.

The surge protection device shall meet or exceed the following performance requirements.

Protectors, after being subjected to twenty five 20 kA (8 X 20 μ s) pulses must remain operative and exhibit less than 5 percent plus or minus change in clamp voltage before and after the test.

The protector clamp shall never exceed 250 V when subjected to the 20 kA surge.

The peak current shall be 20,000 A.

The continuous service current shall be, 10 A maximum, 120 V AC, 60 Hz.

FILTERING SPECIFICATIONS, MIL-STD-220 Insertion Loss Test Data		
Insertion Loss Requirements		
Frequency		Insertion Loss (db)
60	Hz	0
10	kHz	34
50	kHz	55
100	kHz	76
500	kHz	68
2	MHz	58
5	MHz	58
10	MHz	58
20	MHz	63

(d) PROTECTION OF REMOTE DETECTOR AND INTERCONNECT CABLE.

Each remote detector input line and interconnect line, as it enters the cabinet shall be furnished with a surge protection device that meets or exceeds the following requirements.

Unit shall be capable of withstanding 10,000 A 10:20 microsecond standard waveform surges a minimum of 50 times.

Unit shall have internal follow-current limiters (resistive elements).

Unit shall self-extinguish within 8.3 milliseconds after the trailing edge of surge.

Unit shall not have thermal circuit breakers in place of limiters.

Limiter resistance shall be between 0.15 Ω and 0.39 Ω .

Unit shall have a mounting plate for easy removal and replacement and shall be mounted in the controller cabinet in a neat workmanlike manner.

(e) PROTECTION OF LOOP DETECTORS (EXTERNAL SURGE PROTECTION).

External surge protection for each detector must meet the following requirements.

Unit shall be a three terminal device capable of protecting the detector against differential (between the loop leads) surge, and against common mode (between leads and ground) surges.

Unit shall be of the inductive type with a maximum DC resistance of 150 m Ω .

Unit inductance shall be able to protect the detector electronics when the detector is subjected to a 400 A surge across the detector leads.

Unit shall be a two stage device.

Unit shall clamp a 250 A surge to 25 V within 40 nanoseconds. Surge shall be applied between the two detector leads.

Unit shall clamp a 250 A COMMON mode (between leads and ground) surge to 35 V. These do not include protector lead IR drop.

Unit shall withstand repeated surges.

Unit and loop terminals to be physically mounted approximately 6 inches {150 mm} from bottom of cabinet.

890.05 Vehicular Loop Detector.

(a) GENERAL.

Vehicular detectors shall be capable of providing reliable detection of all vehicles present when the inductance shift of the loop is 0.05 percent of the total inductance of the loop and lead-in when operating in the high sensitivity mode of the detector. Sensitivity of the detector shall remain constant over the operating temperature of -35 °F to +165 °F {-37 °C to 74 °C}.

Vehicular detector operation shall not be affected by changes in the inductance of the loop resulting from environmental changes encountered in the State, nor shall the sensitivity be markedly affected.

Vehicular detector shall have a self-contained power supply, capable of furnishing all necessary power, operate from a 115 V, 60 Hz source.

Vehicular detector shall have a built-in lightning protection device and shall have a built-in fail-safe relay to require a detector call to the controller upon failure of the detector.

Vehicular detector shall have the ability of being connected to multiple loops of various sizes and shall detect vehicles of various sizes with the capability of continuously registering the presence of a conventional passenger car on a 6 foot x 50 foot {2 m x 15 m} two-turn loop for a minimum time of ten minutes when in the presence mode.

Vehicular detector shall operate on loops of various sizes located up to 750 feet {225 m} from the loop.

Vehicular detector circuit boards and power supply shall consist of printed circuit design on a G10 grade or equivalent fiberglass epoxy with 2 ounces {57 g} copper track and coated with protective finish to minimize oxidation.

Vehicular detector boards and power supply shall consist of flow or wave soldered copper connections, including fixed components.

Vehicular detector shall operate on an electronic tuned resonant circuit composed of lumped capacity and inductance provided by the loop embedded in the roadway. The detector shall provide detection by phase comparison means with accuracy of better than 99 percent of all vehicles passing over the loop at speeds of 1 mile per hour to 80 miles per hour {1 km/hr through 130 km/hr}. The voltage across the loop combination reflecting any change shall be used as a signal for relay operation.

Tuning capacitors shall be ceramic enclosed and epoxy filled.

Vehicular detector shall have the capability to function when loops are shorted or leaking to ground at one point.

Detection indication shall be provided in the form of indicator lamps on the face of the unit.

(b) SINGLE CHANNEL VEHICULAR LOOP DETECTOR.

Single channel vehicular loop detectors shall conform to the following additional requirements.

The loop detector shall be a digital solid state unit with the capability of automatic tracking of environmental changes after automatic or manual initial tuning. The unit shall have pulse and presence modes all, which are activated by, wire loops embedded in the roadway. Loop influence shall be adjustable so as not to extend beyond the sawcut more than 12 inches {300 mm}.

The loop detector shall have a minimum of two sensitivity modes, two presence modes and two operating frequencies that will enable the detector to accommodate the usual configuration of loops and lead-ins.

Total power consumption shall not exceed 5 W.

The loop detector shall have a tuning inductance range of at least 75 to 400 μ Hz.

A Type MS-3102A-18-1P with ten male contacts shall be provided. The pin functions of the connector shall be assigned as follows:

Pin No.	Use
A	117 V AC Connection
B	Relay Output Common
C	117 V AC Line
D	Input from Loop
E	Input from Loop
F	Relay Output Normally Open
G	Relay Output Normally Closed
H	117 V AC Ground
I	Not Used
J	Not Used

(c) TWO CHANNEL VEHICULAR LOOP DETECTOR.

Two channel loop vehicular detectors shall conform to the following additional requirements.

The loop detector shall be a digital solid state unit with capability of automatic tracking of environmental changes after automatic initial tuning. The two channel unit shall have pulse and presence modes for each channel, which are activated by wire loops embedded in the roadway. Loop influence shall be adjustable so as not to extend beyond the sawcut more than 12 inches {300 mm}.

The loop detector shall have a minimum of two sensitivity modes, two presence modes and two operating frequencies for each channel, which will enable the detector to accommodate the usual configuration of loops and lead-ins. Crosstalk between channels within the detector shall be eliminated by sequential scanning of loops.

Each channel shall be capable of tuning to any effective loop inductance within the range of 0 to 2000 μ Hz.

Total power consumption shall not exceed 8 W.

Two Type MS-3102A-18-1P connectors with ten male contacts shall be provided. The pin functions of each connector shall be assigned as follows:

Pin No.	Use
A	117 V AC Connection
B	Relay Output Common
C	117 V AC Line
D	Input from Loop
E	Input from Loop
F	Relay Output Normally Open
G	Relay Output Normally Closed
H	117 V AC Ground
I	Not Used
J	Not Used

(d) FOUR CHANNEL VEHICULAR LOOP DETECTOR.

Four channel loop vehicular detectors shall conform to the following additional requirements.

The loop detector shall be a digital solid state unit with capability of automatic tracking of environmental changes after automatic initial tuning. The four channels shall have pulse and presence modes for each channel, which are activated by wire loops embedded in the roadway. Loop influence shall be adjustable so as not to extend beyond the sawcut more than 12 inches {300 mm}.

The loop detector shall have a minimum of two sensitivity modes, two presence modes and two operating frequencies for each channel which will enable the detector to accommodate the usual configuration of loops and lead-ins. Crosstalk between channels within the detector shall be eliminated by sequential scanning of loops.

Each channel shall be capable of tuning to any effective loop inductance within the range of 0 to 2000 μ Hz.

Total power consumption shall not exceed 8 W.

A Type MS-3102A-22-14P connector with nineteen male contacts shall be provided.

890.06 Interconnect Cable.

(a) DESCRIPTION.

Interconnect cable shall be used to transmit information between intersections or other control points in a traffic control system.

(b) MATERIALS.

Interconnect cable shall conform to the requirements of this specification unless otherwise specified on the plans or in the proposal. If in such case that the plans designate fiber optic cable material be used for the interconnect cable then Section 734 shall apply.

(c) UNDERGROUND INTERCONNECT CABLE.

Underground interconnect cable, for closed loop systems, shall be shielded and conform to the requirements of Rural Electrification Administration (R.E.A.) Specification PE- 39, filled telephone cable, No. 19 AWG, 6 pair.

Underground interconnect cable for time base coordination shall conform to the requirements of IMSA 20-1 No. 14 AWG, 9 conductors.

(d) AERIAL INTERCONNECT CABLE.

Self-supporting aerial interconnect cable, for closed loop systems, shall be shielded and conform to the requirements of Rural Electrification Administration (R.E.A.) Specification PE- 38, No. 19 AWG, 6 pair.

Standard aerial interconnect cable, for closed loop systems, attached to a messenger strand in the field, shall conform to the requirements of Rural Electrification Administration (R.E.A.) Specification PE- 22, No. 19 AWG, 6 pair.

Self-supporting aerial interconnect cable, for time base coordination, shall conform to the requirements of IMSA 20-3, No. 14 AWG, 9 conductors.

Standard aerial interconnect cable, for time base coordination, attached to a messenger strand in the field, shall conform to the requirements of IMSA 20-1, No. 14 AWG, 9 conductors.

(e) INTERCONNECT CABLE SUPPORT WIRE.

A support cable, whether separate or integral to aerial interconnect cable, having a minimum diameter of 0.25 inch {6.35 mm} shall be provided for interconnect cable that is not self-supporting. Support cable shall be steel wire strand Class A (double galvanized) and conform to the requirements of ASTM Standards Publication No. A 475-89, "Standard Specifications for Zinc-Coated Wire Strand".

(f) CABLE ATTACHMENT HARDWARE.

Attachment hardware shall be stainless steel or non-corrosive material and shall be provided with tensile strength adequate for application.

890.07 Electrical Power Service Assembly.

(a) DESCRIPTION.

Electrical power service assembly shall consist of equipment to provide a pole attached raceway and disconnect switch for use with power cable routed from the service entrance to the controller cabinet and nearest supporting structure with luminaire. The electrical power service assembly shall include a weatherhead, conduit and fittings, a disconnect switch with enclosure, and attachment clamps.

Electrical power service shall be in accordance with these specifications, NEC requirements, local utility codes, and on the details shown in the Special and Standard Highway Drawings.

(b) MATERIALS.

Materials shall be tested and approved by a nationally recognized testing laboratory and shall meet the following requirements.

1. SERVICE POLE (WOOD POLE).

Service pole shall be southern yellow pine treated in accordance with the latest American Wood-Preserver's Association (AWPA) standards and shall conform with the requirements given in Section 833.

Unless otherwise noted on the plans, service pole used for service lateral drop shall be a 35 foot Class 3 wood pole and shall conform to the requirements of ANSI Standards Publication No. 05.1-1992, "American National Standards for Wood Poles - Specifications and Dimensions".

The poles shall not have more than 180 degrees of twist in grain over the full length and the sweep shall be no more than 4 inches {100 mm}.

2. ATTACHMENT HARDWARE.

Attachment hardware shall meet the requirements as shown on the details in the Special and Standard Highway Drawings.

3. CONDUIT.

Conduit shall conform to the requirements specified in this Section.

4. WEATHERHEAD.

Weatherhead shall be made of a copper-free aluminum alloy or galvanized ferrous material.

5. ELECTRICAL CABLE.

Phase or current carrying conductors shall be of the type RHH, RHW, USE, or XHHW. Conductors shall be stranded annealed copper with not less than 98 percent conductivity and shall be insulated for 600 V or more with rubber insulation and a neoprene jacket, or with cross-

linked polyethylene insulation. The size of the conductor, voltage rating and type of insulation shall be clearly marked on the conductor in a color that contrasts with the color of the insulation.

Service wire to supply the controller shall be No. 6 AWG, stranded copper, two conductors rated for dry and wet conditions. The equipment grounding conductor shall be a bare conductor or shall be identified by a continuous green insulation. Grounded conductors (neutrals) shall be identified by a continuous white color insulation.

Service wire to supply the traffic signal luminaries shall be No. 8 AWG, stranded copper, three conductors rated for dry and wet conditions. The equipment and pole grounding conductor shall be a bare conductor or shall be identified by a continuous green insulation. Grounded conductors (neutrals) shall be identified by a continuous white color insulation.

6. METER BASE.

When a meter base is required, meter base shall be a meter base approved by the local electric power company.

7. SERVICE DISCONNECT.

Enclosure Cabinet: The cabinet shall conform to NEMA standards, made of galvanized steel, aluminum, stainless steel or other material approved by the Engineer. The enclosure shall have a hinged door with a padlock. Padlock No. 3210 keyed for a No. 3 key shall be provided. One key shall be hung within the controller cabinet.

Circuit Breaker: A manually resettable circuit breaker shall be installed, which has a current rating of the circuit to which electrical power is provided.

Transient Protective Device: A surge lightning arrester rated for a maximum permissible line to ground voltage of (175 V AC) shall be installed, meeting the requirements of NEMA standards for surge arrestors.

8. PHOTOELECTRIC CONTROL UNITS.

The photoelectric control shall meet the design and testing requirements of ANSI C136.10. The photoelectric control unit shall also:

- be a dusk-to-dawn sensor attached to the service pole;
- have relay contacts that are single-pole, single-throw (SPST), normally closed (NC);
- contain built-in surge and lightning protection;
- have a direct load rating of 1000 Watts incandescent load and 1800 volt-amperes for High Pressure Sodium;
- have a rated life at full load of at least 5,000 on-off operations.
- upon failure leave the luminaires turned on as a notification of needed maintenance;
- be able to operate over the range of 105-130V, 60 Hz. AC (120 V Nominal);
- have over voltage protection for the control components and the load circuit by the means of an expulsion type surge arrester capable of passing the surge outlined in ANSI C136.10;
- be calibrated for a "Turn-on" setting of 2.6 footcandles and a "Turn-off" setting not exceeding 0.6 times the "Turn-on" setting;
- have a control housing that is UV resistant.

The photoelectric control shall have a cadmium-sulfide light sensitive element. The base shall have an integral, locking type, brass 3 prong plug according to NEMA SH16-1962 and a neoprene gasket that meets IEEE/NEMA publications.

Photoelectric control units shall be installed facing north; however, if obstructions are such that this is not possible then they shall be installed facing south.

890.08 Span Wire Assembly.

(a) DESCRIPTION.

Messenger cable shall be attached to supporting structures to support traffic signal heads, signs, and electrical cables.

(b) MATERIALS.

1. STEEL WIRE STRAND.

Steel wire strand shall be Class A (double galvanized) and shall conform to the requirements of ASTM A 475-89.

2. MESSENGER CABLE.

Messenger cable used to support signal heads shall be 3/8 inch {9.5 mm} nominal diameter, 7 wires twisted into a single strand.

Messenger cable shall be extra high-strength grade with a minimum breaking strength of 15,400 pounds {68.4 kN}.

3. TETHER CABLE.

Tether cable attached to the bottom of signal heads shall be 1/4 inch {6.4 mm} nominal diameter, 3 wires twisted into a single strand.

Tether cable shall be utilities grade with a minimum breaking strength of 3,150 pounds {14.0 kN}.

890.09 Vehicular Signal Heads.

(a) ITE STANDARD PUBLICATIONS.

All signal heads shall conform to the requirements given in the ITE Standards Publications "Adjustable Face Vehicular Traffic Control Signal Heads" and "Vehicle Traffic Control Heads" and the following, assembled in accordance with the latest edition of the MUTCD.

(b) SEPARATE ILLUMINATION.

Each lens of a signal head shall be illuminated by a separate optical unit.

(c) HOUSING, DOOR, and VISOR.

1. HOUSING.

The housing shall be constructed of cast corrosion-resistant, copper free non-ferrous metal of not less than 17,000 psi {117 MPa} with all parts clean, smooth and free from flaws, cracks, blow holes and other imperfections.

The housing shall be of unitized sectional construction of as many sections as are optical levels, rigidly and securely fastened together into one watertight assembly.

Each housing shall be arranged with round openings in the top and bottom so as to be capable of being rotated about a vertical line between the waterproof supporting brackets or trunnions and of being securely fastened at increments of not more than 7 inches {175 mm} of rotation.

2. DOOR.

The door shall also be cast units from similar material to that used for the main section housing suitably hinged and shall be forced tightly against the gasket on the body of the housing by simple stainless steel locking devices.

All other exterior hardware, such as hinge pins, lens, clips, etc., shall be of stainless steel.

Neoprene gaskets shall be provided between the body of the housing and the doors, between the lenses and the doors, and between the lenses and reflectors to exclude dust and moisture.

The lens opening in the doors shall provide a visible diameter of not less than 11 inches {279 mm} nor more than 11.5 inches {292 mm} for a nominal 12 inch {300 mm} round lens. The dimensions of the opening in doors for rectangular lenses shall provide for a visible area of not less than 8 inches x 8 inches {205 mm x 205 mm}, nor more than 8.5 inches x 8.5 inches {215 mm x 215 mm}, for a nominal 9 inch {225 mm} rectangular lens and a visible area of not less than 11 inches x 11 inches {279 mm x 279 mm} nor more than 11.5 inches x 11.5 inches {292 mm x 292 mm} for a nominal 12 inch {300 mm} rectangular lens.

3. VISOR.

Each signal head shall have a tunnel visor for each signal indication. The door shall have an integrally cast collar not less than 3/16 of an inch {4.8 mm} around the lens opening, and the visor shall be designed to fit tightly against the collar and door, and shall not permit any perceptible filtration of light between the door and the visor. The percentage enclosure of the

lens shall be as specified by the purchaser. The visor shall be a minimum of 9.5 inches {241 mm} in length for 12 inches {300 mm} diameter lenses, and not less than 0.05 inches {1.27 mm} in thickness, with a minimum downward tilt of 3.5 degrees. The visor shall be of corrosion-resistant nonferrous material. Visors shall be mounted with twist-on slots and stainless steel screws positioned for either vertical or horizontal mounting of the signal.

(d) TRUNNIONS, BRACKETS, AND SUSPENSIONS.

All trunnions, brackets, and suspensions used for assembling and mounting vehicle traffic control signal faces shall be entirely weather-tight.

Wire entrance fittings for signal heads and span wire hangers shall be cast aluminum tri-stud with aluminum span wire hinge with stainless steel nuts, bolts, and washers.

Wire raceway areas within brackets, trunnions and suspensions shall be of adequate size to carry all necessary wires without crowding, and raceway surfaces shall be free of sharp edges or protrusions that might damage insulation on wires.

Suspensions for mast arm or span wire mounting shall include a device to permit adjustment for proper vertical alignment of the signal head.

(e) EXTERIOR FINISH.

All exterior parts of the signal head except the lens, the insides of visors, and the entire surface of louvers or fins shall be finished of the best quality of synthetic resin enamel that is colored black or federal highway yellow. A combination color scheme may be used in lieu of either an all black or an all federal highway yellow. A combination color scheme may consist of an all black face with an all federal highway yellow body. No other combination color schemes or the mixing of allowed color schemes shall be used within an intersection or project unless noted otherwise on the plans.

The inside of the visors and the entire surface of louvers or fins shall be painted dull black using best quality synthetic resin enamel. All enamel shall conform to the appropriate requirements of Section 855.

(f) BACK PLATES.

Backplates shall be installed if shown on the plans. Backplates shall have a 5 inch {127 mm} border constructed of black metal.

(g) BACKING FOR ARROW LENSES.

The arrow shall be the only illuminated portion of the lens. The arrow lenses shall be covered (except for the arrow) with dull or dark gray enamel of a thickness sufficient to totally hide the light from a 200 watt lamp placed behind it.

The enamel shall be baked or fired into the glass. The enamel shall be hard and durable and shall not peel or flake when subjected to the heat of a signal lamp when the lens is either in use or when the lens is washed.

(h) SIGNAL HEAD COVER.

Signal head covers shall be opaque, black, and cover the signal head. The cover shall be weather and ultra violet resistant. A garden or trash bag shall not be an acceptable cover. The cover shall be so designed so that it will not collect/hold water in the bottom of the cover.

The Contractor shall submit the proposed cover and method of attaching the cover over the signal head to the Engineer for approval.

(i) PROGRAMMED VEHICULAR SIGNAL HEAD.

Programmed vehicular signal heads shall provide an optical system of such design that will permit the required visibility zone of the indication to be determined optically. The projected signal may be visible or selectively veiled anywhere within 15° of the optical axis. Indication shall not result from external illumination nor shall one indication illuminate a second.

The optical system shall provide an imaging surface, at focus on the optical axis for objects 900 feet to 1200 feet {275 m to 365 m} in distance and permit an effective veiling system to be variously applied as determined by the desired visibility zone.

Lamps shall be nominal 150 W, 120 V AC, three prongs, sealed beam type with integral reflector having a rated life of 6000 hours.

The objective lens may be glass or hermetically sealed plastic within a flat lamination of weather-resistant acrylic. The lens shall be symmetrical in outline allowing rotation to any 90° orientation about the optical axis.

The limiter and/or diffuser shall be provided with a positive means of indexing and shall be formed of heat resistant material.

Signal intensity controls shall be provided for each signal indication (color).

All other components of the Programmed Vehicular signal heads shall conform to the requirements specified in this Article.

(j) OPTICAL UNIT FOR INCANDESCENT LAMPS.

1. LAMPS.

Lamps used in traffic signal heads shall conform to the standards set forth in the ITE latest Standard for Traffic Signal Lamps, not smaller than 125 V, 8000+ hour rated life clear bulb in accordance with the following:

12 inch	{300 mm}	Red lens	150 or 165 W	3 inch light center length
12 inch	{300 mm}	Yellow lens	69 W	3 inch light center length
12 inch	{300 mm}	Green lens	116 W	3 inch light center length

2. WIRING.

Each lamp receptacle shall be provided with coded No. 18 AWG {1.06 mm} or larger wires type TEW, 600 V, securely fastened to the socket.

A suitable terminal block for connection of the wires from the socket and the incoming wires to the traffic signal head shall be provided in the signal housing.

3. REFLECTORS.

Reflectors shall be specular Alzak finished aluminum or an approved equal.

Reflectors shall be mounted in a cast aluminum reflector support attached to the housing, or shall be an integral reflector and support of formed sheet aluminum.

The reflector assembly shall be pivoted to the housing, and shall be designed so that it can be swung out or easily removed without the use of any tools.

The method of mounting and fastening reflectors shall be sufficiently rigid to secure proper alignment between the lens and reflector when the door is closed.

The construction of the signal head and its components shall be such that the fit between the reflector and the lens will eliminate all possibility of false indicators.

Reflectors shall have an opening in the back for the lamp socket.

4. LENSES.

Lenses shall be of glass; the quality and processing of which shall be the best for the purpose. The composition must be durable on prolonged exposure to weather; all lenses shall be uniformly colored throughout the body, true to size and form, and free from any streaks, wrinkles, chips, or bubbles that in any way detract from their efficiency or use.

Each lens shall have pressed on its flange the word "TOP" to indicate the proper positioning of the lens in the door for obtaining the light distribution required, together with the diameter and other designations including the name or trademark of the manufacturer needed for proper application and help in purchasing replacements.

A nominal 12 inch {300 mm} circular convex lens shall have an outside diameter of from 11.938 inches to 12.031 inches {303 mm to 306 mm}.

A nominal 9 inch {225 mm} rectangular lens shall have minimum over-all dimensions of 9 inches by 8.75 inches {228 mm by 222 mm}.

A nominal 12 inch {300 mm} rectangular lens shall have minimum over-all dimensions of 12 inches by 12 inches {305 mm by 305 mm}.

All lenses shall comply with the design designated by ITE for the use intended.

The color of the lens shall be of a color approved for use by ITE for the use shown on the plans.

(k) OPTICAL UNITS FOR LEDS.

1. LED TECHNOLOGY.

The LEDs shall be manufactured using AlInGaP (Aluminum-Indium-Gallium-Phosphorous) technology or other LEDs with lower susceptibility to temperature degradation than AlGaS (Aluminum-Gallium-Arsenic). AlGaS LEDs will not be allowed.

2. PHOTOMETRIC REQUIREMENTS.

Each LED traffic signal lamp (including replacements for incandescent lamps) shall produce 115 % of the light intensity values shown in the following tables of Minimum Luminous Intensity Values. Each LED shall also meet the color (chromaticity), and light output distribution described in ITE VTCSH (Vehicle Traffic Control Signal Head Standard) part 2 of the specifications 6.4.2.1, 6.4.4.1, 6.4.4.2, 6.4.4.3, 6.4.5, and 6.4.6.

The following tables of Minimum Luminous Intensity Values shall replace the values given in Table 1 of Section 4.1.1 of the ITE VTCSH. The 6.4.2.1 tests shall include an expanded view with the required minimum luminous intensity values.

MINIMUM LUMINOUS INTENSITY VALUES (IN CANDELAS) FOR 12 INCH DIAMETER RED LEDS												
GRID VALUES IN BOLD TEXT, 2.5D THROUGH 17.5 D, ARE ITE REQUIREMENTS FOR LIGHT INTENSITY												
	27.5	22.5	17.5	12.5	7.5	2.5	-2.5	-7.5	-12.5	-17.5	-22.5	-27.5
22.5U												
17.5U			3			10	10			3		
12.5U			14			20	20			14		
7.5U			20			54	54			20		
2.5U			58			220	220			58		
2.5D			77	141	251	339	339	251	141	77		
7.5D	16	38	89	145	202	226	226	202	145	89	38	16
12.5D	16	22	34	44	48	50	50	48	44	34	22	16
17.5D	16	20	22	22	22	22	22	22	22	22	20	16
22.5D			7			10	10			7		
27.5D												

MINIMUM LUMINOUS INTENSITY VALUES (IN CANDELAS) FOR 12 INCH DIAMETER GREEN AND YELLOW LEDS												
GRID VALUES IN BOLD TEXT, 2.5D THROUGH 17.5 D, ARE ITE REQUIREMENTS FOR LIGHT INTENSITY												
	27.5	22.5	17.5	12.5	7.5	2.5	-2.5	-7.5	-12.5	-17.5	-22.5	-27.5
22.5U												
17.5U			7			20	20			7		
12.5U			27			41	41			27		
7.5U			41			108	108			41		
2.5U			115			441	441			115		
2.5D			154	283	501	678	678	501	283	154		
7.5D	32	77	178	291	404	452	452	404	291	178	77	32
12.5D	32	44	69	89	97	101	101	97	89	69	44	32
17.5D	32	41	44	44	44	44	44	44	44	44	41	32
22.5D			14			20	20			14		
27.5D												

Arrow indications shall be the light intensity shown in the following table.

ARROW INDICATION LIGHT INTENSITY (IN CANDELLAS PER SQUARE METER)			
	Red	Yellow	Green
Arrow Indication	5500	11000	11000

LEDs for arrow indications shall be spread evenly across the illuminated portion of the arrow area.

The chromaticity of LED signal modules shall conform to the requirements given in the following table, for a minimum period of 60 months, over an operating temperature range of -40°C to +74°C. Each LED traffic signal lamp unit shall meet the minimum requirements for light output for the entire range of voltage from 80 to 135 volts.

CHROMATICITY REQUIREMENTS*	
Red	Y: greater than 0.280 and less than 0.308 for $Y = 0.998 - X$
Yellow	Y: greater than 0.411 and less than 0.452 for $Y = 0.995 - X$
Green	Y: greater than $0.506 - 0.519X$ ($0 < X \leq 0.2243$) and greater than $0.150 + 1.068X$ ($0.2243 \leq X \leq 0.2804$) and less than $0.730 - X$ ($0 < X \leq 0.2804$)
* Taken from the ITE VTCSH Standard, Chapter 2, Paragraph 8.02, Figure 1.	

3. LED PRODUCTION TESTING REQUIREMENTS.

Each new LED traffic signal lamp unit shall be energized for a minimum of 24 hours at operating voltage and at a temperature of +60 °C in order to cause any electronic infant mortality to occur, and to ensure electronic component reliability prior to shipment. Each LED traffic signal lamp unit shall be tested for initial luminous intensity at rated operating voltage.

4. QUALITY ASSURANCE.

LED signal modules tested or submitted for testing shall be representative of typical production units. Optical testing shall be performed with LED signal modules mounted in standard traffic signal sections without visors or hoods attached to the signal sections.

After burn-in, LED signal modules shall be tested for rated initial luminous intensity in conformance with the preceding photometric requirements. Before measurement, LED signal modules shall be energized at rated voltage, with 100 percent on-time duty cycle, for a time period of 30 minutes. The current, voltage, total harmonic distortion (THD) and power factor (PF) associated with each measurement shall be recorded and made available for future reference.

Photometrics, luminous intensity, and color measurements for yellow LED signal modules shall be taken immediately after the modules are energized. The ambient temperature for these measurements shall be 25 °C. The current, voltage, total harmonic distortion (THD) and power factor (PF) associated with each measurement shall be recorded and made available for future reference.

5. PHYSICAL AND MECHANICAL REQUIREMENTS.

The assembly and manufacturing process for the LED traffic signal lamp unit assembly shall be configured to assure all internal LED and electronic components are adequately supported to withstand mechanical shock and vibration from high winds and other sources.

Each LED traffic signal lamp unit shall comprise a UV stabilized polymeric outer shell, multiple LED light sources, and a regulated power supply.

6. ELECTRICAL.

Each unit shall incorporate a regulated power supply engineered to electrically protect the LEDs and maintain a safe and reliable operation. The power supply shall provide capacitor filtered, DC regulated current to the LEDs per the LED manufacturer's specification. Design of the power supply shall be such that the failure of an individual component or any combination of components cannot cause the signal to be illuminated after AC power is removed. Any deviation without prior testing and approval from the Department, shall be grounds for removal from the Materials, Sources, and Devices with Special Acceptance Requirements Listing.

The LED traffic signal lamp unit shall operate on a 60 Hz AC line voltage ranging from 80 volts RMS to 135 volts RMS. The circuitry shall prevent flickering over this voltage range. Nominal rated voltage for all measurements shall be 117 volts RMS.

The LED traffic signal lamp unit shall be operationally compatible with NEMA TS1 & TS2 and Type 170 & 2070 controllers, conflict monitors with plus features, and malfunction management units currently used by the Alabama Department of Transportation and any other State government entities.

Two, captive, color coded, 600 V, 18 AWG minimum, jacketed wires, 3 feet ± 1 inch long, conforming to the National Electric Code, rated for service at 105°C, shall be provided for an electrical connection.

Individual LEDs shall be wired so that a catastrophic failure of one LED light source will result in the loss of only that one LED light source.

The LED signal shall operate with a minimum 0.90 power factor.

Total harmonic distortion (current and voltage) induced into an AC power line by a signal module shall not exceed 20 percent.

LED signal modules and associated on-board circuitry shall conform to the requirements given in Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 regulations concerning the emissions of electronic noise.

7. ENVIRONMENTAL REQUIREMENTS.

The LED traffic signal lamp unit shall be rated for use in the ambient operating temperature range of -40 °C to +74 °C.

The unit shall be dust and moisture tight to protect all internal LED and electrical components.

The unit shall consist of a housing that is a sealed, watertight enclosure that eliminates dirt contamination and allows for safe handling in all weather conditions. Moisture resistance testing shall be performed on LED signal modules in conformance with the requirements in NEMA Standard 250-1991 for Type 4 enclosures. Evidence of internal moisture after testing shall be cause for rejection.

8. WARRANTY REQUIREMENTS.

All LED traffic signal lamp units shall be warranted against failure due to workmanship and material defects during the first 60 months of field operation. The LED signal lamp units shall also be warranted to meet or exceed the minimum luminous intensity values during the first 60 months of operation. This warranty shall be included with each LED signal module, in writing, by the manufacturer. The warranty shall include a commitment by the manufacturer to replace all failed LEDs at no cost the Department.

(l) LENSES FOR LEDS.

The lens for an LED signal lamp unit shall be a UV stabilized polymeric lens that is sealed to the LED housing to prevent dust and moisture from entering into the unit.

(m) LEDS FOR REPLACING LAMPS IN EXISTING INCANDESCENT SIGNAL HEADS.

The LED traffic signal lamp unit shall be designed as a retrofit replacement for existing signal lamps, which will not require any special tools for installation. The 12" retrofit replacement LED traffic signal lamp unit shall fit into existing traffic signal housings without modifications to the housing.

Installation of a retrofit replacement LED traffic signal lamp unit into an existing signal housing shall only require removing the existing lens and incandescent lamp, fitting of the new unit securely in the dousing door, and connecting the unit to existing electrical wiring or terminal block by means of simple connectors. The LED retrofit shall not require the removal of the reflector.

If proper orientation of the LED unit is required for optimal performance, prominent and permanent directional markings (an "UP arrow") for correct indexing and orientation shall exist on the unit.

The manufacturer's name, serial number, model number, manufactured date, and other necessary identification shall be permanently marked on the backside of the LED traffic signal lamp unit. A label shall be placed on the unit certifying compliance to ITE standards.

The LED traffic signal lamp unit shall be a single, self-contained device, not requiring on-site assembly for installation into an existing incandescent traffic signal housing.

(m) SUBMITTAL DATA REQUIRED FOR LEDS.

Each LED traffic signal lamp unit shall be provided with the following data:

- Complete and accurate installation wiring guide;
- Contact name, address, and telephone for the representative, manufacturer, or distributor for warranty repair;

- -Schematics for all electronics.

The Contractor shall submit a copy of a test report certified by an independent laboratory (Intertek Testing Services ETL Semko) that the LED traffic signal lamp model submitted meets ITE Standard for light distribution, chromaticity, and power (consumption, power factor, and harmonic distortion). In addition, the independent lab report shall specify the drive current being supplied to individual LEDs within the unit. Designs which require LEDs to be operated at currents greater than the LED manufacturer's recommended drive current will not be allowed.

(n) DUAL INDICATION SIGNAL HEAD.

The dual indication signal shall provide a dynamic means of selectively displaying two separate colored indications from the same section during different intervals of the signal cycle.

The dual indication signal Heads shall conform to the applicable requirements for Programmed Vehicular Signal Heads including exterior finish and ITE Standards Publication "Adjustable Face Traffic Control Signal Heads".

No indication shall result from external illumination nor shall one light unit illuminate a second and only one indication shall be apparent to any viewer at one time.

890.10 Pedestrian Signal Heads.

(a) GENERAL.

All pedestrian signal heads shall conform to the requirements of the ITE Standards Publication "Adjustable Face Pedestrian Signal Heads" and the following, assembled in accordance with the latest edition of the MUTCD.

(b) INCANDESCENT PEDESTRIAN SIGNALS.

1. HOUSING, DOOR, and VISOR.

Housing: Housing shall be rectangular and constructed of lightweight die cast aluminum. The housing assembly shall form a dust tight and moisture resistant compartment.

The top and bottom of the signal shall be provided with two holes suitable for entrance of 1.5 inch {38 mm} conduit. Surrounding each hole shall be cast aluminum serration containing 72 teeth at 5° on center by 0.062 inches {1.57 mm} deep. The overall dimension of the pedestrian signal shall be 17.5 inches horizontal x 16.875 inches vertically x 9.875 inches front to back { 445 mm horizontal x 429 mm vertically x 251 mm front to back} including the visor. A door hinge is provided at the bottom of the case and two upset flanges at the top, to enable draw bolts to adequately draw down the door against the case. A neoprene gasket shall be fitted around the front edge of the case to provide a waterproof compartment when the door is closed.

Door: The door shall contain an offset upon which an endless neoprene gasket will seat, for the purpose of holding the lens, and causing a watertight fit of door to housing.

All components shall be readily and easily accessible from the door.

Two hinge lugs shall be cast at the bottom of the door, which shall mesh with two pairs of hinge lugs cast in the bottom of the housing. Stainless steel drive pins shall connect these hinges to permit the door to rotate downward. Two reinforced lugs, each with a vertical slot (open at the top) shall be cast integrally in the top of the door. The top of the front of these lugs shall be slightly offset to prevent the hinge bolts from sliding out of the slots. Two pairs of lugs shall be cast integrally with the top of the housing compartment. Two stainless steel hinge bolts with captive stainless steel wing nuts and plain washers shall be attached to the housing lugs with the use of a stainless steel 0.25 inch {6.5 mm} drive pin.

Visor: A single unit sun shield eggcrate type visor shall be attached to the cast door without the use of any screws and be capable of being removed only when the door is opened. The visor shall sit directly on the door. The visor shall consist of 15 vertical 0.30 inch {7.6 mm} thick polycarbonate strips and 26 horizontal 0.030 inch {0.76 mm} polycarbonate strips. The strips shall be slotted such that they fit together in cross hatch fashion. The polycarbonate strips when assembled shall be bordered by an extruded 0.040 inch {1.0 mm} aluminum channel that shall be pop riveted together to provide a solid support for the polycarbonate strips. The visor shall have two horizontal mounted 1/8 inch {3.2 mm} diameter aluminum reinforcement rods.

The visor assembly shall be 1.5 inches {38.1 mm} deep and the grid pattern shall measure approximately 0.5 inches X 0.5 inch {12.7 mm X 12.7 mm}.

2. OPTICAL UNIT.

The reflector shall be a one-piece reflector made of die cast aluminum with an Alzak finish. The inside surface of the reflector shall be metalized silver and overcoat for endurance. The reflectors shall consist of two parabolic curves, one situated behind the UPRAISED HAND symbol one behind the WALKING PERSON symbol. Two lamp sockets shall mount directly to the back of the reflector. The reflector shall be designed to accept 69 watt bulbs through 150 watt bulbs depending upon the light intensity required. Higher wattage lamp shall not cause any degradation to the die cast aluminum reflector or lens.

Internal illumination shall be used.

3. HARDWARE.

All screws, bolts, nuts, washers, hinge pins, and other necessary fasteners shall be made of 18-8 stainless Type 304.

4. EXTERIOR FINISH.

Before painting, housing shall be cleaned and treated in accordance with Military Specification MIL-DTL-5541-F.

The housing, door, and visor channel shall be cleaned and etched prior to paint and then painted with one coat of primer and two coats of baking enamel.

When a visor is required, the inside of the visor must be Flat Black. The balance of the signal shall be Federal Yellow.

5. LENSES.

The symbols shall transmit light through a prismatic surface. The prismatic surface shall be on the inside. The molded lenses shall have the proper colors, Portland Orange for the UPRAISED HAND and Lunar White for the WALKING PERSON, molded in the glass. The background shall be opaque black. Lunar White and Portland Orange shall conform to ITE requirements.

The UPRAISED HAND indication shall be mounted directly above or integral with the WALKING PERSON indication.

The lens size shall be 14 inches X 14 inches {350 mm X 350 mm}. The lens material shall be two pieces, 1/4 inch {6.4 mm} molded glass.

The letter height shall be 4.5 inches {115 mm}.

6. WIRING.

Each pedestrian signal shall be wired completely internally and ready for connection of field wiring. There shall be a four point terminal block inside the housing to which a wiring harness consisting of 18 AWG wiring shall be attached. The other end shall be sufficient to allow the reflector to be fully removed from the signal.

(c) LED PEDESTRIAN SIGNALS.

Light Emitting Diode (LED) pedestrian signal head shall conform to ITE's interim specifications for LED pedestrian traffic signals.

890.11 Pedestrian Detectors.

(a) GENERAL.

Pedestrian detectors shall conform to the American with Disabilities Act Accessibility Guidelines, Section 14.2.5(1) "Crossing Controls", dated 1994.

(b) MATERIALS.

Pedestrian detector shall be capable of actuation by a force equal to or less than 5 pound force {22.2N}.

A control button shall be raised or flush and shall be a minimum of 2 inches {50.8 mm}.

The microswitch shall be dustproof, water resistant type.

The splice between the cable and the detector leads shall be waterproof.

The pipe or other protective cable covering to the detector housing shall be secure.

The detector shall be provided with a housing to prevent the entrance of water.

Where a push button is attached to a pole, the housing shall be shaped to fit the curvature of the pole and secured to provide a rigid installation. Saddles shall be provided to make a neat fit when required.

Where a push button is to be mounted on top of a post, the housing shall be provided with a slip-fitter fitting and screws for securing rigidly to the post.

(c) HARDWARE.

Hardware and fittings shall be constructed of galvanized steel or non-corrosive metal.

890.12 Signal Cable.

(a) DESCRIPTION.

Signal cable shall be used to supply electrical power to vehicle and pedestrian signal heads, lane control signals, electrically powered signs, and pedestrian detectors.

(b) MATERIALS.

Signal cable shall conform to the requirements of IMSA Specification No. 20-1, polyethylene insulated, polyethylene jacketed communication cable.

Unless otherwise noted on the plans, signal cable conductors shall be solid copper, No. 14 AWG. The number of conductors shall be provided as follows:

Pedestrian Push Button Assembly	2 Conductors
Pedestrian Signal Head	3 Conductors
Flashing Beacon	3 Conductors
3 - Section Signal Head	4 Conductors
5 - Section Signal Head	7 Conductors

890.13 Loop Detector Wire.

(a) DESCRIPTION.

Loop detector wire shall be used to provide a zone of detection (sensor loop) where the passage or presence of a vehicle in the zone causes a decrease in the inductance of the loop.

(b) MATERIALS.

1. WIRE.

Wire shall be Type USE-2, Type RHH, or Type RHW-2 XLP, 600 V cross-link polyethylene insulated cable. All loop wire shall have an insulation thickness of 0.045" (45 mils).

Wire shall be No. 12AWG.

Wire shall have a single conductor that is soft annealed stranded wire of not less than 98 percent conductivity; seven strands shall make up this single conductor.

The outer jacket shall be surface printed indicating the manufacturer, national research testing laboratory listing, maximum rated voltage, AWG size, the proper type letter or letters for the type of wire or the IMSA specification number every two feet {0.6 m} or less.

2. LOOP SEALANT.

Proposed loop sealant shall be included in the proposed material submittal as required in Section 730.

890.14 Loop Detector Lead-In Cable.

(a) DESCRIPTION.

Loop detector lead-in cable shall be used to connect the sensor loop to the input of the loop detector unit.

(b) MATERIALS.

Loop detector lead-in cable shall conform to the requirements of IMSA Specification No. 50-2, polyethylene insulated, polyethylene jacketed shielded, loop detector lead-in cable.

The cable shall have stranded tinned copper conductors, No. 12 AWG.

The cable shall have two conductors individually insulated in a twisted pair configuration.

890.15 Junction Box.

(a) DESCRIPTION.

Junction box shall be provided to splice loop wires to shielded lead-in-cable, to allow access to ground rods located beneath sidewalks, and to decrease friction drag of pulling underground cable through conduit.

(b) MATERIALS.

1. JUNCTION BOX.

The junction box shall be constructed of non-concrete plastic mortar reinforced with heavy-weave fiberglass. It shall be capable of withstanding a vertical load test of 20,000 pounds {9.07 metric tons} over a 10 inch {254 mm} by 10 inch {254 mm} area.

Junction box shall conform to the dimensions shown on the details in the Special and Standard Highway Drawings.

2. JUNCTION BOX COVER.

All junction boxes shall be supplied with a heavy duty cover tested to 20,000 pounds {9.07 metric tons} over a 10 inch {254 mm} by 10 inch {254 mm} area. All covers shall conform to the American Association of State Highway and Transportation Officials' (AASHTO) Specification H10 10 Ton GVW HA Cover Rating. All covers shall comply with the requirements given in ASTM Standard Publication No. ASTM C857, "Practice for Minimum Structural Concrete Utility Structures" and conform to load test, 20,000 pounds {9.07 metric tons} performed as stated in AASHTO T280-87, "Standard Method of Testing For Concrete Pipe, Section, or Tile". The junction box shall have a locking cover. The junction box cover shall be embossed with "TRAFFIC SIGNALS" in standard block type not less than 1.5 inches {38.1 mm} in height.

890.16 Conduit.

(a) DESCRIPTION.

Conduit furnished shall be metallic or non-metallic, of the size specified on the plans.

(b) RIGID METAL CONDUIT (RMC).

Rigid metal conduit, couplings, and fittings shall be galvanized steel, meeting the requirements given in UL 6. Couplings and fittings shall be threaded.

(c) RIGID NONMETALLIC CONDUIT (RNC).

Rigid nonmetallic conduit shall be Schedule 40 or Schedule 80 PVC and shall meet the requirements given in UL 651.

(d) LIQUID-TIGHT FLEXIBLE METAL CONDUIT (LFMC).

Liquid-tight flexible metal conduit shall meet the requirements given in UL 360. The thermoplastic covering shall be oil resistant. Connectors shall be either angle or straight and be UL listed for the intended use. LFMC shall be installed where conduits cross an expansion or open joint on bridges, barrier rails and other structures and shall be installed at other expansion locations as directed by the Engineer. The LFMC shall be a maximum of 36 inches {1800 mm} long and shall not sag more than 3 inches {150 mm} between the fixed ends of the rigid conduit.

(e) LIQUID-TIGHT FLEXIBLE NON-METALLIC CONDUIT (LFNC).

Liquid-tight flexible non-metallic conduit shall meet the requirements given in UL 1660.

890.17 Supporting Structures.

(a) GENERAL.

Supporting structures (metal traffic signal pole, prestressed concrete traffic signal pole, mast arm pole, and pedestal pole) used for mounting signal equipment shall conform to the requirements of Section 718 and Section 891.

(b) METAL AND CONCRETE SUPPORTING STRUCTURE FEATURES.

Handholes with covers shall be provided to facilitate installation and wiring.

Adapter with provisions for overhead wiring and wire entrance shall be provided for the top of the pole.

A grounding connection shall be provided adjoining the base.

When painting of the supporting structure is specified by the plans or proposal, the supporting structure shall have two primer coats applied at the factory or point of fabrication and two additional coats of high-grade exterior grade enamel applied in the field.

Paints shall conform to the applicable portions of Section 855.

(c) TIMBER POLES.

Timber poles shall be southern yellow pine treated in accordance with the latest American Wood-Preserver's Association (AWPA) standards and conform to the requirements of Section 833.

Unless otherwise noted on the plans, timber poles used for supporting traffic signals shall be Class 5 and shall conform to the requirements of ANSI Standards Publication No. 05.1-1992. The poles shall not have more than 180 degrees of twist in grain over the full length and the sweep shall be no more than 4 inches {100 mm}.

When required, guy wires shall be provided of adequate strength and shall meet the requirements of ASTM A 475-89. Guy wire anchors shall be expanding or screw type with a minimum guy tension of 8000 pounds {35 kN}.

890.18 Luminaire Extension Assembly.

(a) DESCRIPTION.

Luminaire extension assembly shall consist of an extension arm, housing, reflector, a refractor or lens, a lamp socket, an integral ballast, a terminal strip, and a lamp shall conform to the requirements of this specification unless otherwise specified on the plans, in the proposal, and on the details in the Special and Standard Highway Drawings.

(b) GENERAL.

The luminaire shall be of the horizontal type for IES Type III medium cutoff distributing an asymmetrical light pattern.

(c) MATERIALS.

1. LUMINAIRE EXTENSION ARM.

Unless otherwise shown on the plans, the extension arm shall be 12 feet {3.7 m} in length. Stud mounting bolts and brackets shall be provided.

2. PHOTOELECTRIC CONTROL UNIT.

A photoelectric control unit shall be provided and conform to the requirements of the Institute of Electrical and Electronic Engineers (IEEE) and NEMA.

3. HOUSING.

The housing shall be fabricated from die-cast aluminum.

If the housing is provided with a hole for the receptacle, the hole shall be closed, covered, and sealed with weatherproof material, in a permanent manner.

The housing shall be weather-tight and shall be gasketed.

All hinges, bolts, nuts, washers, screws and miscellaneous hardware shall be stainless steel.

4. LENS.

The lens shall be a pressed borosilicate glass refractor to provide the IES lighting pattern indicated.

5. BALLAST.

The ballast shall be a CWA Type.

6. LAMP.

Each luminaire shall have clear high-pressure sodium (HPS) lamp of the required wattage. Average lamp life shall be 24,000 hours. Initial lumen output shall be 27,500 lumens for 250 W and 50,000 lumens for 400 W.

7. FIELD WIRES.

Field wires connected to the luminaire shall terminate on a barrier type terminal block secured to the housing.

An ultra violet resistant No. 10 AWG cable shall be provided. Phase or current carrying conductors shall be of the Type RHH, RHW, USE, or XHHW and shall be identified by a continuous

black color or colors other than white, gray, or green. If colors are used, they shall be consistent for circuit and phase.

8. SURGE ARRESTOR.

The surge arrester shall be enclosed in a watertight case with mounting ears so that no additional hardware will be required except attachment screws. There will be no limitation as to proper orientation for mounting to insure that the unit is 100 percent functional.

The surge protection elements shall be metal-oxide varistors with a total peak surge current rating (8x20 microseconds) of 45 kA for the 120 V mode. Certified response time shall be 5 nanoseconds max at 700 A and 440 V. Certified test reports from an independent laboratory shall be submitted when requested by the Engineer.

The arrester shall provide protection from line to ground and neutral to ground. It shall have a calculated surge life of greater than 40,000 occurrences at 700 A or 1000 occurrences at 1000 A. There shall be no follow current and current drain shall be less than 100 μ A.

9. LED Luminaire.

LED Luminaires shall meet the requirements of Section 889 and the plans.

890.19 Concrete Foundations.

All concrete foundations or footings shall conform to the requirements of Section 718.

A ground rod of a non-ferrous coating material, 5/8 inch {16 mm} in diameter by 10 feet {3.0 m} in length, shall be provided. The ground rod shall be provided with a bonding copper wire or strip equivalent to the cross sectional area of a No. 6 AWG {4.25 mm} wire.

890.20 Signs.

The R10-10 sign, R10-12 sign, R10-4B sign, and any sign as indicated on the plans, as a part of the signal installation shall conform to the requirements of Section 880.

890.21 Video Detection System.

(a) CAMERA.

The camera enclosure shall have the following features and functionality:

- provide real time detection;
- operate from 0% to 100% humidity;
- include a lens with an automatic iris;
- be easily field replaceable;
- shall be clearly identified with the focal length and aperture;
- shall be resistant to vibration and resistant to shock when installed for operation.

(b) CAMERA ENCLOSURE.

The camera enclosure shall have the following features and functionality:

- shall be a NEMA Type 4 enclosure;
- shall be fabricated from corrosion resistant aluminum;
- shall be finished in a light colored UV and weather resistant paint;
- shall be provided with a sunshield;
- shall have a sunshield designed to divert water flow to the sides of the sunshield.

(c) CAMERA AND ENCLOSURE ASSEMBLY.

The camera in the enclosure shall have the following features and functionality:

- shall have a heater mounted toward the front of the enclosure;
- weight of all components shall not exceed 10 pounds {4,54 kg}.

All devices required for maintaining the internal temperature and faceplate temperature shall be integral to the environmental enclosure. The heater shall not interfere with the operation of camera electronics, and shall not cause interference with the video signal.

The weight shall include the environmental enclosure, complete with camera, fittings, heater, and transformers.

(d) CAMERA MOUNTING ASSEMBLY.

The camera mounting assembly shall have the following features:

- shall have all stainless steel or aluminum construction;
- shall meet the support requirements of the camera manufacturer;
- shall be equipped with lightning protection;
- connections shall be mounted on the rear of the enclosure;
- all connections shall have liquid tight fittings.

(e) PROCESSOR.

The processor shall be rack or shelf mounted in a controller cabinet and shall have a RS232 serial port.

The processor shall provide video output (BNC) for connecting a television monitor for testing purposes and for connection to video transmitter provided by others. The video output (BNC) shall be located at the front of the processor.

The processor shall be plugged into a NEMA-5-15R receptacle located in the controller cabinet.

The processor shall be capable of detecting vehicle presence in 8 user-defined detection zones. When the vehicle is in the detection zone, the detection zone shall change color or intensify on the screen to verify proper operation of the detectable system.

(f) VIDEO INTERFACE PANEL AND CABLES.

The video interface panel shall provide facilities to protect against damage from lightning and to isolate the ground of the cables from that of the video detection system.

Coaxial cable and power cable shall meet the requirements of vehicle detection manufacturer.

(g) TWO CHANNEL AND FOUR CHANNEL DETECTOR UNIT.

All detector units shall be card rack units, suitable for mounting in a detector unit as specified in NEMA Standard Publication TS-2-1992.

890.22 Priority Control System, Traffic Signal Preemption.

(a) PRIORITY CONTROL SYSTEMS.

The priority control system shall be either acoustically (sound) activated, optically activated, or GPS (Global Positioning System) activated. All equipment and components shall meet or exceed all National Electrical Manufacturers Association (NEMA) TS1 and TS2, as well as, Type 170 and Type 2070 weather exposure durability requirements.

(b) OPERATIONAL REQUIREMENTS.

The priority control system shall be capable of providing preemption information to the standard NEMA TS1, NEMA TS2, Type 170, and Type 2070 traffic controllers used by the ALDOT. The priority control system shall be capable of setting time limits for how long a call can be held, when the call is dropped after a vehicle passes, or if the call is lost.

Acoustically activated systems shall be able to detect and respond to a preemption call from an emergency or priority vehicle at a minimum of 1000 feet {300 meters} from a roadway intersection. All other systems shall be able to detect and respond to a preemption call from an emergency or priority vehicle at a minimum of 2500 feet {760 meters} from a roadway intersection.

Setup and programming of the priority control system shall be accomplished through the use of the current ALDOT computer operating software.

(c) LOG FILE.

The priority control system shall maintain a log file of at least 2000 of the most recent priority calls. This log file shall be downloadable in a standard ASCII, delimited format. Each call record for all systems shall contain the following four items:

- Time & Date: shall indicate the time and date the call was made;
- Direction: indicates the direction from which the call was made;
- ID: identifies what vehicle or device made the request;
- Duration: indicates the total amount of time the call was active.

The following are additional requirements for optical and GPS activated systems:

- User: what department or agency that used the system;

- Level: shows what priority level was used.

(d) SOFTWARE.

The manufacturer's software shall be provided for the operation of the system. One software package shall be provided for each detection system. Software updates and revisions shall be provided to the ALDOT as updated by the manufacturer at no additional cost. The software shall not require a licensing fee.

All setup, controller program, and diagnostic software shall be provided and shall run on Microsoft Windows based operating systems. Software updates shall be provided free of charge.

On-line help screens shall be provided as an integral part of the system software.

Interface software shall be capable of real-time viewing of the system activity.

(e) DOCUMENTATION REQUIREMENTS.

A minimum of 2 sets of operational and maintenance manuals shall be provided with the system. These manuals shall cover all aspects of the system from the installation to maintenance.

The following data shall also be provided by the manufacturer:

- Model & Serial numbers shall be visible on all electrical components;
- Power and current requirements;
- Acceptable operational temperature ranges;
- Weight and dimensions;
- Required mounting equipment;
- Operating frequency where needed;
- Detection range;
- Response time and sensitivity;
- Required software;
- Manufacturer's advertised product capabilities;
- Any limitations, requirements, or potential hazards associated with the operation or maintenance of the device.

(f) WARRANTY.

Final payment will not be made until a written warranty is provided by the Contractor and accepted by the Engineer in writing. The warranty shall be a written guarantee from the distributor or manufacturer that the priority control system will be fully functional and will remain free of defects in material and workmanship for a period of one year from date of acceptance. During the warranty period, the distributor or manufacturer shall repair with new materials, or replace at no charge, any device, product or other material containing a warranty defect. All materials returned from warranty repairs shall be made through the distributor or manufacturer at no additional charge. Warranty repairs and replacements shall not exceed two weeks from date of return to the distributor or manufacturer.

The warranty will not begin until the traffic signal installation "30 operation check period" is complete

ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: June 26, 2017

Special Provision No. 12-2332

SUBJECT: Bollards, Project No. ASOA59443-ATRP(017), Tuscaloosa County

Alabama Standard Specifications, 2012 Edition, shall be amended by the addition of a new SECTION 770 as follows:

SECTION 770 BOLLARDS

770.01 Description.

This Section shall cover the work of furnishing and installing Bollards in accordance with the details shown on the plans.

770.02 Materials and Design

The materials shall meet the requirements of Division 800 and the plans.

770.03 Construction Requirements

Bollards shall be constructed in accordance with the requirements shown on the plans. Shop drawings are not required.

770.04 Method of Measurement

Bollards shall be measured per each.

770.05 Basis of Payment

(a) UNIT PRICE COVERAGE.

Payment for bollards shall include all labor, materials, and incidentals for the complete in-place bollards as specified in the plans

(b) PAYMENT WILL BE MADE UNDER ITEM NO:

770-L Bollards, Complete in Place - per each



ALABAMA DEPARTMENT OF TRANSPORTATION

DATE: September 6, 2017

Special Provision No. 12-2467

SUBJECT: Wood Fence, Project Number ACOA59443-ATRP(017), Tuscaloosa County

Alabama Standard Specifications, 2012 Edition, shall be amended by adding the following new SECTION 638:

SECTION 638 WOOD FENCE

638.01 Description.

This Section shall cover the work of furnishing and erecting fences of wood material. Posts and fence components shall be in accordance with details shown on the plans. When it is optional as to the choice of the post type to be used, the alternate, once selected, shall be used throughout the project.

638.02 Materials.

Materials shall conform to requirements of Division 800, Materials, with specific reference to Sections 805, 833, and 855 and the details shown on the plans.

638.03 Construction Requirements.

(a) General.

All construction methods and equipment employed in the setting of fence shall be in accordance with requirements of the Specifications and the manufacturer's recommendations.

(b) Clearing Fence Line.

All brush, stumps, logs, large roots, humps of earth, boulders or debris which would interfere with proper construction of the fence in the required location and present a pleasing and acceptable profile along the tops of the posts shall be removed before starting fencing operations. Sound standing trees in the fence line shall be removed or trimmed as directed to provide adequate working room. The clearing and/or grading of the fence line and the disposal of material removed shall be accomplished in such a way that trees and shrubs on the remainder of the right of way will not be damaged.

(c) Setting Posts.

All posts and anchorage shall be set at intervals shown on the plans, or directed. The posts shall be set plumb and in true alignment on the side on which the rail is attached. Holes shall be dug to the minimum diameter and depth shown on the plans except that special treatment may be authorized when the fence is over solid rock. Wood posts, excluding posts that are to be set in concrete, may be driven if the soil conditions are suitable. Methods shall be used to protect the posts and galvanized coating or wood preservative during the driving operation. The heads of all posts shall be protected from damage by caps or driving heads of approved design. Heads of wood posts shall be protected by a suitable cushion of wood, rope or like material and by a metal driving head. Posts that are damaged in any way shall be removed and replaced without additional cost to the State.

(d) Installing Fence.

The wood material shall be erected in a manner that corresponds to the plan details. The engineer should approve any deviation from this method before work begins.

(e) Concrete Block Columns

Concrete block columns shall be installed in accordance with Section 613 and the details shown on the plans. Steel reinforcement shall be installed per Section 502.

638.04 Method of Measurement.

All wood fencing will be measured in place, along the top of the posts overall between the extreme limits of each section, in linear feet to nearest foot.

638.05 Basis of Payment.

(a) Unit Price Coverage.

Fences constructed and measured as above provided will be paid for at the contract unit price per linear foot {meter} for Wood Fence completely in place, which shall be payment in full for clearing, grubbing, and preparatory shaping for the fence line; for disposing of waste materials; for excavating for posts and braces and pouring concrete foundations where required; for furnishing all materials; for setting posts and braces, for painting (if required), for furnishing and installing concrete block columns (including steel reinforcement), for installing panels and other incidentals, and for all equipment, tools and labor required to complete the work.

(b) Payment Will Be Made Under Item No.:

638-D Wood Fence - per linear foot

**END OF
PROPOSAL**



CONTRACT

THIS AGREEMENT made and entered into this 4th day of January Two Thousand 18, by and between the STATE OF ALABAMA, party of the first part (hereinafter called the State) and CORNERSTONE CIVIL CONTRACTORS, LLC, NORTHPORT, ALABAMA, party of the second part (hereinafter called Contractor), WITNESSETH:

WHEREAS, the State desires the improvement and construction of a certain road hereinafter more particularly described and the Contractor desires to furnish and deliver all the material and to do and perform all the work and labor for the said purpose;

NOW, THEREFORE, in consideration of the premises, the mutual covenants herein contained and the sum of one dollar (\$1.00) by each of the parties to the other in hand paid, the receipt whereof is hereby acknowledged, the parties hereto agree as follows:

1. The Contractor promises and agrees to furnish and deliver all the material and to do and perform all the work and labor required to be furnished and delivered, done and performed in and about the improvement and construction of a road in, TUSCALOOSA COUNTY, Known as FEDERAL AID PROJECT NUMBER(s) ACOA59443-ATRP(017) Same to be FOR ROADWAY IMPROVEMENTS ON HARGROVE ROAD FROM THE INTERSECTION OF 10TH AVENUE TO THE JUNCTION OF HACKBERRY LANE IN TUSCALOOSA: 0.450 MILE of road in strict and entire conformity with the provisions of the Contract, and the Notice to Contractors and the Proposal, and the Plans and Specifications (including Special Provisions) prepared (or approved) by the State Transportation Director (or an Assistant Engineer), the originals of which are on file in the Office of the State Transportation Department, and which said Plans and Specifications and the Notice to Contractors and the Proposal are hereby made a part of this Agreement as fully and to the same effect as if the same had been set forth at length in the body of this Agreement.

2. The State agrees and promises to pay to the Contractor for said Work, when completed in accordance with the Provisions of this Contract, the price as set forth in the said Proposal amounting approximately to TWO MILLION, ONE HUNDRED SIXTY-NINE THOUSAND, SEVEN HUNDRED SIXTY-EIGHT AND 60/100 DOLLARS, (\$2,169,768.60), payments made as provided in said Specifications upon presentation of the proper certificates of the State Transportation Director or his representatives and upon the terms set forth in the said Specifications and pursuant to the terms of this Contract.

3. The said work shall be done in accordance with the laws of the State of Alabama under the direct supervision, and to the entire satisfaction of the State Transportation Director, subject at all times to the inspection and approval of the United States Secretary of Transportation, or his agents, and in accordance with the rules and regulations made pursuant to the Federal Highway Act and Acts of the Federal Congress, amendatory and/or supplementary thereto.

4. The decision of said State Transportation Director upon any question connected with the execution of this Agreement or any failure or delay in the prosecution of the Work by the said Contractor shall be final and conclusive.

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PAGE TWO OF CONTRACT

IN WITNESS WHEREOF, THE STATE OF ALABAMA has caused these presence to be executed by JOHN R. COOPER, TRANSPORTATION DIRECTOR and CORNERSTONE CIVIL CONTRACTORS, LLC, THE CONTRACTOR, has hereto sat his hand and seal this day and year above written.

STATE OF ALABAMA,

THIS CONTRACT HAS BEEN LEGALLY REVIEWED AND APPROVED AS TO FORM AND CONTENT.

William F. Patty (RP)
By/For: WILLIAM F. PATTY
Chief Counsel, Transportation Department

BY: John R. Cooper
JOHN R. COOPER, Director
Transportation Department

CONTRACTOR,

(X) Cornerstone Civil Contractors, LLC
CONTRACTOR FIRM

(X) 39115
AL. CONTRACTOR'S LICENSE NUMBER

Signed, sealed and delivered in the presence of

(X) J. S. Robbins
WITNESS

BY (X) Edmund H. Colgrove, Jr.
MEMBER OF FIRM

Ian S. Robbins
PRINT NAME

Edmund H. Colgrove, Jr.
PRINT NAME

Owner/Manager
TITLE

The within and foregoing contract is hereby approved on this the 23rd day of

January, 20 18.

Kay Ivey

KAY IVEY
GOVERNOR OF ALABAMA

1941



BOND FOR PAYMENT

OF LABOR, MATERIALS, FEED-STUFFS OR SUPPLIES

STATE OF ALABAMA
MONTGOMERY COUNTY

KNOW ALL MEN BY THESE PRESENTS: That we, CORNERSTONE CIVIL CONTRACTORS, LLC, NORTHPORT, ALABAMA, as

Principal, and Travelers Casualty and Surety Company of America as Surety, are held and firmly bound unto the State of Alabama, in the penal sum of TWO MILLION, ONE HUNDRED SIXTY-NINE THOUSAND, SEVEN HIUNDRED SIXTY-EIGHT AND 60/100 DOLLARS, (\$2,169,768.60), for the payment of which sum well and truly to be made, we hereby bind ourselves, our heirs, executors, administrators, successors and assigns.

IN WITNESS WHEREOF, we have hereunto set our hands and affixed our seals this 4th day of January, 20 18.

PROVIDED, HOWEVER, that the condition of this obligation is such that whereas the above bound CORNERSTONE CIVIL CONTRACTORS, LLC have this day entered into a Contract with the STATE OF ALABAMA, FOR ROADWAY IMPROVEMENTS of 0.450 MILE in TUSCALOOSA COUNTY, known as FEDERAL AID, Project No(s). ACOA59443-ATRP(017), located ON HARGROVE ROAD FROM THE INTERSECTION OF 10TH AVENUE TO THE JUNCTION OF HACKBERRY LANE IN TUSCALOOSA, a copy of which said Contract is hereto attached.

NOW, THEREFORE, in the event that said CORNERSTONE CIVIL CONTRACTORS, LLC, as such Contractor shall promptly make payment to all persons supplying him or them with labor, material, feed-stuffs, or supplies for or in the prosecution of the Work provided for in said Contract, that this obligation shall be null and void and of no effect, otherwise to remain and be in full force and effect.

PROVIDED, further, in the event that the said CORNERSTONE CIVIL CONTRACTORS, LLC, as such Contractor shall fail to make prompt payment to all persons supplying him or them with labor, materials, feed-stuffs, or supplies for or in the prosecution of the work provided for in such Contract, the above bound

Travelers Casualty and Surety Company of America as Surety shall be liable for the payment of such labor, materials, feed-stuffs or supplies and for the payment of reasonable attorney's fees incurred by successful claimants or plaintiffs in suits on said bond as provided in Section 39-1-1, Code of Alabama, 1975, as amended.

For any notice, claim or dispute regarding this contract, the Surety shall notify the Alabama Department of Transportation at the address below:

Alabama Department of Transportation
ATTN: CONSTRUCTION BUREAU
1409 Coliseum Blvd.
Montgomery, AL 36110



PAGE TWO OF PAYMENT OF LABOR, MATERIALS, FEED-STUFFS OR SUPPLIES

PROVIDED, FURTHER, that said Contractor and Surety hereby agree and bind themselves to the mode of service described in Section 39-1-1, Code of Alabama, 1975, as amended, and consent that such service shall be the same as personal service on said Contractor or Surety.

UPON the completion of said Contract pursuant to its terms, if any funds remain due on said Contract, the same shall be paid to said Principal or Surety.

The decision of said Alabama Department of Transportation Director upon any question connected with the execution of said Contract, or any failure or delay in the prosecution of the Work by said Principal or Surety shall be final and conclusive.

The Proposal, Specifications and the Contract herein before referred to and the Bond For Performance Of The Work executed under the provisions of Section 39-1-1, Code of Alabama, 1975, as amended, are made a part of this obligation, and this instrument is to be construed in connection therewith.

WITNESS our hands and seals, this 4th day of January, 2018

[Signature] (L.S.)
WITNESS

[Signature] (L.S.)
CONTRACTOR'S SIGNATURE

Travelers Casualty and Surety Company of America
NAME OF SURETY

Owner / Manager
TITLE

BY: [Signature]
ATTORNEY-IN-FACT
Charles F. Horton, Jr.

Cornerstone Civil Contractors, LLC
LEGAL NAME OF CONTRACTOR

SURETY CLAIMS DEPARTMENT ADDRESS

One Tower Square, Hartford, CT 06183

P.O. Box 20225, Tuscaloosa, AL 35401
ADDRESS

SURETY CLAIMS DEPARTMENT TELEPHONE NUMBER

205-982-4589

NOTICE TO INSURANCE PRODUCER

Please print or write legibly your name and complete address below, including PRODUCER'S COMPANY

Countersigned by Alabama Licensed Insurance Producer for Surety, if Applicable

Charles F. Horton, Jr.

1806 6th Street, Tuscaloosa, AL 35401

Charles F. Horton, Jr., License # 0041170
NAME AND LICENSE NUMBER

1806 6th Street, Tuscaloosa, AL 35401
ADDRESS

Fitts Agency, Inc.
PRODUCER'S COMPANY



BOND FOR PERFORMANCE OF THE WORK

STATE OF ALABAMA
MONTGOMERY COUNTY

KNOW ALL MEN BY THESE PRESENTS: That we, CORNERSTONE CIVIL CONTRACTORS, LLC, NORTHPORT, ALABAMA, as

Principal and Travelers Casualty and Surety Company of America, as Surety, are held and firmly bound unto the State of Alabama in the penal sum of TWO MILLION, ONE HUNDRED SIXTY-NINE THOUSAND, SEVEN HIUNDRED SIXTY-EIGHT AND 60/100 DOLLARS, (\$2,169,768.60) for the payment of which well and truly to be made, we hereby bind ourselves, our heirs, executors, administrators, successors and assigns.

IN WITNESS WHEREOF, we have hereunto set our hands and affixed our seals, this 4th day of January, 20 18.

PROVIDED, HOWEVER, that the condition of this obligation is such that where-as the above bound CORNERSTONE CIVIL CONTRACTORS, LLC have this day entered into a Contract with the State of Alabama, FOR ROADWAY IMPROVEMENTS of 0.450 MILE in TUSCALOOSA COUNTY to-wit: known as FEDERAL AID Project No(s). ACOA59443-ATRP(017), located ON HARGROVE ROAD FROM THE INTERSECTION OF 10TH AVENUE TO THE JUNCTION OF HACKBERRY LANE IN TUSCALOOSA, a copy of which said Contract is hereto attached.

NOW, THEREFORE, In the event the said CORNERSTONE CIVIL CONTRACTORS, LLC, as such Contractor shall faithfully and promptly perform said contract and all the conditions and requirements thereof, then this obligation shall be null and void and of no effect, otherwise to remain and be in full force and effect.

PROVIDED, further, that upon the failure of the said CORNERSTONE CIVIL CONTRACTORS, LLC to promptly and efficiently prosecute said work, in any respect, in accordance with the contract, the above bound

Travelers Casualty and Surety Company of America
as surety, shall take charge of said work and complete the contract at their own expense, pursuant to its terms, receiving, however, any balance of the funds in the hands of said State due under said contract. Said Surety may, if they so elect, by written direction given to the Alabama Department of Transportation Director authorize the Alabama Department of Transportation Director to advertise for bids to complete the said contract at the expense of said Surety, and such Surety hereby agree and bind themselves to pay the expense of the completion of such work, less any funds in the hands of the State remaining due to above bound Contractor.

For any notice, claim or dispute regarding this contract, the Surety shall notify the Alabama Department of Transportation at the address below:

Alabama Department of Transportation
ATTN: CONSTRUCTION BUREAU
1409 Coliseum Blvd.
Montgomery, AL 36110







POWER OF ATTORNEY

Farmington Casualty Company
Fidelity and Guaranty Insurance Company
Fidelity and Guaranty Insurance Underwriters, Inc.
St. Paul Fire and Marine Insurance Company
St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company
Travelers Casualty and Surety Company
Travelers Casualty and Surety Company of America
United States Fidelity and Guaranty Company

Attorney-In Fact No. 230377

Certificate No. 007320100

KNOW ALL MEN BY THESE PRESENTS: That Farmington Casualty Company, St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company are corporations duly organized under the laws of the State of Connecticut, that Fidelity and Guaranty Insurance Company is a corporation duly organized under the laws of the State of Iowa, and that Fidelity and Guaranty Insurance Underwriters, Inc., is a corporation duly organized under the laws of the State of Wisconsin (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint

Timothy L. Donahue, T. Gary Fitts, J. David Fitts, Charles F. Horton Jr., R. Forrest Fitts, Cheryl Camak, Julie Tubbs, and Chris Davidson

of the City of Tuscaloosa, State of Alabama, their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

The authority granted hereunder to sign, execute, seal and acknowledge any individual bond, recognizance, conditional undertaking, and other writing obligatory in the nature thereof is limited to the sum of TEN MILLION (\$10,000,000.00) DOLLARS per bond.

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed and their corporate seals to be hereto affixed, this 2nd day of August, 2017.

Farmington Casualty Company
Fidelity and Guaranty Insurance Company
Fidelity and Guaranty Insurance Underwriters, Inc.
St. Paul Fire and Marine Insurance Company
St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company
Travelers Casualty and Surety Company
Travelers Casualty and Surety Company of America
United States Fidelity and Guaranty Company



State of Connecticut
City of Hartford ss.

By: [Signature]
Robert L. Raney, Senior Vice President

On this the 2nd day of August, 2017, before me personally appeared Robert L. Raney, who acknowledged himself to be the Senior Vice President of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

In Witness Whereof, I hereunto set my hand and official seal.
My Commission expires the 30th day of June, 2021.



[Signature]
Marie C. Tetreault, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, which resolutions are now in full force and effect, reading as follows:

RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

FURTHER RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

FURTHER RESOLVED, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, Kevin E. Hughes, the undersigned, Assistant Secretary, of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 4th day of January, 20 18.


Kevin E. Hughes, Assistant Secretary



To verify the authenticity of this Power of Attorney, call 1-800-421-3880 or contact us at www.travelersbond.com. Please refer to the Attorney-In-Fact number, the above-named individuals and the details of the bond to which the power is attached.



POWER OF ATTORNEY

Farmington Casualty Company
Fidelity and Guaranty Insurance Company
Fidelity and Guaranty Insurance Underwriters, Inc.
St. Paul Fire and Marine Insurance Company
St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company
Travelers Casualty and Surety Company
Travelers Casualty and Surety Company of America
United States Fidelity and Guaranty Company

Attorney-In Fact No. 230377

Certificate No. 007320099

KNOW ALL MEN BY THESE PRESENTS: That Farmington Casualty Company, St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company are corporations duly organized under the laws of the State of Connecticut, that Fidelity and Guaranty Insurance Company is a corporation duly organized under the laws of the State of Iowa, and that Fidelity and Guaranty Insurance Underwriters, Inc., is a corporation duly organized under the laws of the State of Wisconsin (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint

Timothy L. Donahue, T. Gary Fitts, J. David Fitts, Charles F. Horton Jr., R. Forrest Fitts, Cheryl Camak, Julie Tubbs, and Chris Davidson

of the City of Tuscaloosa, State of Alabama, their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

The authority granted hereunder to sign, execute, seal and acknowledge any individual bond, recognizance, conditional undertaking, and other writing obligatory in the nature thereof is limited to the sum of TEN MILLION (\$10,000,000.00) DOLLARS per bond.

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed and their corporate seals to be hereto affixed, this 2nd day of August, 2017.

Farmington Casualty Company
Fidelity and Guaranty Insurance Company
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Travelers Casualty and Surety Company
Travelers Casualty and Surety Company of America
United States Fidelity and Guaranty Company



State of Connecticut
City of Hartford ss.

By: [Signature]
Robert L. Raney, Senior Vice President

On this the 2nd day of August, 2017, before me personally appeared Robert L. Raney, who acknowledged himself to be the Senior Vice President of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

In Witness Whereof, I hereunto set my hand and official seal.
My Commission expires the 30th day of June, 2021.



[Signature]
Marie C. Tetreault, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, which resolutions are now in full force and effect, reading as follows:

RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

FURTHER RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

FURTHER RESOLVED, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, Kevin E. Hughes, the undersigned, Assistant Secretary, of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 4th day of January, 20 18


Kevin E. Hughes, Assistant Secretary



To verify the authenticity of this Power of Attorney, call 1-800-421-3880 or contact us at www.travelersbond.com. Please refer to the Attorney-In-Fact number, the above-named individuals and the details of the bond to which the power is attached.