

VIRGINIA TRANSPORTATION CONSTRUCTION ALLIANCE (VTCA) JOINT CONFERENCE

2024 MATERIALS DIVISION UPDATES Salem & Lynchburg Districts

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2024 Specification Sections With Changes

Section	Areas of Change
SS 211	Antistripping/WMA dosage rates, burn ticket submission
SP 211 (E mixes)	Added option of <u>Wet</u> GTR binder
Section 248	VCA Mix=VCA DRC/Notify the engineer and provide correction action
Section 321 (Trench Widening)	Type 1 Plugs/Cores are not required

2024 Section 315 Specification Changes

- **Pavement uniformity**
- **Max lift size with NMAS, 5xNMAS**
- **Clean existing pavement surface before overlay**
- **92.5% minimum density for SM, IM, and BM mixes**
- **Removal, if density <88%**

2024 PM Schedules BMD Implementation

BMD P+VO mix designation in contracts for SM-9.5/12.5 A & D mixes

Must meet BMD Special Provision (SQ315-000200-24)

Design performance tests: APA, IDT-HT, Cantabro, and IDT-CT

‘A’ Mix types = NO performance production testing

‘D’ Mix types = performance testing in production required

2024 BMD Implementation Points of Interest

- **BMD Mix Design may differ from typical Superpave mix**
 - **Slighter different gradation bands**
 - **Allowed to change PG grade for binder from Table II-14 (with Engineer approval)**
- **Or can be same existing Superpave design with performance tests**
- **Existing Superpave mixes still specified outside of PM contracts**
 - **May be dual production of both Superpave and BMD mixes**

2024 BMD Rollover Mix Designs

- **2023 BMD Mix rollover to 2024 BMD mix design**
 - Performance testing for IDT-HT at design binder content and +0.5% above design
 - Resubmit all performance tests at design binder content
- **2023 Superpave mix rollover to 2024 BMD mix design**
 - Submit all performance results at design binder content and $\pm 0.5\%$ (as required)

2024 BMD Specification Highlights

- **IDT-HT - wet specimen testing. 100 kPa limit for design. Report only in production**
- **IDT-CT – Production testing either Reheat or Non-Reheat. Reheat – mix cool to room temperature**
- **Contractor results submitted within 48 hours. VDOT to sample loose mix and make samples**

2024 BMD Other Notes

- **Excel workbook to submit performance results**
 - **Available from District Materials Staff**
 - **To be posted as TL form online**
- **MITIS/PLAID updates are coming. Do not expect to be during the 2024 season**
- **Numerous topics of VTRC research on-going and upcoming**

2024 ANTICIPATED BMD TESTING

2023 TESTING REVIEW

SNEAK PEAK AT 2025 SPECIFICATION DISCUSSIONS

2023 Asphalt Production Summary

District	Schedule (SM 12.5/9.5 A/D)	Other	% schedule work	2023 BMD Tonnage
BRISTOL	38,520	445,796	8%	5,421
SALEM	162,587	208,108	44%	85,283
LYNCHBURG	124,875	72,029	63%	-
RICHMOND	303,180	484,500	38%	134,752
HR	91,839	371,276	20%	19,030
FREDERICK	173,948	451,970	28%	26,985
CULPEPER	123,281	126,594	49%	23,940
STAUNTON	150,917	216,093	41%	8,695
NOVA	838,615	728,647	54%	29,555
Total	2,007,762	3,105,013	39%	333,661

2024 BMD Production Testing Samples

(estimated from PMSS Schedule tonnages)

Project District	BMD Tonnage (Both A and D)	Contractor				VDOT	
		BMD Gradation	BMD Volumetric	IDT-CT/ Cantabro	IDT-HT	BMD Gradation/ Volumetric	IDT-CT/ Cantabro/ IDT-HT
1							
2	349,940	711	361	102	54	84	54
Lynchburg	273,882	553	280	144	76	116	76
4	238,975	491	252	104	57	84	57
5	207,049	421	214	101	54	82	54
6	304,994	621	315	139	72	114	72
7	246,212	502	255	95	53	80	53
8	187,866	389	198	79	44	66	44
9	531,475	1074	543	133	72	110	72
Total	2,340,393	4762	2418	897	482	736	482

2023 Volumetric Testing Comparisons between VDOT and the Producers in Lynchburg Plants

2023	Split Samples							Non-Matched Producer Samples			Combined Producer Failure Rate
	Producer Failing	Producer Failing	Producer Passing	Producer Passing	2023 VDOT	2023 Match	Producer Failures	Producer Passing	2023 Non-Match		
District	VDOT Failing	VDOT Passing	VDOT Failing	VDOT Passing							
Bristol	8	0	42	43	54%	9%	39	438	8%	8%	
Salem	42	11	25	105	37%	29%	42	440	9%	14%	
Lynchburg	11	2	8	45	29%	20%	30	190	14%	15%	
Richmond	26	10	64	272	24%	10%	25	918	3%	5%	
Hampton Roads	13	3	52	184	26%	6%	1	629	0%	2%	
Fredericksburg	11	7	17	326	8%	5%	8	449	2%	3%	
Culpeper	11	3	15	100	20%	11%	28	198	12%	12%	
Staunton	17	5	35	82	37%	16%	35	282	11%	13%	
NOVA	75	42	97	551	22%	15%	130	1213	10%	12%	
Statewide	214	83	355	1708	24.11%	12.58%	338	4757	6.6%	9%	

Testing Rates Key Metrics Per Plant in Lynchburg

Prod Sample Count	VDOT Sample Count	Sample %	Submitted in 24 hrs	Gradation/ AC Flag %	d2s Flag %	Split Volumetric Sample		Non-Matched Failure %	AC St Dev
						Matched Vol Failure %	VDOT Vol Failure %		
20	4	20%	100%	85%	0%	50%	25%	40%	0.20%
18	5	28%	83%	89%	60%	0%	0%	18%	0.22%
55	14	25%	62%	71%	0%	13%	13%	8%	0.13%
16	3	19%	75%	38%	33%	0%	0%	0%	0.09%
12	3	25%	92%	92%	33%	0%	0%	14%	0.15%
41	11	27%	100%	76%	9%	25%	25%	0%	0.17%
14	4	29%	100%	79%	0%	0%	50%	0%	0.12%
30	8	27%	97%	97%	0%	33%	33%	0%	0.24%
10	3	30%	100%	90%	100%	0%	0%	0%	0.17%
11	3	27%	73%	82%	33%	0%	50%	57%	0.16%
63	15	24%	87%	59%	7%	25%	13%	15%	0.19%
34	8	24%	76%	59%	25%	0%	40%	11%	0.22%
8	2	25%	50%	50%	0%	0%	0%	50%	0.14%
13	3	23%	85%	92%	0%	0%	0%	13%	0.27%

Proposed 2025 Specification Refinements

Initial proposed specification changes sent for comment

Potential areas of refinement:

- . Section 211- One Base Mix**
- . Section 319 - Longitudinal Joint Placement, tack optimized application rate, minimum yield**
- . Section 248 - SMA 12.5 gradation band adjustment**

2024 Significant Asphalt Spec Changes

Balanced Mix Design (BMD)

- **SM-9.5 and SM-12.5, A & D mixes shall meet BMD Mix Design**
- **SM-9.5D and SM-12.5D Mixes require BMD Performance Testing in addition to Volumetric, Gradation and Asphalt Content Testing. BMD Performance Testing results required to be reported to VDOT within 48 hrs**

2024 Significant Asphalt Spec Changes

Remove and Replace

- **Section 315**—Any subplot of asphalt with density less than 88% shall be removed and replaced at the contractor's expense
- **Section 248 (SMA)** - If Voids in the Coarse Aggregate (VCA) exceeds the Voids in the Dry Rodded Condition (DRC), the contractor shall remove and replace the mix. If the material in any load or portion of the roadway is visually contaminated, segregated, flushed or rutted, that load or portion of the roadway shall be rejected
- **Section 315**—finished asphalt mat with visual segregation or flushing, shall be removed and replaced at the contractor's expense

2024 Significant Asphalt Spec Changes

- **Stockpiling Materials on Pavement**
- Section 315—At no point shall soils, aggregates, or other potential bond breaker materials be stored on the pavement surface, unless otherwise approved by the District Materials Engineer. This includes all base, intermediate and surface layers.
- **Minimum Density Requirements**
- Section 315—Minimum density requirement set to 92.5% for all surface (SM), intermediate (IM) and base (BM) mixes.
- **Lift Size Change**
- Maximum asphalt lift thickness increased from four-times (4x) the Nominal Maximum Aggregate Size (NMAS) to five-times (5x) the NMAS.

Materials Manual of Instruction Changes

2024 MOI Changes

· Fence Approved List and Acceptance

- MD 465-23—Fencing must be obtained from a manufacturer on Approved List No. 69 or from a Misc. Supplier on Approved List No. 44. Approved List No. 70 (Approved Fence Suppliers) is now obsolete.

2023 MOI Changes

· Revisions to Allowable Methods for Settlement Analysis

- MD 456-23—Primary and Secondary Settlement Analysis shall be performed in accordance with LRFD Section 10.6.2.4. Published correlations shall not be substituted for lab and in-situ testing of critical slopes. Final settlement analysis shall use parameters derived from one-dimensional consolidation test (ASTM D 2435).

Materials Manual of Instruction Changes

2023 MOI CHANGES (CONTINUED)

Conducting Slope Stability Analysis

- MD 456-23—The effective cohesion for coarse-grained non-plastic soils shall be considered zero and maximum allowable value of effective cohesion for coarse-grained plastic soils and fine-grained soils shall be determined by the DME in each District based upon the local soil properties.
- A minimum of two methods shall be used in slope stability analysis with the lowest value of Factor of Safety being reported.
- Embankment soil parameters for slope stability are assumed or estimated at the time of design. Design assumptions such as minimum CBR value, soil types and parameters, slope ratio, undercutting must be reasonable and shall be included as a required minimum specification in construction plans.

VDOT SP for Bioretention Basins

- Finally, the special provision (SP) was approved by DEQ
- VDOT (L&D division) is currently working with the Construction Division to get the SP published
- As soon as the revised SP is published, we will publish the following documents:
 - (New) Approved list for Bioretention Soil Media
 - (New) TL 144 – Bioretention Soil Media Job Mix Formula Form
 - Revised VTM- 134 (note: some minor editorial changes; testing procedures not changed)

TL 144 Form

- The Contractor should conduct initial testing on all materials requirements as listed in Section II of VTM-134 to gain approval of the JMF on annual basis
- Upon approval of the job mix, at a 4- month and 8 month interval, the test results (except for Sat. hydraulic conductivity) should be completed and submitted to VDOT

VIRGINIA DEPARTMENT OF TRANSPORTATION

MATERIALS DIVISION

STATEMENT OF BIORETENTION SOIL MEDIA JOB-MIX FORMULA

Submit to the District Materials Engineer, Virginia Department of Transportation. Approval must be received by the Contractor from the Materials Section before work is begun. This job mix design is approved for all projects of the Department for the type of mix and the calendar year shown below.

Job Mix ID No. _____
 Date _____ Calendar Yr. _____
 Producer Name & Plant Location _____ Phone _____

Materials	Approval Phase		Kind	Source
	A	B*		
Mineral Soil	_____	_____	_____	_____
Organic Amendment	_____	_____	_____	_____

See VTM-134 for all test procedures.

Job-Mix Sieves	Total % Passing		Design/Spec. Range (Tolerance)	Other Tests	Total % Passing		Design/Spec Range
	Lab JMF	Production JMF			Lab JMF	Production JMF	
Approval Phase	A	B*			A	B*	
Sand in mineral soil portion	_____	/	75 - 90% (1.5%)	Extractable Phosphorus (mg/kg) Mehlich I	_____	/	5 - 32
Silt and Clay in mineral soil portion	_____	/	10 - 25% (1.5%)	Extractable Phosphorus (mg/kg) Mehlich III	_____	/	10 - 78
Clay in mineral soil portion	_____	/	0 - 10% (1.5%)	CEC (meq/100g)	_____	/	Min 5.0 (-0.5%)
Organic Matter Portion of overall mix	_____	/	2 - 5%	pH	_____	/	5.5 - 8 (+/- 0.1%)
3/8-in Sieve Mineral Soil	_____	/	100% (-5%)	Sat. Hydraulic Conductivity (in/hr)	_____	N/A	1 - 15
				Organic Matter Content of Organic Amendment	_____	/	Min 40% (-5%)

Method of Mixing (pug mill or other): _____

Attach test results from certified labs, conductivity results sealed by VA PE, and calculations.

MATERIALS DIVISION USE ONLY

Remarks	_____		
Checked By:	_____		
Approved tentatively subject to the production of material meeting all other applicable requirements of the specification. *Note: Part B "Production JMF" and corresponding material percentages will be filled out by the DME upon receipt of the additional requirements of the producer at 4-month and 8-month intervals, per VTM-134.			
Copies: State Materials Engineer District Materials Engineer Project Inspector Sub-Contractor and/or Producer	Approvals	Part A: _____	Date: _____
		Part B: _____	Date: _____

SP for CTA

We submitted the following changes to CN (June, 2022):

- Water Content : OMC to OMC+2% → OMC+/-2%
- Density : Min. 95% of T-134 MDD → Min. 100% of T-134 MDD
- Minimum Cement Content : 4% cement

We addressed all the comments that we received from the industry and FWHA. It is currently under final review by CN

Proposed changes to Aggregate Specifications

Sections 305, 308, and 309

- Sections 305 (Subgrade and Shoulders), 308 (Subbase Course), and 309 (Aggregate Base Course)
- The purpose of these changes is to provide clarity regarding reducing the minimum density requirements by 5% as specified in VTM-10 when using the portable density gauge in direct transmission mode

Each layer of subbase course shall be compacted at optimum moisture, within ± 2 percentage points of optimum. The density of each layer of subbase aggregate material, when compared to the theoretical maximum density as determined in accordance with VTM-1, shall conform to the following:

<u>% Material Retained on No. 4 Sieve</u>	<u>Min. % Density</u>
0-50	100
51-60	95
61-70	90

Percentages shall be reported to the nearest whole number. The above density requirements may be reduced by 5% per VTM-10 when using the portable nuclear density gauge in direct transmission mode.

The Department will perform field density determinations with a portable nuclear density gauge using the density control strip as specified in Section 304 and VTM-10, or by other approved methods as directed by the Engineer.

~~Not more than one sample in every five shall have a density less than that specified, and the density of such a sample shall be not more than 2 percent below that specified.~~

The Contractor shall scarify, reshape, and recompact the surface of the subbase if it becomes uneven or distorted and sets up in that condition. If the subbase when compacted and shaped shows a deficiency in thickness or if depressions occur in the surface, the Contractor shall scarify such sections at his own expense before additional material is added.

~~The Department will perform field density determinations with a portable nuclear field density testing device using the density control strip as specified in Section 304 and VTM-10, or by other approved methods as directed by the Engineer.~~

Proposed changes to Aggregate Specification

Sections 305, 308, and 309

- Section 305 also includes guidelines for compaction of shoulder materials when the total thickness of the layer for aggregate shoulder being constructed is less than 4 inches.

Field density determination will be performed with a portable nuclear density gauge as specified in VTM-10, or by other approved method as directed by the Engineer. When the total thickness of the layer for aggregate shoulder material being constructed is less than 4 inches, the minimum density requirement may not be enforced. For such cases, the aggregate shoulder should be compacted with **five** or more passes of a heavy-duty vibratory roller (e.g., a 10-ton smooth drum roller) or as approved by the Engineer. The aggregate shoulder should be compacted until it is apparent that no further densification can be obtained.

- Submitted to CN in 2021
- Reviewed by the Districts, the Industry, and FHWA
- Currently under final review by CN

Proposed Changes to Specification Section 202 - Fine Aggregate

Uncompacted Void Content

- ❑ Get rid of VTM-5 testing method
- ❑ Replace with AASHTO T-304 method

Specific Gravity

- ❑ Add AASHTO T-84 method



Proposed Changes to Specification Section 202 - Coarse Aggregate

Specific Gravity

- ❑ Add AASHTO T-85 method

Bulk Density (Unit Weight)

- ❑ Add AASHTO T-19 method



Proposed Changes to Specification Section 217 – Hydraulic Cement Concrete

Incorporate Current SPs for ECC and VHPC

- Engineered Cementitious Composite SP (SP217-000110-00)
- Very High Performance Concrete SP (SP217-000100-00)

Modify Admixture Dispensing Systems

- Meet the NRMCA plant certification requirements sufficient

Low Shrinkage Class A4 Concrete

- Add SRA dosage as a requirement (1.5g/yard³)
- Remove the 28-day drying shrinkage testing

Proposed Changes to Specification Section 237 – Structure Bedding Materials and Bearing Pads

Elastomeric Bearing Pads

- Replace with AASHTO M251 for dimension tolerances
- Add hardness durometer 60 (comply with AASHTO M251)

