Materials Acceptance and Certification System

EARTHWORK LAB/FIELD TESTING SUMMARY

by
Dino Jameson

State Materials Office - Geotechnical Unit
5007 NE 39th Ave.| Gainesville, FL 32609
Telephone: 352-955-6600 | Fax: 352-955-6644
materials.dot.state.fl.us

Disclaimer: This document depicts MAC design and doesn't supersede any requirements of the actual contract documents on the project.

Revised: 07/2019 - Version 4.2

Spec. ID/ Spec Yr.: 120 Excavation and Embankment / All Spec Years

Category 1: Embankment Material with Standard Proctor Option

- Sampler: ECI Level 1
- Sample Size: QC/VT/RT/IV 100 lbs.
- Frequency: QC/VT: 1 per soil Type; IV: Per Engineer's Option

1) AASHTO M 145
- Comparison: QC/VT match Utilz. Symbol (S for 4' under base | S or P for 4' beyond)

2) AASHTO T88
- Tester: Agg Base Tech

3) AASHTO T89/90
- Tester: Agg Base Tech
- Limit: LL ≤ 50

4) FM 1-T 99
- Tester: Agg Base Tech
- Comparison: QC/ VT ± 4.5 pcf

5) FM 1-T 267
- Limit: OC (up to 3 readings) ≤ 7.0 | Avg. OC ≤ 5.0

Category 2: Embankment Material with Modified Proctor Option

- Run all tests from catg1 but replace T99 w/ T180

Category 3: Alternate Soil and RAP Layer Construction

- Sampler: ECI Level 1
- Sample Size: QC/VT/RT/IV 100 lbs.
- Frequency: QC/VT: 1 per soil Type; IV: Per Engineer's Option

Type 1: Embankment Material

1) AASHTO M 145
2) AASHTO T88
3) AASHTO T89/90
4) FM 1-T 99
5) FM 1-T 267
6) FM 5-515
- Limit: LBR ≥ 40

Type 2: RAP Material

1) FM 1-T 99

Category 4: Special Select Soil Option

- Same header information as category 1
- Note: SPECIAL SELECT SOIL OPTION may be used only when shown in the Plans.

1) AASHTO M 145
- Limit: S+ only (A-1, A-3, A-2-4)

2) AASHTO T88
- Limit: #200 ≤ 12%

3) AASHTO T89/90
- Limit: LL ≤ 50; PI=NP

4) FM 1-T 180

5) FM 1-T 267
- Limit: OC (up to 3 readings) ≤ 7.0 | Avg. OC ≤ 5.0

6) FM T-215
- Limit: Avg. Permeability ≥ $5x10^{-5}$ $^{cm}/_{sec}$

Category A: Nuke Density for Mainline Only or Whole Width of the Roadway

- Tester: ECI Level 1
- Frequency: QC: 1 Per LOT | VT: 1 per 4 LOTs & 1st lift not affected by water | IV: Per Engineer's Option
- Reduced Frequency: QC: 1 Per 2 LOTs

1) FM 1-T 238
- Limit: Max Density ≥ 100%

Category B: Nuke Density for Non-Mainline Roadway Only

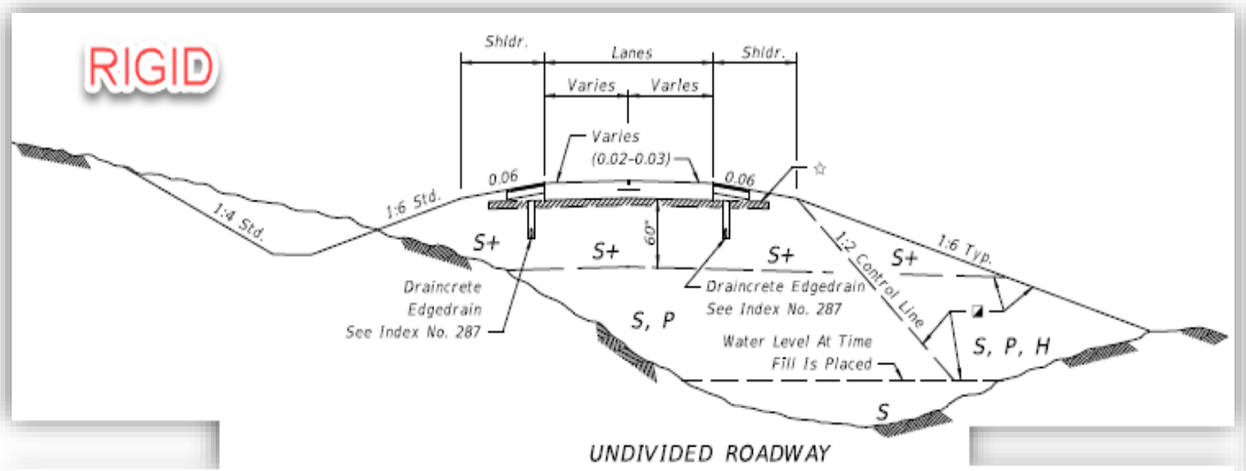
- Tester: ECI Level 1
- Frequency: QC: 1 Per LOT | VT: 1 per 2 LOTs | IV: Per Engineer's Option

1) FM 1-T 238
- Limit: Max Density ≥ 100%

** Nuke Density Notes **	
For A-3 or A-2-4 materials ≤ 15% fines	Max 12" Lifts
For A-1 or A-2-4 materials > 15% fines	Max 6" lift (12" lift allowed after successfully passing 5 QC density tests in 500' thick lift test strip).
Soil and RAP Mixture	This method only allowed after successful 500' test strip. 4" max depth for RAP. Final compacted thickness must be ≤ 12". The mixture must pass embankment utilization. No mixture allowed in the bottom 12" of subgrade
RAP Layer	Max 12" Lifts

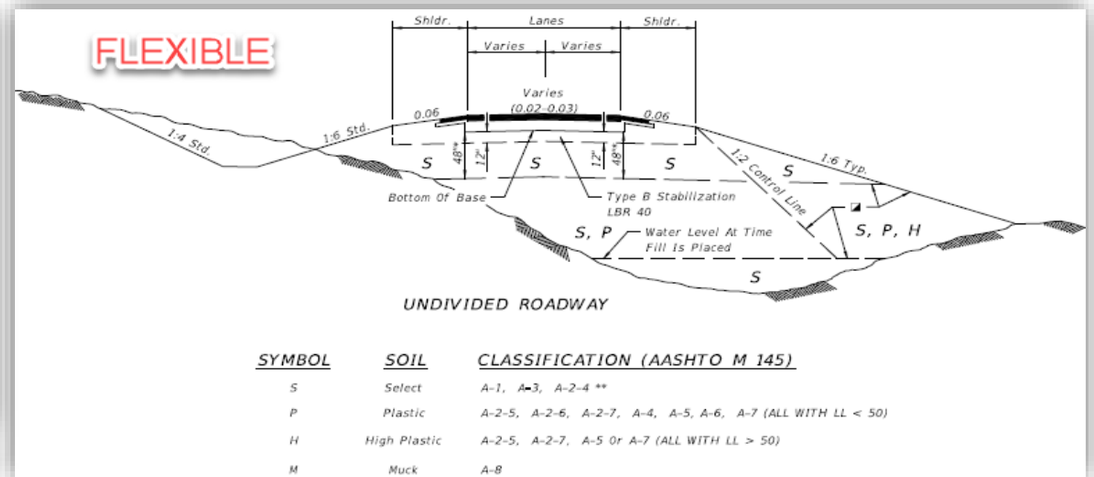
** Restrict M145 0'-4' below base & from 4' beyond

RIGID



UNDIVIDED ROADWAY

FLEXIBLE



UNDIVIDED ROADWAY

SYMBOL	SOIL	CLASSIFICATION (AASHTO M 145)
S	Select	A-1, A-3, A-2-4 **
P	Plastic	A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7 (ALL WITH LL < 50)
H	High Plastic	A-2-5, A-2-7, A-5 Or A-7 (ALL WITH LL > 50)
M	Muck	A-8

Spec. ID/ Spec Yr.: 125 Excavation for Structures and Pipe / 2010 to 2013

Category 1: Embankment Material with Standard Proctor Option

Login sample under 120 spec. Same tests & requirements as 120 spec.

Category A: Nuke Density within the Soil Envelope for Concrete Pipe or Any Drainage Structures

Tester: ECI Level 1

Frequency: QC: 1 Per LOT | VT: 1 per 4 LOTs & 1st lift not affected by water | IV: Per Engineer's Option

Red. Frequency: QC → 1 per 2 LOTs

1) FM 1-T 238

Limit: Max Density ≥ 100%

Category B: Nuke Density within the Soil Envelope for Metal/Plastic Pipe

Tester: ECI Level 1

Frequency: QC: 1 Per LOT | VT: 1 per 4 LOTs & 1st lift not affected by water | IV: Per Engineer's Option

Red. Frequency: QC → 1 per 2 LOTs

1) FM 1-T 238

Limit: Max Density ≥ 95%

Nuke Notes	
Lowest Zone	Coarse sand or other suitable granular material
Soil Envelope	Allowed soil classes are A-1, A-2, or A-3. A-4 is only allowed if concrete pipe is utilized
Top Zone	Material allowed based on Standard Plans 120-001 (Index 505)

Spec. ID/ Spec Yr.: 125 Excavation for Structures and Pipe / 2014 →

Category 1: Embankment Material with Standard Proctor Option

Login sample under 120 spec. Same tests & requirements as 120 spec.

Category A: Nuke Density with Cover Height ≤ 15"

Tester: ECI Level 1

Frequency: QC: 1 Per LOT | VT: 1 per 4 LOTs & 1st lift not affected by water | IV: Per Engineer's Option

Rad. Frequency: QC → 1 per 2 LOTs

1) FM 1-T 238

Limit: Max Density ≥ 100%

Category B: Nuke Density with Cover Height > 15"

Tester: ECI Level 1

Frequency: QC: 1 Per LOT | VT: 1 per 4 LOTs & 1st lift not affected by water | IV: Per Engineer's Option

Rad. Frequency: QC → 1 per 2 LOTs

1) FM 1-T 238

Limit: Max Density ≥ 95%

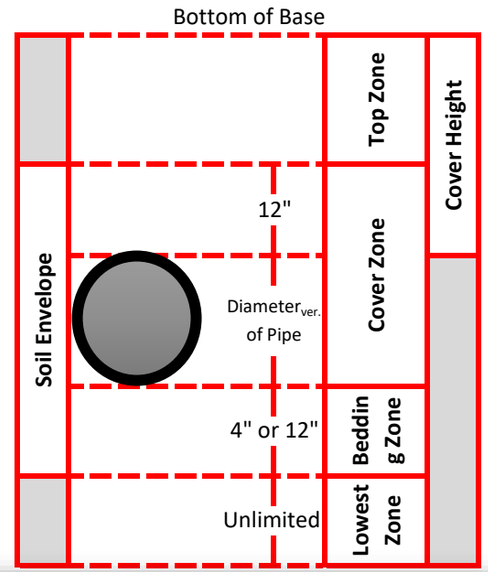
Category C: Nuke Density for Drainage Structure Only or Drainage Structures and Pipe compacted in one Operation

Frequency: QC: 1 Per LOT | VT: 1 per 4 LOTs & 1st lift not affected by water | IV: Per Engineer's Option

Red. Frequency: QC → 1 per 2 LOTs

1) FM 1-T 238

Limit: Max Density ≥ 100%



Group	AASHTO Soil Class	Maximum Lift Thickness		Thick Lift Control Test Section Requirements	
		Within Cover Zone	Above Soil Envelope	Within Cover Zone	Above Soil Envelope
1	A-3 A-2-4 (No. 200 Sieve ≤ 15%)	6 inches	12 inches	N/A	Not Needed
2	A-1 A-2-4 (No. 200 Sieve > 15%) A-2-5, A-2-6, A-2-7, A-4, A-5, A-6 A-7 (Liquid Limit < 50)	6 inches without control test section		N/A	Maximum of 12 inches per 120-8.2.1.2

Certification: (1) Coarse Aggregate by spec 901; Collect shipping tickets for 1 per 1 shipment; Notes: Use coarse aggregate as specified in Specification 901 with appropriate aggregate size numbers in accordance with Spec 125 (2) Filter Fabric by spec 985; Notes: The Contractor shall provide Engineer certification documents and two 8"x10' samples for product identification.

Spec. ID/ Spec Yr.: 145 Geosynthetic Reinforcement / All Spec Years

Category 1: Backfill using Modified Proctor at Point of Placement

- Sampler: ECI Level 1
- Sample Size: QC/RT 100 lbs., VT/IV 200 lbs.
- Frequency: QC/VT: 1 per soil Type; IV: Per Engineer's Option

1) AASHTO M 145

- Limit: Soil Util. Symbol = S
- Comparison: QC/VT = Match Soil Util. Symbol

2) AASHTO T27/T11

- Tester: Agg Testing Tech
- Limit:
  3½ = 100% | ¾" ≥ 70%
  #4 ≥ 30% | #40 ≥ 15%
  5% ≤ #100 ≤ 65%
  0% ≤ #200 ≤ 15%

3) AASHTO T89/90

- Tester: Agg Base Tech
- Limit: LL ≤ 15, PI ≤ 6.0

4) FM 1-T 180

- Tester: Agg Base Tech
- Comparison: QC → VT ± 4.5 pcf

5) FM 1-T 267

- Limit: OC (up to 3 readings) ≤ 3.0 | Avg. OC ≤ 2.0

6) FM 5-550

Limit 1: 4.5 ≤ pH ≤ 10 w/ condition Metallic Elements or Pipes = No | Limit 2: 6 ≤ pH ≤ 10 w/ condition Metallic Elements or Pipes = Yes

Category 2: Backfill using Standard Proctor at Point of Placement

- Sampler: ECI Level 1
- Sample Size: QC/RT 100 lbs., VT/IV 200 lbs.
- Frequency: QC/VT: 1 per soil Type; IV: Per Engineer's Option

1) AASHTO M 145
2) AASHTO T27/T11
3) AASHTO T89/90
4) FM 1-T 099
5) FM 1-T 267
6) FM 5-550

- Same criteria as Cat1

Category 3: Source Testing Prior to Placement

- Certified Test Report: Provide certification to the Engineer that the results have met the requirements of Section 145-3 and are signed and sealed by a Professional Engineer, registered in the State of Florida.
- Frequency: QC Only: 1 per soil Type; IV: Per Engineer's Option

1) AASHTO M 145
2) AASHTO T27/T11
3) AASHTO T89/90
4) FM 1-T 099
5) FM 1-T 267
6) FM 5-550

- Same criteria as Cat1

Category A: Nuke Density for Modified Proctor Backfill

- Tester: ECI Level 1
- Frequency: QC: 1 Per LOT | VT: 1 per 4 LOTs | IV: Per Engineer's Option

1) FM 1-T 238

- Limit: % Max Density ≥ 95%

Category B: Nuke Density for Standard Proctor Backfill

- Tester: ECI Level 1
- Frequency: QC: 1 Per LOT | VT: 1 per 4 LOTs | IV: Per Engineer's Option

1) FM 1-T 238

- Limit: % Max Density ≥ 100%

Filter Fabric by spec 985 notes: The Contractor shall provide Engineer certification documents and two 8"x10" samples for product identification.

160 Stabilized Subgrade Field Tests ONLY

Category A: Nuke Density for Mainline Only or Whole Width of the Roadway

- Tester: ECI Level 1
- Frequency: QC: 1 Per LOT | VT: 1 per 4 LOTs | IV: Per Engineer's Option

1) FM 1-T 238

- Limit: Max Density ≥ 98%

Category B: Nuke Density for Non-Mainline Roadway Only

Type 1: Existing Base or Granular Sub-base

- Tester: ECI Level 1
- Frequency: QC: 1 Per LOT | VT: 1 per 2 LOTs | IV: Per Engineer's Option

1) FM 1-T 238

- Limit: Max Density ≥ 95%

Type 2: Local or Commercial Material

- Same header as catB, type1

1) FM 1-T 238

- Limit: Max Density ≥ 98%

Category C: Stabilizing Mixing Depth

- Sampler: ECI Level 1
- Frequency: QC 3 per LOT | VT Witness 1 per LOT

Type 1: Mainline Only or Whole Width of the Rdway
Type 2: Non-Mainline Roadway Only

Additional Requirements:

Comparison Package: (1) Modified Proctor QC → VT ± 4.5 pcf

Certification: Delivery tickets for Commercial materials and Sub-base materials

2009 -- Spec 160 Stabilized Subgrade Only

Category		Before Spreading (440A)		After Spreading (440B)		After Mixing (020L)		
		QC	VT	QC	VT	QC	VT	
							Split Mtl.	Non-Split Mtl.
Commercial Material or Existing Base or Subgrade w/out Stabilizer	Tests	-	-	-	-	T180, FM5-515	T180	T89/T90, T267, FM5-515
	Frequency					1 per 2 LOTs	1 per 8 LOTs Mainline or 1 per 4 LOTs for Non-Mainline	
	Targets & Limits					LBR ≥ 35, Unsoaked LBR ≥ 43; QC/VT Proctor ± 4.5pcf	QC/VT Proctor ± 4.5pcf	Same frequency and Targets & Limits as Local Material
	Notes					Collect 3 x 100lbs. (Hold 1 for RT)	Obtain 100lbs. from QC	
Local Material	Tests	T89/T90, T267	T89/T90, T267	T89/T90, T267	T89/T90, T267	T180, FM5-515	T180	M145, T88, T89/T90, T267, FM5-515
	Frequency	1 per source	1 per source	1 per 2 LOTs	1 per 8 LOTs	1 per 2 LOTs	1 per 8 LOTs Mainline or 1 per 4 LOTs for Non-Mainline	1 per 8 LOTs Mainline or 1 per 4 LOTs for Non-Mainline
	Targets & Limits	LL ≤ 40 | PI ≤ 10 | OC ≤ 4% (up to 3 readings), Avg. OC ≤ 2.5%		LL ≤ 40 | PI ≤ 10 | OC ≤ 4% (up to 3 readings), Avg. OC ≤ 2.5%		LBR ≥ 35, Unsoaked LBR ≥ 43; QC/VT Proctor ± 4.5pcf	QC/VT Proctor ± 4.5pcf	LL ≤ 30 | PI ≤ 8 | M145 = S Mtl. | LBR ≥ 35, Unsoaked LBR ≥ 43 | OC_{avg} ≤ 2.5%, OC_{ind}≤4%
	Notes	Collect 15lbs.	Collect 2 x 15lbs. (Hold 1 for RT)	Collect 15lbs.	Collect 2 x 15lbs. (Hold 1 for RT)	Collect 3 x 100lbs. (Hold 1 for RT)	Obtain 100lbs. from QC	Collect 100 lbs.
Granular Subbase In-Lieu of Subgrade	Tests	-	-	-	-	T180	T180	-
	Frequency	-	-	-	-	1 per 8 LOTs or 1 per 2 LOTs for Non-Mainline	1 per 16 LOTs Mainline or 1 per 4 LOTs for Non-Mainline	-
	Targets & Limits					QC/VT Proctor ± 4.5pcf		
	Notes	-	-	-	-	Collect 3 x 100lbs. (Hold 1 for RT)	Obtain 100lbs. from QC	-

Comparison Package for Split Proctor and an LBR sample in 160 specs						
QC			VT			
Sample #	LOT		Sample #	LOT	Sample #	LOT
S001Q	1-2					
S002Q	3-4		S002V	3		
S003Q	5-6				L003V	6
S004Q	7-8					

* The order in which the comparison package is performed is critical.
* Follow the sample numbering process based on the directions given by the DMO.

Step 1: Select the Split Proctor sample to be compared.

Comparison Package 1	
Original Sample	S002Q
VT Sample	S002V
Associated Samples	S001Q, S003Q, S004Q

** Once VT and associated samples are used in the first comparison package, they will no longer be available to be used in any additional comparison packages.

Step 2: Select the LBR sample to be compared and choose the same original sample used for Split Proctor from the first comparison package

Comparison Package 2	
Original Sample	S002Q
VT Sample	L003V
Associated Samples	Never attach associated samples to an LBR sample

** Ensure correct comparison definition is selected for the comparison package. The correct definition will contain the word LBR.

160 Stabilized Subgrade Resolution Process for Proctor

Red = Doesn't Compare

Step 1: Compare QC to VT

LOT 1	LOT 2	LOT 3	LOT 4	LOT 5	LOT 6	LOT 7	LOT 8
S001Q (LOT 1)		S002Q (LOT 4)		**S003Q (LOT 5)**		S004Q (LOT 8)	
				S003V (LOT 5)			

Original Sample:	S003Q
Verification Sample:	S003V
Associated Samples:	S001Q, S002Q, S004Q

Comparison Status: **Doesn't Compare**

Step 2: Compare QC to RT

LOT 1	LOT 2	LOT 3	LOT 4	LOT 5	LOT 6	LOT 7	LOT 8
S001Q (LOT 1)		S002Q (LOT 4)		**S003Q (LOT 5)**		S004Q (LOT 8)	
				S003R (LOT 5)			

Original Sample:	S003Q
Verification Sample:	S003R

Comparison Status: **Doesn't Compare**

Acceptance: Use VT's Proctor as acceptance for LOT 5 and 6

Step 3: Further VT Testing

Collect remaining split samples for VT testing to delineate failing areas.

LOT 1	LOT 2	LOT 3	LOT 4	LOT 7	LOT 8
S001V (LOT 1)		S002V (LOT 4)		S004V (LOT 8)	

Use VT's Proctor results for the remaining LOTs

Step 4: Summary

LOTS Represented	Status
LOTS 1-2	Use VT's Proctor
LOTS 3-4	Use VT's Proctor
LOTS 5-6	Use VT's Proctor
LOTS 7-8	Use VT's Proctor

2013 -- Spec 160 Stabilized Subgrade Only								
Category		**Before Spreading (440A)**		**After Spreading (440B)**		**After Mixing (020L)**		
		QC	**VT**	**QC**	**VT**	**QC**	**VT**	
							Split Mtl.	**Non-Split Mtl.**
Commercial Material or Existing Base or Subgrade w/out Stabilizer	Tests	-	-	-	-	T180, FM5-515	T180	T89/T90, T267, FM5-515
	Frequency					1 per 2 LOTs	1 per 8 LOTs Mainline or 1 per 4 LOTs for Non-Mainline	
	Targets & Limits					LBR ≥ 35, Unsoaked LBR ≥ 43; QC/VT Proctor ± 4.5pcf	QC/VT Proctor ± 4.5pcf	Same frequency and Targets & Limits as Local Material
	Notes					Collect 3 x 100lbs. (Hold 1 for RT)	Obtain 100lbs. from QC	
Local Material	Tests	T89/T90, T267	T89/T90, T267	T89/T90, T267	T89/T90, T267	T180, FM5-515	T180	M145, T88, T89/T90, T267, FM5-515
	Frequency	1 per source	1 per source	1 per 2 LOTs	1 per 8 LOTs	1 per 2 LOTs	1 per 8 LOTs Mainline or 1 per 4 LOTs for Non-Mainline	1 per 8 LOTs Mainline or 1 per 4 LOTs for Non-Mainline
	Targets & Limits	LL ≤ 40 | PI ≤ 10 | OC ≤ 4% (up to 3 readings), Avg. OC ≤ 2.5%		LL ≤ 40 | PI ≤ 10 | OC ≤ 4% (up to 3 readings), Avg. OC ≤ 2.5%		LBR ≥ 35, Unsoaked LBR ≥ 43; QC/VT Proctor ± 4.5pcf	QC/VT Proctor ± 4.5pcf	LL ≤ 30 | PI ≤ 8 | M145 = S Mtl. | LBR ≥ 35, Unsoaked LBR ≥ 43 | OC_{avg} ≤ 2.5%, OC_{ind}≤4%
	Notes	Collect 15lbs.	Collect 2 x 15lbs. (Hold 1 for RT)	Collect 15lbs.	Collect 2 x 15lbs. (Hold 1 for RT)	Collect 3 x 100lbs. (Hold 1 for RT)	Obtain 100lbs. from QC	Collect 100 lbs.
RAP/RAP Blended materials	Tests	T89/T90, T267	T89/T90, T267	-	-	T180, FM5-515, FM 5-563	T180, FM5-563	M145, T88, T89/T90, FM5-515
	Frequency	1 per source	1 per source	-	-	1 per 2 LOTs	1 per 8 LOTs Mainline or 1 per 4 LOTs for Non-Mainline	1 per 8 LOTs Mainline or 1 per 4 LOTs for Non-Mainline
	Targets & Limits	LL ≤ 40 | PI ≤ 10 | Ind. OC > 4% or Avg. OC > 2.5%		-	-	LBR ≥ 35, Unsoaked LBR ≥ 43 | AC ≤ 4.7% | QC/VT Proctor ± 4.5pcf	AC ≤ 4.7% | QC/VT Proctor ± 4.5pcf	LL ≤ 30 | PI ≤ 8 | LBR ≥ 35, Unsoaked LBR ≥ 43 | M145 = S Mtl.
	Notes	Collect 15 lbs. If T267 limits fails in MAC then move it to Local Material category	Collect 15 lbs. If T267 limits fails in MAC then move it to Local Material category	-	-	Collect 3 x 100lbs. (Hold 1 for RT)	Obtain 100lbs. from QC	Collect 100 lbs.
Granular Subbase In-Lieu of Subgrade	Tests:	-	-	-	-	T180	T180	-
	Frequency	-	-	-	-	1 per 8 LOTs or 1 per 2 LOTs for Non-Mainline	1 per 16 LOTs Mainline or 1 per 4 LOTs for Non-Mainline	-
	Targets & Limits					QC/VT Proctor ± 4.5pcf		
	Notes	-	-	-	-	Collect 3 x 100lbs. (Hold 1 for RT)	Obtain 100lbs. from QC	-

2015 -- Spec 160 Stabilized Subgrade Only								
Category		**Before Spreading (440A)**		**After Spreading (440B)**		**After Mixing (020L)**		
		QC	**VT**	**QC**	**VT**	**QC**	**VT**	
							Split Mtl.	**Non-Split Mtl.**
Commercial Material or Existing Base or Subgrade w/out Stabilizer	Tests	-	-	-	-	T180, FM5-515	T180	T89/T90, T267, FM5-515
	Frequency					1 per 2 LOTs	1 per 8 LOTs Mainline or 1 per 4 LOTs for Non-Mainline	
	Targets & Limits					LBR ≥ 35, Unsoaked LBR ≥ 43 | QC/VT Proctor ± 4.5pcf	QC/VT Proctor ± 4.5pcf	Same frequency and Targets & Limits as Local Material
	Notes					Collect 3 x 100lbs. (Hold 1 for RT)	Obtain 100lbs. from QC	
Local Material	Tests	T89/T90, T267	T89/T90, T267	T89/T90, T267	T89/T90, T267	T180, FM5-515	T180	M145, T88, T89/T90, T267, FM5-515
	Frequency	1 per source	1 per source	1 per 2 LOTs	1 per 8 LOTs	1 per 2 LOTs	1 per 8 LOTs Mainline or 1 per 4 LOTs for Non-Mainline	1 per 8 LOTs Mainline or 1 per 4 LOTs for Non-Mainline
	Targets & Limits	LL ≤ 40 | PI ≤ 10 | OC ≤ 4% (up to 3 readings), Avg. OC ≤ 2.5%		LL ≤ 40 | PI ≤ 10 | OC ≤ 4% (up to 3 readings), Avg. OC ≤ 2.5%		LBR ≥ 35, Unsoaked LBR ≥ 43 | QC/VT Proctor ± 4.5pcf	QC/VT Proctor ± 4.5pcf	LL ≤ 30 | PI ≤ 8 | M145 = S Mtl. | LBR ≥ 35, Unsoaked LBR ≥ 43 | OC_{avg} ≤ 2.5%, OC_{ind}≤4%
	Notes	Collect 15lbs.	Collect 2 x 15lbs. (Hold 1 for RT)	Collect 15lbs.	Collect 2 x 15lbs. (Hold 1 for RT)	Collect 3 x 100lbs. (Hold 1 for RT)	Obtain 100lbs. from QC	Collect 100 lbs.
RAP/RAP Blended materials	Tests	T89/T90, T267	T89/T90, T267	-	-	T180, FM5-515, FM 5-563	T180, FM5-563	M145, T88, T89/T90, FM5-515
	Frequency	1 per source	1 per source	-	-	1 per 2 LOTs	1 per 8 LOTs Mainline or 1 per 4 LOTs for Non-Mainline	1 per 8 LOTs Mainline or 1 per 4 LOTs for Non-Mainline
	Targets & Limits	LL ≤ 40 | PI ≤ 10 | Ind. OC > 4% or Avg. OC > 2.5%		-	-	LBR ≥ 35, Unsoaked LBR ≥ 43 | AC ≤ 4.7% | QC/VT Proctor ± 4.5pcf	AC ≤ 4.7% | QC/VT Proctor ± 4.5pcf	LL ≤ 30 | PI ≤ 8 | LBR ≥ 35, Unsoaked LBR ≥ 43 | M145 = S Mtl.
	Notes	Collect 15 lbs. If T267 limits fails in MAC then move it to Local Material category	Collect 15 lbs. If T267 limits fails in MAC then move it to Local Material category	-	-	Collect 3 x 100lbs. (Hold 1 for RT)	Obtain 100lbs. from QC	Collect 100 lbs.
Granular Subbase In-Lieu of Subgrade	Tests:	-	-	-	-	T180	T180	-
	Frequency	-	-	-	-	1/8 LOTs or 1/2 for Non-Mainline | Pit Proctor 1/16 or 1/4 for Non-Mainline	1 per 16 LOTs Mainline or 1 per 4 LOTs for Non-Mainline	-
	Targets & Limits					QC/VT Proctor ± 4.5pcf		
	Notes	-	-	-	-	Collect 3 x 100lbs. (Hold 1 for RT)	Obtain 100lbs. from QC	-

2016 -- Spec 160 Stabilized Subgrade Only								
Category		**Before Spreading (440A)**		**After Spreading (440B)**		**After Mixing (020L)**		
		QC	**VT**	**QC**	**VT**	**QC**	**VT**	
							Split Mtl.	**Non-Split Mtl.**
Commercial Material or Existing Base or Subgrade w/out Stabilizer	Tests	-	-	-	-	T180, FM5-515	T180	T89/T90, T267, FM5-515
	Frequency					1 per 2 LOTs	1/8 LOTs or 1/ 4 LOTs for Non-Mainline	
	Targets & Limits					LBR ≥ 35, Unsoaked LBR ≥ 43 | QC/VT Proctor ± 4.5pcf	QC/VT Proctor ± 4.5pcf	Same frequency and Targets & Limits as Local Material
	Notes					Collect 3 x 100lbs. (Hold 1 for RT)	Obtain 100lbs. from QC	
Local Material	Tests	T89/T90, T267	T89/T90, T267	T89/T90, T267	T89/T90, T267	T180, FM5-515	T180	M145, T88, T89/T90, T267, T180/FM5-515
	Frequency	1 per source	1 per source	1 per 2 LOTs	1 per 8 LOTs	1 per 2 LOTs	1/8 LOTs or 1/ 4 LOTs for Non-Mainline	1/8 LOTs or 1/ 4 LOTs for Non-Mainline
	Targets & Limits	LL ≤ 40 | PI ≤ 10 | OC ≤ 4% (up to 3 readings), Avg. OC ≤ 2.5%		LL ≤ 40 | PI ≤ 10 | OC ≤ 4% (up to 3 readings, Avg. OC ≤ 2.5%		LBR ≥ 35, Unsoaked LBR ≥ 43 | QC/VT Proctor ± 4.5pcf	QC/VT Proctor ± 4.5pcf	LL ≤ 30 | PI ≤ 8 | M145 = S Mtl. | LBR ≥ 35, Unsoaked LBR ≥ 43 | OC_{avg} ≤ 2.5%, OC_{ind}≤4%
	Notes	Collect 15lbs.	Collect 2 x 15lbs. (Hold 1 for RT)	Collect 15lbs.	Collect 2 x 15lbs. (Hold 1 for RT)	Collect 3 x 100lbs. (Hold 1 for RT)	Obtain 100lbs. from QC	Collect 100 lbs.
100% RAP Milled From and Windrowed Back on the Same Project	Tests	Get permission from Engineer in writing to use 100% RAP.	Retain copy of approval in project logbook.	-	-	M145, T88, T89/T90, T180, FM5-563, FM5-515	M145, T88, T89/T90, T180, FM5-563	T180/FM5-515
	Frequency					1 per 2 LOTs	1/8 LOTs or 1/ 4 LOTs for Non-Mainline	1/8 LOTs or 1/ 4 LOTs for Non-Mainline
	Targets & Limits					LL ≤ 30 | PI ≤ 8 | LBR ≥ 35, Unsoaked LBR ≥ 43 | AC ≤ 4.0% | QC/VT Proctor ± 4.5pcf | QC/VT = Same M145	LL ≤ 30 | PI ≤ 8 | AC ≤ 4.0% | QC/VT Proctor ± 4.5pcf | M145 = S Mtl.	LBR ≥ 35, Unsoaked LBR ≥ 43
	Notes					Collect 3 x 100lbs. (Hold 1 for RT)	Obtain 100lbs. from QC	Collect 100 lbs.
RAP/RAP Blended Material	Tests	T89/T90, T267	T89/T90, T267	-	-	M145, T88, T89/T90, T180, FM5-563, FM5-515	M145, T88, T89/T90, T180, FM5-563,	T180/FM5-515
	Frequency	1 per source	1 per source	-	-	1 per 2 LOTs	1/8 LOTs or 1/ 4 LOTs for Non-Mainline	1/8 LOTs or 1/ 4 LOTs for Non-Mainline
	Targets & Limits	LL ≤ 40 | PI ≤ 10 | Ind. OC > 4% or Avg. OC > 2.5%		-	-	LL ≤ 30 | PI ≤ 8 | LBR ≥ 35, Unsoaked LBR ≥ 43 | AC ≤ 4.0% | QC/VT Proctor ± 4.5pcf | QC/VT = Same M145	LL ≤ 30 | PI ≤ 8 | AC ≤ 4.0% | QC/VT Proctor ± 4.5pcf | M145 = S Mtl.	LBR ≥ 35, Unsoaked LBR ≥ 43
	Notes	Collect 15 lbs. If T267 limits fails in MAC then move it to Local Material category	Collect 15 lbs. If T267 limits fails in MAC then move it to Local Material category	-	-	Collect 3 x 100lbs. (Hold 1 for RT)	Obtain 100lbs. from QC	Collect 100 lbs.
Granular Subbase In-Lieu of Subgrade	Tests	-	-	-	-	T180	T180	-
	Frequency	-	-	-	-	1/8 LOTs or 1/2 for shoulder | Pit Proctor 1/16 or 1/4 for shoulder	1/16 LOTs Mainline or 1/4 LOTs for Non-Mainline	-
	Targets & Limits					QC/VT Proctor ± 4.5pcf		
	Notes	-	-	-	-	Collect 3 x 100lbs. (Hold 1 for RT)	Obtain 100lbs. from QC	-

Spec. ID/ Spec Yr.: 160 Stabilizing / Jul 2018 →

Category 1: Stabilizer Material (440A)

Frequency: QC/VT: 1 per soil Type

Sample Size: QC/VT/RT/IV -- 15 lbs. per party

Purpose 1: Normal

Type 1: Local

Type 2: RAP or RAP Blended

QC | VT | RT | IV

1) AASHTO T89/90

Limit: LL ≤ 40, PI ≤ 10

2) FM 1-T 267

Limit: Avg. OC ≤ 2.5%
OC (up to 3 readings) ≤ 4.0%

Category 4: Granular Subbase In-Lieu of Stabilized Subgrade

Purpose 1: Non Pit Proctor

Frequency: QC: 1 per 8 LOTs | VT: 1 per 16 LOTs

Sample Size: QC/VT/RT/IV -- 100 lbs. per party

Type 1: Mainline

Type 2: Non-Mainline

QC | VT | RT | IV

1) FM 1-T 180

Purpose 2: Pit Proctor

Frequency: QC: Max 32 LOTs IV/RT: 1 per 16 LOTs

Sample Size: RT/IV -- 100 lbs.

Type 1: Mainline

Type 2: Non-Mainline

QC | RT | IV

1) Pit Proctor Reporting (QC Only)

2) FM 1-T 180 (IV/RT only)

ΔProctor Comparison ≤ 4.5pcf

Category 2: Stabilized Subgrade on Mainline or Whole Width

Purpose 1: Normal

Sample Size: 100 lbs.

Type 1: Using Commercial Stabilizer

Type 2: Using Existing Base Stabilizer

Type 3: Using Local Stabilizer

Type 4: Using RAP or RAP/Blended Stabilizer

IV

ANY AVAILABLE TESTS

Purpose 2: Independent LBR

Frequency: 1 per 8 LOTs

Sample Size: 2 x 100 lbs. (Hold 1 for RT)

Type 1: Using Commercial Stabilizer

Type 2: Using Existing Base Stabilizer

Type 3: Using Local Stabilizer

Type 4: Using RAP or RAP/Blended Stabilizer

VT | RT

1) FM 1-T 180

Proctor Comparison ± 4.5pcf

2) FM 5-515

Limit: Soaked LBR ≥ 35 | Unsoaked LBR ≥ 43

Purpose 3: Split Material from QC

Frequency: QC: 1 per 2 LOTs; VT/RT: 1 per 8 LOTs | Sample Size: QC collect 3 x 100lbs. (Hold 1 for RT)

Type 1: Using Commercial Stabilizer

QC

1) FM 1-T 180 | 2) FM 5-515

VT | RT

1) FM 1-T 180 | 2) T89/90 | 3)T-267

Type 2: Using Existing Base Stabilizer

QC

1) AASHTO M145

Target: "S" Utilization

2) AASHTO T88

3) AASHTO T89/T90

Limit: LL ≤ 30, PI ≤ 8

4) AASHTO 1-T 267

Limit: Avg. OC ≤ 2.5%
OC (up to 3 readings) ≤ 4.0%

5) FM 1-T 180

6) FM 5-515

Limit: Soaked LBR ≥ 35 | Unsoaked LBR ≥ 43

Type 3: Using Local Stabilizer or No Stabilizer

VT | RT

1) AASHTO M145 | 4) FM 1-T 267

2) AASHTO T88 | 5) FM 1-T 180

3) AASHTO T89/T90

Same targets & limits as QC

Type 4: Using RAP or RAP Blended Stabilizer

QC

1) AASHTO M145

2) AASHTO T88

3) AASHTO T89/T90

4) FM 5-563

| Limit: AC ≤ 4.0%

5) FM 1-T 180

6) FM 5-515

VT | RT

1) AASHTO M145

2) AASHTO T88

3) AASHTO T89/T90

4) FM 5-563

Limit: AC ≤ 4.0%

5) FM 1-T 180

Category 3: Stabilized Subgrade on Non- Mainline

Frequency: QC: 1 per 2 LOTs; VT: 1 per 4 LOTs

Same tests as category 2

- Sampler must be ECI Level 1
- Commercial material must be obtained from an FDOT production facility and the delivery tickets must include an approved product code with the statement "Certified for FDOT"
- Obtain the Engineer's approval in writing before using existing base
- Substitution of 6 inches of granular subbase is only for 12 inches of Type B stabilization LBR 40. The correlation between design structural number and granular subbase substitution thickness is not linear.

Spec. ID/ Spec Yr.: 162 Prepared Soil Layer / 2010 - 2013

Category 1: Prepared Soil Layer

- Sampler: ECI Level 1
- Sample Size: QC/IV 12.5 lbs., VT 25 lbs.
- Frequency: QC: 1 per 2500 yd^2 | VT: 1 per 10,000 yd^2| IV: Per Engineer's Option

Type 1: After Mixing

1) FM 1-T 267
- Limit: 2.5% ≤ OC ≤ 10.0%
- Comparison: (1) 4 QC to 1 VT must pass individual target/limit (2) 2.5 ≤ Avg of 4 QC OC ≤ 10.0

2) FM 5-550
- *Limit 1: 4.5 ≤ pH ≤ 8.5*
- Comparison: 4 QC to 1 VT must pass target/limit (T&L)

** NOTES FROM 162/987**

(1) Finish Soil Layer
Obtain 2.5 ≤ OC ≤ 10, 4.5 ≤ pH ≤ 8.5, Primary Macro Nutrients (N,P,K), Secondary Macro Nutrients (S, Ca, Mg)

(2) Organic Soil
If Clay > 50% then OC ≥ 30%
If Clay = 0% then OC > 20%

(3) Blanket Material
AASHTO M145 (Soil Class) must meet Plans & Design Standards Index 505

(4) Compost
Meet requirements of FDEP Rule 62.709.550 Type Y, YM, A, or Rule 62.640.850 Type AA

Spec. ID/ Spec Yr.: 162 Prepared Soil Layer / JAN 2014 → 06/2017

Category 1: Prepared Soil Layer

- Sampler: ECI Level 1
- Sample Size: QC/IV 12.5 lbs., VT 25 lbs.
- Frequency: QC: 1 per 1 LOT | VT: 1 per 4 LOTs| IV: Per Engineer's Option
- STRG NOTE: 1 LOT = ½ mile

Type 1: After Mixing

1) FM 1-T 267
- Limit: OC ≥ 1.5%
- Comparison: (1) 4 QC to 1 VT must pass individual target/limit (2) 2.5 ≤ Avg of 4 QC OC ≤ 10.0

2) FM 5-550
- *Limit 1: 4.5 ≤ pH ≤ 8.5*
- Comparison: 4 QC to 1 VT must pass target/limit

Spec. ID/ Spec Yr.: 162 Prepared Soil Layer / JUL 2017 → JUN 2019

Same as Jan 2014 version except the following changes to FM 5-550 pH

2) FM 5-550	*Limit 1: 5.5 ≤ pH ≤ 7.0*

Spec. ID/ Spec Yr.: 200 Rock Base / 2010 to 2014

Category 1: Non Pit Proctor Method

Type 1: Mainline Only or Whole Width of the Roadway
- Sampler: ECI Level 1
- Sample Size: QC 300 lbs., VT/RT/IV: 100 lbs.
- Frequency: QC: 1 per 8 LOTs | VT: 1 per 16 LOTs| IV: Per Engineer's Option
- Note: QC-Split sample into 3 equal bags | VT/RT/IV-Retrieve split sample from QC

1) FM 1-T 180
- Tester: Agg Base Tech

Type 2: Non-Mainline Roadway Only
- Sampler: ECI Level 1
- Sample Size: QC 300 lbs., VT/RT/IV: 100 lbs.
- Frequency: QC: 1 per 2 LOTs | VT: 1 per 4 LOTs| IV: Per Engineer's Option
- Note: QC-Split sample into 3 equal bags | VT/RT/IV-Retrieve split sample from QC

1) FM 1-T 180
- Tester: Agg Base Tech

Category A: Field Testing for Mainline Only or Whole Width of the Roadway

Type 1: Nuke Density
- Tester: ECI Level 1
- Frequency: QC - 1 Per LOT | VT: 1 per 4 LOTs | IV: Per Engineer's Option

1) FM 1-T 238
- Limit: Max Density ≥ 98%

Type 2: Roadway Thickness
- Tester: ECI Level II
- Frequency: QC - 3 per LOT | VT: Witness 3 per LOT | IV: Per Engineer's Option
- Red Freq.: QC - 3 per 2 LOTs | VT: Witness 3 per 2 LOTs | IV: Per Engineer's Option

1) Base Depth

Category B: Field Testing for Non-Mainline Roadway Only

Type 1: Nuke Density
- Tester: ECI Level 1
- Frequency: QC: 1 Per LOT | VT: 1 per 2 LOTs | IV: Per Engineer's Option

1) FM 1-T 238
- Limit: Max Density ≥ 95%

Type 2: Roadway Thickness
- Tester: ECI Level II
- Frequency: QC - 3 Per 1000' | VT: Witness 3 per 1000' | IV: Per Engineer's Option
- Frequency: QC - 3 Per 2000' | VT: Witness 3 per 2000' | IV: Per Engineer's Option

1) Base Depth

Certification: Base Rock material delivery tickets

Spec. ID/ Spec Yr.: 200 Rock Base / 2015 →

Category 1: Non-Pit Proctor Method: Mainline Only or Whole Width of the Roadway

- Sampler: ECI Level 1
- Sample Size: QC 300 lbs., VT/RT/IV: 100 lbs.
- Frequency: QC: 1 per 8 LOTs | VT: 1 per 16 LOTs| IV: Per Engineer's Option
- Note: QC-Split sample into 3 equal bags | VT/RT/IV-Retrieve split sample from QC

1) FM 1-T 180
- Tester: Agg Base Tech

Category 2: Non-Pit Proctor Method: Non-Mainline Roadway Only

Type 1: Optional Base (OBG)

Type 2: 283 RAP Base
- Sampler: ECI Level 1
- Sample Size: QC 300 lbs., VT/RT/IV: 100 lbs.
- Frequency: QC: 1 per 2 LOTs | VT: 1 per 4 LOTs| IV: Per Engineer's Option
- Note: QC-Split sample into 3 equal bags | VT/RT/IV-Retrieve split sample from QC

1) FM 1-T 180
- Tester: Agg Base Tech

Category 3: Pit Proctor Method: Mainline Only or Whole Width of the Roadway
- Sampler: ECI Level 1
- Sample Size: IV/RT 200 lbs.
- Frequency: IV - 1 per 16 LOTs
- Note: IV-Split sample into 2 equal bags for IV and RT

1a) FM 1-T 180 for IV/RT
- Tester: Agg Base Tech

1b) Pit Proctor Reporting for QC
- Tester: Any QC personnel
- Freq: Report into MAC every time IV inputs min 1 sample or max 2 samples.

Category 4: Pit Proctor Method: Non-Mainline Only Roadway Only
- Same criteria as Catg 3

Category 5: Existing Base

Type 1: Preliminary Stockpile

Type 2: Reg. Production Stockpile

Type 3: Reduced Frequency Production Stockpile
- See page 11 criteria details

Category A: Field Testing for Mainline Only or Whole Width of the Roadway
- Same req't as 2010-2014 Category 2

Category B: Field Testing for Non-Mainline Roadway Only
- Same req't as 2010-2014 Category 3

Certification: Base Rock material delivery tickets

Spec. ID: 204 Graded Aggregate Base

- Log roadway soils sampling and testing in MAC Specs 200
- Follow 200 sampling and testing frequency
- Collect shipping tickets

Category A: Field Testing for Mainline Only or Whole Width of the Roadway
- Same tester and frequency req't as 200

Type 1: Nuke Density

1) FM 1-T 238
- Limit: Max Density ≥ 100% of T180

Type 2: Roadway Thickness

1) Base Depth

Category B: Field Testing for Non-Mainline Roadway Only
- Same tester and frequency req't as 200 Category A

Type 1: Nuke Density

1) FM 1-T 238
- Limit: Max Density ≥ 98% of T180

Type 2: Roadway Thickness

1) Base Depth

Spec. ID: 549Dev Geosynthetic Reinforced Soil (GRS) Abutments & Walls

Category 1: Graded Aggregate Base (GAB)
- Sampler: ECI Level 1
- Sample Size: 100 lbs.
- Frequency: 1 per source

Type 1: Coated Polyester Geosynthetic

1) FM 1-T 180

1) FM 5-550
- 4.5 ≤ pH ≤ 10.0

Type 2: Uncoated Polyester Geosynthetic

1) FM 1-T 180

1) FM 5-550
- 4.5 ≤ pH ≤ 9.0

Category 2: Coarse Aggregate Backfill
- Sampler: ECI Level 1
- Sample Size: 15 lbs.
- Frequency: 1 per source
- *Note: Only products #57 stone through #89 may be used as CA.*

Type 1: Coated Polyester Geosynthetic

1) FM 5-550
- 4.5 ≤ pH ≤ 10.0

Type 2: Uncoated Polyester Geosynthetic

1) FM 5-550
- 4.5 ≤ pH ≤ 9.0

Category A: Field Testing for GAB Backfill areas
- Same tester and frequency req't as 200

Type 1: Nuke Density

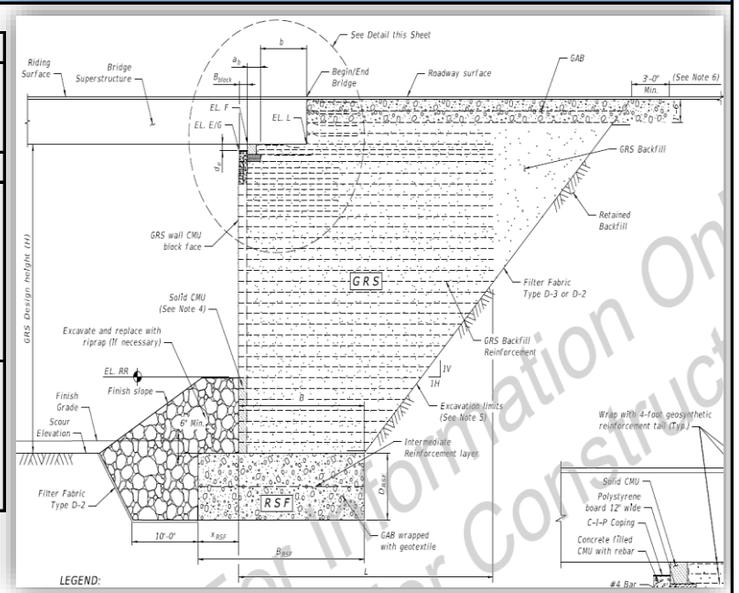
1) FM 1-T 238
- Limit: Max Density ≥ 95% of T180

Category B: Field Testing for Sand Backfill for Temporary Walls

Type 1: Nuke Density

1) FM 1-T 238
- Limit: Max Density ≥ 100% of T99

General Note	
1	For temporary GRS walls, select sand backfill must be logged into MAC Specs 548 and field density requirements in accordance with specs 120.
2	Select sand backfill is not allowed for permanent walls
3	Collect shipping tickets for GAB and CA and ensure product certification is from an approved aggregate source with the following information: "Certified for FDOT" phrase , source number, process number, product code, material description, date, and quantity in tons.
4	Only allowed products on the wall are aggregate product codes B10 for RSF and top layer and C10 through C17 for GRS backfill. B10 may be substituted for C10 through C17 product codes. No substitution for GAB



Spec. ID/ Spec Yr.: 548 Retaining Wall Systems / 2010

Category 1: Backfill using Modified Proctor at Point of Placement

- Sampler: ECI Level 1
- Sample Size: QC 100 lbs., VT 200 lbs.
- Frequency: QC/VT: 1 per soil Type; IV: Per Engineer's Option
- Attach Document in MAC: Provide certification to the Engineer that the results have met the requirements of Section 548-2.6.2 and are signed and sealed by a Professional Engineer, registered in the State of FL.

Type 1: With Geosynthetic Soil Reinforcement

1) AASHTO M 145

2) AASHTO T27/T11
- Tester: Agg Testing Tech
- Limit: 3½ = 100% | ¾" ≥ 70% | #4 ≥ 30% | #40 ≥ 15% | #100 ≤ 65% | #200 ≤ 12% | Sample Mass ≥ 300g

3) AASHTO T89/90
- Tester: Agg Base Tech
- Limit: LL < 15, PI = NP

4) FM 1-T 180
- Tester: Agg Base Tech
- Comparison: QC → VT ± 4.5 pcf

5) FM 1-T 267
- Limit: OC (up to 3 readings) ≤ 3.0 | Avg. OC ≤ 2.0

6) FM 5-550
- *Limit 1: 3 ≤ pH ≤ 10 w/ condition Metallic Elements or Pipes = No | Limit 2: 5 ≤ pH ≤ 9 w/ condition Metallic Elements or Pipes = Yes*

Type 2: With Metallic Soil Reinforcement

1) AASHTO M 145
- Same criteria as Geosynth.

2) AASHTO T27/T11
- Same criteria as Geosynth.

3) AASHTO T89/90
- Same criteria as Geosynth.

4) FM 1-T 180
- Same criteria as Geosynth.

5) FM 1-T 267
- Same criteria as Geosynth.

6) FM 5-550
- Limit: 5 ≤ pH ≤ 9

7) FM 5-551
- Resistivity > 3000 ohm-cm

8) FM 5-552
- Limit: Soluble Chloride Content < 100 PPM

9) FM 5-553
- Limit: Soluble Sulfate Content < 200 PPM

Type 3: Without Reinforcement in Soil

1) AASHTO M 145
- Same criteria as Geosynth.

2) AASHTO T27/T11
- Tester: Agg Testing Tech
- Limit; 3½ = 100% ; 0% ≤ #200 ≤ 12% ; Sample Mass ≥ 300g

3) AASHTO T89/90
- Same criteria as Geosynth.

4) FM 1-T 180
- Same criteria as Geosynth.

5) FM 1-T 267
- Same criteria as Geosynth.

6) FM 5-550
- Same criteria as Geosynth.

Category A: Nuke Density for Modified Proctor Backfill

- Tester: ECI Level 1
- Frequency: QC: 1 Per LOT | VT: 1 per 4 LOTs | IV: Per Engineer's Option

Type 1: 3 ft behind the wall face

1) FM 1-T 238
- % Max Density ≥ 90%

Type 2: Beyond 3 ft behind the wall face

1) FM 1-T 238
- % Max Density ≥ 95%

Category B: Nuke Density for Standard Proctor Backfill

- Tester: ECI Level 1
- Frequency: QC: 1 Per LOT | VT: 1 per 4 LOTs | IV: Per Engineer's Option

Type 1: 3 ft behind the wall face

1) FM 1-T 238
- % Max Density ≥ 95%

Type 2: Beyond 3 ft behind the wall face

1) FM 1-T 238
- % Max Density ≥ 100%

Certified Test Report: (1) Select Backfill 548-2.6

Spec. ID/ Spec Yr.: 548 Retaining Wall Systems / 2013

Category 1: Backfill using Modified Proctor at Point of Placement
- Sampler: ECI Level 1
- Sample Size: QC 100 lbs., VT 200 lbs.
- Frequency: QC/VT: 1 per soil Type; IV: Per Engineer's Option

Category 2: Backfill using Standard Proctor at Point of Placement
- Sampler: ECI Level 1
- Sample Size: QC 100 lbs., VT 200 lbs.
- Frequency: QC/VT: 1 per soil Type; IV: Per Engineer's Option

Type 1: With Geosynthetic Reinforcement
- Run all tests under Cat 1, Type 1, except replace FM 1-T 180 w/ FM 1-T 99 & M145 = A-3 or A-2-4

Type 2: With Metallic Reinforcement
- Run all tests under Cat 1, Type 2, except replace FM 1-T 180 w/ FM 1-T 99 & M145 = A-3 or A-2-4

Type 3: Without Reinforcement
- Run all tests under Cat 1, Type 3, except replace FM 1-T 180 w/ FM 1-T 99 & M145 = A-3 or A-2-4

Type 1: With Geosynthetic Soil Reinforcement

1) AASHTO M 145

2) AASHTO T27/T11
- Tester: Agg Testing Tech
- Limit: 3½ = 100% ; ¾" ≥ 70% ; #4 ≥ 30% ; #40 ≥ 15% ; #100 ≤ 65% ; #200 ≤ 12%

3) AASHTO T89/90
- Tester: Agg Base Tech
- Limit: LL < 15, PI = NP

4) FM 1-T 180
- Tester: Agg Base Tech
- Comparison: QC → VT ± 4.5 pcf

5) FM 1-T 267
- Limit: OC (up to 3 readings) ≤ 3.0 | Avg. OC ≤ 2.0

6) FM 5-550
- Limit: 5 ≤ pH ≤ 9

*Note
Attach Document in MAC: Provide certification to the Engineer that the results have met the requirements of Section 548-2.6.2 and are signed and sealed by a Professional Engineer, registered in the State of FL.

Type 2: With Metallic Soil Reinforcement

1) AASHTO M 145
- Same criteria as Geosynth.

2) AASHTO T27/T11
- Same criteria as Geosynth.

3) AASHTO T89/90
- Same criteria as Geosynth.

4) FM 1-T 180
- Same criteria as Geosynth.

5) FM 1-T 267
- Same criteria as Geosynth.

6) FM 5-550
- Limit: 5 ≤ pH ≤ 9

7) FM 5-551
- Resistivity > 3000 ohm-cm

8) FM 5-552
- Limit: Soluble Chloride Content < 100 PPM

9) FM 5-553
- Limit: Soluble Sulfate Content < 200 PPM

Type 3: Without Reinforcement in Soil

1) AASHTO M 145
- Same criteria as Geosynth.

2) AASHTO T27/T11
- Tester: Agg Testing Tech
- Limit; 3½ = 100% ; 0% ≤ #200 ≤ 12%

3) AASHTO T89/90
- Same criteria as Geosynth.

4) FM 1-T 180
- Same criteria as Geosynth.

5) FM 1-T 267
- Same criteria as Geosynth.

6) FM 5-550
- Same criteria as Geosynth.

Category A: Nuke Density for Modified Proctor Backfill
- Tester: ECI Level 1
- Frequency: QC: 1 Per LOT | VT: 1 per 4 LOTs | IV: Per Engineer's Option

Type 1: 3 ft behind the wall face

1) FM 1-T 238
- % Max Density ≥ 90%

Type 2: Beyond 3 ft behind the wall face

1) FM 1-T 238
- % Max Density ≥ 95%

Category B: Nuke Density for Standard Proctor Backfill
- Tester: ECI Level 1
- Frequency: QC: 1 Per LOT | VT: 1 per 4 LOTs | IV: Per Engineer's Option

Type 1: 3 ft behind the wall face

1) FM 1-T 238
- % Max Density ≥ 95%

Type 2: Beyond 3 ft behind the wall face

1) FM 1-T 238
- % Max Density ≥ 100%

Certified Test Report: (1) Select Backfill 548-2.6.2

Spec. ID/ Spec Yr.: 548 Retaining Wall Systems / 2014

Category 1: Backfill using Modified Proctor at Point of Placement
- Sampler: ECI Level 1
- Sample Size: QC 100 lbs., VT 200 lbs.
- Frequency: QC/VT: 1 per soil Type; IV: Per Engineer's Option

Category 2: Backfill using Standard Proctor at Point of Placement
- Sampler: ECI Level 1
- Sample Size: QC 100 lbs., VT 200 lbs.
- Frequency: QC/VT: 1 per soil Type; IV: Per Engineer's Option

Type 1: With Geosynthetic Reinforcement
- Run all tests under Cat 1, Type 1, except replace FM 1-T 180 w/ FM 1-T 99 & M145 = A-3 or A-2-4

Type 2: With Metallic Reinforcement
- Run all tests under Cat 1, Type 2, except replace FM 1-T 180 w/ FM 1-T 99 & M145 = A-3 or A-2-4

Type 3: Without Reinforcement
- Run all tests under Cat 1, Type 3, except replace FM 1-T 180 w/ FM 1-T 99 & M145 = A-3 or A-2-4

Type 1: With Geosynthetic Soil Reinforcement

1) AASHTO M 145

2) AASHTO T27/T11
- Tester: Agg Testing Tech
- Limit: 3½ = 100% | ¾" ≥ 70% | #4 ≥ 30% | #40 ≥ 15% | #100 ≤ 65% | #200 ≤ 12%

3) AASHTO T89/90
- Tester: Agg Base Tech
- Limit: LL < 15, PI = NP

4) FM 1-T 180
- Tester: Agg Base Tech
- Comparison: QC → VT ± 4.5 pcf

5) FM 1-T 267
- Limit: OC (up to 3 readings) ≤ 3.0 | Avg. OC ≤ 2.0

6) FM 5-550
- *Limit 1 : 5 ≤ pH ≤ 9*
- *Limit 2 : 4.5 ≤ pH ≤ 9 if conditions 1-6 = Pass*

*Note

Attach Document in MAC: Provide certification to the Engineer that the results have met the requirements of Section 548-2.6.2 and are signed and sealed by a Professional Engineer, registered in the State of FL.

Type 2: With Metallic Soil Reinforcement

1) AASHTO M 145
- Same criteria as Geosynth.

2) AASHTO T27/T11
- Same criteria as Geosynth.

3) AASHTO T89/90
- Same criteria as Geosynth.

4) FM 1-T 180
- Same criteria as Geosynth.

5) FM 1-T 267
- Same criteria as Geosynth.

6) FM 5-550
- Same criteria as Geosynth.

7) FM 5-551
- Resistivity > 3000 ohm-cm

8) FM 5-552
- Limit: Soluble Chloride Content < 100 PPM

9) FM 5-553
- Limit: Soluble Sulfate Content < 200 PPM

Type 3: Without Reinforcement in Soil

1) AASHTO M 145
- Same criteria as Geosynth.

2) AASHTO T27/T11
- Tester: Agg Testing Tech
- Limit; 3½ = 100% ; 0% ≤ #200 ≤ 12%

3) AASHTO T89/90
- Same criteria as Geosynth.

4) FM 1-T 180
- Same criteria as Geosynth.

5) FM 1-T 267
- Same criteria as Geosynth.

6) FM 5-550
- Same criteria as Geosynth.

Category 3: Direct Shear
- Sampler: ECI Level 1
- Sample Size: VT/IV 25 lbs.
- Frequency: VT: 1 per soil type | IV: Engineer's Option

Type 1: Friction Angle

1) FM 1-T 236
- Limit: Peak Friction Angle ≥ Shop Drawing Friction Angle

Category A: Nuke Density for Modified Proctor Backfill
- Tester: ECI Level 1
- Frequency: QC: 1 Per LOT | VT: 1 per 4 LOTs | IV: Per Engineer's Option

Type 1: 3 ft behind the wall face

1) FM 1-T 238
- % Max Density ≥ 90%

Type 2: Beyond 3 ft behind the wall face

1) FM 1-T 238
- % Max Density ≥ 95%

Category B: Nuke Density for Standard Proctor Backfill
- Tester: ECI Level 1
- Frequency: QC: 1 Per LOT | VT: 1 per 4 LOTs | IV: Per Engineer's Option

Type 1: 3 ft behind the wall face

1) FM 1-T 238
- % Max Density ≥ 95%

Type 2: Beyond 3 ft behind the wall face

1) FM 1-T 238
- % Max Density ≥ 100%

Certified Test Report: (1) Select Backfill 548-2.6.2

**Conditions for FM5-550: (1) Metallic elements/pipes within backfill = No |(2) Concrete cover over the reinforcement for the Interior face of the MSE wall panels ≥ 3" |(3) Quantity of cement replaced with Type F fly ash in % by weight 10%≥X≤ 20% |(4) Quantity of cement replaced with Slag in % by weight 50%≤X≤ 60% |(5) % of Portland cement by weight of total cementitious material ≥ 30% |(6) % of total weight of the Type F fly ash and slag to total cementitious material ≤ 70%

Spec. ID/ Spec Yr.: 548 Retaining Wall Systems / 2015

Category 1: Backfill using Modified Proctor at Point of Placement
- Sampler: ECI Level 1
- Sample Size: QC 200 lbs., VT/IV 100 lbs.
- Frequency: QC/VT: 1 per soil Type; IV: Per Engineer's Option

Category 2: Backfill using Standard Proctor at Point of Placement
- Sampler: ECI Level 1
- Sample Size: QC 200 lbs., VT/IV 100 lbs.
- Frequency: QC/VT: 1 per soil Type; IV: Per Engineer's Option

Type 1: With Geosynthetic Reinforcement
- Run all tests under Cat 1, Type 1, except replace FM 1-T 180 w/ FM 1-T 99 & M145 = A-3 or A-2-4

Type 2: With Metallic Reinforcement
- Run all tests under Cat 1, Type 2, except replace FM 1-T 180 w/ FM 1-T 99 & M145 = A-3 or A-2-4

Type 3: Without Reinforcement
- Run all tests under Cat 1, Type 3, except replace FM 1-T 180 w/ FM 1-T 99 & M145 = A-3 or A-2-4

Type 1: With Geosynthetic Soil Reinforcement

1) AASHTO M 145
2) AASHTO T27/T11
   - Tester: Agg Testing Tech
   - Limit: 3½ = 100%; ¾" ≥ 70%; #4 ≥ 30%; #40 ≥ 15%; #100 ≤ 65%; #200 ≤ 12%
3) AASHTO T89/90
   - Tester: Agg Base Tech
   - Limit: LL < 15, PL = NP
4) FM 1-T 180
   - Tester: Agg Base Tech
   - Comparison: QC → VT ± 4.5 pcf
5) FM 1-T 267
   - Limit: OC (up to 3 readings) ≤ 3.0 | Avg. OC ≤ 2.0
6) FM 5-550
   - *Limit 1 : 5 ≤ pH ≤ 9*
   - *Limit 2 : 3 ≤ pH ≤ 9 if conditions 1-6 = Pass*

*Note
Attach Document in MAC: Provide certification to the Engineer that the results have met the requirements of Section 548-2.6.2 and are signed and sealed by a Professional Engineer, registered in the State of FL.

Type 2: With Metallic Soil Reinforcement

1) AASHTO M 145
   - Same criteria as Geosynth.
2) AASHTO T27/T11
   - Same criteria as Geosynth.
3) AASHTO T89/90
   - Same criteria as Geosynth.
4) FM 1-T 180
   - Same criteria as Geosynth.
5) FM 1-T 267
   - Same criteria as Geosynth.
6) FM 5-550
   - *Limit 1 : 5 ≤ pH ≤ 9*
   - *Limit 2 : 4.5 ≤ pH ≤ 9 if conditions 2-6 = Pass*
7) FM 5-551
   - Resistivity > 3000 ohm-cm
8) FM 5-552
   - Limit: Soluble Chloride Content < 100 PPM
9) FM 5-553
   - Limit: Soluble Sulfate Content < 200 PPM

Type 3: Without Reinforcement in Soil

1) AASHTO M 145
   - Same criteria as Geosynth.
2) AASHTO T27/T11
   - Tester: Agg Testing Tech
   - Limit; 3½ = 100% ; 0% ≤ #200 ≤ 12%
3) AASHTO T89/90
   - Same criteria as Geosynth.
4) FM 1-T 180
   - Same criteria as Geosynth.
5) FM 1-T 267
   - Same criteria as Geosynth.
6) FM 5-550
   - Same criteria as Geosynth.

Category 3: Direct Shear
- Sampler: ECI Level 1
- Sample Size: QC/VT/IV 25 lbs.
- Frequency: QC: 3 per soil type | VT: 1 per soil type | IV: Engineer's Option

Type 1: Friction Angle

1) FM 1-T 236
   - Limit: Peak Friction Angle ≥ Shop Drawing Friction Angle

Category A: Nuke Density for Modified Proctor Backfill
- Tester: ECI Level 1
- Frequency: QC: 1 Per LOT | VT: 1 per 4 LOTs | IV: Per Engineer's Option

Type 1: 3 ft behind the wall face

1) FM 1-T 238
   - % Max Density ≥ 90%

Type 2: Beyond 3 ft behind the wall face

1) FM 1-T 238
   - % Max Density ≥ 95%

Category B: Nuke Density for Standard Proctor Backfill
- Tester: ECI Level 1
- Frequency: QC: 1 Per LOT | VT: 1 per 4 LOTs | IV: Per Engineer's Option

Type 1: 3 ft behind the wall face

1) FM 1-T 238
   - % Max Density ≥ 95%

Type 2: Beyond 3 ft behind the wall face

1) FM 1-T 238
   - % Max Density ≥ 100%

Certified Test Report: (1) Select Backfill 548-2.6.2 (2) Coarse Aggregate Backfill 548-2.6.4

Certification: Coarse Aggregate Delivery Tickets

**Conditions for FM5-550: (1) Metallic elements/pipes within backfill = No |(2) Concrete cover over the reinforcement for the Interior face of the MSE wall panels ≥ 3" |(3) Quantity of cement replaced with Type F fly ash in % by weight 10%≥X≤ 20% |(4) Quantity of cement replaced with Slag in % by weight 50%≤X≤ 60% |(5) % of Portland cement by weight of total cementitious material ≥ 30% |(6) % of total weight of the Type F fly ash and slag to total cementitious material ≤ 70%

Spec. ID/ Spec Yr.: 985 Retaining Wall Systems / ALL YEARS

Intended Use for Specs 125, 287, 288, 400, 407, 410, 430, 440, 446, 449, 514, 524, 548, & 571
1) General Material Certification
2) Application Evaluation
Notes: The Engineer shall obtain from the contractor product certification documents stating the product meet the 985 specification requirements with the signature of the legal binding representative, print out of sample login sheet, and two 8"x10" samples for product identification and submit it to lab DSM001 (SMO @ Gainesville).

Geotextile Selection	
In-situ Soil Type or Drainage Application	**Class for Type D1, D2, D3 Materials**
< 15% passing a No. 200 Sieve*	a
15% to 50% passing a No. 200 Sieve*	b
> 50% passing a No. 200 Sieve*	c
> 50% passing a No. 200 Sieve* with Plastic Index >7	d
MSE Joint Cover for Sand or Limerock Backfill	e
MSE Joint Cover for Coarse Aggregate Backfill	f
**as per AASHTO T88*	

Category 1: Drainage 1
D-1: Revetment (Special)
D-1: Rock, Rubble without bedding stone
D-1: Ditch Pavement (Rubble Riprap) without bedding stone

Category 2: Drainage 2
D-2: Revetment (Standard)
D-2: Articulating Block
D-2: Gabions
D-2: Rock, Rubble, and Broken Concrete with bedding stone
D-2: Ditch Pavement (Rubble Riprap) with bedding stone
D-2: Joint Cover for Mechanically Stabilized Retaining Wall Supporting Spread Footing Foundations
D-2: Joint Cover for Mechanically Stabilized Retaining Wall with Coarse Aggregate Backfill

Category 3: Drainage 3
D-3: Underdrain
D-3: French Drain
D-3: Sheet Piling Filter
D-3: Filter Fabric Jacket (Culvert)
D-3: Concrete Pavement Subdrainage
D-3: Joint Cover for Mechanically Stabilized Retaining Wall with Sand or Limerock Backfill

Category 4: Drainage 4
D-4: Slope Pavement
D-4: Ditch Pavement (Sand-Cement Riprap or Concrete)

Category 5: Drainage 5
D-5: Separation Geotextile
D-5: Cast-In-Place Retaining Wall

Category 6: Erosion Control
E-1: Staked Silt Fence
E-2: Wind Screen
E-3: Plastic Erosion Mat (Turf Reinforcement Mat) (Type 1)
E-4: Plastic Erosion Mat (Turf Reinforcement Mat) (Type 2)
E-5: Plastic Erosion Mat (Turf Reinforcement Mat) (Type 3)

Category 7: Reinforcement, Separation and Stabilization
R-1: Geosynthetic Reinforced Soil (GRS)
R-2: Reinforcement of Foundations over Soft Soils
R-3: Steepened Slopes
R-4: Reinforced Embankment
R-5: Construction Expedient

NOTES

General Notes

1	LOT # must be single number in MAC to represent where the material is sampled (not a range).
2	LOTs Represented and Station Limits must match and be accurate.
3	See Density Logbook instructions for appropriate FDOT sample numbering process. Contact DMO IA personnel If additional numbering codes are required.
4	Analyze MAC reports periodically → (1) ERS Summary of Soil Samples (2) EWK Sample Analysis Report (3) EWK Sample and LOT # Report
5	VT must ensure QC test results are reported first before finalizing VT test results.
6	If the project contains a specification other than standard, forward the appropriate documentation to SMO/DMO to customize MAC Specs before construction begins.
7	Notify SMO to assign a fixed MAC specs for contracts that have no contract let date (typically LAP, grant projects, etc.)
8	Frequency for comparison package must be less than or equal to the required frequency. For example, if the required frequency is 8 LOTs and QC had a sample that covered LOTs represented 8-9, then stop the comparison package at LOT 7.

Table 285-1: Optional Base Groups 1 through 7

Base Materials	Base Group (Base Group Pay Item) 1 (701)	2 (702)	3 (703)	4 (704)	5 (705)	6 (706)	7 (707)
Limerock, LBR 100	4"	5"	5-1/2"	6"	7"	8"	8-1/2"
Cemented Coquina, LBR 100	4"	5"	5-1/2"	6"	7"	8"	8-1/2"
Shell Rock, LBR 100	4"	5"	5-1/2"	6"	7"	8"	8-1/2"
Bank Run Shell, LBR 100	4"	5"	5-1/2"	6"	7"	8"	8-1/2"
Recycled Concrete Aggregate, LBR 150 (1)	4"	5"	5-1/2"	6"	7"	8"	8-1/2"
Graded Aggregate Base, LBR 100	4-1/2"	5-1/2"	6-1/2"	7-1/2"	8-1/2"	9"	10"
Type B-12.5	4" (3)	4" (3)	4" (3)	4" (3)	4-1/2"	5"	5-1/2"
B-12.5 and 4" Granular Subbase, LBR 100 (2)	-	-	-	-	-	-	-
RAP Base (4)	5" (4)	-	-	-	-	-	-

Base Materials	8 (708)	9 (709)	10 (710)	11 (711)	12 (712)	13 (713)	14 (714)	15 (715)
Limerock, LBR 100	9-1/2"	10"	11"	12"	12-1/2"	13-1/2" (5)	14" (5)	-
Cemented Coquina, LBR 100	9-1/2"	10"	11"	12"	12-1/2"	13-1/2" (5)	14" (5)	-
Shell Rock, LBR 100	9-1/2"	10"	11"	12"	12-1/2"	13-1/2" (5)	14" (5)	-
Bank Run Shell, LBR 100	9-1/2"	10"	11"	12"	12-1/2"	13-1/2" (5)	14 (5)	-
Recycled Concrete Aggregate, LBR 150 (1)	9-1/2"	10"	11"	12"	12-1/2"	13-1/2" (5)	14" (5)	-
Graded Aggregate Base, LBR 100	11"	12"	13"	14"	-	-	-	-
Type B-12.5	5-1/2"	6"	6-1/2"	7"	7-1/2"	8"	8-1/2"	9"
B-12.5 and 4" Granular Subbase, LBR 100 (2)	-	4"	4-1/2"	5"	5-1/2"	6"	6-1/2"	7"
RAP Base (4)	-	-	-	-	-	-	-	-

204 Specification Notes

1	Log samples under 200 specs when GAB is used as a base layer on roadway
2	Follow 204-6 for compaction and finishing base: 100% compaction of modified Proctor on mainline and 98% on non-mainline
3	GAB must be obtained from FDOT approved production facility with product code "B10" and must contain "Certified for FDOT" on the shipping tickets

160 Specification Notes

1	If ***Commercial material*** is used as a stabilizer then the material must be obtained from an approved production facility and the product must be "Certified for FDOT" as specified in 914-2.1 and Aggregate Rule 1-103, FAC. The delivery tickets must be collected and kept with the CEI office for records.
2	Inform the Engineer of the location of existing base that will be excavated and stockpiled to be used as stabilizer. Obtain the Engineer's approval in writing before using Existing Base.
3	Substitution of 6" of granular subbase is only for 12" of Type B stabilization LBR 40. The correlation between design structural number and subbase substitution is not linear.

145/548 Specification Notes

1	Stockpile select backfill by source. Contractor must perform source sampling and testing prior to placement.
2	At point of placement QC/VT must sample and test select backfill material for each source type. QC must submit a certification package that is signed and sealed by a Professional Engineer registered in the State of Florida, that the lab test results have met the requirements specified in the specification.

455 Specification Notes

1	Log samples under 120 spec using category "Embankment Material with Modified Proctor Option" for spread footer pads

200 Specification Notes

Pit Proctor Notes

1	Pit Proctor values are furnished by the SMO on the first day of the new quarter
2	Contractor must obtain written approval from the Engineer before utilizing Pit Proctor program in accordance with Specification 200-7
3	Collect base shipping tickets and ensure product certification is from an approved aggregate source with the following information: "Certified for FDOT" phrase , source number, process number, product code, material description, date, and quantity in tons. Contact production facility if the process # is not printed and the Pit Proctor report contains Proctor with more than one process number.
3	Density tests must use current quarter Pit Proctor value to calculate percent density compaction
4	Quality Control (QC) will report their Pit Proctor values into MAC for every two Independent Verification (IV) samples. This will provide a formal notification as required in Specification 200-7.2.3 and be used by Project Administrators to create comparison packages with the IV samples.
5	The Verification project personnel will collect an Independent Verification (IV) sample at a minimum frequency of one per 16 LOTS and test the material to obtain a Modified Proctor.
6	If QC switches from Pit Proctor back to traditional sampling, QC must continue with the traditional sampling and testing until the current quarter ends.
7	Do not restart Pit Proctor LOT numbering over at the beginning of the new quarter

200 Specification Notes Continued

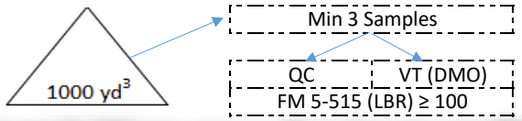
8	If more than one source is being used, differentiate with a letter "A" , "B", "C" in the FDOT sample number.
9	If a project is using the same base material for in lieu of stabilized subgrade and base strata, then two entries must be made in MAC with two separate sampling and testing (one in Spec 160 and the other in 200).
11	Requirements to use Existing Base

Documentation

Contractor must submit Process Control Plan (CPCP) to DMO for the approval to use existing base and to build a preliminary stockpile

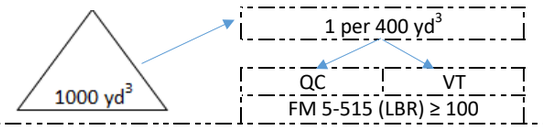
1. Notify the Engineer in writing prior to excavating existing rock.
2. Submit a process control plan, herein referred to as "Plan" consisting of the following:
   a. Locations where existing rock will be removed from the roadway.
   b. Locations where existing rock will be used for new construction.
   c. Method of excavation, transport, and placement to ensure excavated rock will be kept separate from other approved stockpiles. Excavation methods that may result in damage to the rock rendering it unfit to be used as base will not be approved.
   d. Proposed measures to prevent contamination and segregation.
   e. Proposed locations and methods for constructing stockpiles for sampling and testing.
   f. Method for sampling and reporting test results

Preliminary Stockpile

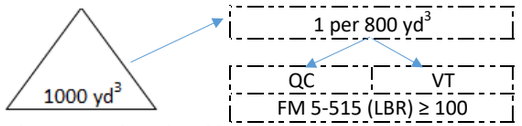


6. If all test results meet the requirements of this Section, the Engineer will notify the Contractor in writing of the approved status of the preliminary stockpile based on the analysis of test data performed by the District Materials Office.

Regular Production Stockpile



Reduced Frequency Production Stockpile



*** In order to meet the reduced frequency, 10 consecutive test samples must be greater than LBR of 120 from the Regular Production Stockpile*

This page is intentionally left blank

FDOT Materials

State Materials - Geotechnical Unit
5007 NE 39th Avenue
Gainesville, FL 32609
Tel: 352-955-6600
Fax: 352-955- 6644
Email: materials@dot.state.fl.us
Web: www..fdot.gov/materials/