



Florida Department of Transportation

CHARLIE CRIST
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

STEPHANIE KOPELOUSOS
SECRETARY

MEMORANDUM

DATE: December 24, 2009

TO: Specification Review Distribution List

FROM: Rudy Powell, Jr., P.E., State Specifications Engineer

SUBJECT: Proposed Specification: **5480206 Retaining Wall Systems – Backfill Materials**

In accordance with Specification Development Procedures, we are sending you a copy of a proposed specification change.

This change was proposed by Larry Jones of the State Structures Design Office to add the option to use flowable fill as a backfill material for MSE walls.

Please share this proposal with others within your responsibility. Review comments are due within four weeks and should be sent to Mail Station 75 or to my attention via e-mail at ST986RP or rudy.powell@dot.state.fl.us. Comments received after **January 19, 2010**, may not be considered. Your input is encouraged.

RP/
Attachment

RETAINING WALL SYSTEMS – BACKFILL MATERIALS.

(REV 12-2412-09)

SUBARTICLE 548-2.6 (Pages 682-683) is deleted and the following substituted:

548-2.6 Backfill Material:

548-2.6.1 General: When the option for flowable fill is shown in the plans, use either compacted select backfill or flowable fill. Options available for backfill are either compacted select backfill or flowable fill. The retaining wall volume is defined to extend from the top of the leveling pad or footing, or bottom of walls which do not have footing or leveling pads, to the finish grade line and from the face of the wall to a vertical plane passing through the end of the extreme wall component (straps, counterforts, etc.) plus 1 foot.

548-2.6.2 Compacted Select Backfill: Meet the requirements of Sections 105; and 120 except as noted within this Section. Have the backfill material tested for every soil type for pH, resistivity, sulfate and chloride content by a Department approved independent testing laboratory prior to placement. Provide certification to the Engineer, that the results have met the requirements of this Section and are signed and sealed by a Professional Engineer, registered in the State of Florida. ~~The retaining wall volume is defined to extend from the top of the leveling pad or footing, or bottom of walls which do not have footing or leveling pads, to the finish grade line and from the face of the wall to a vertical plane passing through the end of the extreme wall component (straps, counterforts, etc.) plus 1 foot.~~

For constructing the retaining wall volume, do not use backfill material containing more than 2.0% by weight of organic material, as determined by FM 1-T 267 and by averaging the test results for three randomly selected samples from each stratum or stockpile of a particular material. If an individual test value of the three samples exceeds 3%, the stratum or stockpile will not be suitable for constructing the retaining wall volume.

Ensure that the material is non-plastic as determined by AASHTO T 90 and the liquid limit as determined by AASHTO T 89 is less than 15. The pH, as determined by FM 5-550, shall not be lower than five and not higher than nine, unless approved otherwise by the Engineer, as follows: For walls utilizing non-metallic soil reinforcement, the Engineer may approve using a backfill with a pH value between three and ten, if no metallic structures, such as metallic pipes, are placed within the backfill. Do not use backfill with a pH lower than three or higher than ten.

Use backfill for walls using soil reinforcements that meets the following gradation limits determined in accordance with AASHTO T 27 and FM 1-T 011:

Sieve Size	Percent Passing
3 1/2 inches	100
3/4 inch	70-100
No. 4	30-100
No. 40	15-100
No. 100	0-65
No. 200	0-12

In addition, for permanent walls utilizing metallic soil reinforcement, use backfill that meets the following electro-chemical test criteria for determining corrosiveness:

Criteria	Test Method
Resistivity: > 3000 $\Omega \cdot m$	FM 5-551
Sulfate content: < 200 PPM	FM 5-553
Soluble chloride content < 100 PPM	FM 5-552

For walls not using soil reinforcement, use backfill that meets the following gradation limits determined in accordance with AASHTO T 27 and FM 1-T 011:

Sieve Size	Percent Passing
3 1/2 inches	100
No. 200	0-12

548-2.6.3 Flowable Fill: *Meet the requirements of Section 121 except as noted within this Section and the plans.*

SUBARTICLE 548-6.5 (Page 686) is deleted and the following substituted:

548-6.5 Backfill Placement:

548-6.5.1 Compacted Select Backfill: Perform work in accordance with an approved Quality Control Plan (QCP) meeting the requirements of 105-3. A LOT is defined as a single lift of finished embankment not to exceed 500 feet in length. Isolated compaction operations will be considered as separate LOTs. For multiple phase construction, a LOT will not extend beyond the limits of the phase.

Place the backfill closely following the erection of each course of precast components or soil reinforcement layers and spread by moving the machinery parallel to the wall face. Do not allow equipment heavier than 8 tons closer than 3 feet behind the wall face. Place backfill in a manner to avoid any damage or disturbance to the wall materials or misalignment of the facing materials. Remove and replace any wall materials which become damaged or disturbed during backfill placement at no cost to the Department, or correct as directed by the Engineer. Remove and reconstruct any misalignment or distortion of the wall facing due to placement of backfill outside the limits of this specification at no cost to the Department.

Sheepfoot, grid rollers or other types of equipment employing a foot are not allowed. Achieve compaction within 3 feet of the back of the wall face using a power operated roller or plate weighing less than 1,000 lbs. At a distance greater than 3 feet from the back of the wall, a vibratory roller may be used, provided that the frequency and amplitude combined with bulk weight of the roller has performed satisfactorily at a trial section of the same type of wall. A smooth wheel or rubber tire roller is considered adequate. Ensure that the maximum lift thickness after compaction does not exceed 6 inches. Decrease the lift thickness if necessary, to obtain specified density.

Perform backfill compaction in a way that the compactor moves in a direction parallel to the wall face and proceeds from a distance not less than 3 feet behind the wall face toward the end of the soil reinforcement element.

Ensure that the moisture content of the backfill material prior to and during compaction is uniformly distributed throughout each layer of material. Use backfill material having a placement moisture content at the dry side of the Optimum Moisture content. To achieve the required compaction moisture content, use water that meets the requirements of Section 923. Do not use saltwater. Do not transport excessively moist backfill materials to the site for any reason. The Engineer will determine the Optimum Moisture Content in accordance with FM 5-521.

At the end of each day's operation, shape the last level of backfill to permit runoff of rainwater away from the wall face or provide a positive means of controlling runoff away from the wall such as temporary pipe, etc.

548-6.5.2 Flowable Fill: Perform work in accordance with an approved Quality Control Plan (QCP) meeting the requirements of 105-3. Metallic wall components (including metallic soil reinforcements) must not be in partial contact with the flowable fill. If the metallic components contact the flowable fill, the metallic components must be completely encapsulated by the flowable fill.