



*Florida Department of Transportation*

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KEVIN J. THIBAUT, P.E.  
SECRETARY

January 24, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **005 – 556**  
Proposed Specification: **Section 001 through Section 556.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Vern Danforth from the Production Support Office to update the language in accordance with the changes to the FDM and PSO memo 21-20 requiring signing and sealing of BIM files associated with earth work. Various sections, removed references to “ground line” or “cross sections” in the plans, as well as terminology like “template” to consistently use “existing surface” or “finished graded surface.” The proposed changes include changes to SP3270301 and SP4550000DB.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**MILLING OF EXISTING ASPHALT PAVEMENT****(REV 12-2216-2119) (FA 12-30-19) (1-22)**

SUBARTICLE 327-3.1 is deleted and the following substituted:

**327-3 Construction.**

**327-3.1 General:** Remove the existing raised pavement markers (RPMs) before milling. Include the cost of removing existing RPMs in the price for milling.

When milling to improve rideability or cross slope, remove the existing pavement to the average depth specified in the Plans, in a manner that will restore the pavement surface to a uniform cross ~~slope~~ ~~section~~ and longitudinal profile. The Engineer may require the use of a stringline to ensure maintaining the proper alignment.

Establish the longitudinal profile of the milled surface in accordance with the milling plans. Ensure the final cross slope of the milled surface parallels the surface cross slope shown in the Plans or as directed by the Engineer. Establish the cross slope of the milled surface by a second sensing device near the outside edge of the cut or by an automatic cross slope control mechanism. The Plans may waive the requirement of automatic grade or cross slope controls where the situation warrants such action.

Operate the milling machine to minimize the amount of dust being emitted. The Engineer may require prewetting of the pavement.

Provide positive drainage of the milled surface and the adjacent pavement. Perform this operation on the same day as milling. Milling operations are restricted to only that area which can be milled and resurfaced with the first lift of asphalt within the same work operation and prior to opening to traffic.

Before opening an area which has been milled to traffic, sweep the pavement and gutters with a power broom or other approved equipment to remove, to the greatest extent practicable, fine material which will create dust under traffic. Sweep in a manner to minimize the potential for creation of a traffic hazard and to minimize air pollution. Do not sweep or allow milled asphalt into inlets.

Sweep the milled surface with a power broom before placing asphalt concrete.

In urban and other sensitive areas, use a street sweeper or other equipment capable of removing excess milled materials and controlling dust. Obtain the Engineer's approval of such equipment, contingent upon its demonstrated ability to do the work.

Perform the sweeping operation immediately after the milling operations or as directed by the Engineer.

**STRUCTURES FOUNDATIONS (DESIGN BUILD).**

(REV ~~127-2214-21~~) (~~FA 7-19-21~~) (~~1-22~~)

SUBARTICLE 455-2.10 is deleted and the following substituted:

**455-2.10 Disposition of Tested Piles/Shafts:** After completing testing, cut off the tested piles/shafts, which are not to be incorporated into the final structure, and any reaction piles/shafts at an elevation 24 inches below the finished ~~graded~~ surface. Take ownership of the cut-offs and provide areas for their disposal.

SUBARTICLE 455-5.1 is deleted and the following substituted:

**455-5 General Construction Requirements.**

**455-5.1 Predrilling of Pile Holes:** Predrilled pile holes are either starter holes to the depth described in this Subarticle or holes drilled through embankment/fill material down to the natural ground ~~surface~~ at no additional cost to the Department. When using low displacement steel piling such as structural shapes, drive them through the compacted fill without the necessity of drilling holes through the fill except when the requirements for predrilling are shown in the Plans. When using concrete or other high displacement piles, drill pile holes through fill, new or existing, to at least the elevation of the natural ground ~~surface~~. Use the range of drill diameters listed below for square concrete piles.

12 inch square piles .....	15 to 17 inches
14 inch square piles .....	18 to 20 inches
18 inch square piles .....	22 to 26 inches
20 inch square piles .....	24 to 29 inches
24 inch square piles .....	30 to 34 inches
30 inch square piles .....	36 to 43 inches

For other pile sizes, use the diameter of the drills shown in the Plans or accepted by the Engineer. Accurately drill the pile holes with the hole centered over the Plan location of the piling. Maintain the location and vertical alignment within the tolerances allowed for the piling.

For predrilled holes required through rock or other hard (i.e. debris, obstructions, etc.) materials that may damage the pile during installation, predrill hole diameters approximately 2 inches larger than the largest dimension across the pile cross-section. Fill the annular space around the piles as described in 455-5.10.1 with clean A-3 sand or sand meeting the requirements of 902-3.3.

In the setting of permanent and test piling, the Contractor may initially predrill holes to a depth up to 20% of the test pile length, unless required otherwise by the Engineer or the plans. Predrill holes for production piles in the same manner as the test piles. When installing piles in compacted fill, predrill the holes to the elevation of the natural ground ~~surface~~. With prior written authorization from the Engineer, the Contractor may predrill holes to greater depths

to minimize the effects of vibrations on existing structures adjacent to the work or for other reasons the Contractor proposes.

SUBARTICE 455-5.9 is deleted and the following substituted:

**455-5.9 Penetration Requirements:** Measure the penetration of piles from the elevation of the natural ground, the existing surface, the deepest scour elevation shown in the Pile Data Table, or the bottom of excavation, whichever is lowest. When the Contract Documents show a minimum pile tip elevation, drive the tip of the pile to this minimum elevation. The Engineer will accept the bearing of a pile only if the Contractor achieves the required bearing when the tip of the pile is at or below the specified minimum tip elevation and below the bottom of the preformed or predrilled pile hole.

When the Plans do not show a minimum tip elevation, ensure that the penetration is at least 10 feet into firm bearing material or at least 20 feet into soft material unless otherwise permitted by the Engineer. The Engineer may accept a penetration between 15 feet and 20 feet when there is an accumulation of five consecutive feet or more of firm bearing material. Firm bearing material is any material offering a driving resistance greater than or equal to 30 tons per square foot of gross pile area as determined by the Dynamic Load Testing (455-5.12.4). Soft material is any material offering less than these resistances. The gross pile area is the actual pile tip cross-sectional area for solid concrete piles, the product of the width and depth for H piles, and the area within the outside perimeter for pipe piles and voided concrete piles.

Do not drive piles beyond practical refusal. To meet the requirements in this Subarticle, provide penetration aids, such as jetting or preformed pile holes, when piles cannot be driven to the required penetration without reaching practical refusal.

ARTICLE 455-18 is deleted and the following substituted:

#### **455-18 Method Shafts.**

The Engineer will use the construction of method shafts (test holes) to determine if the methods and equipment used by the Contractor are sufficient to produce a shaft excavation meeting the requirements of the Contract Documents. During method shaft excavations, the Engineer will evaluate the ability to control dimensions and alignment of excavations within tolerances; to seal the casing into impervious materials; to control the size of the excavation under caving conditions by the use of slurry or by other means; to properly clean the completed shaft excavation; to construct excavations in open water areas; to determine the elevation of ground water; to place reinforcing steel and concrete meeting the requirements of these Specifications within the prescribed time frame; and to execute any other necessary construction operation. Revise the methods and equipment as necessary at any time during the construction of the method shaft when unable to satisfactorily carry out any of the necessary operations described above or when unable to control the dimensions and alignment of the shaft excavation within tolerances.

Successfully construct method shafts out of permanent position at the location shown in the Plans. Ensure the diameter and depth of the method shafts are the same diameter and maximum depth as the production drilled shafts. When there are shafts both on land and in water, successfully construct a method shaft for each condition. When there is more than one size of

drilled shaft, perform a method shaft for the largest diameter for each condition. Reinforce the method shaft unless otherwise directed in the Contract Documents. Conduct integrity tests on each shaft, using both cross-hole sonic logging and TITDS test methods. Fill the method shaft with concrete in the same manner production drilled shafts will be constructed. Backfill method shafts which are not filled with concrete with suitable soil in a manner satisfactory to the Engineer. Leave concreted method shafts in place, except remove the top of the shaft to a depth of 2 feet below the ~~finished graded surface~~ground line. Use the same procedure for shafts constructed in water. Restore the disturbed areas at the sites of method shafts drilled out of position as nearly as practical to their original condition. When the Contractor fails to demonstrate to the Engineer the adequacy of his methods or equipment, and alterations are required, make appropriate modifications and provide additional method shafts at no expense to the Department. Make no changes in methods or equipment after initial acceptance without the consent of the Engineer.

A separate method shaft is not required for drilled shafts installed under sign, signal, lighting and ITS structures. The first production shaft will serve as a method shaft for determining acceptability of the installation method.

ARTICLE 455-31 is deleted and the following substituted:

#### **455-31 Compaction and Density Requirements.**

Compact the bottom of the excavation with suitable equipment. Compact the soil beneath footing excavation (whether dug to the bottom of footing or over-excavated) to a density not less than 95% of the maximum density as determined by FM 1-T180 for a minimum depth of 2 feet below the bottom of the excavation or to the depth shown in the Plans before backfilling begins. For every 500 feet of excavation or isolated compaction operation, perform two Quality Control (QC) density tests with a 12 inch depth of measurement: one QC density test with the gauge placed at an elevation of 1 foot below the bottom of the excavation and one QC density test with the gauge placed at the bottom of the excavation in accordance with FM 1-T238. Compact the backfill in footing excavations which have been over-excavated to a density not less than 95% of the maximum density as determined by FM 1-T180. Ensure that the maximum lift thickness after compaction does not exceed 6 inches. For every 500 feet of backfill or isolated compaction operation, perform at least one QC density test. The Engineer will conduct one density verification test per every four QC test with a minimum of one density test below the bottom of the excavation and one density test in the backfill. Verification comparison criteria and resolution procedures will be in accordance with 120-10.4 except replace FM 1-T99, with FM 1-T180.

For compaction, use a suitable heavy vibratory roller with a static drum weight of at least 4 tons. Compact each lift to the required density. Also, compact the final lift below the footing with a suitable sled vibratory compactor to remove any upper disturbance caused by the drum roller. When conditions require use of smaller compaction equipment, obtain the Engineer's acceptance for the equipment, and reduce the lift thickness to achieve the required density.

Perform backfilling to the ~~existing original ground~~ surface or, finished graded ~~surface~~, ~~or~~ subgrade as required by the Plans in the immediate vicinity by suitable mechanical compactors weighing less than 1,000 pounds. The Contractor may compact backfill located more than 15 feet away from the exterior periphery of the footing with heavier compactors. Do not place backfill

on the footing until the Engineer has given permission and until the concrete is at least seven days old.

When the plans indicate spread footing abutments on mechanically stabilized earth (MSE) walls, place and compact the backfill material underneath the footing in accordance with the requirements of 548-8.5. Meet the density requirements of 548-9.4.

**SECTION 1  
DEFINITIONS AND TERMS  
(REV 11-10-21)**

ARTICLE 1-3 is deleted and the following substituted:

**1-3 Definitions.**

The following terms, when used in the Contract Documents, have the meaning described

**Advertisement.**

The public announcement, as required by law, inviting bids for work to be performed or materials to be furnished, usually issued as “Notice to Contractors,” or “Notice to Bidders.”

**Article.**

The numbered prime subdivision of a Section of these Specifications.

**Bidder.**

An individual, firm, or corporation submitting a proposal for the proposed work.

**Bridge.**

A structure, including supports, erected over a depression or over an obstruction such as water, highway or railway, or for elevated roadway, for carrying traffic or other moving loads, and having a length, measured along the center of the roadway, of more than 20 feet between the inside faces of end supports. A multiple-span box culvert is considered a bridge, where the length between the extreme ends of the openings exceeds 20 feet.

**Calendar day.**

Every day shown on the calendar, ending and beginning at midnight.

**Contract.**

The term “Contract” means the entire and integrated agreement between the parties thereunder and supersedes all prior negotiations, representations, or agreements, either written or oral. The Contract Documents form the Contract between the Department and the Contractor setting forth the obligations of the parties thereunder, including, but not limited to, the performance of the Work and the basis of payment.

**Contract Bond.**

The security furnished by the Contractor and the surety as a guaranty that the Contractor shall fulfill the terms of the Contract and pay all legal debts pertaining to the construction of the project.

**Contract Claim (Claim).**

A written demand submitted to the Department by the Contractor in compliance with 5-12.3 seeking additional monetary compensation, time, or other adjustments to the Contract, the entitlement or impact of which is disputed by the Department.

**Contract Documents.**

The term “Contract Documents” includes: Advertisement for Proposal, Proposal, Certification as to Publication and Notice of Advertisement for Proposal, Appointment of Agent by Nonresident Contractors, Noncollusion Affidavit, Warranty Concerning Solicitation of the Contract by Others, Resolution of Award of Contract, Executed Form of Contract, Performance Bond and Payment Bond, Specifications, Plans (including revisions thereto issued during construction), Estimated Quantities Report, Standard Plans, Addenda, or other information mailed or otherwise transmitted to the prospective bidders prior to the receipt of bids, work orders and supplemental agreements, all of which are to be treated as one instrument whether or not set forth at length in the form of contract.

Note: As used in Sections 2 and 3 only, Contract Documents do not include work orders, and supplementary agreements. As used in Section 2 only, Contract Documents also do not include Resolution of Award of Contract, Executed Form of Contract, and Performance and Payment Bond.

**Contract Letting.**

The date that the Department opened the bid proposals.

**Contract Time.**

The number of calendar days allowed for completion of the Contract work, including authorized time extensions.

**Contractor.**

The individual, firm, joint venture, or company contracting with the Department to perform the work.

**Contractor’s Engineer of Record.**

A Professional Engineer registered in the State of Florida, other than the Engineer of Record or his subcontracted consultant, who undertakes the design and drawing of components of the permanent structure as part of a redesign or Cost Savings Initiative Proposal, or for repair designs and details of the permanent work. The Contractor’s Engineer of Record may also serve as the Specialty Engineer.

The Contractor’s Engineer of Record must be an employee of a pre-qualified firm. The firm shall be pre-qualified in accordance with the Rules of the Department of Transportation, Chapter 14-75. Any Corporation or Partnership offering engineering services must hold a Certificate of Authorization from the Florida Department of Business and Professional Regulation.

As an alternate to being an employee of a pre-qualified firm, the Contractor’s Engineer of Record may be a Department-approved Specialty Engineer. For items of the permanent work declared by the State Construction Office to be “major” or “structural”, the work performed by a Department-approved Specialty Engineer must be checked by another Department-approved Specialty Engineer. An individual Engineer may become a Department-approved Specialty Engineer if the individual meets the Professional Engineer experience requirements set forth within the individual work groups in Chapter 14-75, Rules of the Department of Transportation, Florida Administrative Code. Department-approved Specialty Engineers are listed on the State Construction Website. Department-approved Specialty Engineers will not be authorized to perform redesigns or Cost Savings Initiative Proposal designs of items fully detailed in the Plans.



**Controlling Work Items.**

The activity or work item on the critical path having the least amount of total float. The controlling item of work will also be referred to as a Critical Activity.

**Culverts.**

Any structure not classified as a bridge that provides an opening under the roadway.

**Delay.**

Any unanticipated event, action, force or factor which extends the Contractor's time of performance of any controlling work item under the Contract. The term "delay" is intended to cover all such events, actions, forces or factors, whether styled "delay", "disruption", "interference", "impedance", "hindrance", or otherwise, which are beyond the control of and not caused by the Contractor, or the Contractor's subcontractors, materialmen, suppliers or other agents. This term does not include "extra work".

**Department.**

State of Florida Department of Transportation.

**Developmental Specification.**

See definition for Specifications.

**Engineer.**

The Director, Office of Construction, acting directly or through duly authorized representatives; such representatives acting within the scope of the duties and authority assigned to them.

Note: In order to avoid cumbersome and confusing repetition of expressions in these Specifications, it is provided that whenever anything is, or is to be done, if, as, or, when, or where "acceptable, accepted, approval, approved, authorized, condemned, considered necessary, contemplated, deemed necessary, designated, determined, directed, disapproved, established, given, indicated, insufficient, ordered, permitted, rejected, required, reserved, satisfactory, specified, sufficient, suitable, suspended, unacceptable, or unsatisfactory," it shall be understood as if the expression were followed by the words "by the Engineer," "to the Engineer," or "of the Engineer."

**Engineer of Record.**

The Professional Engineer or Engineering Firm registered in the State of Florida that develops the criteria and concept for the project, performs the analysis, and is responsible for the preparation of the Plans and Specifications. The Engineer of Record may be Departmental in-house staff or a consultant retained by the Department.

The Contractor shall not employ the Engineer of Record as the Contractor's Engineer of Record or as a Specialty Engineer.

**Equipment.**

The machinery and equipment, together with the necessary supplies for upkeep and maintenance thereof, and all other tools and apparatus necessary for the construction and acceptable completion of the work.

**Estimated Quantities Report.**

The Estimated Quantities Report contains pay item and quantity information for the project. When the Plans do not adequately describe quantity related information, refer to the Estimated Quantities Report.

**Extra Work.**

Any “work” which is required by the Engineer to be performed and which is not otherwise covered or included in the project by the existing Contract Documents, whether it be in the nature of additional work, altered work, deleted work, work due to differing site conditions, or otherwise. This term does not include a “delay”.

**Federal, State, and Local Rules and Regulations.**

The term “Federal, State and Local Rules and Regulations” includes: any and all Federal, State, and Local laws, bylaws, ordinances, rules, regulations, orders, permits, or decrees including environmental laws, rules, regulations, and permits.

**Highway, Street, or Road.**

A general term denoting a public way for purposes of vehicular travel, including the entire area within the right-of-way.

**Holidays.**

Days designated by the State Legislature or Cabinet as holidays, which include, but are not limited to, New Year’s Day, Martin Luther King’s Birthday, Memorial Day, Independence Day, Labor Day, Veterans’ Day, Thanksgiving Day and the following Friday, and Christmas Day.

**Inspector.**

An authorized representative of the Engineer, assigned to make official inspections of the materials furnished and of the work performed by the Contractor.

**Laboratory.**

The official testing laboratory used by the Department.

**Major Item of Work.**

Any item of work having an original Contract value in excess of 5% of the original Contract amount.

**Materials.**

Any substances to be incorporated in the work under the Contract.

**Median.**

The portion of a divided highway or street separating the traveled ways for traffic moving in opposite directions.

**Plans.**

The plans sheets and digital models (2D and 3D) provided as contract documents, including reproductions thereof, showing the location, character, dimensions, and details of the work.

~~The approved Plans, including reproductions thereof, showing the location, character, dimensions, and details of the work.~~

**Proposal (Bid, Bid Proposal).**

The offer of a bidder, on the prescribed form, to perform the work and to furnish the labor and materials at the prices quoted.

**Proposal Form.**

The official form or the electronically generated bid item sheets on which the Department requires formal bids to be prepared and submitted for the work.

**Proposal Guaranty.**

The security furnished by the bidder as guaranty that the bidder will enter into the Contract for the work if the Department accepts the proposal.

**Request for Correction.**

A document initiated by the Contractor proposing a method for correction of work that is not in compliance with the Contract Documents. The Request for Correction is submitted to the Engineer for review and disposition.

**Request for Information.**

A document initiated by the Contractor that is submitted to the Engineer for interpretation of a Contract Document provision, the meaning of which is not clear to the Contractor. The Request for Information is submitted to the Engineer for review and disposition.

**Request for Modification.**

A document initiated by the Contractor requesting to modify the Contract Documents, that is submitted to the Engineer for review and disposition.

**Right-of-Way.**

The land that the Department has title to, or right of use, for the road and its structures and appurtenances, and for material pits furnished by the Department.

**Roadbed.**

The portion of the roadway occupied by the subgrade and shoulders.

**Roadway.**

The portion of a highway within the limits of construction.

**Secretary.**

Secretary of Transportation, State of Florida Department of Transportation, acting directly or through an assistant or other representative authorized by him; the chief officer of the Department of Transportation.

**Section.**

A numbered prime division of these Specifications.

**Special Event.**

Any event, including but not limited to, a festival, fair, run or race, motorcade, parade, civic activity, cultural activity, charity or fund drive, sporting event, or similar activity designated in the Contract Documents.

**Special Provisions.**

See definition for Specifications.

**Specialty Engineer.**

A Professional Engineer registered in the State of Florida, other than the Engineer of Record or his subcontracted consultant, who undertakes the design and drawing preparation of components, systems, or installation methods and equipment for specific temporary portions of the project work or for special items of the permanent works not fully detailed in the Plans and required to be furnished by the Contractor. The Specialty Engineer may also provide designs and details, repair designs and details, or perform Engineering Analyses for items of the permanent work declared by the State Construction Office to be “minor” or “non-structural”.

For items of work not specifically covered by the Rules of the Department of Transportation, a Specialty Engineer is qualified if he has the following qualifications:

1. Registration as a Professional Engineer in the State of Florida.
2. The education and experience necessary to perform the submitted design as required by the Florida Department of Business and Professional Regulation.

**Specifications.**

The directions, provisions, and requirements contained herein, together with all stipulations contained in the Contract Documents, setting out or relating to the method and manner of performing the work, or to the quantities and qualities of materials and labor to be furnished under the Contract.

Standard Specifications: “Standard Specifications for Road and Bridge Construction” an electronic book, applicable to all Department Contracts containing adopted requirements, setting out or relating to the method or manner of performing work, or to the quantities and qualities of materials and labor.

Supplemental Specifications: Approved additions and revisions to the Standard Specifications, applicable to all Department Contracts.

Special Provisions: Specific clauses adopted by the Department that add to or revise the Standard Specifications or supplemental specifications, setting forth conditions varying from or additional to the Standard Specifications applicable to a specific project.

Technical Special Provisions: Specifications, of a technical nature, prepared, signed, and sealed by an Engineer registered in the State of Florida other than the State Specifications Engineer or his designee, that are made part of the Contract as an attachment to the Contract Documents.

Developmental Specification: A specification developed around a new process, procedure, or material.

**Standard Plans.**

“Standard Plans for Road and Bridge Construction”, an electronic book describing and detailing aspects of the Work. Where the term Design Standards appears in the Contract Documents, it will be synonymous with Standard Plans.

**Standard Specifications.**

See definition for Specifications.

**State.**

State of Florida.

**Subarticle.**

A headed and numbered subdivision of an Article of a Section of these Specifications.

**Subgrade.**

The portion of the roadbed immediately below the base course or pavement, including below the curb and gutter, valley gutter, shoulder and driveway pavement. The subgrade limits ordinarily include those portions of the roadbed shown in the Plans to be constructed to a design bearing value or to be otherwise specially treated. Where no limits are shown in the Plans, the subgrade section extends to a depth of 12 inches below the bottom of the base or pavement and outward to 6 inches beyond the base, pavement, or curb and gutter.

**Substructure.**

All of that part of a bridge structure below the bridge seats, including the parapets, backwalls, and wingwalls of abutments.

**Superintendent.**

The Contractor's authorized representative in responsible charge of the work.

**Superstructure.**

The entire bridge structure above the substructure, including anchorage and anchor bolts, but excluding the parapets, backwalls, and wingwalls of abutments.

**Supplemental Agreement.**

A written agreement between the Contractor and the Department, and signed by the surety, modifying the Contract within the limitations set forth in these Specifications.

**Supplemental Specifications.**

See definition for Specifications.

**Surety.**

The corporate body that is bound by the Contract Bond with and for the Contractor and responsible for the performance of the Contract and for payment of all legal debts pertaining thereto.

**Technical Special Provisions.**

See definition for Specifications.

**Traveled Way.**

The portion of the roadway for the movement of vehicles, exclusive of shoulders and bicycle lanes.

### **Unilateral Payment.**

A payment of money made to the Contractor by the Department pursuant to Section 337.11(12), Florida Statutes (2009), for sums the Department determines to be due to the Contractor for work performed on the project, and whereby the Contractor by acceptance of such payment does not waive any rights the Contractor may otherwise have against the Department for payment of any additional sums the Contractor claims are due for the work.

### **Work.**

All labor, materials and incidentals required to execute and complete the requirements of the Contract including superintendence, use of equipment and tools, and all services and responsibilities prescribed or implied.

### **Work Order.**

A written agreement between the Contractor and the Department modifying the Contract within the limitations set forth in these Specifications. Funds for this agreement are drawn against the Initial Contingency Pay Item or a Contingency Supplemental Agreement.

### **Working Day.**

Any calendar day on which the Contractor works or is expected to work in accordance with the approved work progress schedule.

## **SECTION 5 CONTROL OF THE WORK (REV 11-10-21)**

SUBARTICLE 5-1.2 is deleted and the following substituted:

**5-1.2 Department's Plans:** Plans consist of general drawings showing such details as are necessary to give a comprehensive idea of the construction contemplated. In general, roadway plans will show alignment, profile grades, typical ~~cross-sections~~ and general ~~cross-sections~~ plan view details. Cross sectional views maybe provided or created from provided surface models. In general, structure plans will show in detail all dimensions of the work contemplated. When the structure plans do not show the dimensions in detail, they will show general features and such details as are necessary to give a comprehensive idea of the structure.

~~Grades~~ Elevations ~~shown are finished grades,~~ and B.M. Datum ~~shown are is~~ North American Vertical Datum 1988 (NAVD-1988), National Geodetic Vertical Datum of 1929 (NGVD-1929), or other datum as noted in the Plans.

The existing surface is a combination of the following:

1. The natural ground or the original ground line,
2. The bottom of the existing pavement,
3. The bottom of existing features removed by clearing and grubbing,
4. The bottom of the existing base, if the base is to be removed,

The finished graded surface includes the completed grades of side slopes, unpaved shoulders, and the bottom of the base for flexible or rigid pavement.

ARTICLE 5-3 is deleted and the following substituted:

### **5-3 Conformity of Work with Contract Documents.**

Perform all work and furnish all materials in reasonably close conformity with the lines, grades, ~~models~~ ~~cross-sections~~, dimensions, and material requirements, including tolerances, as specified in the Contract Documents.

In the event that the Engineer finds that the Contractor has used material or produced a finished product that is not in reasonably close conformity with the Contract Documents, but that the Contractor has produced reasonably acceptable work, the Engineer will determine if the Department will accept the work in place. In this event, the Engineer will document the basis of acceptance by Contract modification, which provides for an appropriate reduction in the Contract price for such work or materials included in the accepted work as deemed necessary to conform to the determination based on engineering judgment.

In the event that the Engineer finds that the Contractor has used material or produced a finished product that is not in reasonably close conformity with the Contract Documents, and that the Contractor has produced an inferior or unsatisfactory product, the Contractor shall remove and replace or otherwise correct the work or materials at no expense to the Department.

For base and surface courses, the Department will allow the finished grade to vary as much as 0.1 foot from the grade shown in the Plans, provided that the Contractor's work meets all templates and straightedge requirements and contains suitable transitions.

## **SECTION 9 MEASUREMENT AND PAYMENT (REV 11-10-21)**

SUBARTICLE 9-3.2.1 is deleted and the following substituted:

**9-3.2.1 Error in Plan Quantity:** As used in this Article, the term "substantial error" is defined as the smaller of (1) or (2) below:

1. a difference between the original plan quantity and final quantity of more than 5%,
2. a change in quantity which causes a change in the amount payable of more than \$5,000.

On multiple job Contracts, changes made to an individual pay item due to substantial errors will be based on the entire Contract quantity for that pay item.

Where the pay quantity for any item is designated to be the original plan quantity, the Department will revise such quantity only in the event that the Department determines it is in substantial error. In general, the Department will determine such revisions by final measurement, plan calculations, or both, as additions to or deductions from plan quantities.

In the event that either the Department or the Contractor contends that the plan quantity for any item is in error and additional or less compensation is thereby due, the claimant shall submit, at their own expense, evidence of such in the form of acceptable and verifiable measurements or calculations. The Department will not revise the plan quantity solely

on the basis of a particular method of construction that the Contractor selects. For earthwork items, the claimant must note any differences in the ~~existing original ground~~ surfaces from that shown in the ~~original Plan cross-sections~~ Plans that would result in a substantial error to the plan quantity, and must be properly documented by appropriate verifiable level notes, acceptable to both the Contractor and the Department, prior to disturbance of the ~~existing original ground~~ surface by construction operations. The claimant shall support any claim based upon a substantial error for differences in the ~~existing original ground~~ surface by documentation as provided above.

**SECTION 125**  
**EXCAVATION FOR STRUCTURES AND PIPE**  
**(REV 11-10-21)**

SUBARTICLE 125-4.4 is deleted and the following substituted:

**125-4.4 Pipe Trench Excavation:** Excavate trenches for pipes to the elevation of the bottom of the pipe and to a width sufficient to provide adequate working room. Remove soil not meeting the classification specified as suitable backfill material in 125-8.3.2.2, to a depth of 4 inches below the bottom of the pipe elevation. Where the soils permit, ensure that the trench sides are vertical up to at least the mid-point of the pipe.

For pipe lines placed above the ~~natural ground line~~ existing surface, place and compact the embankment, prior to excavation of the trench, to an elevation at least 2 feet above the top of the pipe and to a width equal to four pipe diameters, and then excavate the trench to the required grade.

For pipe trenches utilizing trench boxes, ensure that the trench box used is of sufficient width to permit thorough tamping of bedding material under and around the pipes as specified in 125-8.1.6.

Do not disturb the installed pipe and its embedment when moving trench boxes. Move the trench box carefully to avoid excavated wall displacement or damage. As the trench box is moved, fill any voids left by the trench box and continuously place and compact the backfill material adjacent to and all along the side of the trench box walls to fill any voids created by the trench box.

SUBARTICLE 125-5.1 is deleted and the following substituted:

**125-5.1 General:** Unless shown in the Plans, do not excavate outside of caissons, cribs, cofferdams, or sheet piling, and do not disturb the natural stream bed adjacent to the structure. If excavating or dredging at the site of the structure before sinking caissons, cribs, or cofferdams, complete the foundation and backfill all such excavations to the ~~original ground line~~ existing surface or other required elevation, with material satisfactory to the Engineer.



SUBARTICLE 125-8.1.3 is deleted and the following substituted:

**125-8.1.3 Backfill Materials:** Backfill to the ~~original ground line~~existing surface or subgrade surface of openings made for structures, with a sufficient allowance for settlement. The Engineer may require that the material used for this backfill be obtained from a source entirely apart from the structure. Use only material accepted by the Engineer. Maintain a clearance of at least 1 foot of clean select soil between recycled concrete aggregate (RCA) and aluminum or metalized drainage pipe.

Do not allow heavy construction equipment to cross over culvert or storm sewer pipes until placing and compacting backfill material to the finished ~~earthwork~~ graded surface or to an elevation at least 4 feet above the crown of the pipe.

## **SECTION 145 GEOSYNTHETIC REINFORCEMENT (REV 11-10-21)**

SUBARTICLE 145-4.3.1 is deleted and the following substituted:

### **145-4.3 Reinforced Foundations Constructed on Soft In-Situ Soils:**

**145-4.3.1 Preparation:** For some applications involving reinforcement of soft insitu soils, the Engineer may require that some vegetation be left in place. If directed in the Plans or by the Engineer, cut trees to within 6 inches of the ~~ground line~~existing surface, and leave the stumps in place. Remove fallen trunks, limbs, etc. greater than 3 inches in diameter.

SUBARTICLE 145-8.1 is deleted and the following substituted:

**145-8.1 Geosynthetic Reinforced Soil Slopes:** The quantity to be paid for will be the plan quantity area, in square feet, of the projected vertical height of the slope face, measured from the top of slope to the ~~proposed final~~ finished ground linegraded surface at the toe of slope and from the beginning to end limits as shown in the Plans, regardless of the length or number of layers of geosynthetic within the reinforced volume and including any reinforcement required below the toe of slope elevation.

## **SECTION 160 STABILIZING (REV 11-10-21)**

SUBARTICLE 160-3.1 is deleted and the following substituted:

### **160-3 Construction Methods.**

**160-3.1 General:** Prior to the beginning of stabilizing operations, construct the area to be stabilized to an elevation such that, upon completion of stabilizing operations, the completed

stabilized subgrade will conform to the lines ~~and, grades, and cross-section~~ shown in the Plans. Prior to spreading any additive stabilizing material, bring the surface of the roadbed to a plane approximately parallel to the plane of the ~~proposed~~ finished graded surface shown in the Plans.

Construct mainline pavement lanes, turn lanes, ramps, parking lots, concrete box culverts, retaining wall systems, shoulder-only areas, sidewalk, and shared use path areas meeting the requirements of 120-8.1, except replace “embankment” with “subgrade”.

Isolated mixing operations will be considered as separate LOTS. Curb pads and shoulders compacted separately shall be considered separate LOTS. Isolated compaction operations will be considered as separate LOTS. For multiple phase construction, a LOT shall not extend beyond the limits of the phase.

SUBARTICLE 160-3.4.3 is deleted and the following substituted:

**160-3.4.3 Finish Grading:** Shape the completed stabilized subgrade to conform with the finished graded lines, grades, and cross-section surface shown ~~indicated~~ in the Plans. Check the subgrade using elevation stakes or other means approved by the Engineer.

## **SECTION 200 ROCK BASE (REV 11-10-21)**

SUBARTICLE 200-6.1.1 is deleted and the following substituted:

**200-6.1.1 Single Course Base:** After spreading, scarify the entire surface, then shape the base to produce the required grade and cross-~~section~~ slope, free of scabs and laminations, after compaction.

SUBARTICLE 200-6.1.2 is deleted and the following substituted:

**200-6.1.2 Multiple Course Base:** Clean the first course of foreign material, then blade and bring it to a surface cross-~~section~~ slope approximately parallel to the finished base. Before spreading any material for the upper courses, allow the Engineer to make density tests for the lower courses to determine that the required compaction has been obtained. After spreading the material for the top course, scarify finish and shape its surface to produce the required grade and cross-~~section~~ slope, free of scabs and laminations, after compaction.

ARTICLE 200-9 is deleted and the following substituted:

### **200-9 Calculations for Average Thickness of Base.**

For bases that are not mixed in place, the Engineer will determine the average thickness from the measurements specified in 200-10.1, calculated as follows:

1. When the measured thickness is more than 1/2 inch greater than the design thickness shown on the typical ~~cross~~-section in the Plans, it will be considered as the design thickness plus 1/2 inch.

2. Average thickness will be calculated per typical ~~cross~~-section for the entire job as a unit.

3. Any areas of base left in place with no payment will not be included in the calculations.

4. Where it is not possible through borings to distinguish the base materials from the underlying materials, the thickness of the base used in the measurement will be the design thickness.

**SECTION 230  
LIMEROCK STABILIZED BASE  
(REV 11-10-21)**

ARTICLE 230-4 is deleted and the following substituted:

**230-4 Preparation of Roadbed.**

Complete the area to be stabilized to the lines shown in the Plans and to a grade parallel to the finished elevation of the stabilized base, before adding the stabilizing material. Ensure that the elevation of the roadbed is such that the base will conform to the typical ~~cross~~-section upon completing the work. Dispose of any surplus excavated materials resulting from this work, as specified in 120-5.

SUBARTICLE 230-5.4 is deleted and the following substituted:

**230-5.4 Shaping Surface:** After mixing, shape the surface so it conforms to the grade and typical ~~cross~~-section shown in the Plans after compacting.

**SECTION 285  
OPTIONAL BASE COURSE  
(REV 11-10-21)**

ARTICLE 285-1 is deleted and the following substituted:

**285-1 Description.**

Construct a base course composed of one of the optional materials shown on the typical ~~cross~~-sections.

ARTICLE 285-3 is deleted and the following substituted:

**285-3 Selection of Base Option.**

The Plans will include typical ~~cross~~-sections indicating the various types of base construction (material and thickness) allowable.

When base options are specified in the Plans, use only those options. When base options are not specified, select one base option as allowed for each ~~typical cross-section~~ typical section shown in the Plans. Only one base option is permitted for each typical ~~cross~~-section. See Tables 285-1 and 285-2 for optional base materials, thickness and additional restrictions.

Notify the Engineer in writing of the base option selected for each ~~typical cross-section~~ typical section at least 45 calendar days prior to beginning placement of base material.

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 <sup>(1)</sup>	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" <sup>(3)</sup>	4" <sup>(3)</sup>	4" <sup>(3)</sup>	4" <sup>(3)</sup>	4-1/2"	5"	5-1/2"
B-12.5 and 4" Granular Subbase, LBR 100 <sup>(2)</sup>	-	-	-	-	-	-	-
RAP Base <sup>(4)</sup>	5" <sup>(4)</sup>	-	-	-	-	-	-

(1) Do not use on interstate roadways.  
(2) The construction of both the subbase and Type B-12.5 will be bid and used as Optional Base. Granular subbases include limerock, cemented coquina, shell rock, bank run shell, recycled concrete aggregate and graded aggregate base. All subbase thicknesses are 4" minimum prior to adding the required prime coat.  
(3) Based on minimum practical thickness.  
(4) Only for use on non-limited access paved shoulders, shared use paths, or other non-traffic bearing applications.  
(5) To be used for widening, three feet or less.

Table 285-1(continued) Optional Base Groups 8 through 15								
Base Materials	Base Group (Base Group Pay Item)							
	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" <sup>(5)</sup>	14" <sup>(5)</sup>	-
Cemented Coquina, LBR 100	9-1/2"	10"	11"	12"	12-1/2"	13-1/2" <sup>(5)</sup>	14" <sup>(5)</sup>	-
Shell Rock, LBR 100	9-1/2"	10"	11"	12"	12-1/2"	13-1/2" <sup>(5)</sup>	14" <sup>(5)</sup>	-

Table 285-1(continued) Optional Base Groups 8 through 15								
Base Materials	Base Group (Base Group Pay Item)							
	8 (708)	9 (709)	10 (710)	11 (711)	12 (712)	13 (713)	14 (714)	15 (715)
Bank Run Shell, LBR 100	9-1/2"	10"	11"	12"	12-1/2"	13-1/2" <sup>(5)</sup>	14 <sup>(5)</sup>	-
Recycled Concrete Aggregate, LBR 150 <sup>(1)</sup>	9-1/2"	10"	11"	12"	12-1/2"	13-1/2" <sup>(5)</sup>	14" <sup>(5)</sup>	-
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 <sup>(2)</sup>	-	4"	4-1/2"	5"	5-1/2"	6"	6-1/2"	7"
RAP Base <sup>(4)</sup>	-	-	-	-	-	-	-	-

(1) Do not use on interstate roadways.  
(2) The construction of both the subbase and Type B-12.5 will be bid and used as Optional Base. Granular subbases include limerock, cemented coquina, shell rock, bank run shell, recycled concrete aggregate and graded aggregate base. All subbase thicknesses are 4" minimum prior to adding the required prime coat.  
(3) Based on minimum practical thickness.  
(4) Only for use on non-limited access paved shoulders, shared use paths, or other non-traffic bearing applications.  
(5) To be used for widening, three feet or less.

Table 285-2: Limited Use Optional Base Groups <sup>(1)</sup>								
Base Materials	Base Group (Base Group Pay Item)							
	101 (701)	102 (702)	103 (703)	104 (704)	105 (705)	106 (706)	107 (707)	108 (708)
Limerock Stabilized, LBR 70	5"	6-1/2"	8"	9"	10"	11"	12-1/2"	-
Shell, LBR 70	5"	6-1/2"	8"	9"	10"	11"	12-1/2"	-
Shell Stabilized, LBR 70	7"	8-1/2"	9-1/2"	10-1/2"	12"	-	-	-
Sand-Clay, LBR 75	5"	6-1/2"	8"	9"	10"	11"	12-1/2"	-
Soil Cement (300 psi) (Plant Mixed)	5"	5-1/2"	6-1/2"	7-1/2"	8-1/2"	9"	10"	11"
Soil Cement (300 psi) (Road Mixed)	5"	5-1/2"	6-1/2"	7-1/2"	8-1/2"	-	-	-
Soil Cement (500 psi) (Plant Mixed)	4" <sup>(2)</sup>	4"	5"	5-1/2"	6"	7"	7-1/2"	8-1/2"

(1) Use only when specified in the Plans.  
(2) Based on minimum practical thicknesses.

ARTICLE 285-7 is deleted and the following substituted:

**285-7 Calculation of Average Thickness of Base.**

For bases that are not mixed in place, the Engineer will determine the average thickness from the measurements specified in 285-6.1, calculated as follows:

1. When the measured thickness is more than 1/2 inch greater than the design thickness shown on the ~~typical cross-section~~ typical section in the Plans, it will be considered as the design thickness plus 1/2 inch.

2. Average thickness will be calculated per ~~typical cross-section~~ typical section for the entire job as a unit.

3. Any areas of base left in place with no payment will not be included in the calculations.

4. Where it is not possible through borings to distinguish the base materials from the underlying materials, the thickness of the base used in the measurement will be the design thickness.

5. For Superpave asphalt base course, the average spread rate of each course shall be constructed in compliance with 234-8.

ARTICLE 285-9 is deleted and the following substituted:

### **285-9 Basis of Payment.**

Price and payment will be full compensation for all work specified in this Section, including tack coat between base layers, prime coat, cover material for prime coat, bituminous material used in bituminous plant mix, and cement used in soil-cement.

For superpave asphalt base course, a pay adjustment based upon the quality of the material will be applied in accordance with 334-8.

Where the Plans include a ~~typical cross-section~~ typical section which requires the construction of an asphalt base only, price adjustments for bituminous material provided for in 9-2.1.2 will apply to that typical ~~cross-section~~. For typical ~~cross-sections~~ which permit the use of asphalt or other materials for construction of an optional base, price adjustments for bituminous material provided for in 9-2.1.2 will not apply.

Payment will be made under:

Item No. 285- 7-      Optional Base - per square yard.

## **SECTION 286 DRIVEWAY BASE (REV 11-10-21)**

ARTICLE 286-4 is deleted and the following substituted:

### **286-4 Spreading, Compacting, and Finishing Base.**

Uniformly spread base material over the prepared area to a depth which will, upon completion of compaction and finishing, result in driveway base conforming with the specified lines and elevations. Then, strike off the base material to a plane paralleling the finished surface, and compact it in a manner similar to that used in the construction of roadway base. The Engineer will not require any specific density.

Finish the surface to the specified grade and ~~cross-section~~ slope.

**SECTION 327**  
**MILLING OF EXISTING ASPHALT PAVEMENT**  
**(REV 11-10-21)**

SUBARTICLE 327-3.1 is deleted and the following substituted:

**327-3 Construction.**

**327-3.1 General:** Remove the existing raised pavement markers (RPMs) before milling. Include the cost of removing existing RPMs in the price for milling.

When milling to improve rideability or cross slope, remove the existing pavement to the average depth specified in the Plans, in a manner that will restore the pavement surface to a uniform cross ~~section~~ slope and longitudinal profile. The Engineer may require the use of a stringline to ensure maintaining the proper alignment.

Establish the longitudinal profile of the milled surface in accordance with the milling plans. Ensure the final cross slope of the milled surface parallels the surface cross slope shown in the Plans or as directed by the Engineer. Establish the cross slope of the milled surface by a second sensing device near the outside edge of the cut or by an automatic cross slope control mechanism. The Plans may waive the requirement of automatic grade or cross slope controls where the situation warrants such action.

Operate the milling machine to minimize the amount of dust being emitted. The Engineer may require prewetting of the pavement.

Provide positive drainage of the milled surface and the adjacent pavement. Perform this operation on the same day as milling. Pave all milled surfaces no later than the day after the surface was milled.

If traffic is to be maintained on the milled surface before the placement of the new asphalt concrete, provide suitable transitions between areas of varying thickness to create a smooth longitudinal riding surface. Control milling operations to produce a pattern of striations and a texture that provide an acceptable riding surface.

Before opening an area which has been milled to traffic, sweep the pavement and gutters with a power broom or other approved equipment to remove, to the greatest extent practicable, fine material which will create dust under traffic. Sweep in a manner to minimize the potential for creation of a traffic hazard and to minimize air pollution. Do not sweep or allow milled asphalt into inlets.

Sweep the milled surface with a power broom before placing asphalt concrete.

In urban and other sensitive areas, use a street sweeper or other equipment capable of removing excess milled materials and controlling dust. Obtain the Engineer's approval of such equipment, contingent upon its demonstrated ability to do the work.

Perform the sweeping operation immediately after the milling operations or as directed by the Engineer.

**SECTION 330  
HOT MIX ASPHALT -  
GENERAL CONSTRUCTION REQUIREMENTS  
(REV 11-10-21)**

SUBARTICLE 330-5.2.1 is deleted and the following substituted:

**330-5.2 Asphalt Paver:**

**330-5.2.1 General:** Provide a self-propelled asphalt paver that can be steered, and is equipped with a receiving and distribution hopper and a mechanical screed. Use a mechanical screed capable of adjustment to regulate the depth of material spread and to produce the desired cross-section slope.

When asphalt mix is placed in windrows, operate windrow pickup equipment so substantially all of the mixture deposited on the roadbed is picked up and loaded into the paver. Prevent the windrow pickup equipment from contaminating the mixture.

**SECTION 339  
MISCELLANEOUS ASPHALT PAVEMENT  
(REV 11-10-21)**

ARTICLE 339-3 is deleted and the following substituted:

**339-3 Foundation and Soil Treatment.**

Shape the soil in areas where pavement is to be constructed, to a surface true to the lines, grades and typical cross-sections shown in the Plans. Compact the soil to a firm state.

Immediately before placing the pavement, uniformly apply a pre-emergent herbicide in accordance with the requirements of 7-1.7, to the foundation soil. Ensure that the herbicide carries an approved label for use under paved surfaces, and that herbicide is applied in accordance with directions on the label.

Prevent damage to any adjacent vegetation during herbicide application. Replace, at no expense to the Department, any plants damaged as the result of soil treatment outside designated areas.

**SECTION 350  
CEMENT CONCRETE PAVEMENT  
(REV 11-10-21)**

SUBARTICLE 350-15.1 is deleted and the following substituted:

**350-15 Thickness Determinations.**

**350-15.1 General:** After completing the concrete pavement, including any corrective work to meet ride requirement, determine the thickness by core boring or non-destructive testing. The Engineer will select the locations for testing and make the determination of thickness.



Sample locations will be taken at various ~~points on the cross-section~~ offsets from the centerline ~~such so~~ that each test represents an area not exceeding 2,500 square yards. Provide traffic control, non-destructive equipment, coring equipment, and operator to obtain the samples.

**SECTION 353**  
**CONCRETE PAVEMENT SLAB REPLACEMENT**  
**(REV 11-10-21)**

ARTICLE 353-7 is deleted and the following substituted:

**353-7 Placing, Striking Off, Consolidating and Finishing Concrete.**

The requirements of Section 350 are applicable to this Section.

Perform straightedging while the concrete is still in plastic state after floating is completed and the excess water removed. Furnish and operate a 10 foot straightedge meeting the requirements of Section 350. Hold the straightedge in successive positions parallel to the road centerline, in contact with the surface, testing until the replacement slab is straight edged from one side to the other. Advance along the road in successive stages of not more than one-half the length of the straightedge. Fill any depressions immediately with freshly mixed concrete, consolidate, strike-off, and refinish. Cut down and refinish any high areas. Continue straightedge testing and surface correction until the entire surface conforms to the required grade and cross ~~section~~ slope. Ensure that transverse slope deviations of the finished pavement do not exceed 1/8 inch with the straightedge laid in a direction perpendicular to the centerline. When ~~portland~~ 25ortland cement concrete pavement abuts bridge approaches or pavement not under this Contract, ensure that the longitudinal slope deviations of the finished pavement do not exceed 1/8 inch in 10 foot length. Produce a uniform, gritty textured final finish longitudinally along the pavement by dragging a broom or seamless strip of damp burlap, having at least 3 feet in contact with the pavement.

If the Engineer identifies a surface irregularity determined to be objectionable, straightedge with a 10 foot long straightedge and address all deficiencies in excess of 1/8 inch by grinding in accordance Section 352.

When required in the Contract Documents, produce a pavement surface that is true to grade and uniform in appearance with a longitudinal line type texture by grinding in accordance with Section 352.

**SECTION 400**  
**CONCRETE STRUCTURES**  
**(REV 11-10-21)**

ARTICLE 400-6 is deleted and the following substituted:

**400-6 Underdrain and Weep Holes.**

Provide weep holes in all abutments and retaining walls.

Provide a continuous underdrain for box culverts in accordance with Standard Plans, Index 400-289. Provide weep holes that are at least 3 inches in diameter and not more than 10 feet apart. Place the outlet ends of the weep holes just above the ~~ground line~~ finish graded surface in front of abutments and retaining walls. Cover the ~~inlet ends exterior openings~~ of all weep holes with galvanized wire mesh and a minimum of 2 cubic feet of clean, broken stone or gravel wrapped in Type D 3 filter fabric, to allow free drainage but prevent the fill from washing through.

SUBARTICLE 400-7.14 is deleted and the following substituted:

**400-7.14 Concrete Box Culverts:** In general, place the base slab or footing of concrete box culverts, and allow them to set before constructing the remainder of the culvert. In this case, make suitable provision for longitudinal keys. Construct bottom slabs, footings, and apron walls as a monolith if practicable. Where transverse construction joints are necessary, place them at right angles to the culvert barrel, and make suitable provision for keys.

In the construction of box culverts having walls 6 feet or less in height, the sidewalls and top slab may be constructed as a monolith or may place the concrete in the walls and allow it to set before placing the top slab concrete.

Where the height of the box culvert walls exceed 6 feet, place the walls, and allow the concrete to set at least 12 hours before placing the top slab concrete. In such cases, form keys in the sidewalls.

When casting the walls and top slabs of box culverts as a monolith, ensure that any necessary construction joints are vertical. Design all construction joints with formed keys. Provide keys that are beveled as shown in the Plans or as directed, but do not allow the edge of the beveled material forming the key to be less than 1 1/2 inches from the edge of the concrete.

Construct each wingwall, if possible, as a monolith. Ensure that construction joints, where unavoidable, are horizontal and so located that no joints will be visible in the exposed face of the wing above the ~~ground line~~ finished graded surface.

Precast box culvert sections may be used in lieu of cast-in-place box culvert construction provided the provisions in Section 410 are satisfied.

## **SECTION 407 THREE-SIDED PRECAST CONCRETE CULVERT (REV 11-10-21)**

ARTICLE 407-12 is deleted and the following substituted:

### **407-12 Construction Requirements.**

Prior to constructing the footing, prepare the bearing soil in accordance with Section 455 for spread footings. If a precast concrete footing is used, prepare a 4-inch-thick layer of compacted granular bedding material to a minimum width of 12 inches outside the footing width and meet the density requirements of 125-9.2. Provide bedding material in accordance with Standard Plans, Index 120-001 select material, with not more than 15% fines passing the No. 200 U.S. Standard sieve, or other granular material approved by the Engineer.

Accomplish all footing construction in dry or dewatered excavations, as defined in 455-29. When coarse aggregate is approved for use as an alternate bedding or foundation backfill material, fully wrap the coarse aggregate with a layer of Type D-4 geotextile filter fabric, as specified in Section 985. At each end of any concrete slab channel lining, substitute the coarse aggregate with select material within four feet of toe walls.

Form a 3 inches deep key in the top surface of the footing 4 inches wider than the wall thickness. Ensure that footings reach a compressive strength of 3,000 psi before placing precast units.

Place the units as shown in the shop drawings. Carefully set the structure to the true line and grade. Set the units in a bed of mortar placed in the keyway in the top of the footing. Fill the keyway with mortar, and float the mortar flush with the top of the footing or use shims between the footer and culvert during setting, then inject non-shrink grout under the culvert walls. Seal blockouts and holes provided for lifting or joint restraint by using an epoxy mortar or non-shrink grout in accordance with Sections 926 or 934.

Carefully place backfill against the filter fabric and joint seal to avoid damage to the material. Use mechanical tampers or approved compacting equipment to compact all backfill and embankment immediately adjacent to each side of the structure. Place the backfill within 4 feet of each side of the structure in lifts of 8 inches or less (loose depth). Do not operate heavy compaction equipment within 4 feet of the structure. Ensure that the backfill elevation differential between both sides of the structure does not exceed 24 inches. Backfill behind wingwalls in accordance with Section 125. Carry backfill in front of wingwalls to ~~the ground lines~~finished grade surface shown in the Plans.

## **SECTION 455 STRUCTURES FOUNDATIONS (REV 11-10-21)**

SUBARTICLE 455-2.10 is deleted and the following substituted:

**455-2.10 Disposition of Tested Piles/Shafts:** After completing testing, cut off the tested piles/shafts, which are not to be incorporated into the final structure, and any reaction piles/shafts at an elevation 24 inches below the finished ~~ground-graded~~ surface or as shown in the Plans. Take ownership of the cut-offs and provide areas for their disposal.

SUBARTICLE 455-5.9 is deleted and the following substituted:

**455-5.9 Penetration Requirements:** Measure the penetration of piles from the elevation of ~~the~~ natural ground, the existing surface, the deepest scour elevation shown in the Pile Data Table, or the bottom of excavation, whichever is lowest~~f~~. When the Contract Documents show a minimum pile tip elevation, drive the tip of the pile to this minimum elevation. The Engineer will accept the bearing of a pile only if the Contractor achieves the required bearing when the tip of

the pile is at or below the specified minimum tip elevation and below the bottom of the preformed or predrilled pile hole.

When the Plans do not show a minimum tip elevation, ensure that the penetration is at least 10 feet into firm bearing material or at least 20 feet into soft material unless otherwise permitted by the Engineer. The Engineer may accept a penetration between 15 feet and 20 feet when there is an accumulation of five consecutive feet or more of firm bearing material. Firm bearing material is any material offering a driving resistance greater than or equal to 30 tons per square foot of gross pile area as determined by the Dynamic Load Testing (455-5.12.4). Soft material is any material offering less than these resistances. The gross pile area is the actual pile tip cross-sectional area for solid concrete piles, the product of the width and depth for H piles, and the area within the outside perimeter for pipe piles and voided concrete piles.

Do not drive piles beyond practical refusal. To meet the requirements in this Subarticle, provide penetration aids, such as jetting or preformed pile holes, when piles cannot be driven to the required penetration without reaching practical refusal.

If the Contractor encounters unforeseeable, isolated obstructions that the Contractor cannot practically penetrate by driving, jetting, or preformed pile holes, and the Contractor must remove the pile to obtain the required pile penetration, the Department will pay the costs for such removal as Unforeseeable Work.

SUBARTICLE 455-11.12 is deleted and the following substituted:

**455-11.12 Preformed Pile Holes:** The quantity added to the payment for piling will be 30% of the length of completed preformed pile holes from existing ~~ground surface~~ or the bottom of any required excavation, whichever is lower, to the bottom of preformed hole acceptably provided, complete for the installation of the bearing piles, regardless of the type of pile (test pile or production pile) installed therein. Only those holes authorized to be paid for, as provided in 455-5.10.3, will be included in the measurement for payment. The Engineer will authorize payment for preformed pile holes only when the pile has been placed in proper position and has achieved the required penetration.

ARTICLE 455-18 is deleted and the following substituted:

**455-18 Method Shafts.**

The Engineer will use the construction of method shafts (test holes) to determine if the methods and equipment used by the Contractor are sufficient to produce a shaft excavation meeting the requirements of the Contract Documents. During method shaft excavations, the Engineer will evaluate the ability to control dimensions and alignment of excavations within tolerances; to seal the casing into impervious materials; to control the size of the excavation under caving conditions by the use of slurry or by other means; to properly clean the completed shaft excavation; to construct excavations in open water areas; to determine the elevation of ground water; to place reinforcing steel and concrete meeting the requirements of these Specifications within the prescribed time frame; and to execute any other necessary construction operation. Revise the methods and equipment as necessary at any time during the construction of the method shaft when unable to satisfactorily carry out any of the necessary operations

described above or when unable to control the dimensions and alignment of the shaft excavation within tolerances.

Construct method shafts out of permanent position at the location shown in the Plans or as directed by the Engineer. Ensure the diameter and depth of the method shaft or holes are the same diameter and maximum depth as the production drilled shafts. Reinforce the method shaft unless otherwise directed in the Contract Documents. Fill the method shaft with concrete in the same manner production drilled shafts will be constructed. Backfill method shaft which are not filled with concrete with suitable soil in a manner satisfactory to the Engineer. Leave concreted method shaft in place, except remove the top of the shaft to a depth of 2 feet below the ~~ground line~~finished graded surface. Use the same procedure for shafts constructed in water. Restore the disturbed areas at the sites of method shaft drilled out of position as nearly as practical to their original condition. When the Contractor fails to demonstrate to the Engineer the adequacy of his methods or equipment, and alterations are required, make appropriate modifications and provide additional test holes at no expense to the Department. Include the cost of all method shaft in the cost of the drilled shafts. Make no changes in methods or equipment after initial approval without the consent of the Engineer.

A separate method shaft is not required for drilled shafts installed under sign, signal, lighting and ITS structures. The first production shaft will serve as a method shaft for determining acceptability of the installation method.

SUBARTICLE 455-23.3 is deleted and the following substituted:

**455-23.3 Unclassified Shaft Excavation:** The quantity to be paid for will be the length, in feet, of unclassified shaft excavation of the diameter shown in the Plans, completed and accepted, measured along the centerline of the shaft from the ground surface elevation after any required excavation per 455-1.2 to the plan bottom of shaft elevation authorized and accepted plus up to 15 feet or 3 shaft diameters, whichever is deeper, of additional excavation as authorized by the Engineer. When drilled shafts are constructed through fills placed by the Contractor, the ~~original ground existing surface before the fill was placed~~ will be used to determine the quantity of unclassified shaft excavation. When the Contractor elects to use O.D. casing, the quantity as determined above will be multiplied by the factor "F" determined as described in 455-23.1.

ARTICLE 455-31 is deleted and the following substituted:

**455-31 Compaction and Density Requirements.**

Compact the bottom of the excavation with suitable equipment. Compact the soil beneath footing excavation (whether dug to the bottom of footing or over-excavated) to a density not less than 95% of the maximum density as determined by FM 1-T180, for a minimum depth of 2 feet below the bottom of the excavation or to the depth shown in the Plans before backfilling begins. For every 500 feet of excavation or isolated compaction operation, perform two Quality Control (QC) density tests with a 12 inch depth of measurement: one QC density test with the gauge placed at an elevation of 1 foot below the bottom of the excavation and one QC density test with the gauge placed at the bottom of the excavation in accordance with FM 1-T238. Compact the backfill in footing excavations which have been over-excavated to a density not less than 95% of

the maximum density as determined by FM 1-T180. Ensure that the maximum lift thickness after compaction does not exceed 6 inches. For every 500 feet of backfill or isolated compaction operation, perform at least one QC density test. The Engineer will conduct one density verification test per every 4 QC test, with a minimum of one density test below the bottom of the excavation and one density test in the backfill. Verification comparison criteria and resolution procedures will be in accordance with 120-10.4 except replace FM 1-T99 with FM 1-T180.

For compaction, use an approved heavy vibratory roller with a static drum weight of at least 4 tons. Compact each lift to the required density. Also, compact the final lift below the footing with a suitable sled vibratory compactor to remove any upper disturbance caused by the drum roller. When conditions require use of smaller compaction equipment, obtain the Engineer's approval for the equipment, and reduce the lift thickness to achieve the required density.

Perform backfilling to the ~~original ground existing~~ surface or, finished graded surface, ~~or subgrade~~ as required by the Plans in the immediate vicinity by approved mechanical compactors weighing less than 1,000 pounds. The Contractor may compact backfill located more than 15 feet away from the exterior periphery of the footing with heavier compactors. Do not place backfill on the footing until the Engineer has given permission and until the concrete is at least seven days old.

When the plans indicate spread footing abutments on mechanically stabilized earth (MSE) walls, place and compact the backfill material underneath the footing in accordance with the requirements of 548-8.5. Meet the density requirements of 548-9.4.

## **SECTION 524**

### **CONCRETE DITCH AND SLOPE PAVEMENT**

**(REV 11-10-21)**

ARTICLE 524-4 is deleted and the following substituted:

#### **524-4 Foundation.**

Shape and compact the foundation materials, upon which the pavement is to be constructed, to a firm, even surface, true to grade and cross slope ~~section~~.

Dispose of surplus material.

ARTICLE 524-7 is deleted and the following substituted:

#### **524-7 Finishing.**

Roughen the surface of ditch pavement after screeding concrete, unless otherwise specified, to the approximate shape and grade by a rake or other suitable tool drawn perpendicular to the direction of flow. Ensure that the furrows are at least 1/4 inch deep.

Strike off slope pavement or smooth surfaced ditch pavement, when specified, true to line and cross ~~section~~ slope, and remove all surplus water and laitance from the surface. Lightly broom the finish.

**SECTION 530**  
**REVETMENT SYSTEMS**  
**(REV 11-10-21)**

SUBARTICLE 530-3.5 is deleted and the following substituted:

**530-3.5 Articulating Concrete Block (ACB) Revetment System:** Install the ACB revetment system in accordance with ASTM D6884 and the manufacturer's recommendations, unless directed otherwise by the Engineer.

Prior to installation, construct the area to be stabilized to an elevation such that, upon completion of stabilizing operations, the completed stabilized subgrade will conform to the lines, grades and cross ~~sections~~ slope shown in the Plans. Bring the subgrade surface to a plane approximately parallel to the plane of the proposed finished surface, such that, upon placement of the mat, no individual block within the ACB mat will protrude more than one-half inch from any adjacent block. Uniformly compact each subgrade layer to achieve the density required in the Plans. If the Plans do not provide for stabilizing, compact the subgrade in both cuts and fills, to the density specified in ASTM D6884.

Embed anchors at least six feet into the subgrade at a 45 degree angle into the bank with a minimum pullout resistance of 875 pounds. In the presence of the Engineer, perform on-site anchor strength testing to verify the required pull out resistance is achieved. Anchor strength testing must be performed on the first two and final two installed anchors, and randomly throughout the installation operation such that 5% of all installed anchors are tested for pullout resistance. If any anchor fails to meet the pullout resistance requirement, test every subsequent installed anchor until a revised installation plan is proposed and approved by the Engineer. Anchor spacing cannot exceed four feet.

Immediately prior to placing the geotextile fabric and ACB system, inspect the prepared subgrade to ensure it is free of loose material and the surface is smoothly compacted. Place the geotextile fabric directly on the prepared area, in intimate contact with the subgrade and free of folds or wrinkles. Do not glue or physically bond the geotextile fabric to the ACB mat. Install a six inch thick layer of bedding stone under the geotextile fabric, when called for in the Plans.

When installing ACB systems around curves, the mats shall be matched up to the greatest extent possible. Gaps greater than one block size shall be filled with a block and grouted the depth of the block with non-structural grout.

Do not install blocks with chips that result in any block weighing less than 95% of the manufacture specified weight.

**SECTION 534**  
**NOISE AND PERIMETER WALLS**  
**(REV 11-10-21)**

ARTICLE 534-4 is deleted and the following substituted:

**534-4 Shop Drawing Submittal.**

Submit shop drawings for precast elements, when required, in accordance with Section 5, showing a plan and elevation with the following project specific information:

1. Begin and end wall stations with offsets
2. Horizontal and vertical alignments of the wall
3. Panel locations
  - a. Graphic details and graphic panel locations (noise walls only)
  - b. Drainage panel locations and Type
  - c. Location and length of side installed panels (when required)
4. Post locations and lengths
5. Elevations of top of panel, bottom of panel, and panel joints
6. Existing ~~and proposed~~ ground and finished grade elevations
7. Non-standard precast component details
8. Non-standard post and pile connection details
9. Lifting devices

ARTICLE 534-5 is deleted and the following substituted:

**534-5 Construction.**

Keep to minimum the clearing and grubbing; trim trees and shrubs only to the extent necessary to construct the walls, unless otherwise shown in the Plans. Keep right-of-way fence that is scheduled to be salvaged in place until completing the wall or as otherwise directed by the Engineer.

Prior to beginning earthwork on the project, stake the wall location in the field and establish the ~~final ground line~~finished graded surface elevations at the base of the walls. Use these elevations to develop the shop drawings. Protect the ~~final ground~~finish graded surface elevations established in the field for the duration of the project, and do not adjust without prior approval of the Engineer. When constructing earthen berms to raise the base elevation of walls, construct the berms of fill material compacted to 95% of the maximum density as determined by AASHTO T99. After erecting the wall, return the disturbed area to preconstruction condition unless otherwise indicated in the Plans.



**SECTION 548**  
**RETAINING WALL SYSTEMS**  
**(REV 11-10-21)**

ARTICLE 548-4 is deleted and the following substituted:

**548-4 Shop Drawings.**

Submit shop drawings and calculations in accordance with Section 5. Provide calculations and drawings showing details, notes, materials, dimensions, sizes and other information necessary for the complete fabrication and erection of the retaining wall system. As a minimum, provide the following:

1. Elevation view showing the ~~finished~~ ground line ~~graded surface~~ and elevations of the top and bottom of wall at the begin and end of wall, all breaks in vertical alignment and all whole stations and 25 foot station increments.
2. Sections showing the length, size and designation of soil reinforcement.
3. Plan view showing the horizontal alignment and offsets from the horizontal control line to the exterior face of the wall; the location of utilities, drainage structures and other items that impact the wall; the limits of the reinforced soil volume; and, the location of piles within the reinforced earth volume.
4. Details for construction around utilities, drainage structures and other items that impact the wall; for placement of soil reinforcement at acute corners; for addressing conflicts between soil reinforcement and obstructions in the reinforced soil volume; for addressing different wall types intersecting and impacting each other.
5. General notes and design parameters including design soil characteristics; factored bearing resistance and factored bearing pressure for each wall height increment and other notes required for construction of the walls.
6. Design calculations for each wall height increment detailed in the shop drawings.
7. When the friction angle depicted in the shop drawings exceeds 30 degrees for sand backfill or 34 degrees for limerock backfill, provide laboratory test results in accordance with 548-9.5 verifying the backfill to be used for the wall meets the design soil characteristics for the shop drawings.
8. For SBW systems, include details for the placement of drainage aggregate, drainage pipes and separation geotextile. Drawings should be similar to details for Type II or Type III underdrains in Standard Plans, Index 440-001. Do not directly cover perforated drainage pipes with a geotextile filter fabric (such as a filter sock).
9. When SBW systems use friction or semi-friction connections between geosynthetic reinforcement and the facing blocks, include the results of connection capacity testing. Tests must be performed using the materials to be used on the project and tested in accordance with ASTM D6638 to justify the short-term ultimate connection strength reduction factor ( $CR_u$ ) used to determine the long-term connection strength reduction factor ( $CR_{cr}$ ) value in the design calculations for each wall height increment detailed in the shop drawings.

**SECTION 550**  
**FENCING**  
**(REV 11-10-21)**

SUBARTICLE 550-4.4.1 is deleted and the following substituted:

**550-4.4 Construction Over Irregular Terrain and Other Obstructions:**

**550-4.4.1 Clearance of Bottom of Fence:** Install the fence such that the bottom of the fence, in general, follows the contour of the ground. The fence is detailed in the Plans at approximately 3 inches above ~~ground line~~ **finished graded surface**. Over irregular ground, however, the Engineer will permit a minimum clearance of 1 inch and a maximum of 6 inches for a length not to exceed 8 feet, and, for Type A fence, with the barbed wire spaced midway between ground and bottom of fabric.

**SECTION 555**  
**DIRECTIONAL BORE**  
**(REV 11-10-21)**

SUBARTICLE 555-5.2 is deleted and the following substituted:

**555-5.2 As-Built Plans:** Provide the Engineer a complete set of as-built plans showing all bores (successful and failed) within 30 calendar days of completing the work. As-built plans must be PDF files, in the same scale as the Plans ~~format on 11 inch by 17 inch sheets~~. Ensure that the plans are dimensionally correct copies of the Plans and include roadway plan and profile, cross-section **views**, boring location and subsurface conditions as directed by the Engineer. The plans must show appropriate elevations referenced to a permanent FDOT feature (mast arm foundation, manhole inlet cover, head wall, etc). Specific plans content requirements include but may not be limited to the following:

1. The Contract plan view shows the center line location of each facility installed, or installed and placed out of service, to an accuracy of 1 inch at the ends and other points physically observed in accordance with the bore path report.

2. As directed by the Engineer, provide either a profile plan for each bore path, or a cross-section of the roadway at a station specified by the Engineer, or a roadway centerline profile. Show the ground or pavement surface and crown elevation of each facility installed, or installed and placed out of service, to an accuracy of within 1 inch at the ends and other exposed locations. On profile plans for bore paths crossing the roadway, show stationing of the crossing on the Plans. On the profile plans for the bore paths paralleling the roadway, show the Plans stationing. If the profile plan for the bore path is not made on one of the ~~Contract profile or cross-section sheets~~ **Plans**, use a 10 to 1 vertical exaggeration.

3. If, during boring, an obstruction is encountered which prevents completion of the installation in accordance with the design location and specification, and the product is left in place and taken out of service, show the failed bore path along with the final bore path on the plans. Note the failed bore path as "Failed Bore Path - Taken Out of Service". Also show the name of the utility owner, location and length of the drill head and any drill stems not removed from the bore path.

4. Show the top elevation, diameter and material type of all utilities encountered and physically observed during the subsoil investigation. For all other obstructions encountered during a subsoil investigation or the installation, show the type of material, horizontal and vertical location, top and lowest elevation observed, and note if the obstruction continues below the lowest point observed.

5. Include bore notes on each plan stating the final bore path diameter, product diameter, drilling fluid composition, composition of any other materials used to fill the annular void between the bore path and the product, or facility placed out of service. Note if the product is a casing as well as the size and type of carrier pipes placed within the casing as part of the Contract work.

## **SECTION 556**

### **JACK AND BORE**

**(REV 11-10-21)**

SUBARTICLE 556-6.2 is deleted and the following substituted:

**556-6.2 As-Built Plans:** Submit to the Engineer a complete set of as-built plans showing all bores (successful and failed) within 30 calendar days of completion of the work. As-built plans must be PDF files, in the same scale as the Plans, ~~and formatted on 11 inch by 17 inch sheets~~. Include notes on the plans stating the final bore path diameter, facility diameter, drilling fluid composition, composition of any other materials used to fill the annular void between the bore path and the facility or facility placed out of service. If the facility is a casing, note this, as well as the size and type of carrier pipes to be placed within the casing as part of the Contract work. Produce the plans as follows:

1. On the Contract plan view, show the centerline location of each facility, installed or installed and placed out of service to an accuracy within 1 inch at the ends and other points physically observed. They show the remainder of the horizontal alignment of the centerline of each facility installed or installed and placed out of service and note the accuracy with which the installation was monitored.

2. As directed by the Engineer, submit either a profile plan for each bore path, or a cross-section of the roadway at a station specified by the Engineer, or a roadway centerline profile. Also show the ground or pavement surface and the crown elevation of each facility installed, or installed and placed out of service, accurately to within 1 inch at the ends and other points physically observed. Show the remainder of the vertical alignment of the crown of each facility installed, or installed and placed out of service and note the accuracy with which the installation was monitored. On profile plans for bore paths crossing the roadway, show the Plans stationing. On the profile plans for bore paths paralleling the roadway show the Plans stationing. If the profile plan for the bore path is not made on one of the ~~contract profile or cross-section sheets~~ Plans, use a 10 to 1 vertical exaggeration.

3. If a bore path is not completed, show on the Plans the failed bore path along with the name of the utility owner and the final bore path. Note the failed bore path as failed bore path. Also show the location and length of the cutting head and any product not removed from the bore path.

4. Show the crown elevation, diameter and material type of all utilities encountered and physically observed during the subsoil investigation. For all other obstructions encountered during subsoil investigation or the installation, show the type of material, horizontal and vertical location, top elevation and lowest elevation observed, and note if the obstruction continues below the lowest point observed.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 4, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **005**  
Proposed Specification: **0050104 Control of the Work.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Ben Goldsberry from the Structures Design Office to allow PT systems to be accepted through the shop drawing submittal process instead of through a pre-approved list. The proposed specification change is associate with the changes made to Section 452, 462, and 960.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**CONTROL OF THE WORK**  
**(REV 11-10-21)**

SUBARTICLE 5-1.4.2 is deleted and the following substituted:

**5-1.4.2 Shop Drawing Submittal and Review Requirements:** See table below for shop drawing submittal and review requirements.

Table 5-1 Submittal and Review Requirements					
Shop Drawing for:	Originated by Specialty Engineer Not Signed and Sealed	Originated by Detailer Not Signed and Sealed	Originated by Specialty Engineer Signed and Sealed	Originated by Contractor's EOR Signed and Sealed	Requires Review, QA/QC Shop Drawing Check prints and disposition stamp by Design EOR
Steel Fabrication Drawings		Originator			Reviewer
Steel Erection Plan			Originator		Reviewer
Geometry Control Manual				Originator	Reviewer
Segmental Erection Manual				Originator	Reviewer
Segmental Shop Drawings					Reviewer
Post-tensioning Mock-up Plan			Originator		Reviewer
Post-tensioning Systems <sub>1</sub>			Originator		Reviewer
Pretensioned Prestressed Concrete Products Containing FRP Bars or Strands Excluding Standard Piles and Sheet Piles			Originator		Reviewer
Temporary Works Affecting Public Safety <sub>2</sub>			Originator		Reviewer

Table 5-1  
Submittal and Review Requirements

Shop Drawing for:	Originated by Specialty Engineer Not Signed and Sealed	Originated by Detailer Not Signed and Sealed	Originated by Specialty Engineer Signed and Sealed	Originated by Contractor's EOR Signed and Sealed	Requires Review, QA/QC Shop Drawing Check prints and disposition stamp by Design EOR
Demolition Plans of Bridges with Continuous Beams or Girders Where One Span Within the Unit is Over Traffic			Originator		Reviewer
Prefabricated Bridge Elements and System Connection Mock-Up Plans			Originator		Reviewer
Bridge Formwork Including SIP Forms			Originator		Reviewer
Construction Equipment Placed on Existing Bridges				Originator	Reviewer
Bridge components not fully detailed in the Plans, i.e., post-tensioning details, handrails, temporary operating systems for movable bridges etc.				Originator	Reviewer
Retaining Wall Systems			Originator		Reviewer
Precast Box Culverts			Originator		Reviewer

Table 5-1  
Submittal and Review Requirements

Shop Drawing for:	Originated by Specialty Engineer Not Signed and Sealed	Originated by Detailer Not Signed and Sealed	Originated by Specialty Engineer Signed and Sealed	Originated by Contractor's EOR Signed and Sealed	Requires Review, QA/QC Shop Drawing Check prints and disposition stamp by Design EOR
Non-standard structures and components for drainage, lighting, signalization and signing			Originator		Reviewer
Building structures			Originator <sup>3</sup>		Reviewer <sup>4</sup>
Non-standard crash cushions and other nonstructural items			Originator		Reviewer
Design and structural details furnished by the Contractor in compliance with the Contract				Originator	Reviewer
Material or Product Cut-Sheets	Originator				Reviewer
<p>1. Includes <del>approved post-tensioning systems and project specific</del> integration details of the <del>approved</del> <b>post-tensioning</b> system.</p> <p>2. Does not include formwork complying with Standard Plans, Index 102-600 (concrete placement is not permitted directly over traffic). Also, does not include critical temporary walls that are fully detailed in the plans unless redesigned by the Contractor. Does not include specialized equipment if traffic is removed from under equipment while equipment is being loaded, launched, and while loads are being transported by equipment.</p> <p>3. In lieu of a Specialty Engineer, originator may be a licensed Architect.</p> <p>4. In lieu of the Design Engineer of Record, the reviewer may be the Design Architect of Record.</p>					





*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 1, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **007**  
Proposed Specification: **0071303 LEGAL REQUIREMENTS AND RESPONSIBILITY TO THE PUBLIC.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Alan Autry to require railroad protective liability insurance documents be submitted at the preconstruction conference.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/jj

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**LEGAL REQUIREMENTS AND RESPONSIBILITY TO THE PUBLIC  
(REV 08-16-21)**

SUBARTICLE 7-13.3 is deleted and the following substituted:

**7-13.3 Insurance Required for Construction at Railroads:** When the Contract includes the construction of a railroad grade crossing, railroad overpass or underpass structure, or any other work or operations within the limits of the railroad right-of-way, including any encroachments thereon from work or operations in the vicinity of the railroad right-of-way, you shall, in addition to the insurance coverage required pursuant to 7-13.2 above, procure and maintain Railroad Protective Liability Coverage (ISO Form CG 00 35) where the railroad is the Named Insured and where the limits are not less than \$2,000,000 combined single limit for bodily injury and/or property damage per occurrence, and with an annual aggregate limit of not less than \$6,000,000. The railroad shall also be added along with the Department as an Additional Insured on the policy/ies procured pursuant to subsection 7-13.2 above. ~~Prior to the execution of the Contract~~ At the preconstruction conference, and at all renewal periods which occur prior to final acceptance of the work, both the Department and the railroad shall be provided with an ACORD Certificate of Liability Insurance reflecting the coverage described herein. The insurance described herein shall be maintained through final acceptance of the work. Both the Department and the railroad shall be notified in writing within ten days of any cancellation, notice of cancellation, renewal, or proposed change to any policy or coverage described herein. The Department's approval or failure to disapprove any policy/ies, coverage, or ACORD Certificates shall not relieve or excuse any obligation to procure and maintain the insurance required herein, nor serve as a waiver of any rights the Department may have.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 17, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **008**  
Proposed Specification: **0080604 Prosecution and Progress.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Melissa Hollis from the Product Evaluation Office to move general note text for Special Events to appropriate specifications section(s).

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**PROSECUTION AND PROGRESS****(REV 8-17-21)**

SUBARTICLE 8-6.4 is deleted and the following substituted:

**8-6.4 Suspension of Contractor's Operations - Holidays and Special Events:** Unless the Contractor submits a written request to work during one or more days of a Holiday or Special Event at least ten calendar days in advance of the beginning date of the Holiday or Special Event and receives written approval from the Engineer, the Contractor shall not work on the following days: Martin Luther King, Jr. Day; Memorial Day; the Saturday and Sunday immediately preceding Memorial Day; Independence Day; Independence Day (Observed); Labor Day; the Friday, Saturday, and Sunday immediately preceding Labor Day; Veterans Day; Veterans Day (Observed); the Wednesday immediately preceding Thanksgiving Day; Thanksgiving Day; the Friday, Saturday and Sunday immediately following Thanksgiving Day; December 24 through January 2, inclusive; and Special Events noted in the [Plans Contract Documents](#). Contract Time will be charged during these Holiday and Special Event periods. Contract Time will be adjusted in accordance with 8-7.3.2. The Contractor is not entitled to any additional compensation beyond any allowed Contract Time adjustment for suspension of operations during such Holiday and Special Event periods.

During such suspensions, remove all equipment and materials from the clear zone, except those required for the safety of the traveling public and retain sufficient personnel at the job site to properly meet the requirements of Sections 102 and 104. The Contractor is not entitled to any additional compensation for removal of equipment from clear zones or for compliance with Section 102 and Section 104 during such Holiday and Special Event periods.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 18, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **102**  
Proposed Specification: **1020304 Maintenance of Traffic.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derwood Sheppard from the Roadway Design to consolidate information from FDOT Standard Plans and to clarify that Pedestrian and Bicycle accommodations should be addressed in the Contract Plans.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**MAINTENANCE OF TRAFFIC**  
**(REV 12-10-21)**

SUBARTICLE 102-3-4 is deleted and the following substituted:

**102-3.4 Pedestrian and Bicycle Accommodations:** ~~When an existing pedestrian or bicycle way is located within a traffic control work zone, accommodation must be maintained and provision for the disabled must be provided.~~ Provide accommodations for pedestrians as shown in the Temporary Traffic Control (TTC) plans or as directed by the Engineer.

Accommodate P~~pedestrians are to be accommodated~~ with a safe, accessible travel path around work sites separated from mainline traffic in compliance with the Americans with Disabilities Act (ADA) Standards for Transportation Facilities. Provide appropriate signs for advanced notification of sidewalk closures and marked detours. Only approved pedestrian longitudinal channelizing devices may be used to close or delineate a pedestrian walkway.

Provide accommodations for the closure of bicycle facilities (i.e., marked bicycle lanes or paved outside shoulders 4 feet or greater in width on non-limited access roadways) as shown in the TTC plans or as directed by the Engineer. ~~Maintain existing or detour bicycle facilities satisfactorily throughout the project limits. Advanced notification of sidewalk closures and marked detours shall be provided by appropriate signs. Only approved pedestrian longitudinal channelizing devices may be used to delineate temporary traffic control zone pedestrian walkway.~~

Existing businesses in work areas are to be provided with adequate entrances for vehicular and pedestrian traffic during business hours.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

February 8, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **102**  
Proposed Specification: **1020912 Maintenance of Traffic.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from the Traffic Engineering and Operations Office to include the 12 hour requirement as stated in SSRBC. Changes also include PCMS requirements that were inadvertently left out of the July 2021 eBook and are being added back in the book.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**MAINTENANCE OF TRAFFIC**  
**(REV 11-23-21)**

SUBARTICLE 102-9.11 is deleted and the following substituted:

**102-9.11 Portable Changeable Message Sign (PCMS):** Furnish PCMSs or truck mounted changeable message signs that meet the requirements of Section 990 as required by the Plans and Standard Plans to supplement other temporary traffic control devices used in work zones. Ensure that the PCMS display panel is raised to a fully upright position and is visible to motorists from ½ mile, or a distance approved by the Engineer, under both day and night conditions. Use PCMS with a minimum letter height of 18 inches. For facilities with posted speed limits of 45 mph or less, PCMS with a minimum letter height of 12 inches may be used.

For roadways with speed limits greater than 45 mph, the message displayed on the PCMS must be unobstructed from 800 feet. For roadways with speed limits of 45 mph or less, the message displayed must be unobstructed from 650 feet.

Messages must have no more than two phases. The display time for each phase must be at least two seconds but no more than three seconds. The sum of the display time must be a maximum of six seconds.

SUBARTICLE 102-9.15 is deleted and the following substituted:

**102-9.15 Temporary Traffic Detection and Maintenance:** Provide temporary traffic detection and maintenance at existing, temporary, and new signalized intersections. Provide temporary traffic detection equipment listed on the APL. Restore any loss of detection within 12 hours. If permanent traffic detection cannot be restored within 12 hours, provide temporary detection. Ensure 90% accuracy per signal phase, measured at the initial installation and after any lane shifts, by comparing sample data collected from the detection system with ground truth data collected by human observation. Collect the sample and ground truth data for a minimum of five minutes during a peak and five minutes during an off-peak period with a minimum three detections for each signal phase. Perform the test in the presence of the Engineer.





*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 10, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **102**  
Proposed Specification: **1021000 Maintenance of Traffic.\***

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Karen Byram to change the black retroreflectivity value.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

\* This revision is associated with proposed Standard Specification revision 9900400.

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## MAINTENANCE OF TRAFFIC.

(REV 12-1-21)

ARTICLE 102-10 is deleted and the following substituted:

### **102-10 Work Zone Pavement Marking.**

**102-10.1 Description:** Furnish and install work zone pavement markings for MOT in construction areas and in close conformity with the lines and details shown in the Plans and Standard Plans.

Centerlines, lane lines, edge lines, stop bars, standard crosswalks, and turn arrows will be required in work zones prior to opening the road to traffic.

#### **102.10.2 Painted Pavement Markings:**

**102-10.2.1 General:** Use painted pavement markings meeting the requirements of Section 710. Use standard paint unless otherwise identified in the Plans or approved by the Engineer.

#### **102-10.3 Removable Tape:**

**102-10.3.1 General:** Use removable tape listed on the APL as shown in the Plans and meeting the requirements of 990-4.

**102-10.3.2 Application:** Apply removable tape with a mechanical applicator to provide pavement lines that are neat, accurate and uniform. Equip the mechanical applicator with a film cut-off device and with measuring devices that automatically and accumulatively measure the length of each line placed within an accuracy tolerance of plus or minus 2%. Ensure removable tape adheres to the road surface. Removable tape may be placed by hand on short sections, 500 feet or less, if it is done in a neat accurate manner.

**102-10.3.3 Retroreflectivity:** Apply white and yellow removable tape pavement markings that will attain an initial retroreflectivity of not less than 300 mcd/lx·m<sup>2</sup> for white ~~and contrast markings~~ and not less than 250 mcd/lx·m<sup>2</sup> for yellow markings. Black portions of contrast tapes and black masking tapes must ~~be non-reflective and~~ have a retroreflectance of less than 520 mcd/lx·m<sup>2</sup>. ~~At the end of the six-month service life, the retro reflectance of white and yellow removable tape shall not be less than 150 mcd/lx·m<sup>2</sup>.~~

Measure, record and certify on the Department approved form and submit to the Engineer, the retroreflectivity of white and yellow removable tape pavement markings in accordance with FM 5-541.

**102-10.3.4 Removability:** Provide removable tape capable of being removed from bituminous concrete and portland cement concrete pavement intact or in substantially large strips, either manually or by a mechanical roll-up device, at temperatures above 40°F, without the use of heat, solvents, grinding or blasting.

**102-10.4 Temporary Raised Pavement Markers (RPMs):** Use Class B RPMs except for work that consists of ground-in rumble strips at centerline locations. For ground-in rumble strips at centerline locations, use temporary RPMs in accordance with Section 710. Provide only temporary RPMs listed on the APL. Install all markers in accordance with the manufacturer's recommendations, the Standard Plans, and Section 706. After initial installation, replace broken or missing temporary RPMs in locations where more than three consecutive temporary RPMs are broken or missing at no expense to the Department.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 15, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **104**  
Proposed Specification: **1040400 Prevention, Control, and Abatement of Erosion and Water Pollution.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Melissa Hollis to reword existing language for incorporating materials into completed projects. Changes also include adding APL reference to geotextile.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**PREVENTION, CONTROL, AND ABATEMENT OF  
EROSION AND WATER POLLUTION  
(REV 12-8-21)**

ARTICLE 104-4 is deleted and the following substituted:

**104-4 Materials for Temporary Erosion Control.**

~~\_\_\_\_\_The Engineer will not require testing of materials used in construction of temporary erosion control devices other than as provided for geotextile fabric in 985-3 unless such material is to be incorporated into the completed project. When no testing is required, the Engineer will base acceptance on visual inspection.~~

\_\_\_\_\_ For materials that are part of the permanent work, meet the testing requirements of the applicable permanent materials.

\_\_\_\_\_ For materials not part of the permanent work, no testing is required; acceptance will be based on visual inspection ~~—The Contractor may use~~Use new or used materials for the construction of temporary silt fence, staked turbidity barriers, and floating turbidity barrier not to be incorporated into the completed project., ~~subject to the approval of the Engineer.~~

\_\_\_\_\_ For geotextile fabrics, use a product on the Approved Product List (APL) meeting the requirements of Section 985.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 18, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **105**  
Proposed Specification: **1050404-MM6.2VII Contractor Quality Control General Requirements.**

Dear Mr. Nguyen:

We are sending you proposed revisions, dated July 1, 2022, to the Materials Manual for Section 6.2, Volume II, Precast Concrete Pipe. These revisions were proposed by the State Materials Office.

**Use the temporary link in the attached document to access the redlined version and provide comments.**

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## CONTRACTOR QUALITY CONTROL GENERAL REQUIREMENTS (REV 11-30-21)

SUBARTICLE 105-4.4 is deleted and the following substituted:

### **105-4.4 Compliance with the Materials Manual:**

Producers of Flexible Pipe shall meet the requirements of Section 6.1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section61V2.shtm>.

Producers of Precast Concrete Pipe shall meet the requirements of Section 6.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section62V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section62V2.shtm>.

Producers of Precast Concrete Drainage Structures shall meet the requirements of Section 6.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section63V2.shtm>.

Producers of Precast Prestressed Concrete Products shall meet the requirements of Sections 8.1 and 8.3, Volume II of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section81V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section83V2.shtm>.

Producers of Precast Prestressed Concrete Products using Self Consolidating Concrete shall meet the requirements of Section 8.4, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section84V2.shtm>.

Producers of Precast/Prestressed Concrete Products using Flowing Concrete shall meet the requirements of Section 8.6, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section86V2.shtm>.

Producers of Incidental Precast/Prestressed Concrete Products shall meet the requirements of Section 8.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section82V2.shtm>.

Producers of Portland Cement Concrete shall meet the requirements of Section 9.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section92V2.shtm>.

Producers of Paving Concrete produced by Central Mix Plants shall meet the requirements of Section 9.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section93V2.shtm>.

Producers of Structural Steel and Miscellaneous Metal Components shall meet the requirements of Sections 11.1, 11.2, 11.3, 11.4, 11.5 and 11.6 of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section111V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section112V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section113V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section114V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section115V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section116V2.shtm>.

Producers of Fiber Reinforced Polymer Composites shall meet the requirements of Section 12-1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section121V2.shtm>.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 18, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **105**  
Proposed Specification: **1050404-MM6.3VII Contractor Quality Control General Requirements.**

Dear Mr. Nguyen:

We are sending you proposed revisions, dated July 1, 2022, to the Materials Manual for Section 6.3, Volume II, Precast Concrete Drainage Structures and Box Culverts. These revisions were proposed by the State Materials Office.

**Use the temporary link in the attached document to access the redlined version and provide comments.**

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



## CONTRACTOR QUALITY CONTROL GENERAL REQUIREMENTS (REV 11-30-21)

SUBARTICLE 105-4.4 is deleted and the following substituted:

### **105-4.4 Compliance with the Materials Manual:**

Producers of Flexible Pipe shall meet the requirements of Section 6.1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section61V2.shtm>.

Producers of Precast Concrete Pipe shall meet the requirements of Section 6.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section62V2.shtm>.

Producers of Precast Concrete Drainage Structures shall meet the requirements of Section 6.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section63V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section63V2.shtm>.

Producers of Precast Prestressed Concrete Products shall meet the requirements of Sections 8.1 and 8.3, Volume II of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section81V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section83V2.shtm>.

Producers of Precast Prestressed Concrete Products using Self Consolidating Concrete shall meet the requirements of Section 8.4, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section84V2.shtm>.

Producers of Precast/Prestressed Concrete Products using Flowing Concrete shall meet the requirements of Section 8.6, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section86V2.shtm>.

Producers of Incidental Precast/Prestressed Concrete Products shall meet the requirements of Section 8.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section82V2.shtm>.

Producers of Portland Cement Concrete shall meet the requirements of Section 9.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section92V2.shtm>.

Producers of Paving Concrete produced by Central Mix Plants shall meet the requirements of Section 9.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section93V2.shtm>.

Producers of Structural Steel and Miscellaneous Metal Components shall meet the requirements of Sections 11.1, 11.2, 11.3, 11.4, 11.5 and 11.6 of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section111V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section112V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section113V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section114V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section115V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section116V2.shtm>.

Producers of Fiber Reinforced Polymer Composites shall meet the requirements of Section 12-1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section121V2.shtm>.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

February 28, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **105**  
Proposed Specification: **1050404-MM8.1VII Contractor Quality Control General Requirements.**

Dear Mr. Nguyen:

We are sending you proposed revisions, dated July 1, 2022, to the Materials Manual for Section 8.1, Volume II, Precast Prestressed Concrete Products. These revisions were proposed by the State Materials Office.

**Use the temporary link in the attached document to access the redlined version and provide comments.**

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## CONTRACTOR QUALITY CONTROL GENERAL REQUIREMENTS (REV 11-30-21)

SUBARTICLE 105-4.4 is deleted and the following substituted:

### **105-4.4 Compliance with the Materials Manual:**

Producers of Flexible Pipe shall meet the requirements of Section 6.1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section61V2.shtm>.

Producers of Precast Concrete Pipe shall meet the requirements of Section 6.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section62V2.shtm>.

Producers of Precast Concrete Drainage Structures shall meet the requirements of Section 6.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section63V2.shtm>.

Producers of Precast Prestressed Concrete Products shall meet the requirements of Sections 8.1 and 8.3, Volume II of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section81V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section81V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section83V2.shtm>.

Producers of Precast Prestressed Concrete Products using Self Consolidating Concrete shall meet the requirements of Section 8.4, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section84V2.shtm>.

Producers of Precast/Prestressed Concrete Products using Flowing Concrete shall meet the requirements of Section 8.6, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section86V2.shtm>.

Producers of Incidental Precast/Prestressed Concrete Products shall meet the requirements of Section 8.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section82V2.shtm>.

Producers of Portland Cement Concrete shall meet the requirements of Section 9.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section92V2.shtm>.

Producers of Paving Concrete produced by Central Mix Plants shall meet the requirements of Section 9.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section93V2.shtm>.

Producers of Structural Steel and Miscellaneous Metal Components shall meet the requirements of Sections 11.1, 11.2, 11.3, 11.4, 11.5 and 11.6 of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section111V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section112V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section113V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section114V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section115V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section116V2.shtm>.

Producers of Fiber Reinforced Polymer Composites shall meet the requirements of Section 12-1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section121V2.shtm>.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 25, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **105**  
Proposed Specification: **1050404-MM8.2VII Contractor Quality Control General Requirements.**

Dear Mr. Nguyen:

We are sending you proposed revisions, dated July 1, 2022, to the Materials Manual for Section 8.2, Volume II, Incidental Precast Concrete Products. These revisions were proposed by the State Materials Office.

**Use the temporary link in the attached document to access the redlined version and provide comments.**

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## CONTRACTOR QUALITY CONTROL GENERAL REQUIREMENTS (REV 11-30-21)

SUBARTICLE 105-4.4 is deleted and the following substituted:

### **105-4.4 Compliance with the Materials Manual:**

Producers of Flexible Pipe shall meet the requirements of Section 6.1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section61V2.shtm>.

Producers of Precast Concrete Pipe shall meet the requirements of Section 6.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section62V2.shtm>.

Producers of Precast Concrete Drainage Structures shall meet the requirements of Section 6.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section63V2.shtm>.

Producers of Precast Prestressed Concrete Products shall meet the requirements of Sections 8.1 and 8.3, Volume II of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section81V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section83V2.shtm>.

Producers of Precast Prestressed Concrete Products using Self Consolidating Concrete shall meet the requirements of Section 8.4, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section84V2.shtm>.

Producers of Precast/Prestressed Concrete Products using Flowing Concrete shall meet the requirements of Section 8.6, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section86V2.shtm>.

Producers of Incidental Precast/Prestressed Concrete Products shall meet the requirements of Section 8.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section82V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section82V2.shtm>.

Producers of Portland Cement Concrete shall meet the requirements of Section 9.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section92V2.shtm>.

Producers of Paving Concrete produced by Central Mix Plants shall meet the requirements of Section 9.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section93V2.shtm>.

Producers of Structural Steel and Miscellaneous Metal Components shall meet the requirements of Sections 11.1, 11.2, 11.3, 11.4, 11.5 and 11.6 of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section111V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section112V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section113V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section114V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section115V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section116V2.shtm>.

Producers of Fiber Reinforced Polymer Composites shall meet the requirements of Section 12-1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section121V2.shtm>.





*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 25, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **105**  
Proposed Specification: **1050404-MM8.4VII Contractor Quality Control General Requirements.**

Dear Mr. Nguyen:

We are sending you proposed revisions, dated July 1, 2022, to the Materials Manual for Section 8.4, Volume II, Self-Consolidating Concrete (SCC) for Precast/Prestressed Concrete Products. These revisions were proposed by the State Materials Office.

**Use the temporary link in the attached document to access the redlined version and provide comments.**

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## CONTRACTOR QUALITY CONTROL GENERAL REQUIREMENTS (REV 12-1-21)

SUBARTICLE 105-4.4 is deleted and the following substituted:

### **105-4.4 Compliance with the Materials Manual:**

Producers of Flexible Pipe shall meet the requirements of Section 6.1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section61V2.shtm>.

Producers of Precast Concrete Pipe shall meet the requirements of Section 6.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section62V2.shtm>.

Producers of Precast Concrete Drainage Structures shall meet the requirements of Section 6.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section63V2.shtm>.

Producers of Precast Prestressed Concrete Products shall meet the requirements of Sections 8.1 and 8.3, Volume II of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section81V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section83V2.shtm>.

Producers of Precast Prestressed Concrete Products using Self Consolidating Concrete shall meet the requirements of Section 8.4, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section84V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section84V2.shtm>.

Producers of Precast/Prestressed Concrete Products using Flowing Concrete shall meet the requirements of Section 8.6, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section86V2.shtm>.

Producers of Incidental Precast/Prestressed Concrete Products shall meet the requirements of Section 8.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section82V2.shtm>.

Producers of Portland Cement Concrete shall meet the requirements of Section 9.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section92V2.shtm>.

Producers of Paving Concrete produced by Central Mix Plants shall meet the requirements of Section 9.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section93V2.shtm>.

Producers of Structural Steel and Miscellaneous Metal Components shall meet the requirements of Sections 11.1, 11.2, 11.3, 11.4, 11.5 and 11.6 of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section111V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section112V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section113V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section114V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section115V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section116V2.shtm>.

Producers of Fiber Reinforced Polymer Composites shall meet the requirements of Section 12-1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section121V2.shtm>.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 25, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **105**  
Proposed Specification: **1050404-MM8.6VII Contractor Quality Control General Requirements.**

Dear Mr. Nguyen:

We are sending you proposed revisions, dated July 1, 2022, to the Materials Manual for Section 8.6, Volume II, Flowing Concrete for Precast/Prestressed Concrete Products. These revisions were proposed by the State Materials Office.

**Use the temporary link in the attached document to access the redlined version and provide comments.**

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## CONTRACTOR QUALITY CONTROL GENERAL REQUIREMENTS (REV 12-1-21)

SUBARTICLE 105-4.4 is deleted and the following substituted:

### **105-4.4 Compliance with the Materials Manual:**

Producers of Flexible Pipe shall meet the requirements of Section 6.1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section61V2.shtm>.

Producers of Precast Concrete Pipe shall meet the requirements of Section 6.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section62V2.shtm>.

Producers of Precast Concrete Drainage Structures shall meet the requirements of Section 6.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section63V2.shtm>.

Producers of Precast Prestressed Concrete Products shall meet the requirements of Sections 8.1 and 8.3, Volume II of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section81V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section83V2.shtm>.

Producers of Precast Prestressed Concrete Products using Self Consolidating Concrete shall meet the requirements of Section 8.4, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section84V2.shtm>.

Producers of Precast/Prestressed Concrete Products using Flowing Concrete shall meet the requirements of Section 8.6, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section86V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section86V2.shtm>.

Producers of Incidental Precast/Prestressed Concrete Products shall meet the requirements of Section 8.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section82V2.shtm>.

Producers of Portland Cement Concrete shall meet the requirements of Section 9.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section92V2.shtm>.

Producers of Paving Concrete produced by Central Mix Plants shall meet the requirements of Section 9.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section93V2.shtm>.

Producers of Structural Steel and Miscellaneous Metal Components shall meet the requirements of Sections 11.1, 11.2, 11.3, 11.4, 11.5 and 11.6 of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section111V2.shtm>.  
<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section112V2.shtm>.  
<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section113V2.shtm>.  
<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section114V2.shtm>.  
<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section115V2.shtm>.  
<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section116V2.shtm>.

Producers of Fiber Reinforced Polymer Composites shall meet the requirements of Section 12-1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section121V2.shtm>.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 22, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **105**  
Proposed Specification: **1050404-MM9.2VII Contractor Quality Control General Requirements.**

Dear Mr. Nguyen:

We are sending you proposed revisions, dated July 1, 2022, to the Materials Manual for Section 9.2, Volume II, Structural Concrete Production Facilities Guide. These revisions were proposed by the State Materials Office.

**Use the temporary link in the attached document to access the redlined version and provide comments.**

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## CONTRACTOR QUALITY CONTROL GENERAL REQUIREMENTS (REV 11-2-21)

SUBARTICLE 105-4.4 is deleted and the following substituted:

### **105-4.4 Compliance with the Materials Manual:**

Producers of Flexible Pipe shall meet the requirements of Section 6.1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section61V2.shtm>.

Producers of Precast Concrete Pipe shall meet the requirements of Section 6.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section62V2.shtm>.

Producers of Precast Concrete Drainage Structures shall meet the requirements of Section 6.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section63V2.shtm>.

Producers of Precast Prestressed Concrete Products shall meet the requirements of Sections 8.1 and 8.3, Volume II of the Department's Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section81V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section83V2.shtm>.

Producers of Precast Prestressed Concrete Products using Self Consolidating Concrete shall meet the requirements of Section 8.4, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section84V2.shtm>.

Producers of Precast/Prestressed Concrete Products using Flowing Concrete shall meet the requirements of Section 8.6, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section86V2.shtm>.

Producers of Incidental Precast/Prestressed Concrete Products shall meet the requirements of Section 8.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section82V2.shtm>.

Producers of Portland Cement Concrete shall meet the requirements of Section 9.2, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section92V2.shtm><https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section92V2.shtm>.

Producers of Paving Concrete produced by Central Mix Plants shall meet the requirements of Section 9.3, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section93V2.shtm>.

Producers of Structural Steel and Miscellaneous Metal Components shall meet the requirements of Sections 11.1, 11.2, 11.3, 11.4, 11.5 and 11.6 of the Department's Materials Manual, which may be viewed at the following URLs:



<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section111V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section112V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section113V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section114V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section115V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section116V2.shtm>.

Producers of Fiber Reinforced Polymer Composites shall meet the requirements of Section 12-1, Volume II of the Department's Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section121V2.shtm>.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

February 3, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **110**  
Proposed Specification: **1100201 Clearing and Grubbing.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Melissa Hollis from the Product Evaluation Office to update terminology to be consistent with FDM, CADD software, CPAM, and Section 120.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## CLEARING AND GRUBBING (REV 12-15-21)

SUBARTICLE 110-2.1 is deleted and the following substituted:

**110-2.1 Work Included:** Completely remove and dispose of all buildings, timber, brush, trees, stumps, roots, rubbish, debris, existing flexible pavement and base, drainage structures, culverts, and pipes. Remove all other obstructions resting on or protruding through the surface of the existing ground and the surface of excavated areas.

Perform standard clearing and grubbing within the following areas:

1. All areas where excavation is to be done, including borrow pits, lateral ditches, right-of-way ditches, etc.

2. If constructing over an existing road, remove existing asphalt pavement. If shown in the Contract Documents, remove existing pavement base.

3. 2- All areas where roadway embankments will be constructed, ~~unless constructing over an existing road. If constructing over an existing road, remove asphalt pavement and base in accordance with 120-4.2 and the Plans.~~

43. All areas where structures will be constructed, including pipe culverts and other pipe lines.

SUBARTICLE 110-6.2 is deleted and the following substituted:

### 110-6.2 Method of Removal:

**110-6.2.1 General:** Remove the structures in such a way so as to leave no obstructions to any proposed new bridge or to any waterways. Pull, cut off, or break off pilings to the requirements of the permit or other Contract Documents, or if not specified, not less than 2 feet below the finished graded surface ~~ground line~~. In the event that the Plans indicate channel excavation to be done by others, consider the finished graded surface ~~ground line~~ as the limits of such excavation. For materials which are to remain the property of the Department or are to be salvaged for use in temporary bridges, avoid damage to such materials, and entirely remove all bolts, nails, etc. from timbers to be so salvaged. Mark structural steel members for identification as directed.

SUBARTICLE 110-10.0 is deleted and the following substituted:

### 110-10 Miscellaneous Operations.

**110-10.1 Water Wells Required to be Plugged:** Fill or plug all water wells within the right-of-way, including areas of borrow pits and lateral ditches, that are not to remain in service, in accordance with applicable Federal, State, and Local Rules and Regulations.

Cut off the casing of cased wells at least 12 inches below the ~~ground line~~ existing surface or 12 inches below the elevation of the finished ~~excavation-graded~~ surface, whichever is lower. Water wells, as referred to herein, are defined either as artesian or non-artesian, as follows:

1. An artesian well is an artificial hole in the ground from which water supplies may be obtained and which penetrates any water-bearing rock, the water in which is raised to the surface by natural flow or which rises to an elevation above the top of the water-bearing bed. Artesian wells are further defined to include all holes drilled as a source of water that penetrate any water-bearing beds that are a part of the artesian water system of Florida, as determined by representatives of the applicable Water Management District.

2. A non-artesian (water-table) well is a well in which the source of water is an unconfined aquifer. The water in a non-artesian well does not rise above the source bed.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

March 10, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **120**  
Proposed Specification: **REVISED 1200100 Excavation and Embankment.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Melissa Hollis from the Product Evaluation Office to update terminology to be consistent with FDM and updated measurement and payment to use for plan quantity items. Changes were also proposed by Dino Jameson from the State Materials Office to update the language due to modern day compaction tools used by the Contractors and the extensive verification steps for the Department are no longer needed.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## EXCAVATION AND EMBANKMENT (REV 3-7-22)

SECTION 120 is deleted and the following substituted:

### 120-1 Description.

**120-1.1 General:** Excavate and construct embankments as required for the roadway, ditches, channel changes and borrow material. Use suitable excavated material or authorized borrow to prepare subgrades and foundations. Construct embankments in accordance with Standard Plans, Index 120-001. Compact and dress excavated areas and embankments.

Meet the requirements of Section 110 for excavation of material for clearing and grubbing and Section 125 for excavation and backfilling of structures and pipe. Material displaced by the storm sewer or drainage structure system is not included in the earthwork quantities shown in the Contract Documents Plans. ~~The original ground line is defined as the contour of existing natural topography. The finished grading template is defined as the contour of the finished side slopes, unpaved shoulders, and the bottom of the roadway base and shoulder base for flexible or rigid pavement.~~

The existing surface may be a combination of the following:

1. The original unpaved ground line;
2. The bottom of the existing pavement;
3. The bottom of existing features removed by clearing and grubbing;
4. The bottom of the existing base, if the base is to be removed.

The finished graded surface includes the completed grades of side slopes, unpaved shoulders, and the bottom of the base for flexible or rigid pavement.

**120-1.2 Unidentified Areas of Contamination:** When encountering or exposing any abnormal condition indicating the presence of contaminated materials, cease operations immediately in the vicinity and notify the Engineer. The presence of tanks or barrels; discolored earth, metal, wood, ground water, etc.; visible fumes; abnormal odors; excessively hot earth; smoke; or other conditions that appear abnormal may indicate the presence of contaminated materials and must be treated with extreme caution.

Make every effort to minimize the spread of contamination into uncontaminated areas. Immediately provide for the health and safety of all workers at the job site and make provisions necessary for the health and safety of the public that may be exposed to any potentially hazardous conditions. Ensure provisions adhere to all applicable laws, rules or regulations covering potentially hazardous conditions and will be in a manner commensurate with the gravity of the conditions.

The Engineer will notify the District Contamination Impact Coordinator (DCIC) who will coordinate selecting and tasking the Department's Contamination Assessment/Remediation Contractor (CAR). Provide access to the potentially contaminated area. Preliminary investigation by the CAR Contractor will determine the course of action necessary for site security and the steps necessary under applicable laws, rules, and regulations for additional assessment and/or remediation work to resolve the contamination issue.

The CAR Contractor will delineate the contamination areas, any staging or holding area required; and, in cooperation with the Prime Contractor and Engineer, develop a work plan that will provide the CAR Contractor's operations schedule with projected completion dates for the final resolution of the contamination issue.

The CAR Contractor will maintain jurisdiction over activities inside any outlined contaminated areas and any associated staging holding areas. The CAR Contractor will be responsible for the health and safety of workers within the delineated areas. Provide continuous access to these areas for the CAR Contractor and representatives of regulatory or enforcement agencies having jurisdiction.

Both Contractors will use the schedule as a basis for planning the completion of both work efforts. The Engineer may grant the Contract Time extensions according to the provisions of 8-7.3.2.

Cooperate with the CAR Contractor to expedite integration of the CAR Contractor's operations into the construction project. The Prime Contractor is not expected to engage in routine construction activities, such as excavating, grading, or any type of soil manipulation, or any construction processes required if handling of contaminated soil, surface water or ground water is involved. All routine construction activities requiring the handling of contaminated soil, surface water or groundwater will be by the CAR Contractor. Adjustments to quantities or to Contract unit prices will be made according to work additions or reductions on the part of the Prime Contractor in accordance with 4-3.

The Engineer will direct the Prime Contractor when operations may resume in the affected area.

## **120-2 Classifications of Excavation.**

**120-2.1 General:** The Department may classify excavation specified under this Section for payment as any of the following: regular excavation, subsoil excavation, lateral ditch excavation, and channel excavation.

~~If the proposal does not show subsoil excavation or lateral ditch excavation as separate items of payment, include such excavation under the item of regular excavation.~~

~~—————If the proposal shows lateral ditch excavation as a separate item of payment, but does not show channel excavation as a separate item of payment, include such excavation under the item of lateral ditch excavation. Otherwise, include channel excavation under the item of regular excavation.~~

**120-2.2 Regular Excavation:** Regular excavation includes roadway excavation and borrow excavation, as defined below for each.

~~**120-2.2.1 Roadway Excavation:**~~ Roadway excavation consists of the excavation and the utilization or disposal of all materials necessary for the construction of the roadway, ditches, channel changes, etc., except for removal of existing pavement as defined in Section 110.

~~**120-2.2.2 Borrow Excavation:**~~ Borrow excavation consists of the excavation and utilization of material from authorized borrow pits, including only material that is suitable for the construction of roadway embankments or of other embankments covered by the Contract.

A Cost Savings Initiative Proposal (CSIP) submittal based on using borrow material from within the project limits will not be considered.

**120-2.3 Subsoil Excavation:** Subsoil excavation consists of the excavation and disposal of muck, clay, rock, or any other material that is unsuitable in its original position and that is excavated below the existing surface ~~finished grading template~~. For pond and ditches that identify the placement of a blanket material, ~~consider the~~ existing surface is ~~finished grading~~ template as the bottom of the blanket material. Subsoil excavation also consists of the excavation of all suitable material within the above limits as necessary to excavate the unsuitable material.

Consider the limits of subsoil excavation indicated in the Plans as being particularly variable, in accordance with the field conditions actually encountered.

The quantity of material required to replace the excavated material and to raise the elevation of the roadway to the bottom of the template will be paid for under embankment or borrow excavation (Truck Measure).

**120-2.4 Lateral Ditch Excavation:** Lateral ditch excavation consists of all excavation of inlet and outlet ditches to structures and roadway, ~~changes in channels of streams, and ditches parallel to the roadway right-of-way.~~ Dress lateral ditches to the grade and ~~cross-section~~ finished graded surface shown in the Plans.

**120-2.5 Channel Excavation:** Channel excavation consists of the excavation of channels and streams and satisfactory disposal of all materials from within the limits of the channel as shown in the Plans.

### 120-3 Preliminary Soils Investigations.

When the Plans contain the results of a soil survey, do not assume such data is a guarantee of the depth, extent, or character of material present.

### 120-4 Removal of Unsuitable Materials and Existing Roads.

**120-4.1 Subsoil Excavation:** Where muck, rock, clay, or other material within the limits of the roadway is unsuitable in its original position, excavate such material to the ~~depths cross-sections~~ shown in the Plans as the removal limits or as indicated by the Engineer, and backfill with suitable material. ~~Shape backfill material to the required cross-sections.~~ Where the removal of plastic soils ~~below the finished earthwork grade~~ is required, meet a construction tolerance, ~~from the lines shown in the Plans as the removal limits,~~ of plus or minus 0.2 foot in depth and plus or minus 6 inches (each side) in width.

**120-4.2 Construction over Existing Old Road:** Where a new roadway is to be constructed over an old one, completely remove the existing flexible and Portland cement concrete pavement for the entire limits of the width and depth in accordance with Section 110. Compact disturbed material in accordance with Section 120 or 160, whichever material applies. If indicated in the Plans, remove the existing base in accordance with Section 110.

### 120-5 Disposal of Surplus and Unsuitable Material.

**120-5.1 Ownership of Excavated Materials:** ~~Take Dispose of surplus and excavated materials as shown in the Plans or, if the Plans do not indicate the method of disposal, take~~ ownership of the materials and dispose of them outside the right-of-way.

**120-5.2 Placement Disposal of Muck on Side Slopes:** As an exception to the provisions of 120-5. 1, ~~when approved by the Engineer, in rural undeveloped areas,~~ the Contractor may ~~place muck (A-8 material) on the slopes,~~ or store muck (A-8 material) alongside the roadway, provided there is a clear distance of at least 6 feet between the roadway grading limits and the muck, ~~and the Contractor dresses the muck to present a neat appearance. In addition, the Contractor may also dispose of this material by placing it on the slopes in developed areas where, in the opinion of the Engineer, this will result in an aesthetically pleasing appearance and will have no detrimental effect on the adjacent developments. Where the Engineer permits the disposal of muck or other unsuitable material inside the right-of-way limits,~~ Do not store place such material in a manner which will impede the inflow or outfall of any channel or side ditches. All stored materials that are not used for final surface materials, per Section 570, must be



~~disposed of outside the right-of-way. The Engineer will determine the limits adjacent to channels within which such materials may be disposed.~~

**120-5.3 Disposal of Paving Materials:** Unless otherwise noted, take ownership of paving materials, such as paving brick, asphalt block, concrete slab, sidewalk, curb and gutter, etc., excavated in the removal of existing pavements, and dispose of them outside the right-of-way. ~~If the materials are to remain the property of the Department, place them in neat piles as directed.~~ Existing base materials that are removed may be incorporated in the stabilized portion of the subgrade in accordance with Section 160. If the construction sequence will allow, incorporate all existing base material into the project as allowed by the Contract Documents.

**120-5.4 Disposal Areas:** Where the Contract Documents require disposal of excavated materials outside the right-of-way, and the disposal area is not indicated in the Contract Documents, furnish the disposal area without additional compensation.

Provide areas for disposal of removed paving materials out of sight of the project and at least 300 feet from the nearest roadway right-of-way line of any State maintained road. If the materials are buried, disregard the 300 foot limitation.

## **120-6 Borrow.**

**120-6.1 Materials for Borrow:** Do not open borrow pits until the Engineer has approved their location.

Prior to the purchase or use of any borrow pit materials, provide the Engineer with a written certification of borrow pit compliance meeting the requirements of Section 337.0262, Florida Statutes.

Do not provide borrow materials that are polluted as defined in Chapter 376 of the Florida Statutes (oil of any kind and in any form, gasoline, pesticides, ammonia, chlorine, and derivatives thereof, excluding liquefied petroleum gas) in concentrations above any local, State, or Federal standards.

Prior to placing any borrow material that is the product of soil incineration, provide the Engineer with a copy of the Certificate of Materials Recycling and Post Burn Analysis showing that the material is below all allowable pollutant concentrations.

**120-6.2 Furnishing of Borrow Areas:** To obtain the Engineer's approval to use an off-site construction activity area that involves excavation such as a borrow pit or local aggregate pit, request in writing, a review for cultural resources involvement. Send the request to the Division of Historical Resources (DHR), Department of State, State Historic Preservation Officer, Tallahassee, FL. As a minimum, include in the request the Project Identification Number, the County, a description of the property with Township, Range, Section, etc., the dimensions of the area to be affected, and a location map. Do not start any work at the off-site construction activity area prior to receiving clearance from the DHR that no additional research is warranted.

For certain locations, the DHR will require a Cultural Resources Assessment (CRA) Survey before approval can be granted. When this is required, secure professional archaeological services to complete an historical and archaeological survey report. Submit the report to the DHR and to the Department. The Engineer will determine final approval or rejection of off-site construction activity areas based on input from the DHR.

Before receiving approval or before use of borrow areas, obtain written clearance from the Engineer concerning compliance with the Federal Endangered Species Act and other Wildlife Regulations as specified in 7-1.4 and Section 4(f) of the USDOT Act as specified in 7-1.8.

The Department will adjust Contract Time in accordance with 8-7 for any suspension of operations required to comply with this Article. The Department will not accept any monetary claims due to delays or loss of off-site construction activity areas.

Except where the Plans specifically call for the use of a particular borrow or dredging area, the Contractor may substitute borrow or dredging areas of his own choosing provided the Engineer determines the materials from such areas meet the Department's standards and other requirements for stability for use in the particular sections of the work in which it is to be placed, and the Contractor absorbs any increase in hauling or other costs. Stake the corners of the proposed borrow area and provide the necessary equipment along with an operator in order for the Engineer to investigate the borrow area. The Engineer will determine test locations, collect samples, and perform tests to investigate the proposed borrow area based on soil strata and required soil properties. The Engineer will approve use of materials from the proposed area based on test results and project requirements. Final acceptance of materials will be based on Point of Use Test as described in 6-1.2.4.

Before using any borrow material from any substitute areas, obtain the Engineer's approval, in writing, for the use of the particular areas, and, where applicable, ensure that the Engineer has ~~surveyed~~~~cross-sectioned~~ the surface. Upon such written approval by the Engineer, consider the substitute areas as designated borrow areas.

When furnishing the dredging or borrow areas, supply the Department with evidence that the necessary permits, rights, or waivers for the use of such areas have been secured.

Do not excavate any part of a Contractor furnished borrow area which is less than 300 feet from the right-of-way of the project or any State Road until the Engineer has approved a plan for landscaping and restoring the disturbed area. Perform this landscaping and land restoration at no expense to the Department, prior to final acceptance of the project. Do not provide a borrow area closer than 25 feet to the right-of-way of any state road. In Department furnished borrow pits, do not excavate material within 5 feet of adjacent property lines.

Upon completion of excavation, neatly shape, dress, grass, vegetate, landscape, and drain all exposed areas including haul roads, as necessary so as not to present an objectionable appearance.

Meet the requirements of Section 104 when furnishing borrow areas, regardless of location.

**120-6.3 Borrow Material for Shoulder Build-up:** When indicated in the Plans, furnish borrow material with a specific minimum bearing value, for building up of existing shoulders. Blend materials as necessary to achieve this specified minimum bearing value prior to placing the materials on the shoulders. Take samples of this borrow material at the pit or blended stockpile. Include all costs of providing a material with the required bearing value in the Contract unit price for borrow material.

**120-6.4 Haul Routes for Borrow Pits:** Provide and maintain, at no expense to the Department, all necessary roads for hauling the borrow material. Where borrow area haul roads or trails are used by others, do not cause such roads or trails to deteriorate in condition.

Arrange for the use of all non-public haul routes crossing the property of any railroad. Incur any expense for the use of such haul routes. Establish haul routes which will direct construction vehicles away from developed areas when feasible, and keep noise from hauling operations to a minimum. Advise the Engineer in writing of all proposed haul routes.

**120-6.5 Authorization for Use of Borrow:** When the item of borrow excavation is included in the Contract, use borrow only when sufficient quantities of suitable material are not available from roadway and drainage excavation, to properly construct the embankment, subgrade, and shoulders, and to complete the backfilling of structures. Do not use borrow material until so ordered by the Engineer, and then only use material from approved borrow pits.

## **120-7 Materials for Embankment.**

**120-7.1 Use of Materials Excavated from the Roadway and Appurtenances:** Assume responsibility for determining the suitability of excavated material for use on the project in accordance with the applicable Contract Documents. Consider the sequence of work and maintenance of traffic phasing in the determination of the availability of this material.

**120-7.2 General Requirements for Embankment Materials:** Construct embankments of acceptable material including reclaimed asphalt pavement (RAP), recycled concrete aggregate (RCA) and Portland cement concrete rubble, but containing no muck, stumps, roots, brush, vegetable matter, rubbish, reinforcement bar or other material that does not compact into a suitable and enduring roadbed. Do not use RAP or RCA in the top 3 feet of slopes and shoulders that are to be grassed or have other type of vegetation established. Do not use RAP or RCA in stormwater management facility fill slopes or permitted wetland impact areas.

Remove all waste material designated as undesirable. Use material in embankment construction in accordance with Plans or as the Engineer directs.

Complete the embankment using maximum particle sizes (in any dimension) as follows:

1. In top 12 inches: 3-1/2 inches (in any dimension).
2. 12 to 24 inches: 6 inches (in any dimension).
3. In the depth below 24 inches: not to exceed 12 inches (in any dimension) or the compacted thickness of the layer being placed, whichever is less.

Spread all material so that the larger particles are separated from each other to minimize voids between them during compaction. Compact around these rocks in accordance with 120-9.2.

When and where approved by the Engineer, the Contractor may place larger rocks (not to exceed 18 inches in any dimension) outside the ~~1:2~~<sup>one to two</sup> slope and at least 4 feet or more below the bottom of the base. Compact around these rocks to a firmness equal to that of the supporting soil. Construct grassed embankment areas in accordance with 120-9.2.5. Where constructing embankments adjacent to bridge end bents or abutments, do not place rock larger than 3-1/2 inches in diameter within 3 feet of the location of any end-bent piling.

**120-7.3 Materials Used at Pipes, Culverts, etc.:** Construct embankments over and around pipes, culverts, and bridge foundations with selected materials.

## **120-8 Embankment Construction.**

**120-8.1 General:** Construct embankments in sections of not less than 300 feet in length or for the full length of the embankment. Do not construct another LOT over an untested LOT without the Engineer's approval in writing.

For construction of mainline pavement lanes, turn lanes, ramps, parking lots, concrete box culverts and retaining wall systems, a LOT is defined as a single lift of finished embankment not to exceed 500 feet.

For construction of shoulder-only areas, shared use paths, and sidewalks areas, a LOT is defined as a single lift of finished embankment not to exceed 2000 feet.

Isolated compaction operations will be considered as separate LOTs. For multiple phase construction, a LOT shall not extend beyond the limits of the phase.

**120-8.2 Dry Fill Method:**

**120-8.2.1 General:** Construct embankments to meet the compaction requirements in 120-9 and in accordance with the acceptance program requirements in 120-10.

~~As far as practicable, distribute traffic over the work during the construction of embankments so as to cover the maximum area of the surface of each layer.~~

Construct embankment using the dry fill method whenever normal dewatering equipment and methods can accomplish the needed dewatering.

**120-8.2.1.1 Maximum Compacted Lift Thickness Requirements:**

Construct the embankment in successive layers with lifts up to a maximum listed in Table 120-1 below based on the embankment material classification group.

Group	AASHTO Soil Class	Maximum Lift Thickness	Thick Lift Control Test Section Requirements
1	A-3	12 inches	Not Needed
	A-2-4 (No. 200 Sieve $\leq$ 15%)		
2	A-1	6 inches without Control Test Section	Maximum of 12 inches per 120-8.2.1.2
	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)		

**120-8.2.1.2 Thick Lift Requirements:** For embankment materials classified as Group 2 in Table 120-1 above, the option to perform thick lift construction in successive layers of not more than 12 inches compacted thickness may be used after meeting the following requirements:

1. Notify the Engineer and obtain approval in writing prior to beginning construction of a test section.

~~a. Demonstrate the possession and control of compacting equipment sufficient to achieve density required by 120-10.2 for the full depth of a thicker lift.~~

2. Construct a test section of the length of one full LOT of not less than 500 feet.

3. Perform five Quality Control (QC) tests at random locations within the test section.

a. All five QC tests and a Department Verification test must meet the density required by 120-10.2.

b. Identify the test section with the compaction effort and soil classification in the Department's Earthwork Records System (ERS).

4. Obtain Engineer's approval in writing for the compaction effort after completing a successful test section.

In case of a change in compaction effort or soil classification, failing QC test or when the QC tests cannot be verified, construct a new test section. The Contractor may elect to place material in 6 inches compacted thickness at any time. Construct all layers approximately parallel to the centerline profile of the road.

The Engineer reserves the right to terminate the Contractor's use of thick lift construction. Whenever the Engineer determines that the Contractor is not achieving satisfactory results, revert to the 6 inch compacted lifts.

**120-8.2.1.3 Equipment and Methods:** Provide normal dewatering equipment including, but not limited to, surface pumps, sump pumps and trenching/digging machinery. Provide normal dewatering methods including, but not limited to, constructing shallow surface drainage trenches/ditches, using sand blankets, sumps and siphons.

When normal dewatering does not adequately remove the water, the Engineer may require the embankment material to be placed in the water or on low swampy ground in accordance with 120-9.2.3.

**120-8.2.2 Placing in Unstable Areas:** When depositing fill material in water, or on low swampy ground that will not support the weight of hauling equipment, construct the embankment by dumping successive loads in a uniformly distributed layer of a thickness not greater than necessary to support the hauling equipment while placing subsequent layers. Once sufficient material has been placed so that the hauling equipment can be supported, construct the remaining portion of the embankment in layers in accordance with the applicable provisions of 120-9.2.2.

**120-8.2.3 Placing on Steep Slopes:** When constructing an embankment on a hillside sloping more than 20 degrees from the horizontal, before starting the fill, deeply plow or cut steps into the surface of the existing slope on which the embankment is to be placed.

**120-8.2.4 Placing Outside the Standard Minimum Slope:** The standard minimum slope is defined as the plane described by a one (vertical) to two (horizontal) slope downward from the roadway shoulder point or the gutter line, in accordance with Standard Plans, Index 120-001 and 120-002. Where material that is unsuitable for normal embankment construction is to be used in the embankment outside the standard minimum slope, place such material in layers of not more than 18 inches in thickness, measured loose. The Contractor may also place material which is suitable for normal embankment, outside such standard minimum slope, in 18 inch layers. Maintain a constant thickness for suitable material placed within and outside the standard minimum slope, unless placing in a separate operation.

### **120-8.3 Hydraulic Method:**

**120-8.3.1 Method of Placing:** When the hydraulic method is used, as far as practicable, place all dredged material in its final position in the embankment by such method. Place and compact any dredged material that is reworked, or moved and placed in its final position by any other method, as specified in 120-9.2. Baffles or any other form of construction may be used if the slopes of the embankments are not steeper than indicated in the Plans. Remove all timber used for temporary bulkheads or baffles from the embankment, and fill and thoroughly compact all voids. When placing fill on submerged land, construct dikes prior to beginning of dredging, and maintain the dikes throughout the dredging operation.

**120-8.3.2 Excess Material:** Do not use any excess material placed outside the prescribed slopes or below the normal high-water table to raise the fill areas. Remove only the portion of this material required for dressing the slopes.

**120-8.3.3 Protection of Openings in Embankment:** ~~Maintain Leave~~ openings in the embankments at the bridge sites. Remove any material which invades these openings or existing channels without additional compensation to provide the same existing channel depth as before the construction of the embankment. Do not excavate or dredge any material within 200 feet of the toe of the proposed embankment.

**120-8.4 Reclaimed Asphalt Pavement (RAP) Method:**

**120-8.4.1 General:** Use only RAP material stored at facilities with an approved Florida Department of Environmental Protection Stormwater permit or, transferred directly from a milling project to the Department project. Certify the source if RAP material is from an identifiable Department project. Do not use RAP material in the following areas: construction areas that are below the seasonal high groundwater table elevation; MSE Wall backfill; underneath MSE Walls or the top 6 inches of embankment.

Prior to placement, submit documentation to the Engineer for his approval, outlining the proposed location of the RAP material.

**120-8.4.2 Soil and RAP Mixture:** Place the RAP material at the location and spread uniformly, using approved methods to obtain a maximum layer thickness of 4 inches. Mix this 4 inches maximum layer of RAP with a loose soil layer 8 to 10 inches thick. After mixing, meet all embankment utilization requirements of Standard Plans, Index 120-001 for the location used. The total RAP and other embankment material shall not exceed 12 inches per lift after mixing and compaction if the contractor can demonstrate that the density of the mixture can be achieved. Perform mixing using rotary tillers or other equipment meeting the approval of the Engineer. The Engineer will determine the order in which to spread the two materials. Mix both materials to the full depth. Ensure that the finished layer will have the thickness and shape required by the typical section. Demonstrate the feasibility of this construction method by successfully completing a 500 foot long test section.

**120-8.4.3 Alternate Soil and RAP Layer Construction:** Construct soil in 6 to 12 inch compacted lifts and RAP in alternate layers with 6 inch maximum compacted lifts. Use soil with a minimum LBR value of 40 to prevent failure during compaction of the overlying RAP layer. Demonstrate the feasibility of this construction method by successfully completing a 500 foot long test section.

**120-9 Compaction Requirements.**

**120-9.1 Moisture Content:** Compact the materials at a moisture content such that the specified density can be attained. If necessary to attain the specified density, add water to the material, or lower the moisture content by manipulating the material or allowing it to dry, as is appropriate.

**120-9.2 Compaction of Embankments:**

**120-9.2.1 General:** Uniformly compact each layer, using equipment that will achieve the required density, and as compaction operations progress, shape and manipulate each layer as necessary to ensure uniform density throughout the embankment.

**120-9.2.2 Compaction Over Unstable Foundations:** Where the embankment material is deposited in water or on low swampy ground, and in a layer thicker than 12 inches (as provided in 120-8.2.2), compact the top 6 inches (compacted thickness) of such layer to the density as specified in 120-10.2.

**120-9.2.3 Compaction Where Plastic Material Has Been Removed:** Where unsuitable material is removed and the remaining surface is of the A-4, A-5, A-6, or A-7 Soil Groups (see AASHTO M145), as determined by the Engineer, compact the surface of the

excavated area by rolling with a sheepsfoot roller exerting a compression of at least 250 psi on the tamper feet, for the full width of the roadbed (subgrade and shoulders). Perform rolling before beginning any backfill, and continue until the roller feet do not penetrate the surface more than 1 inch. Do not perform such rolling where the remaining surface is below the normal water table and covered with water. Vary the procedure and equipment required for this operation at the discretion of the Engineer.

**120-9.2.4 Compaction of Grassed Shoulder Areas:** For the upper 6 inch layer of all shoulders which are to be grassed, since no specific density is required, compact only to the extent [needed for planting](#) ~~directed~~.

**120-9.2.5 Compaction of Grassed Embankment Areas:** Do not compact the outer layers of any embankments where plant growth will be established. Leave this layer in a loose condition to a minimum depth of 6 inches for the subsequent seeding or planting operations. Do not place RAP or RAP blended material within the top 12 inches of areas to be grassed.

**120-9.3 Compaction for Pipes, Culverts, etc.:** Compact the backfill of trenches to the densities specified for embankment or subgrade, as applicable, and in accordance with the requirements of 125-9.2.

Thoroughly compact embankments over and around pipes, culverts, and bridges in a manner which will not place undue stress on the structures, and in accordance with the requirements of 125-9.2.

**120-9.4 Compaction of Subgrade:** If the Plans do not provide for stabilizing, compact the subgrade [as defined in 1-3](#) in both cuts and fills, to the density specified in 120-10.2. For cut areas, determine Standard Proctor Maximum Density in accordance with FM 1-T099 at a frequency of one per mile or when there is a change in soil type, whichever occurs first. For undisturbed soils, do not apply density requirements where constructing paved shoulders 5 feet or less in width.

Where trenches for widening strips are not of sufficient width to permit the use of standard compaction equipment, perform compaction using vibratory rollers, trench rollers, or other type compaction equipment approved by the Engineer.

Maintain the required density until the base or pavement is placed on the subgrade.

## **120-10 Acceptance Program.**

### **120-10.1 General Requirements:**

**120-10.1.1 Initial Equipment Comparison:** Before initial production, perform an initial nuclear moisture density gauge comparison with the Verification and Independent Assurance (IA) gauges. When comparing the computed dry density of one nuclear gauge to a second gauge, three sets of calculations must be performed (IA to QC, IA to Verification, and QC to Verification). Ensure that the difference between any two computed dry densities does not exceed 2 lb/ft<sup>3</sup> between gauges from the same manufacturer, and 3 lb/ft<sup>3</sup> between gauges from different manufacturers. Repair or replace any gauge that does not compare favorably with the IA gauge.

Perform a comparison analysis between the QC nuclear gauge and the Verification nuclear gauge any time a nuclear gauge or repaired nuclear gauge is first brought to the project. Repair and replace any QC gauge that does not compare favorably with the Verification gauge at any time during the remainder of the project. Calibrate all QC gauges annually.

**120-10.1.2 Initial Production LOT:** Before construction of any production LOT, prepare a 500 foot initial control section consisting of one full LOT. Notify the Engineer in writing at least 24 hours prior to production of the initial control section. Perform all QC tests required in 120-10.1.4 **with the Engineer present**. ~~When the initial QC test results pass specifications, the Engineer will perform a Verification test to verify compliance with the specifications.~~ Do not begin constructing another LOT until successfully completing the initial production LOT. ~~The Engineer will notify the Contractor in writing of the initial production LOT approval within three working days after receiving the Contractor's QC data when test results meet the following conditions:~~

- ~~1. QC and Verification tests must meet the density requirements.~~
- ~~2. Difference between QC and Verification computed dry density results shall meet the requirements of 120-10.1.1.~~

If ~~QC Verification~~ test result fails the density requirements of 120-10.2, correct the areas of non-compliance. The QC and Verification tests will then be repeated.

**120-10.1.3 Density over 105%:** When a QC computed dry density results in a value greater than 105% of the applicable Proctor maximum dry density, the Engineer will perform an Independent Verification (IV) density test within 5 feet. If the IV density results in a value greater than 105%, the Engineer will investigate the compaction methods, examine the applicable Standard Proctor Maximum Density and material description. The Engineer may collect and test an IV Standard Proctor Maximum Density sample for acceptance in accordance with the criteria of 120-10.2.

#### **120-10.1.4 Quality Control (QC) Tests:**

##### **120-10.1.4.1 Standard Proctor Maximum Density Determination:**

Determine the QC standard Proctor maximum density and optimum moisture content by sampling and testing the material in accordance with the specified test method listed in 120-10.2.

**120-10.1.4.2 Density Testing Requirements:** Ensure compliance to the requirements of 120-10.2 by Nuclear Density testing in accordance with FM 1-T238. Determine the in-place moisture content for each density test. Use FM 1-T238, FM 5-507 (Determination of Moisture Content by Means of a Calcium Carbide Gas Pressure Moisture Tester), or ASTM D-4643 (Laboratory Determination of Moisture Content of Granular Soils by use of a Microwave Oven) for moisture determination.

**120-10.1.4.3 Soil Classification:** Perform soil classification tests on the sample collected in 120-10.1.4.1, in accordance with AASHTO T88, T89, T90, and FM 1-T267. Classify soils in accordance with AASHTO M145 in order to determine compliance with embankment utilization requirements as specified in Standard Plans, Index 120-001.

**120-10.1.5 Department Verification:** The Engineer will conduct Verification tests in order to accept all materials and work associated with 120-10.1.4. The Engineer will verify the QC results if they meet the Verification Comparison Criteria, otherwise the Engineer will implement Resolution procedures.

The Engineer will select test locations, including Station, Offset, and Lift, using a random number generator, based on the LOTs under consideration. Each Verification test evaluates all work represented by the QC testing completed in those LOTs.

In addition to the Verification testing, the Engineer may perform additional Independent Verification (IV) testing. The Engineer will evaluate and act upon the IV test results in the same manner as Verification test results.



When the project requires less than four QC tests per material type, the Engineer reserves the right to accept the materials and work through visual inspection.

**120-10.1.6 Reduced Testing Frequency:** Obtain the Engineer's written approval for the option to reduce density testing frequency to one test every two LOTs if Resolution testing was not required for 12 consecutive verified LOTs, or if Resolution testing was required, but the QC test data was upheld and all substantiating tests are recorded in the [Earthwork Records System \(ERS\)](#).

Generate random numbers based on the two LOTs under consideration. When QC test frequency is reduced to one every two LOTs, obtain the Engineer's approval to place more than one LOT over an untested LOT. Assure similar compaction efforts for the untested LOTs. If the Verification test fails, and QC test data is not upheld by Resolution testing, the QC testing will revert to the original frequency of one QC test per LOT. Do not apply reduced testing frequency in construction of shoulder-only areas, shared use paths, sidewalks, and first and last lift.

**120-10.1.7 Payment for Resolution Tests:** If the Resolution laboratory results compare favorably with the QC results, the Department will pay for Resolution testing. No additional compensation, either monetary or time, will be made for the impacts of any such testing.

If the Resolution laboratory results do not compare favorably with the QC results, the costs of the Resolution testing will be deducted from monthly estimates. No additional time will be granted for the impacts of any such testing.

**120-10.2 Acceptance Criteria:** Obtain a minimum QC density of 100% of the standard Proctor maximum density as determined by FM 1-T099, Method C, with the following exceptions: embankment constructed by the hydraulic method as specified in 120-8.3; material placed outside the standard minimum slope as specified in 120-8.2.4 except when a structure is supported on existing embankment; and, other areas specifically excluded herein.

**120-10.3 Additional Requirements:**

**120-10.3.1 Frequency:** Conduct QC sampling and testing at a minimum frequency listed in Table 120-2 below. The Engineer will perform Verification sampling and tests at a minimum frequency listed in Table 120-2 below.

Test Name	Quality Control	Verification	Verification of Shoulder-Only Areas, Shared Use Paths, and Sidewalks
Standard Proctor Maximum Density	One per soil type	One per soil type	One per soil type
Density	One per LOT	One per four LOTS and for wet conditions, the first lift not affected by water	One per two LOTs
Soil Classification and Organic Content	One per Standard Proctor Maximum Density	One per Standard Proctor Maximum Density	One per Standard Proctor Maximum Density

**120-10.3.2 Test Selection and Reporting:** Determine test locations including stations and offsets, using the random number generator approved by the Engineer. Do not use notepads or worksheets to record data for later transfer to the Density Log Book. Notify the Engineer upon successful completion of QC testing on each LOT prior to placing another lift on top.

**120-10.4 Verification Comparison Criteria and Resolution Procedures:**

**120-10.4.1 Standard Proctor Maximum Density Determination:** The Engineer will verify the QC results if the results compare within 4.5 lb/ft<sup>3</sup> of the Verification test result. Otherwise, the Engineer will take one additional sample of material from the soil type in question. The State Materials Office (SMO) or an AASHTO accredited laboratory designated by the SMO will perform Resolution testing. The material will be sampled and tested in accordance with FM 1-T099, [Method C](#).

The Engineer will compare the Resolution test results with the QC test results. If all Resolution test results are within 4.5 lb/ft<sup>3</sup> of the corresponding QC test results, the Engineer will use the QC test results for material acceptance purposes for each LOT with that soil type. If the Resolution test result is not within 4.5 lb/ft<sup>3</sup> of the Contractor's QC test, the Verification test result will be used for material acceptance purposes.

**120-10.4.2 Density Testing:** When a Verification or IV density test fails the acceptance criteria, retest the site within a 5 foot radius and the following actions will be taken:

1. If the QC retest meets the acceptance criteria and meets the 120-10.1.1 criteria when compared with the Verification or IV test, the Engineer will accept those LOTs.

2. If the QC retest does not meet the acceptance criteria and compares favorably with the Verification or IV test, rework and retest the LOT. The Engineer will re-verify those LOTs.

3. If the QC retest and the Verification or IV test do not compare favorably, complete a new comparison analysis as defined in 120-10.1.1. Once acceptable comparison is achieved, retest the LOTs. The Engineer will perform new verification testing. Acceptance testing will not begin on a new LOT until the Contractor has a gauge that meets the comparison requirements.

Record QC test results in the density logbook on approved Department forms provided by the Engineer. Submit the original, completed density logbook to the Engineer at final acceptance.

**120-10.4.3 Soil Classification:** The Engineer will verify the QC test results if the Verification and the QC test results both match the soil utilization symbol listed in Standard Plans, Index 120-001. Otherwise, the Engineer will test the sample retained for Resolution testing. The SMO or an AASHTO accredited laboratory designated by the SMO will perform the Resolution testing. The material will be sampled and tested in accordance with AASHTO T88, T89, and T90, and classified in accordance with AASHTO M145.

The Engineer will compare the Resolution test results with the QC test results. If the Resolution test matches the QC soil utilization symbol, the Engineer will use the QC soil utilization symbol for material acceptance purposes. If the Resolution test result does not match the Contractor's QC soil utilization symbol, the Verification test results will be used for material acceptance purposes.

**120-10.4.4 Organic Content:** The Engineer will verify the QC test results if the Verification test results satisfy the organic content test criteria in Standard Plans, Index 120-001.

Otherwise, the Engineer will test the sample retained for Resolution testing. The SMO or an AASHTO accredited laboratory designated by the SMO will perform Resolution testing. The material will be sampled and tested in accordance with FM 1-T267. If the Resolution test results satisfy the required criteria, material of that soil type will be verified and accepted. If the Resolution test results do not meet the required criteria, reject the material and reconstruct with acceptable material.

**120-10.5 Disposition of Defective Materials:** Assume responsibility for removing and replacing all defective material, as defined in Section 6.

Alternately, submit an Engineering Analysis Scope in accordance with 6-4 to determine the disposition of the material.

### **120-11 Maintenance and Protection of Work.**

While construction is in progress, maintain adequate drainage for the roadbed at all times. Maintain a shoulder at least 3 feet wide adjacent to all pavement or base construction in order to provide support for the edges.

Maintain all earthwork construction throughout the life of the Contract, and take all reasonable precautions to prevent loss of material from the roadway due to the action of wind or water. Repair, at no expense to the Department except as otherwise provided herein, any slides, washouts, settlement, subsidence, or other mishap which may occur prior to final acceptance of the work. Perform maintenance and protection of earthwork construction in accordance with Section 104.

Maintain all channels excavated as a part of the Contract work against natural shoaling or other encroachments to the lines, and grades, ~~and cross-sections~~ shown in the Plans, until final acceptance of the project.

### **120-12 Construction.**

**120-12.1 Construction Tolerances:** Shape the surface of the earthwork to conform to the lines, and grades, and ~~cross-sections~~ shown in the Plans. In final shaping of the surface of earthwork, maintain a tolerance of 0.3 foot above or below the finished graded surface ~~cross-section~~ with the following exceptions:

1. Shape the surface of shoulders to within 0.1 foot of the finished graded surface ~~cross-section~~ shown in the Plans.
2. Shape the earthwork to match adjacent pavement, curb, sidewalk, structures, etc.
3. Shape the bottom of conveyance ditches so that the ditch impounds no water.
4. When the work does not include construction of base or pavement, shape the entire roadbed (shoulder point to shoulder point) to within 0.1 foot above or below the Plan finished graded surface ~~cross-section~~.
5. When the work includes permitted linear stormwater management facilities, shape the swales and ditch blocks to within 0.1 foot of the finished graded surface ~~cross-section~~ shown in the Plans.

Ensure that the shoulder lines do not vary horizontally more than 0.3 foot from the true lines shown in the Plans.

**120-12.2 Operations Adjacent to Pavement:** Carefully dress areas adjacent to pavement areas to avoid damage to such pavement. Complete grassing of shoulder areas prior to placing the final wearing course. Do not manipulate any embankment material on a pavement surface.

When shoulder dressing is underway adjacent to a pavement lane being used to maintain traffic, exercise extreme care to avoid interference with the safe movement of traffic.

### **120-13 Method of Measurement.**

**120-13.1 General:** When payment for excavation is on a volumetric basis, the quantity to be paid for will be the volume, in cubic yards. The material will be measured in its original position by field survey or by photogrammetric means as designated by the Engineer, unless otherwise specified under the provisions for individual items.

~~Where subsoil excavation extends outside the lines shown in the Plans or authorized by the Engineer including allowable tolerances, and the space is backfilled with material obtained in additional authorized roadway or borrow excavation, the net fill, plus shrinkage allowance, will be deducted from the quantity of roadway excavation or borrow excavation to be paid for, as applicable.~~

The quantity of all material washed, blown, or placed beyond the limits of the finished graded surface ~~authorized roadway cross section~~ will be determined by the Engineer and will be ~~excluded~~ ~~deducted~~ from the quantity of roadway excavation or borrow excavation to be paid for, as applicable.

~~Subsoil excavation that extends outside the lines shown in the Plans or authorized by the Engineer including allowable tolerances will be deducted from the quantity to be paid for as subsoil excavation.~~

**120-13.2 Roadway Excavation:** The measurement will include only the net volume of material excavated between the original ground line or finished graded surface ~~grading template~~ of an existing roadbed, as applicable, and the finished surface ~~grading template~~ of new pavement, except that the measurement will also include all unavoidable slides which may occur in connection with excavation classified as roadway excavation.

The pay quantity will be the plan quantity provided that the excavation was accomplished in substantial compliance with the plan dimensions and subject to the provisions of 9-3.2 and 9-3.4. On designated 3-R Projects, regular excavation will be paid for at the Contract lump sum price provided that the excavation was accomplished in substantial compliance with the plan dimension.

**120-13.3 Borrow Excavation:** Measurement will be made on a loose volume basis, measured in trucks or other hauling equipment at the point of dumping on the road. If measurement is made in vehicles, level the material to facilitate accurate measurement.

Unsuitable material excavated from borrow pits where truck measurement is provided for and from any borrow pits furnished by the Contractor, will not be included in the quantity of excavation to be paid for.

**120-13.4 Lateral Ditch Excavation:** The measurement will include only material excavated within the lines and grades indicated in the Plans or as directed by the Engineer. The measurement will include the full ~~station to station length~~ shown in the Plans or directed by the Engineer and acceptably completed. Excavation included for payment under Section 125 will not be included in this measurement.

The pay quantity will be the plan quantity provided that the excavation was accomplished in substantial compliance with the plan dimensions and subject to the provisions of 9-3.2 and 9-3.4.

**120-13.5 Channel Excavation:** The measurement will include only material excavated within the lines and grades indicated in the Plans or in accordance with authorized Plan changes.

The measurement will include the full ~~station-to-station~~ length shown in the Plans including any authorized changes thereto.

If shoaling occurs subsequent to excavation of a channel and the Engineer authorized the shoaled material to remain in place, the volume of any such material remaining within the limits of channel excavation shown in the Plans will be deducted from the measured quantity of channel excavation.

**120-13.6 Subsoil Excavation:** The measurement will include only material excavated within the lines and grades indicated in the Plans (including the tolerance permitted therefore) or as directed by the Engineer.

When no item for subsoil excavation is shown in the Contract but subsoil excavation is subsequently determined to be necessary, such unanticipated subsoil excavation will be paid for as provided in Article 4-4.

**120-13.7 Embankment:** The plan quantity measurement will be at the plan quantity. ~~Where payment for embankment is not to be included in the payment for the excavation and is to be paid for on a cubic yard basis for the item of embankment, the measurement~~ will include material ~~actually placed above the original ground line or the finished grading template of an existing roadbed, as applicable, within the lines and grades indicated~~ within limits of or existing surface, to the finished graded surface as shown in the Plans, Standard Plans Index 120-001, or directed by the Engineer. Where embankment is constructed over an existing road, the embankment measurement will include only the material actually placed ~~above the existing base.~~ ~~If the pavement (flexible or rigid) and base are removed, the embankment measurement will include only the material actually placed above the finish grading template of the existing roadbed.~~ If there are authorized changes in plan dimensions or if errors in plan quantities are detected, plan quantity will be adjusted as provided in 9-3.2.

Any overrun or underrun of plan quantity for subsoil excavation which results in a corresponding increase or decrease in embankment will be considered as an authorized plan change for adjustment purposes as defined in 9-3.2.2.

No payment will be made for embankment material used to replace unsuitable material excavated beyond the lines and grades shown in the Plans or ordered by the Engineer.

In no case will payment be made for material allowed to run out of the embankment on a flatter slope than indicated on the Plans ~~cross-section~~. The Contractor shall make his own estimate on the volume of material actually required to obtain the pay section.

## **120-14 Basis of Payment.**

**120-14.1 General:** Prices and payments for the various work items included in this Section will be full compensation for all work described herein, including excavating, dredging, pumping, hauling, placing, and compacting; dressing the surface of the earthwork; maintaining and protecting the complete earthwork; ~~and hauling~~.

The Department will not allow extra compensation for any reworking of materials. The Department will compensate for the cost of grassing or other permanent erosion control measures directed by the Engineer as provided in the Contract ~~for similar items of roadway work~~.

### **120-14.2 Excavation:**

**120-14.2.1 Items of Payment:** When no classification of material is indicated in the Plans, and bids are taken only on regular excavation, the total quantity of all excavation specified under this Section will be paid for at the Contract unit price for regular excavation.

When separate classifications of excavation are shown in the proposal, the quantities of each of the various classes of materials so shown will be paid for at the Contract unit prices per cubic yard for regular excavation, lateral ditch excavation, subsoil excavation, and channel excavation, as applicable, and any of such classifications not so shown will be included under the item of regular excavation (except that if there is a classification for lateral ditch excavation shown and there is no classification for channel excavation, any channel excavation will be included under the item of lateral ditch excavation). As an exception on designated projects, regular excavation will be paid for at the Contract lump sum price.

**120-14.2.2 Basic Work Included in Payments:** Prices and payments will be full compensation for all work described under this Section, except for any excavation, or embankment which is specified to be included for payment under other items. Such prices and payments will include hauling; any reworking that may be necessary to accomplish final disposal as shown in the Plans; the dressing of shoulders, ditches and slopes; removal of trash, vegetation, etc., from the previously graded roadway where no item for clearing and grubbing is shown in the Plans; and compacting as required.

**120-14.2.3 Additional Depth of Subsoil Excavation:** Where subsoil excavation is made to a depth of 0 to 5 feet below the depth shown in the Plans, such excavation will be paid for at the unit price bid.

Where subsoil excavation is made to a depth greater than 5 feet, and up to 15 feet, deeper than the depth shown in the Plans, such excavation will be paid for at the unit price bid plus 25% of such unit price. Additional extra depth, more than 15 feet below such plan depth, will be considered as a change in the character of the work and will be paid for as unforeseeable work.

Where no subsoil excavation is shown in a particular location on the original Plans, payment for extra depth of subsoil will begin 5 feet below the lowest elevation on the finished graded surface~~grading template~~.

**120-14.2.4 Borrow Excavation:** When the item of borrow excavation is included in the Contract, price and payment will also include the cost of furnishing the borrow areas and any necessary clearing and grubbing thereof, the removal of unsuitable material that it is necessary to excavate in order to obtain suitable borrow material, and also the costs incurred in complying with the provisions of 120-6.3.

**120-14.2.5 Materials Excluded from Payment for the Excavation:** No payment for excavation will be made for any excavation covered for payment under the item of embankment.

No payment will be made for the excavation of any materials which is used for purposes other than those shown in the Plans or designated by the Engineer. No payment will be made for materials excavated outside the lines and grades given by the Engineer, unless specifically authorized by the Engineer. As an exception, in operations of roadway excavation, all slides and falls of insecure masses of material beyond the regular slopes that are not due to lack of precaution on the part of the Contractor, will be paid for at the Contract unit price for the material involved. The removal of slides and falls of material classified as lateral ditch excavation or as subsoil excavation will not be paid for separately, but will be included in the Contract unit price for the pay quantity of these materials, measured as provided in 120-14.

**120-14.3 Embankment:**

**120-14.3.1 General:** Price and payment will be full compensation for all work specified in this Section, including all material for constructing the embankment, all excavating, dredging, pumping, placing and compacting of material for constructing the embankment complete, dressing of the surface of the roadway, maintenance and protection of the completed earthwork, and the removal of rubbish, vegetation, etc., from the roadway where no clearing and grubbing of the area is specified in the Plans. Also, such price and payment, in each case, will specifically include all costs of any roadway, lateral ditch, or channel excavation, unless such excavation is specifically shown to be paid for separately, regardless of whether the materials are utilized in the embankment.

**120-14.3.2 Excluded Material:** No payment will be made for the removal of muck or overburden from the dredging or borrow areas. No payment will be made ~~for embankment material used to replace muck or other unsuitable material excavated~~ beyond the lines and grades shown in the Plans or ordered by the Engineer.

**120-14.3.3 Clearing and Grubbing:** No payment will be made for any clearing and grubbing of the borrow or dredging areas. Where no clearing and grubbing of such areas is specified in the Plans, the cost of any necessary clearing and grubbing will be included in the Contract unit or lump sum price for Embankment.

**120-14.3.4 Cost of Permits, Rights, and Waivers:** Where the Contractor provides borrow or dredging areas of his own choosing, the cost of securing the necessary permits, rights or waivers will be included in the Contract price for embankment.

**120-14.4 Payment Items:** Payment will be made under:

- |                   |   |
|-------------------|---|
| Item No. 120- 1-  | Regular Excavation - per cubic yard.          |
| Item No. 120- 2-  | Borrow Excavation - per cubic yard.           |
| Item No. 120- 3-  | Lateral Ditch Excavation - per cubic yard.    |
| Item No. 120- 4-  | Subsoil Excavation - per cubic yard.          |
| Item No. 120- 5-  | Channel Excavation - per cubic yard.          |
| Item No. 120- 6-  | Embankment - per cubic yard.                  |
| Item No. 120- 71- | Regular Excavation (3-R Projects) - lump sum. |



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

February 3, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **125**  
Proposed Specification: **1251300 Excavation for Structures and Pipe.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Melissa Hollis from the Product Evaluation Office to eliminate the inconsistent use of the 125- pay item; all excavation will be paid in accordance with Section 120.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



## EXCAVATION FOR STRUCTURES AND PIPE (REV 8-18-21)

ARTICLE 125-13 is deleted and the following substituted:

### 125-13 Method of Measurement.

~~When direct payment for excavation for structures is provided in the proposal, and such payment is on a unit basis, the basis of payment is the cubic yard volume of the material excavated below the original ground line or stream bed, but not including that shown in the Plans to be paid for either as regular excavation, subsoil excavation, lateral ditch excavation or channel excavation, or which is included in the item for grading, and except that no payment will be made for material removed in excavating for footings or foundations outside of an area which is bounded by vertical planes 12 inches outside of the limits of the footing and parallel thereto. For pipe trenches the width used to be in the calculation shall be the diameter of the pipe, plus 24 inches. No separate measurement or payment will be made for work under this Section.~~

ARTICLE 125-14 is deleted and the following substituted:

### 125-14 Basis of Payment.

Payment for excavation of bridge structures will be made under Section 120. Payment for excavation of drainage system items will be incidental to those items.

~~**125-14.1 When No Direct Payment Provided:** When direct payment for excavation for structures is not provided for in the proposal, all work specified in this Section, other than as specified in 125-14.3 through 125-14.7, shall be included in the Contract price for the concrete or for other items covering the applicable structure.~~

~~**125-14.2 Direct Payment:** When direct payment for work under this Section is provided, the Contract price per cubic yard (measured as provided in 125-13), as shown in the proposal, shall be full compensation for all the work specified in this Section, except such work as is specifically stipulated to be paid for separately, in 125-14.3 through 125-14.7.~~

~~**125-14.3 Excavation Below Plan Grade:** When excavation of material below plan grade is called for in the Plans or authorized by the Engineer, and payment for Excavation for Structures is on a cubic yard basis, the material excavated below plan grade will be included in the measurement for this item.~~

~~Payment for the material used for the backfill will be made as specified in 125-14.7.~~

~~**125-14.4 Strengthening Foundations:** The work of strengthening the foundations (as provided in 125-4.2) shall be paid for as provided in 4-4, unless such work is covered by a bid item.~~

~~**125-14.5 Backfilling for Additional Support:** The work of providing additional support by backfilling with sand or other satisfactory material, where called for by the Engineer (as specified in 125-8), shall be paid for as provided in 4-4.~~

~~**125-14.6 Removal and Replacement of Existing Pavement:** For pavement, curb, etc., which is removed only in order to construct pipe culverts or storm sewers, as specified in 125-11, all costs of such removal and replacement shall be included in the costs of the pipe or other structure for which it is removed, unless otherwise provided for in the contract.~~

~~—————~~ **125-14.7 Removal and Replacement of Material Unsuitable for Backfill:** When it cannot reasonably be anticipated from information contained in the Plans, that material excavated for the structure will be unsuitable for use as backfill, and such material proves to be unsuitable for this use, the work of disposing of such material away from the site will be paid for as Unforeseeable Work, and the work of bringing in substitute material for the backfill will be paid for as specified for the particular case shown below:

~~—————~~ 1. No additional payment will be made for backfill materials obtained from surplus material available from the normal excavation or grading operations.

~~—————~~ 2. When the necessary material is not available from the normal excavation or grading operations, and the Contract includes an item for borrow excavation, backfill material authorized to be obtained from designated borrow areas will be included in the volume of borrow excavation to be paid for.

~~—————~~ 3. When the necessary material is not available from the normal excavation or grading operations and no separate item for borrow excavation is included in the Contract, any backfill material obtained by increasing the volume of excavation within the roadway right of way will be measured and paid for as regular excavation subject to the provisions of 9-3.2.2.

~~—————~~ 4. When authorization is given for obtaining the material from outside the right of way and from other than designated borrow areas, such excavation will be paid for as unforeseeable work.

~~—————~~ 5. Where pipe bedding is provided, as specified in 125-8, by the use of select granular material, the quantity of such select material obtained either as commercial material or from material from the grading operations other than in the immediate vicinity of the pipe to be bedded, as authorized by the Engineer, will be paid for at the Contract price per cubic yard for select bedding material. No payment for this material will be made for material available from the excavation for the pipe culvert or from other material available from the grading operations at a location not sufficiently remote as to require loading on trucks.

~~—————~~ **125-14.8 Pay Items:** Payment for the work under this Section, when provided for directly, shall be made under:

~~Item No. 125-1 Excavation for Structures per cubic yard~~ ~~Item No. 125-3 Select Bedding Material per cubic yard.~~



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 18, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **160**  
Proposed Specification: **1600405 Stabilizing.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Dino Jameson from the State Materials Office to add resolution for LOT based testing.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**STABILIZING**  
**(REV 10-11-21)**

SUBARTICLE 160-4.5.2 is deleted and the following substituted:

**160-4.5.2 Modified Proctor Maximum Density Determination:** ~~Meet the requirements of 120-10.4.1 except replace FM 1-T099 with FM 1-T180.~~ The Engineer will randomly select one of the retained split samples referenced in 160-4.1.4.1. The Engineer will compare the Verification test results to the corresponding Quality Control (QC) test results. If the test result is within 4.5 lb/ft<sup>3</sup> of the QC test result, the LOTs will be verified. Otherwise, the Engineer will collect the Resolution split sample corresponding to the Verification sample tested. The State Materials Office or an AASHTO accredited laboratory designated by the State Materials Office will perform Resolution testing. The material will be sampled and tested in accordance with FM 1-T180.

The Engineer will compare the Resolution Test (RT) results with the QC test results. If the RT result is within 4.5 lb/ft<sup>3</sup> of the corresponding QC test result, the Engineer will use the QC test results for material acceptance purposes for each corresponding pair of LOTs. If the RT result is not within 4.5 lb/ft<sup>3</sup> of the corresponding QC test, the Engineer will collect and test the remaining Verification split samples for the LOTs in question. Verification test results will be used for material acceptance purposes for the remaining LOTs in question.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

February 3, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **200**  
Proposed Specification: **2000202 Rock Base.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Dino Jameson from the State Materials Office to include milling not permissible for reusing limerock and linked the acceptance program language to Section 120 that was missing through the evolution of 120 specs.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**ROCK BASE**  
**(REV 10-19-21)**

SUBARTICLE 200-2.2 is deleted and the following substituted:

**200-2.2 Existing Rock:** Meet the following requirements for use of existing rock on the same project:

1. Notify the Engineer in writing prior to excavating existing rock. Do not mill any existing rock from the roadway.
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.
3. The Engineer will coordinate the review of the “Plan” with the District Materials Office.
4. Upon the Engineer’s review of the “Plan”, build a preliminary stockpile, not to exceed 1,000 cubic yards.
5. Collect and test a minimum of three samples from the preliminary stockpile. Once the stockpile has been sampled, do not add any additional material to the stockpile. Determine compliance with 200-2.1, with the exception of carbonate contents. Reject any stockpile if the Limerock Bearing Ratio (LBR) is less than 100. The Engineer District Materials Office will sample and test the preliminary stockpile to verify compliance with this Section.
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.
7. If the use of existing rock is approved, continue to produce additional stockpiles not exceeding 1,000 cubic yards. Ensure the rock meets the requirements of this Section by sampling and testing each new stockpile at a minimum frequency of one sample per 400 cubic yards. Once a stockpile has been sampled, do not add additional material to that stockpile. The District Materials Office may also perform sampling and testing. Materials will be accepted if test results meet the requirements of this Section.
8. After 10 consecutive quality control (QC) LBR test results meet the requirements of the Section and no individual LBR test is less than 120, the sampling and testing frequency may be reduced to a minimum frequency of one sample per 800 cubic yards for each stockpile. Notify the Engineer in writing prior to reducing testing frequency. If any QC LBR test result falls below 120 or a stockpile is rejected, revert to original sampling frequency of one sample per 400 cubic yards.

9. Construct a new preliminary stockpile if there is a change in material, conditions not addressed in the “Plan” are encountered, or if production varies from the approved “Plan”.

**200-7 Acceptance Program.**

**200-7.1 General Requirements:** Meet the requirements of 120-10, except exclude the requirements of 120-10.1.4.3, 120-10.3.1, 120-10.4.3, and 120-10.4.4. Use 200-7.3.1.1 instead of 120-10.1.4.1, 200-7.2 instead of 120-10.2, and 200-7.4.1 instead of 120-10.4.1~~use 200-7.2 instead of 120-10.2, 200-7.3 instead of 120-10.3 and 200-7.4 instead of 120-10.4.~~



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

February 9, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **200**  
Proposed Specification: **2000702 Rock Base.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Rich Hewitt from the State Construction Office to address issues with additional asphalt needed when earthwork base elevation is low or placed at cross slope different than design cross slope. The proposed specification is associated with the changes made to Section 234, 334, 337, 339, and 520.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



**ROCK BASE**(REV ~~2-8-22~~~~12-21-21~~)

SUBARTICLE 200-7.2.2 is deleted and the following substituted:

**200-7.2.2 Frequency:** Conduct QC sampling and testing at a minimum frequency listed in the table below. The Engineer will perform Verification sampling and tests at a minimum frequency listed in the table below.

Table 200-1 Mainline Pavement Lanes, Turn Lanes, Ramps, Parking Lots, Concrete Box Culverts and Retaining Wall Systems		
Test Name	Quality Control	Verification
Modified Proctor Maximum Density	One per eight consecutive LOTs	One per 16 consecutive LOTs
Density	One per LOT	One per four LOTs
Roadway Surface <u>and Cross Slope</u>	<del>Five</del> One per LOT	<del>Witness</del> One per two LOTs
Roadway Thickness	Three per LOT	Witness

Table 200-2 Shoulder-Only, Shared Use Path and Sidewalk Construction		
Test Name	Quality Control	Verification
Modified Proctor Maximum Density	One per two LOTs	One per four LOTs
Density	One per LOT	One per two LOTs
Surface <u>and Cross Slope</u>	<del>Five per 500 feet</del> One per LOT	<del>Witness</del> One per two LOTs
Thickness	Three per 1000 consecutive feet	Witness

SUBARTICLE 200-7.3.1.2 is deleted and the following substituted:

**200-7.3.1.2 Depth and Surface Testing Requirements:** Notify the Engineer a minimum of 24 hours before checking base depths and surface checking. Determine test locations including Stations and Offsets, using the Random Number generator approved by the Department. Do not perform depth and surface checks until the Engineer is present to witness. Enter test results into the Department's database. Perform thickness check on the finished base or granular subbase component of a composite base. Provide traffic control, coring/boring equipment, and an operator for the coring/boring equipment. Traffic control is to be provided in accordance with the standard maintenance of traffic requirements of the Contract.

The thickness is considered deficient, if the measured depth is over 1/2 inch less than the specified thickness. Correct all deficient areas of the completed base by scarifying and adding additional base material. As an exception, if authorized by the Department, such areas may be left in place without correction and with no payment.

~~Check the finished surface of the base course with a template cut to the required crown and with a 15 foot straightedge laid parallel to the centerline of the road. Correct all irregularities greater than 1/4 inch to the satisfaction of the Engineer by scarifying and removing or adding rock as required, and recompact the entire area as specified hereinbefore.~~

SUBARTICLE 200-7.4.4 is deleted and the following substituted:

**200-7.4.4 Thickness and Surface Testing Requirements:** Resolve deficiencies in accordance with 200-7.3.1.2.

SUBARTICLE 200-7.4 is expanded by the following new Subarticle:

**200-7.5 Cross Slope:** Construct base surface with cross slopes in compliance with the requirements of the Contract Documents. Furnish a level with a minimum length of 4 feet with a digital slope measuring device approved by the Engineer for the control of cross slope. Make this level or measuring device available at the jobsite at all times during base construction operations.

**200-7.5.1 Quality Control Requirements:** Measure the cross slope of the base surface by placing the measuring device perpendicular to the roadway centerline. Report the cross slope to the nearest 0.1%. Record all the measurements and submit to the Engineer for documentation. Measure the cross slope at a minimum frequency of one measurement per lot to ensure the cross slope is uniform and in compliance with the design cross slope. When the difference between the measured cross slope and the design cross slope exceeds  $\pm 0.2\%$  for travel lanes (including turn lanes) or  $\pm 0.5\%$  for shoulders, make all corrections in accordance with 200-7.5.3 to bring the cross slope into the acceptable range.

**200-7.5.2 Verification:** The Engineer will verify the Contractor's cross slope measurements by randomly taking one measurement every two lots. If the average cross slope of the ten random measurements varies more than the allowable tolerance from the design cross slope ( $\pm 0.2\%$  for travel lanes (including turn lanes) and  $\pm 0.5\%$  for shoulders), make corrections in accordance with 200-7.5.3 to bring the cross slope into the acceptable range. A recheck of the cross slope will be made following any corrections or additional work performed on the base surface. This process will be repeated until the base cross slope meets the requirements of this specification.

The Engineer may waive the corrections specified above (at no reduction in payment) if:

1. the deficiencies are sufficiently separated so as not to affect the overall ride quality, traffic safety and surface drainage characteristics of the pavement and;

2. the Contractor agrees to use asphalt to fill in areas where the earthwork is low at no additional cost to the Department greater than the 10% allowed in Sections 234, 334, 337, and 339.

For intersections, tapers, crossovers, transitions at beginning and end of project and similar areas, adjust the cross slope to match the actual site conditions or as directed by the Engineer.

**200-7.5.3 Cross Slope Corrections:** Correct all cross slopes out of tolerance per 200-7.5.1 and 200-7.5.2 in accordance with 200-7.3.1.2.

**200-7.5.4 Elevation Data Collection:** Within curb and gutter areas and in widening areas, measure and record elevation of finished surface of base course every 500 feet by measuring elevation of base adjacent to curb and gutter, as well as at each lane edge location. Provide the elevation measurements to the Engineer.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

February 9, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **234**  
Proposed Specification: **2340900 Superpave Asphalt Base.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Rich Hewitt from the State Construction Office to address issues with additional asphalt needed when earthwork elevation is low or placed at cross slope different than design cross slope. Raised maximum possible asphalt pay quantity by 5%. The proposed specification is associated with the changes made to Section 200, 334, 337, 339 and 520.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**SUPERPAVE ASPHALT BASE**  
**(REV 12-21-21)**

ARTICLE 234-9 is deleted and the following substituted:

**234-9 Method of Measurement.**

The quantity to be paid for will be the plan quantity. For each pay item, the pay area will be adjusted based upon the following formula:

Pay Area = Surface Area (actual tonnage placed/adjusted plan quantity tonnage).

Where: The adjusted plan quantity tonnage is calculated by multiplying the plan quantity square yards (including any Engineer approved quantity revisions) times the spread rate as defined in 234-8.1 and dividing by 2,000 pounds per ton, except the pay item's tonnage-weighted average  $G_{mm}$  is used instead of the design  $G_{mm}$  as defined in 234-8.1.

The pay area shall not exceed ~~105~~10% of the designed surface area.

Prepare and submit a Certification of Quantities to the Engineer in accordance with 9 2.1.2.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 27, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **300**  
Proposed Specification: **3000202 Prime and Tack Coats.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Wayne Rilko to remove EPR language, add criteria for distributor nozzle openings, and tack application requirements when using a spray paver in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**PRIME AND TACK COATS.**  
**(REV 10-12-21)**

SUBARTICLE 300-2.2 is deleted and the following substituted:

**300-2.2 Cover Material for Prime Coat:** Uniformly cover the primed base by a light application of cover material. ~~However, if using EPR 1 prime material, the Engineer may waive the cover material requirement if the primed base is not exposed to general traffic and construction traffic does not mar the prime coat so as to expose the base.~~ The Contractor may use either sand or screenings for the cover material. For the sand, meet the requirements as specified in 902-2 or 902-6, and for the screenings, meet the requirements as specified in 902-5. If the primed base course will be exposed to general traffic, apply a cover material coated with 2 to 4% asphalt cement. Apply the asphalt coated material at approximately 10 pounds per square yard. Roll the entire surface of asphalt coated prime material with a traffic roller as required to produce a reasonably dense mat.

SUBARTICLE 300-3.1 is deleted and the following substituted:

**300-3 Equipment.**

**300-3.1 Pressure Distributor:** Provide a pressure distributor equipped with pneumatic tires having a sufficient width of rubber in contact with the road surface to avoid breaking the bond or forming a rut in the surface. Ensure the distance between the centers of openings of the outside nozzles of the spray bar is equal to the width of the application required, plus or minus two inches. Ensure the outside nozzle at each end of the spray bar has an area of opening greater than the opening of an interior nozzle by not less than 25% or more than to 75% in excess of the other nozzles. Ensure all other nozzles have uniform openings. When the application covers less than the full width, the Contractor may allow the normal opening of the end nozzle at the junction line to remain the same as the interior nozzles. A trailer-mounted pressure distributor can be used for non-mainline applications, if approved by the Engineer. It shall have a self-contained heat system, clean out system, calibration chart, manhole, and shall meet the requirements herein.

Clean the distributor tank at a minimum of every twelve months and whenever the product type in the tank is changed. Remove all emulsion and asphalt material during cleaning. Additionally, clean the distributor tank if the quality of the tack or prime shot diminishes or buildup causes the calibration of the tank to be affected.

SUBARTICLE 300-8.5 is deleted and the following substituted:

**300-8.5 Curing and Time of Application:** When using a distributor, Apply tack coat sufficiently in advance of placing bituminous mix to permit drying, but do not apply tack coat so far in advance that it might lose its adhesiveness as a result of being covered with dust or other foreign material. When using a spray paver, the requirements above do not apply.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 27, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **320**  
Proposed Specification: **3200603 Hot Mix Asphalt - Plant Methods and Equipment.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Wayne Rilko to add the maximum temperature for polymer mixtures in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



**HOT MIX ASPHALT - PLANT METHODS AND EQUIPMENT.**  
**(REV 10-12-21)**

SUBARTICLE 320-6.3.3 is deleted and the following substituted:

**320-6.3.3 Rejection Criteria:** Reject any load or portion of a load of asphalt mix at the plant or at the roadway with a temperature outside of its respective master range shown in Table 320-2. Notify the Engineer of the rejection immediately. The maximum temperature for any load of mixture containing PG 76-22 PMA or High Polymer binder shall not exceed 355°F.

Table 320-2	
Mix Temperature Master Range Tolerance	
Location	Acceptable Temperature Tolerance
Plant	Mixing Temperature $\pm 30$ F*
Roadway (mix in truck)	Compaction Temperature $\pm 30$ F*
Roadway (mix in windrow)	Compaction Temperature $+30$ F*, $-40$ F
<u>*Not to exceed 355°F for mixtures containing PG 76-22 PMA or High Polymer binder.</u>	

Table 320-3	
Mix Temperature Tolerance from Verified Mix Design	
Any Single Measurement	$\pm 25$ F



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

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KEVIN J. THIBAUT, P.E.  
SECRETARY

January 10, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **330**  
Proposed Specification: **3300502 Hot Mix Asphalt - General Construction Requirements.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Rich Hewitt to eliminate manufacturer letter requirement and allow the contractor to select the repair method for high and low straightedge deficiencies in the structural course.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**HOT MIX ASPHALT - GENERAL CONSTRUCTION REQUIREMENTS.****(REV ~~142-1527~~-21)**

SUBARTICLE 330-5.2.3 is deleted and the following substituted:

**330-5.2.3 Screed Width:** Provide an asphalt paver with a screed width greater than 8 feet when required to pave full width lanes. Do not use extendable screed strike-off devices that do not provide preliminary compaction of the mat in place of fixed screed extensions. Use a strike-off device only on irregular areas that would normally be done by hand and on shoulders 5 feet or less in width. When using the strike-off device on shoulders, instead of an adjustable screed extension, demonstrate the ability to obtain acceptable texture, density, and thickness.

When using an extendable screed device to extend the screed's width on the full width lane or shoulder by 24 inches or greater, the Engineer will require an auger extension, paddle, or kicker device unless ~~written documentation from the manufacturer is submitted stating these are not necessary~~ the Contractor can demonstrate the ability to achieve an acceptable pavement with respect to density, surface texture, and pavement smoothness without such devices.

SUBARTICLE 330-9.5.1.1 is deleted and the following substituted:

**330-9.5.1.1 Structural Layers:** Correct all deficiencies, as defined in the Specifications, in the Type SP structural layers by removing and replacing the full depth of the layer, extending a minimum of 50 feet on both sides (where possible) of the defective area for the full width of the paving lane.

The following options only apply if the structural layer is not the final surface layer:

1. As an option for high and low straightedge deficiencies 5/16 of an inch or less, pave over with friction course to correct the deficiency.

2. As an option, for high straightedge deficiencies ~~only~~, mill the pavement surface the full lane width to a depth and length adequate to remove the deficiency. ~~This option only applies if the structural layer is not the final surface layer.~~

3. As an option for low straightedge deficiencies 8/16 of an inch or less, mill the pavement surface the full lane width to a depth and length adequate to remove the deficiency.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
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KEVIN J. THIBAUT, P.E.  
SECRETARY

January 6, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **334**  
Proposed Specification: **3340203 Superpave Asphalt Concrete.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Wayne Rilko to update test language and replace the warm mix hyperlink link in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**SUPERPAVE ASPHALT CONCRETE.****(REV 10-124-212)**

SUBARTICLE 334-2.3.3 is deleted and the following substituted:

**334-2.3.3 RAP Stockpile Approval:** Prior to the incorporation of RAP into the asphalt mixture, stockpile the RAP material and obtain approval for the stockpile by one of the following methods:

1. Continuous stockpile: When RAP is obtained from one or multiple sources and is either processed, blended, or fractionated, and stockpiled in a continuous manner, assure an adequate number of test results are obtained for stockpile approval. Test the RAP material for gradation and asphalt content at a minimum frequency of one sample per 1,000 tons with a minimum of six test results. Test the RAP material for  $G_{mm}$  (for  $G_{sb}$  determination) at a minimum frequency of one sample per 5,000 tons with a minimum of two test results. Based on visual inspection and a review of the test data, the Engineer will determine the suitability of the stockpiled material. In addition, address the details and specifics of the processing, sampling, testing and actions to be taken in the Producer Quality Control (QC) Plan.

When RAP is added to the continuous stockpile after original approval of the stockpile as described above, test the RAP material for gradation and asphalt content at a minimum frequency of one sample per 1,000 tons with a minimum of six test results. Test the RAP material for  $G_{mm}$  (for  $G_{sb}$  determination) at a minimum frequency of one sample per 5,000 tons with a minimum of two test results. Monitor test results during crushing operations for conformance to the requirements of Table 334-1. After the minimum frequency of tests have been performed, the Engineer will review the test data and visually inspect the stockpiled material. The average gradation and  $G_{mm}$  of the added material shall be within the allowable ranges shown in Table 334-1 from the originally approved stockpile values. If the added RAP material does not meet the conditions of Table 334-1, then the Contractor must create a new stockpile when resuming crushing operations and the stockpile will receive a new number designation from the Department. The previously crushed material, which was added to the continuous stockpile and did not meet the conditions of Table 334-1, may remain and that stockpile used until depleted.

Characteristic	Limit from Original Approved Stockpile Gradation
No. 8 sieve and coarser	± 6.0%
No. 16 sieve	± 5.0%
No. 30 sieve	± 5.0%
No. 50 sieve	± 4.0%
No. 100 sieve	± <del>3</del> 4.0%
No. 200 sieve	± 2.0%
$G_{mm}$	± 0.040

2. Non-continuous single stockpile: When an individual stockpile is being constructed, obtain representative samples at random locations and test the RAP material for gradation and asphalt content at a minimum frequency of one sample per 1,000 tons with a minimum of six test results. Test the RAP material for  $G_{mm}$  (for  $G_{sb}$  determination) at a minimum frequency of one sample per 5,000 tons with a minimum of two test results. Based on visual inspection and a review of the test data, the Engineer will determine the suitability of the stockpiled material. If the properties of the new stockpile compare with the properties of an existing stockpile within the ranges provided in Table 334-1, the RAP in the new stockpile may be added to the existing stockpile. Once the RAP stockpile has been approved, do not add additional material without prior approval of the Engineer.

Determine the asphalt binder content and gradation of the RAP material in accordance with FM 5-563 and FM 1-T 030, respectively. Establish the  $G_{sb}$  of the RAP material by using one of the following methods:

a. Calculate the  $G_{sb}$  value based upon the effective specific gravity ( $G_{se}$ ) of the RAP material, determined on the basis of the asphalt binder content and maximum specific gravity ( $G_{mm}$ ) of the RAP material. The Engineer will approve the estimated asphalt binder absorption value used in the calculation.

b. Measure the  $G_{sb}$  of the RAP aggregate, in accordance with FM 1-T 084 and FM 1-T 085. Obtain the aggregate by using a solvent extraction method.

ARTICLE 334-3 is deleted and the following substituted:

### **334-3 General Composition of Mixture.**

**334-3.1 General:** Compose the asphalt mixture using a combination of aggregate (coarse, fine or mixtures thereof), mineral filler, if required, and asphalt binder material. Size, grade and combine the aggregate fractions to meet the grading and physical properties of the mix design. Aggregates from various sources may be combined.

#### **334-3.2 Mix Design:**

**334-3.2.1 General:** Design the asphalt mixture in accordance with AASHTO R 35-17, except as noted herein. Prior to the production of any asphalt mixture, submit the proposed mix design with supporting test data indicating compliance with all mix design criteria to the Engineer. For all mix designs, include representative samples of all component materials, including asphalt binder. Allow the Director of the Office of Materials a maximum of four weeks to either conditionally verify or reject the mix as designed.

At no additional cost to the Department, for a Type SP mix the following Traffic Level substitutions are allowed:

Traffic Level E can be substituted for Traffic Level C.

Traffic Level C can be substituted for Traffic Level B.

The same traffic level and binder type that is used for the mainline traffic lanes may be placed in the shoulder at no additional cost to the Department, even if the conditions stated above are not met for the shoulder.

Do not use more than four mix designs per nominal maximum aggregate size per traffic level per binder grade per year, where the year starts at the Notice to Proceed. Exceeding this limitation will result in a maximum Composite Pay Factor (CPF) of 1.00 as defined in 334-8.2 for all designs used beyond this limit.

Warm mix technologies (additives, foaming techniques, etc.) listed on the Department's website may be used in the production of the mix. The URL for obtaining this information, if available, is: <https://www.fdot.gov/materials/mac/default.shtm>.  
<https://www.fdot.gov/materials/laboratory/asphalt/index.shtm>.

When warm mix technologies are used, for mixtures containing a PG 52-28, PG 58-22, or PG 67-22 binder, a mixture will be considered a warm mix asphalt design if the mixing temperature is 285°F or less. For mixtures containing a PG 76-22 or High Polymer binder, a mixture will be considered a warm mix asphalt design if the mixing temperature is 305°F or less.

The Engineer will consider any marked variations from original test data for a mix design or any evidence of inadequate field performance of a mix design as sufficient evidence that the properties of the mix design have changed, and the Engineer will no longer allow the use of the mix design.

**334-3.2.2 Mixture Gradation Requirements:** Combine the coarse and fine aggregate in proportions that will produce an asphalt mixture meeting all of the requirements defined in this specification and conform to the gradation requirements at design as defined in AASHTO M 323-17, Table 4. Aggregates from various sources may be combined.

**334-3.2.2.1 Mixture Gradation Classification:** Plot the combined mixture gradation on an FHWA 0.45 Power Gradation Chart. Include the Control Points from AASHTO M 323-17, Table 4, as well as the Primary Control Sieve (PCS) Control Point from AASHTO M 323-17, Table 5. Fine mixes are defined as having a gradation that passes above the primary control sieve control point and above the maximum density line for all sieve sizes smaller than the primary control sieve and larger than the No. 30 sieve.

**334-3.2.3 Aggregate Consensus Properties:** For Traffic Level C and E mixtures, meet the following consensus properties at design for the aggregate blend. Aggregate consensus properties do not apply to Traffic Level B mixtures.

**334-3.2.3.1 Coarse Aggregate Angularity:** When tested in accordance with ASTM D5821-13 (2017), meet the percentage of fractured faces requirements specified in AASHTO M 323-17, Table 6.

**334-3.2.3.2 Fine Aggregate Angularity:** When tested in accordance with AASHTO T 304-17 (2020), Method A, meet the uncompacted void content of fine aggregate specified in AASHTO M 323-17, Table 6.

**334-3.2.3.3 Flat and Elongated Particles:** When tested in accordance with ASTM D4791-19, (with the exception that the material passing the 3/8-inch sieve and retained on the No. 4 sieve shall be included), meet the requirements specified in AASHTO M 323-17, Table 6. Measure the aggregate using the ratio of 5:1, comparing the length (longest dimension) to the thickness (shortest dimension) of the aggregate particles.

**334-3.2.3.4 Sand Equivalent:** When tested in accordance with AASHTO T 176-17, meet the sand equivalent requirements specified in AASHTO M 323-17, Table 6.

**334-3.2.4 Gyrotory Compaction:** Compact the design mixture in accordance with AASHTO T 312-19, with the following exception: use the number of gyrations at  $N_{\text{design}}$  as defined in Table 334-4. Measure the inside diameter of gyrotory molds in accordance with AASHTO T 312-19.

Traffic Level	$N_{\text{design}}$ Number of Gyration
B	65
C	75
E	100

**334-3.2.5 Design Criteria:** Meet the requirements for nominal maximum aggregate size as defined in AASHTO M 323-17, as well as for relative density, VMA, VFA, and dust-to-binder ratio as specified in AASHTO M 323-17, Table 7.  $N_{\text{initial}}$  and  $N_{\text{maximum}}$  requirements are not applicable.

**334-3.2.6 Moisture Susceptibility:**

1. For all traffic levels, use a liquid anti-strip agent listed on the APL at the specified dosage rate. Hydrated lime may be used instead of the liquid anti-strip agent.
2. Provide a mixture having a retained tensile strength ratio of at least 0.80 and a minimum tensile strength (unconditioned) of 100 psi in accordance with FM 1-T 283.

**334-3.2.7 Additional Information:** In addition to the requirements listed above, provide the following information with each proposed mix design submitted for verification:

1. The design traffic level and the design number of gyrations ( $N_{\text{design}}$ ).
2. The source and description of the materials to be used.
3. The Department source number and the Department product code of the aggregate components furnished from a Department approved source.
4. The gradation and proportions of the raw materials as intended to be combined in the paving mixture. The gradation of the component materials shall be representative of the material at the time of use. Compensate for any change in aggregate gradation caused by handling and processing as necessary.
5. A single percentage of the combined mineral aggregate passing each specified sieve. Degradation of the aggregate due to processing (particularly material passing the No. 200 sieve) should be accounted for and identified.
6. The bulk specific gravity ( $G_{\text{sb}}$ ) value for each individual aggregate and RAP component, as identified in the Department's aggregate control program.
7. A single percentage of asphalt binder by weight of total mix intended to be incorporated in the completed mixture, shown to the nearest 0.1%.
8. A target temperature for the mixture at the plant (mixing temperature) and a target temperature for the mixture at the roadway (compaction temperature) in accordance with 320-6.3. Do not exceed a target temperature of 340°F for High Polymer asphalt binders, 330°F for PG 76-22 asphalt binders, and 315°F for unmodified asphalt binders.
9. Provide the physical properties at the optimum asphalt content, which must conform to all specified requirements.
10. The name of the Construction Training Qualification Program (CTQP) Qualified Mix Designer.
11. The ignition oven and maximum specific gravity ( $G_{\text{mm}}$ ) calibration factors.
12. The warm mix technology, if used.

**334-3.3 Mix Design Revisions:** During production, the Contractor may request a target value revision to a mix design, subject to meeting the following requirements: the target change



falls within the limits defined in Table 334-5, appropriate data exists demonstrating that the mix complies with production air voids specification criteria, and the mixture gradation meets the basic gradation requirements defined in 334-3.2.2.

Table 334-5 Limits for Potential Adjustments to Mix Design Target Values	
Characteristic	Limit from Original Mix Design
Asphalt Binder Content <sup>(1)</sup>	±0.3%
Gradation and Aggregate Component <sup>(2)</sup>	
No. 8 sieve and Coarser	± 5.0%
No. 16 sieve	± 4.0%
No. 30 sieve	± 4.0%
No. 50 sieve	± 3.0%
No. 100 sieve	± 3.0%
No. 200 sieve	± 1.0%
Each Component of Aggregate Blend	± 5.0 %
<sup>(1)</sup> Reductions to the asphalt binder content will not be permitted if the VMA during production is lower than 1.0% below the design criteria.	
<sup>(2)</sup> The Engineer may waive the limits for the individual sieves and component of the aggregate blend contingent upon the quality of the production data for the mixture. Revisions to FC-5 mixtures to be determined by the Engineer.	

Submit all requests for revisions to mix designs, along with supporting documentation, to the Engineer. In order to expedite the revision process, the request for revision or discussions on the possibility of a revision may be made verbally, but must be followed up by a written request. The verified mix design will remain in effect until the Engineer authorizes a change. In no case will the effective date of the revision be established earlier than the date of the first communication between the Contractor and the Engineer regarding the revision.

A new design mix will be required if aggregate sources change, or for any substitution of an aggregate product with a different aggregate code, unless approved by the Engineer.

SUBARTICLE 334-5.1.1 is deleted and the following substituted:

**334-5.1.1 Sampling and Testing Requirements:** Obtain the samples in accordance with FM 1-T 168. Obtain samples at the plant of a sufficient quantity to be split into three smaller samples; one for QC, one for Verification testing and one for Resolution testing. Obtain each split sample of a sufficient quantity, approximately 40 pounds, for all required testing. The split samples for Verification testing and Resolution testing shall be reduced in size and stored in three boxes each. The approximate size of each box must be 12 inches x 8 inches x 4 inches. Provide, label, and safely store sample boxes in a manner agreed upon by the Engineer for future testing.

The asphalt content of the mixture will be determined in accordance with FM 5-563. The gradation of the recovered aggregate will be determined in accordance with FM 1-T 030. Volumetric testing will be in accordance with AASHTO T 312-19 and FM 1-T 209. Prior to testing volumetric samples, condition the test-sized sample for one hour, plus or minus five minutes, at the target roadway compaction temperature in a shallow, flat pan, such

that the mixture temperature at the end of the one-hour conditioning period is within plus or minus 20°F of the roadway compaction temperature.

If one of the QC gyratory specimens is damaged, make an additional gyratory specimen.

For situations where two properly prepared gyratory specimens do not meet single-operator precision requirements for  $G_{mb}$  as provided in FM 1-T-166:

1. Retest both gyratory specimens in accordance FM 1-T-166.
2. Following the retest, if the newly measured  $G_{mb}$  values do not meet single-operator precision requirements, QC shall prepare a third gyratory specimen in accordance with AASHTO T 312-19 and test in accordance with FM 1-T-166. All three test results shall be input into MAC. The average  $G_{mb}$  will be determined by MAC after performing an outlier check in accordance with ASTM E178-16a.

Test for roadway density in accordance with FM 1-T 166.

**334-5.1.2 Acceptance Testing Exceptions:** When the total combined quantity of hot mix asphalt for the project, as indicated in the Plans for Type B-12.5, Type SP and Type FC mixtures only, is less than 2,000 tons, the Engineer will accept the mix on the basis of visual inspection. The Engineer may require the Contractor to run process control tests for informational purposes, as defined in 334-4, or may run independent verification tests to determine the acceptability of the material.

Density testing for acceptance will not be performed on widening strips or shoulders with a width of 5 feet or less, open-graded friction courses, variable thickness overbuild courses, leveling courses, any SP-9.5 or SP-12.5 asphalt layer placed on subgrade with a layer thickness less than or equal to 3-inches, miscellaneous asphalt pavement, shared use paths, crossovers, gore areas, raised crosswalks, speed tables, or any course with a specified thickness less than 1 inch or a specified spread rate that converts to less than 1 inch as described in 334-1.4. Density testing for acceptance will not be performed on asphalt courses placed on bridge decks or approach slabs; compact these courses in static mode only per the requirements of 330-7.7. In addition, density testing for acceptance will not be performed on the following areas when they are less than 500 feet (continuous) in length: turning lanes, acceleration lanes, deceleration lanes, shoulders, parallel parking lanes, ramps, or unsignalized side streets with less than four travel lanes and speed limits less than 35 mph. Do not perform density testing for acceptance in situations where the areas requiring density testing is less than 50 tons within a subplot.

Density testing for acceptance will not be performed in intersections. The limits of the intersection will be from stop bar to stop bar for both the mainline and side streets. A random core location that occurs within the intersection shall be moved forward or backward from the intersection at the direction of the Engineer.

Where density testing for acceptance is not required, compact these courses (with the exception of open-graded friction courses) in accordance with the rolling procedure (equipment and pattern) as approved by the Engineer or with Standard Rolling Procedure as specified in 330-7.2. In the event that the rolling procedure deviates from the procedure approved by the Engineer, or the Standard Rolling Procedure, placement of the mix shall be stopped.

The density pay factor (as defined in 334-8.2) for areas not requiring density testing for acceptance will be paid at the same density pay factor as for the areas

requiring density testing within the same LOT. If the entire LOT does not require density testing for acceptance, the LOT will be paid at a density pay factor of 1.00.

SUBARTICLE 334-5.9.5 is deleted and the following substituted:

**334-5.9.5 Defective Material:** Assume responsibility for removing and replacing all defective material placed on the project, at no cost to the Department.

As an exception to the above and upon approval of the Engineer, obtain an engineering analysis in accordance with Section 6 by an independent laboratory (as approved by the Engineer) to determine the disposition of the material. The engineering analysis must be signed and sealed by a Professional Engineer licensed in the State of Florida.

The Engineer may determine that an engineering analysis is not necessary or may perform an engineering analysis to determine the disposition of the material.

Any material that remains in place will be accepted with a CPF as determined by 334-8, or as determined by the Engineer.

If the defective material is due to a gradation, asphalt binder content or density failure, upon the approval of the Engineer the Contractor may perform delineation tests on roadway cores in lieu of an engineering analysis to determine the limits of the defective material that may require removal and replacement. Prior to any delineation testing, all sampling locations shall be approved by the Engineer. All delineation sampling and testing shall be monitored and verified by the Engineer. For materials that are defective due to air voids, an engineering analysis is required.

When evaluating defective material by engineering analysis or delineation testing, at a minimum, evaluate all material located between passing QC, PC or IV test results.

Any additional PC samples obtained in the same work shift after an IV sample has been obtained shall include enough material for three complete sets of tests (PC, IV and IV check samples) in the event the Contractor requests using the PC test results for engineering analysis or delineation. These additional PC samples must compare with verified IV test results as determined by the comparison process of 334-5.7.1 in order to be used for engineering analysis or delineation.

Exceptions to this requirement shall be approved by the Engineer.

SUBARTICLE 334-8.2.3 is deleted and the following substituted:

**334-8.2.3 Three or More Sublot Test Results:** When three or more sublot test results are available for a LOT, the variability-unknown, standard deviation method will be used to determine the estimated percentage of the LOT that is within the specification limits. The number of significant figures used in the calculations will be in accordance with requirements of AASHTO R 11-06/ASTM E29-13 (2019), Absolute Method.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

February 9, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **334**  
Proposed Specification: **3340700 Superpave Asphalt Concrete.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Rich Hewitt from the State Construction Office to address issues with additional asphalt needed when earthwork elevation is low or placed at cross slope different than design cross slope. Raised maximum possible asphalt pay quantity by 5%. The proposed specification is associated with the changes made to Section 200, 234, 337, 339 and 520.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**SUPERPAVE ASPHALT CONCRETE**  
**(REV 12-21-21)**

ARTICLE 334-7 is deleted and the following substituted:

**334-7 Method of Measurement.**

For the work specified under this Section (including the pertinent provisions of Sections 320 and 330), the quantity to be paid for will be the weight of the mixture, in tons. For each pay item, excluding overbuild, the pay quantity will be based on the quantity placed on the project, limited to ~~105~~10% of the adjusted plan quantity for the pay item. The adjusted plan quantity will be determined by dividing the pay item's original plan quantity (including any Engineer approved quantity revisions) by the design  $G_{mm}$  stated in 334-1.4, then multiplying it by the tonnage-weighted average  $G_{mm}$  of the mixes used for the pay item.

The bid price for the asphalt mix will include the cost of the liquid asphalt and the tack coat application as directed in 300-8. There will be no separate payment or unit price adjustment for the asphalt binder material in the asphalt mix. For the calculation of unit price adjustments of bituminous material, the average asphalt content will be based on the percentage specified in 9-2.1.2. The weight will be determined as provided in 320-3.2 (including the provisions for the automatic recordation system).

Prepare and submit a Certification of Quantities to the Engineer in accordance with 9-2.1.2.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 27, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **337**  
Proposed Specification: **3370201 Asphalt Concrete Friction Courses.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Wayne Rilko to update tables, add the warm mix hyperlink, and add language regarding production cessation in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**ASPHALT CONCRETE FRICTION COURSES.**  
**(REV 10-12-21)**

ARTICLE 337-2 is deleted and the following substituted:

**337-2 Materials.**

**337-2.1 General Requirements:** Meet the requirements specified in Division III as modified herein. The Engineer will base continuing approval of material sources on field performance. Warm mix technologies (additives, foaming techniques, etc.) listed on the Department's website may be used in the production of the mix. The URL for obtaining this information is: <https://www.fdot.gov/materials/mac/default.shtm>.  
<https://www.fdot.gov/materials/laboratory/asphalt/index.shtm>.

**337-2.2 Asphalt Binder:** Meet the requirements of Section 916, and any additional requirements or modifications specified herein for the various mixtures.

**337-2.3 Coarse Aggregate:** Meet the requirements of Section 901, and any additional requirements or modifications specified herein for the various mixtures.

**337-2.4 Fine Aggregate:** Meet the requirements of Section 902, and any additional requirements or modifications specified herein for the various mixtures.

**337-2.5 Hydrated Lime:** Meet the requirements of AASHTO M 303-~~89~~ (2019), Type 1. Provide certified test results for each shipment of hydrated lime indicating compliance with the specifications.

**337-2.6 Liquid Anti-Strip Additive:** Meet the requirements of 916-4 and be listed on the Department's Approved Product List (APL).

**337-2.7 Fiber Stabilizing Additive (Required for FC-5 only):** Use either a mineral or cellulose fiber stabilizing additive. Meet the following requirements:

**337-2.7.1 Mineral Fibers:** Use mineral fibers (made from virgin basalt, diabase, or slag) treated with a cationic sizing agent to enhance the disbursement of the fiber, as well as to increase adhesion of the fiber surface to the bitumen. Meet the following requirements for physical properties:

1. Size Analysis
  - Average fiber length: 0.25 inch (maximum)
  - Average fiber thickness: 0.0002 inch (maximum)
2. Shot Content (ASTM C612-~~19~~)
  - Percent passing No. 60 Sieve: 90 - 100
  - Percent passing No. 230 Sieve: 65 - 100

Provide certified test results for each batch of fiber material indicating compliance with the above tests.

**337-2.7.2 Cellulose Fibers:** Use cellulose fibers meeting the following requirements:

1. Fiber length: 0.25 inch (maximum)
2. Sieve Analysis
  - a. Alpine Sieve Method
    - Percent passing No. 100 sieve: 60-80
  - b. Ro-Tap Sieve Method
    - Percent passing No. 20 sieve: 80-95
    - Percent passing No. 40 sieve: 45-85

- Percent passing No. 100 sieve: 5-40
3. Ash Content: 18% non-volatiles (plus or minus 5%)
  4. pH: 7.5 (plus or minus 1.0)
  5. Oil Absorption: 5.0% (plus or minus 1.0) (times fiber weight)
  6. Moisture Content: 5.0% by weight (maximum)

Provide certified test results for each batch of fiber material indicating compliance with the above tests.

SUBARTICLE 337-4.1 is deleted and the following substituted:

**337-4 Mix Design.**

**337-4.1 FC-5:** The Department will design the FC-5 mixtures. Furnish the materials and all appropriate information (source, gradation, etc.) as specified in 334-3.2.7. The Department will have three weeks to design the mix.

The Department will establish the design binder content for FC-5 within the following ranges based on aggregate type:

<u>Table 337-2</u> <u>FC-5 Percent Binder Content</u>	
Aggregate Type	<u>Percent</u> Binder Content
Crushed Granite and/or Granitic Gneiss	5.5 - 7.5
Crushed Limestone and/or Shell Rock	6.0 - 8.0

SUBARTICLE 337-6.2 is deleted and the following substituted:

**337-6.2 FC-5:** Meet the requirements of 334-5 with the following exceptions:

1. The mixture will be accepted with respect to gradation (P<sub>-3/8</sub>, P<sub>-4</sub>, and P<sub>-8</sub>), and asphalt binder content (P<sub>b</sub>) only.
2. Testing in accordance with AASHTO T 312~~-19~~ and FM 1-T 209 (and conditioning prior to testing) will not be required as part of 334-5.1.1.
3. The standard LOT size of FC-5 will be 2,000 tons, with each LOT subdivided into four equal sublots of 500 tons each.
4. The Between-Laboratory Precision Values described in Table 334-7 are modified to include (P<sub>-3/8</sub>, P<sub>-4</sub>, and P<sub>-8</sub>) with a maximum difference per FM 1-T 030 (Figure 2).
5. Table 334-6 (Master Production Range) is replaced by Table 337-~~23~~.
6. The mixture will be accepted on the roadway with respect to surface tolerance in accordance with 334-5.8. No density testing will be required for these mixtures.

<u>Table 337-<del>23</del></u> <u>FC-5 Master Production Range</u>	
Characteristic	Tolerance (1)
Asphalt Binder Content (%)	Target ± 0.60
Passing 3/8 inch Sieve (%)	Target ± 7.50
Passing No. 4 Sieve (%)	Target ± 6.00



Table 337- <del>23</del> FC-5 Master Production Range	
Characteristic	Tolerance (1)
Passing No. 8 Sieve (%)	Target $\pm$ 3.50
(1) Tolerances for sample size of n = 1 from the verified mix design	

**337-6.2.1 Individual Test Tolerances for FC-5 Production:** Terminate the LOT if any of the following Quality Control (QC) failures occur:

1. An individual test result of a subplot for asphalt binder content does not meet the requirements of Table 337-~~23~~,

2. Two consecutive test results within the same LOT for gradation on any of the following sieve sizes (P- $\frac{3}{8}$ , P- $\frac{4}{4}$ , and P- $\frac{8}{8}$ ) do not meet the requirements of Table 337-~~23~~. The two consecutive failures must be on the same sieve.

When a LOT is terminated due to a QC failure, stop production of the mixture until the problem is resolved to the satisfaction of the QC Managers and/or Asphalt Plant Level II Technicians responsible for the decision to resume production after a QC failure, as identified in Section 105. In the event that it can be demonstrated that the problem can immediately be or already has been resolved, it will not be necessary to stop production. When a LOT is terminated, make all necessary changes to correct the problem. Do not resume production until appropriate corrections have been made. Inform the Engineer of the problem and corrections made to correct the problem. After resuming production, sample and test the material to verify that the changes have corrected the problem. Summarize this information and provide it to the Engineer prior to the end of the work shift when production resumes.

In the event that a QC failure is not addressed as defined above, the Engineer's approval will be required prior to resuming production after any future QC failures.

Address any material represented by a failing test result in accordance with 334-5.9.5. Any LOT terminated under this Subarticle will be limited to a maximum Pay Factor of 1.00 (as defined in 337-12.3) for each quality characteristic.

SUBARTICLE 337-9.1 is deleted and the following substituted:

### **337-9 Special Equipment Requirements for FC-5.**

**337-9.1 Fiber Supply System:** Use a separate feed system to accurately proportion the required quantity of fibers into the mixture in such a manner that uniform distribution is obtained. Interlock the proportioning device with the aggregate feed or weigh system to maintain the correct proportions for all rates of production and batch sizes. Control the proportion of fibers to within plus or minus 10% of the amount of fibers required. Provide flow indicators or sensing devices for the fiber system, interlocked with plant controls so that ~~the mixture production will be interrupted~~ **an alarm will be activated** if introduction of the fiber fails. **Stop production of the asphalt mixture and resume production once the fiber supply system is operating correctly.**

When a batch plant is used, add the fiber to the aggregate in the weigh hopper or as approved and directed by the Engineer. Increase the batch dry mixing time by 8 to 12 seconds, or as directed by the Engineer, from the time the aggregate is completely emptied into the pugmill. Ensure that the fibers are uniformly distributed prior to the addition of asphalt binder into the pugmill.

When a drum-mix plant is used, add and uniformly disperse the fiber with the aggregate prior to the addition of the asphalt binder. Add the fiber in such a manner that it will not become entrained in the exhaust system of the drier or plant.

SUBARTICLE 337-9.2 is deleted and the following substituted:

**337-9.2 Hydrated Lime Supply System:** For FC-5 mixes containing granite, use a separate feed system to accurately proportion the required quantity of hydrated lime into the mixture in such a manner that uniform coating of the aggregate is obtained prior to the addition of the asphalt binder. Add the hydrated lime in such a manner that it will not become entrained in the exhaust system of the drier or plant. Interlock the proportioning device with the aggregate feed or weigh system to maintain the correct proportions for all rates of production and batch sizes and to ensure that all mixture produced is properly treated with hydrated lime. Control the proportion of hydrated lime to within plus or minus 10% of the amount of hydrated lime required. Provide ~~and interlock~~ flow indicators or sensing devices for the hydrated lime system, interlocked with plant controls so that ~~the mixture production will be interrupted~~ an alarm will be activated if introduction of the hydrated lime fails. Stop production of the asphalt mixture and resume production once the hydrated lime supply system is operating correctly. The addition of the hydrated lime to the aggregate may be accomplished by Method A or B as follows:

**337-9.2.1 Method A - Dry Form:** Add hydrated lime in a dry form to the mixture according to the type of asphalt plant being used.

When a batch plant is used, add the hydrated lime to the aggregate in the weigh hopper or as approved and directed by the Engineer. Increase the batch dry mixing time by eight to twelve seconds, or as directed by the Engineer, from the time the aggregate is completely emptied into the pugmill. Uniformly distribute the hydrated lime prior to the addition of asphalt binder into the pugmill.

When a drum-mix plant is used, add and uniformly disperse the hydrated lime to the aggregate prior to the addition of the asphalt binder. Add the hydrated lime in such a manner that it will not become entrained in the exhaust system of the drier or plant.

**337-9.2.2 Method B - Hydrated Lime/Water Slurry:** Add the required quantity of hydrated lime (based on dry weight) in a hydrated lime/water slurry form to the aggregate. Provide a solution consisting of hydrated lime and water in concentrations as directed by the Engineer. Use a plant equipped to blend and maintain the hydrated lime in suspension and to mix it with the aggregates uniformly in the proportions specified.

ARTICLE 337-10 is deleted and the following substituted:

### **337-10 Failing Material.**

Meet the requirements of 334-5.9. For FC-5, use the Master Production Range defined in Table 337-~~23~~ in lieu of Table 334-6.

SUBARTICLE 337-12.3 is deleted and the following substituted:

**337-12 Basis of Payment.**

**337-12.1 General:** Price and payment will be full compensation for all the work specified under this Section (including the applicable requirements of Sections 320 and 330).

Based upon the quality of the material, a pay adjustment will be applied to the bid price of the material as determined on a LOT by LOT basis. The pay adjustment will be assessed by calculating a Pay Factor for individual quality characteristics. The pay adjustment will be computed by multiplying a Composite Pay Factor for the LOT by the bid price per ton.

**337-12.2 FC-9.5 and FC-12.5:** Meet the requirements of 334-8.

**337-12.3 FC-5:** Meet the requirements of 334-8 with the following exceptions:

1. Pay factors will be calculated for asphalt binder content and the percentages passing the 3/8 inch, the No. 4, and the No. 8 sieves only.

2. Table 337-~~34~~ replaces Table 334-8.

3. Table 337-~~45~~ replaces Table 334-9.

4. The Composite Pay Factor equation in 334-8.3 is replaced with the following:

$$CPF = [(0.20 \times PF \text{ 3/8 inch}) + (0.30 \times PF \text{ No. 4}) + (0.10 \times PF \text{ No. 8}) +$$

$$(0.40 \times PF \text{ AC})]$$

Table 337- <del>34</del> Small Quantity Pay Table for FC-5		
Pay Factor	1-Test Deviation	2-Test Average Deviation
Asphalt Binder Content (%)		
<u>1.05</u>	<u>0.00-0.25</u>	<u>0.00-0.18</u>
1.00	<del>0.00</del> <u>0.26-0.50</u>	<del>0.00</del> <u>0.19-0.35</u>
0.90	0.51-0.60	0.36-0.42
0.80	>0.60	>0.42
3/8 inch Sieve (%)		
<u>1.05</u>	<u>0.00-3.25</u>	<u>0.00-2.30</u>
1.00	<del>0.00</del> <u>3.26-6.50</u>	<del>0.00</del> <u>2.31-4.60</u>
0.90	6.51-7.50	4.61-5.30
0.80	>7.50	>5.30
No. 4 Sieve (%)		
<u>1.05</u>	<u>0.00-2.50</u>	<u>0.00-1.77</u>
1.00	<del>0.00</del> <u>2.51-5.00</u>	<del>0.00</del> <u>1.78-3.54</u>
0.90	5.01-6.00	3.55-4.24
0.80	>6.00	>4.24
No. 8 Sieve (%)		
<u>1.05</u>	<u>0.00-1.50</u>	<u>0.00-1.06</u>
1.00	<del>0.00</del> <u>1.51-3.00</u>	<del>0.00</del> <u>1.07-2.12</u>
0.90	3.01-3.50	2.13-2.47
0.80	>3.50	>2.47

Table 337-45  
Specification Limits for FC-5

Quality Characteristic	Specification Limits
Asphalt Binder Content (%)	Target $\pm$ 0.45
Passing 3/8 inch sieve (%)	Target $\pm$ 6.00
Passing No. 4 sieve (%)	Target $\pm$ 4.50
Passing No. 8 sieve (%)	Target $\pm$ 2.50



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

February 9, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **337**  
Proposed Specification: **3371100 Asphalt Concrete Friction Courses.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by when earthwork elevation is low or placed at cross slope different than design cross slope. Raised maximum possible asphalt pay quantity by 5%. The proposed specification is associated with the changes made to Section 200, 234, 334, 339, and 520.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**ASPHALT CONCRETE FRICTION COURSES**  
**(REV 12-21-21)**

ARTICLE 337-11 is deleted and the following substituted:

**337-11 Method of Measurement.**

For the work specified under this Section (including the pertinent provisions of Sections 320 and 330), the quantity to be paid for will be the weight of the mixture, in tons. For each pay item, the pay quantity will be based on the quantity placed on the project, limited to ~~105~~10% of the adjusted plan quantity for the pay item. For dense-graded mixes, the adjusted plan quantity will be determined by dividing the pay item's original plan quantity (including any Engineer approved quantity revisions) by the design  $G_{mm}$  stated in 334-1.4, then multiplying it by the tonnage-weighted average  $G_{mm}$  of the mixes used for the pay item. For open graded mixes, the adjusted plan quantity will be determined by dividing the pay item's original plan quantity (including any Engineer approved quantity revisions) by the design  $G_{sb}$  stated in 337-8.2, then multiplying it by the tonnage-weighted average  $G_{sb}$  of the mixes used for the pay item.

The bid price for the asphalt mix will include the cost of the asphalt binder (asphalt rubber (or polymer), asphalt cement, ground tire rubber, anti-stripping additive, blending and handling) and the tack coat application as directed in 300-8, as well as fiber stabilizing additive and hydrated lime (if required). There will be no separate payment or unit price adjustment for the asphalt binder material in the asphalt mix. The weight will be determined as provided in 320-3.2 (including the provisions for the automatic recordation system).

Prepare and submit a Certification of Quantities to the Engineer in accordance with 9-2.1.2.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

February 9, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **339**  
Proposed Specification: **3390700 Miscellaneous Asphalt Pavement.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Rich Hewitt from the State Construction Office to address issues with additional asphalt needed when earthwork elevation is low or placed at cross slope different than design cross slope. Raise maximum possible asphalt pay quantity by 5%. The proposed specification is associated with the changes made to Section 200, 234, 334, 337, and 520.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**MISCELLANEOUS ASPHALT PAVEMENT**  
**(REV 12-21-21)**

ARTICLE 339-7 is deleted and the following substituted:

**339-7 Method of Measurement.**

For the work specified under this Section (including the pertinent provisions of Sections 320 and 330), the quantity to be paid for will be the weight of the mixture in tons. For each pay item, the pay quantity will be based on the quantity placed on the project, limited to ~~105~~10% of the adjusted plan quantity for the pay item. The adjusted plan quantity will be determined by dividing the original plan quantity (including any Engineer approved quantity revisions) by the design  $G_{mm}$  stated in 334-1.4, then multiplying it by the tonnage-weighted average  $G_{mm}$  of the mixes used on the project for the pay item. The plan quantity will be determined based on a spread rate of 100 pounds per square yard per inch of design thickness of asphalt placed over the area shown in the Plans.

Prepare and submit a Certification of Quantities to the Engineer in accordance with 9-2.1.2.





*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 10 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **346**  
Proposed Specification: **3460200 Structural Portland Cement Concrete.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Jose Armenteros from the State Materials Office to eliminate Class I concrete to reduce the need for excessive mix design laboratory trial batches. Requirements on the number of compressive strength cylinders for a LOT has been clarified and fine aggregate is now required for its use in internal curing. The proposed changes are associated with Section 350, 400 and the Section 9.2 Volume II Materials Manual.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**STRUCTURAL PORTLAND CEMENT CONCRETE  
(REV 11-8-21)**

ARTICLE 346-2 is deleted and the following substituted:

**346-2 Materials.**

**346-2.1 General:** Meet the following requirements:

Coarse Aggregate.....	Section 901
Fine Aggregate* .....	Section 902
Portland Cement and Blended Cement .....	Section 921
Water.....	Section 923
Admixtures** .....	Section 924
Supplementary Cementitious Materials.....	Section 929

\*Use only silica sand except as provided in 902-5.2.3.

\*\*Use products listed on the Department’s Approved Product List (APL).

Do not use materials containing hard lumps, crusts, or frozen matter, or that is contaminated with materials exceeding the specified limits in the above listed Sections.

**346-2.2 Types of Cement:** Unless a specific type of cement is designated in the Contract Documents, use Type I, Type IL, Type IP, Type IT, Type IS, Type II, Type II (MH) or Type III cement in all classes of concrete. Use Type IL, Type IT, or Type II (MH) for all mass concrete elements.

Use only the types of cements designated for each environmental classification in structural concrete as shown in Table 346-1. A mix design for a more aggressive environment may be used in a less aggressive environmental condition.

Table 346-1 Cement Use by Environmental Classification			
Component	Slightly Aggressive Environment	Moderately Aggressive Environment	Extremely Aggressive Environment <sup>(1)</sup>
<b>Bridge Superstructures</b>			
Precast Superstructure and Prestressed Elements	Type I or Type III	Type I, Type IL, Type II, Type III, Type IP, or Type IS	Type II (MH), Type IL, Type III <sup>(2)</sup> , <u>Type IT</u> or Ternary Blend
Cast in Place	Type I	Type I, Type IL, Type II, Type IP, or Type IS	Type II (MH), Type IL, <u>Type IT</u> or Ternary Blend
<b>Bridge Substructures, Drainage Structures, and other Structures</b>			
All Elements	Type I or Type III	Type I, Type IL, Type II, Type IP, or Type IS	Type II (MH), Type IL, <u>Type IT</u> or Ternary Blend
Notes:			
(1) Cements used in a more aggressive environment may also be used in a less aggressive environment.			
(2) Type III cement may be used in an Extremely Aggressive Environment for precast superstructure and prestressed elements when the ambient temperature at the time of concrete placement is 60°F and below.			

**346-2.3 Supplementary Cementitious Materials:** Supplementary cementitious materials (SCMs) are required to produce binary or ternary concrete mixes in all classes of concrete specified in Table 346-3, except for the following when used in slightly aggressive environments: ~~Class I~~, Class I (Pavement), and Class II.

The quantity of ~~portland cement replaced with supplementary cementitious materials~~ SCMs must be on an ~~equal~~ weight ~~replacement~~ percentage basis of the total cementitious materials in accordance with Table 346-2. When using Type IP, IS or IT blended cements, the total quantity of SCMs, including the blended cement added separately at the concrete plant shall meet the requirements of Table 346-2.

**346-2.3.1 Highly Reactive Pozzolans:** Materials that have a very high degree of pozzolanic reactivity due to their very fine particle sizes, including silica fume, metakaolin and ultrafine fly ash.

**346-2.3.2 Binary Concrete Mixes:** Concrete mixes containing portland cement and one ~~supplementary cementitious material~~ SCM.

**346-2.3.3 Ternary Concrete Mixes:** Concrete mixes containing portland cement and any two ~~of supplementary cementitious materials~~ SCMs, ~~either fly ash, slag, or highly reactive pozzolans.~~

Table 346-2 Cementitious Materials Concrete Mix Proportions (%) (Environmental classification is extremely aggressive, unless otherwise noted)						
Application	Portland Cement	Fly Ash Type F	Slag	Highly Reactive Pozzolans <sup>(4)</sup>		
				Silica Fume	Metakaolin	Ultra-Fine Fly Ash
General Use	70-82	18-30				
	66-78	15-25		7-9		
	66-78	15-25			8-12	
	66-78	15-25				8-12
	30-40	10-20	50-60			
	30-50		50-70			
	36-43		50-55	7-9		
	33-42		50-55		8-12	
	33-42		50-55			8-12
Precast / Prestressed	70-85 <sup>(1)</sup>	15-30 <sup>(1)</sup>				
	70-82	18-30				
	66-78	15-25		7-9		
	66-78	15-25			8-12	
	66-78	15-25				8-12
	30-40	10-20	50-60			
	30-50		50-70			
	36-43		50-55	7-9		
	33-42		50-55		8-12	
33-42		50-55			8-12	
Drilled Shaft	63-67	33-37				
	38-42		58-62			
	30-40	10-20	50-60			

Mass Concrete	50-82 <sup>(2)</sup>	18-50 <sup>(2)</sup>				
	50-65 <sup>(3)</sup>	35-50 <sup>(3)</sup>				
	66-78	15-25		7-9		
	66-78	15-25			8-12	
	66-78	15-25				8-12
	30-40	10-20	50-60			
	30-50		50-70			
	36-43		50-55	7-9		
	33-42		50-55		8-12	
	33-42		50-55			8-12

Notes:

(1) Slightly Aggressive and Moderately Aggressive environments.

(2) For Concrete with Core Temperature  $T \leq 165^{\circ}\text{F}$ .

(3) For Concrete with Core Temperature  $T \geq 165^{\circ}\text{F}$ .

(4) Highly reactive pozzolans may be used below the specified ranges to enhance strength and workability.

**346-2.4 Coarse Aggregates Gradation:** Produce all concrete using Size No. 57, 67 or 78 coarse aggregates.

Use Size No. 8, and Size No. 89 alone, only when approved by the Engineer.

Use Size No. 4 or larger blended with smaller size coarse aggregate as two components.

**346-2.4.1 Optimized Aggregate Gradation:** Improve the aggregate packing density at the Contractor's option, by adding an intermediate-size coarse aggregate. Meet the requirements of Section 9.2, Volume II of the Materials Manual, on the methods used to produce combined aggregate gradation of fine, intermediate, and coarse aggregate sizes for the concrete mixes.

**346-2.4.2 Lightweight fine aggregate (LWFA) for internal curing:** At the Contractor's option, use LWFA to reduce the early-age concrete cracking by replacing some of normal fine aggregate with saturated LWFA.

**346-2.5 Admixtures:** Ensure admixtures are used in accordance with the manufacturer's recommendations and meeting the requirements of Section 9.2, Volume II of the Materials Manual.

ARTICLE 346-3 is deleted and the following substituted:

### 346-3 Classification of Concrete.

**346-3.1 General:** The classifications of concrete are designated as ~~Class I~~, Class I (Pavement), Class II, Class II (Bridge Deck), Class III, Class III (Seal), Class IV, Class IV (Drilled Shaft), Class V, Class V (Special), Class VI, and Class VII. The 28-day specified minimum compressive strength, maximum water to cementitious materials ratio and target slump of each class are detailed in Table 346-3. The required air content for all classes of concrete is less than or equal to 6.0%.

For purposes of this Specification the concrete is further classified as follows:

1. Conventional Concrete: The target slump is described in Table 346-3 with a tolerance of  $\pm 1.5$  inches.

2. Increased Slump Concrete: The maximum target slump is 7 inches with a tolerance of  $\pm 1.5$  inches when a Type F, G, I or II admixture is used.

3. Slip-form Concrete: The target slump is 1.5 inches with a tolerance of  $\pm 1.5$  inches.

4. Flowing Concrete: Use flowing concrete only in the manufacturing of precast and prestressed products. Request Engineer's authorization to use flowing concrete for cast-in-place applications. The target slump is 9 inches with a tolerance of  $\pm 1.5$  inches. Meet the requirements of Section 8.6 Volume II of the Materials Manual.

5. Self-Consolidating Concrete (SCC): Use SCC only in the manufacturing of precast and prestressed products. The minimum target slump flow is 22.5 inches with a tolerance of  $\pm 2.5$  inches. Meet the requirements of Section 8.4 Volume II of the Materials Manual.

**346-3.2 Concrete Class Substitutions:** The Engineer may allow the substitution of a higher class concrete in lieu of the specified class concrete when the substituted concrete mixes are included as part of the QC Plan, or for precast concrete, the Precast Concrete Producer QC Plan. The substituted higher class concrete must meet or exceed the requirements of the specified class concrete.

When the average 28-day compressive strength is less than the 28-day specified minimum compressive strength of the higher class mix design, notify the Engineer. Acceptance is based on the requirements in Table 346-3 for the specified class concrete.

**346-3.3 Master Proportion Table:** Proportion the materials used to produce the various classes of concrete in accordance with Table 346-3.

The calculation of the water to cementitious materials ratio (w/cm) is based on the total cementitious materials including portland cement and any [supplementary cementitious materials](#) **SCMs** used in the mix.

Class of Concrete	28-day Specified Minimum Compressive Strength (f'c) (psi)	Maximum Water to Cementitious Materials Ratio (pounds per pounds)	Target Slump Value (inches)
<del>I</del> <sup>(+)</sup>	<del>3,000</del>	<del>0.53</del>	<del>3</del> <sup>(+)</sup>
I (Pavement) <sup>(1)</sup>	3,000	0.50	1.5 or 3 <sup>(+)</sup>
II <sup>(+3)</sup>	3,400	0.53	3 <sup>(2)</sup>
II (Bridge Deck)	4,500	0.44	3 <sup>(2)</sup>
III <sup>(+)</sup>	5,000	0.44	3 <sup>(2)</sup>
III (Seal)	3,000	0.53	8
IV	5,500	0.41 <sup>(4)</sup>	3 <sup>(2)</sup>
IV (Drilled Shaft)	4,000	0.41	8.5
V (Special)	6,000	0.37 <sup>(4)</sup>	3 <sup>(2)</sup>
V	6,500	0.37 <sup>(4)</sup>	3 <sup>(2)</sup>
VI	8,500	0.37 <sup>(4)</sup>	3 <sup>(2)</sup>
VII	10,000	0.37 <sup>(4)</sup>	3 <sup>(2)</sup>

Notes:

~~(1) Meet the requirements of Section 350.~~

~~(2) Increased slump and slip form concrete as defined in 346-3.1.~~

~~(3) For precast three-sided culverts, box culverts, endwalls, inlets, manholes and junction boxes, the target slump value and air content will not apply. The maximum allowable slump is 6 inches, except as noted in (2). The Contractor is permitted to use concrete meeting the requirements of ASTM C478 (4,000 psi) in lieu of the specified ~~Class I or~~ Class II concrete for precast endwalls, inlets, manholes and junction boxes.~~

~~(2) Increased slump and slip form concrete as defined in 346-3.1.~~

~~(3) Meet the requirements of Section 350.~~

(4) When silica fume or metakaolin is required, the maximum water to cementitious material ratio will be 0.35. When ultrafine fly ash is used, the maximum water to cementitious material ratio will be 0.30.

### 346-3.4 Durability for Concrete Construction:

**346-3.4.1 Minimum Cementitious Materials Content:** Ensure that the produced concrete meets the minimum amount of cementitious materials content in Table 346-4.

Concrete Class	Environmental Classification		
	Extremely Aggressive	Moderately Aggressive	Slightly Aggressive
<del>I, I</del> I (Pavement), II, and III (Seal)	470		
II (Bridge Deck), III <sup>(1)</sup> , IV, IV (Drilled Shaft), V, V(Special), VI and VII	600	550	510

Notes:

(1) When precast three-sided culverts, box culverts, endwalls, inlets, manholes or junction boxes require a Class III concrete, the minimum cementitious materials content may be reduced to 470 pounds per cubic yard.

**346-3.4.2 Chloride Content Limits:** Use the following maximum allowable chloride content limits for the concrete application and/or exposure environment shown:

Application/Exposure Environment	Maximum Allowable Chloride Content, (pounds per cubic yard of concrete)	
Non-Reinforced Concrete	No Test Needed	
Reinforced Concrete	Slightly Aggressive Environment	0.70
	Moderately or Extremely Aggressive Environment	0.40
Prestressed Concrete	0.40	

Suspend concrete placement immediately for every mix design if chloride test results exceed the limits of Table 346-5 until corrective measures are made. Submit an Engineering Analysis Scope in accordance with 6-4 by a Specialty Engineer knowledgeable in the areas of corrosion and corrosion control, to determine if the material meets the intended

service life of the structure on all concrete produced from the mix design failing chloride test results to the previous passing test results.

**346-3.4.3 Surface Resistivity Test:** Ensure that the Class II (Bridge Deck), Class IV, Class V, Class V (Special), Class VI, or Class VII concrete in extremely aggressive environments meets or exceeds a resistivity of 29 kOhm-cm at 28 days, when a highly reactive pozzolan is used.

SUBARTICLE 346-9.2 is deleted and the following substituted:

**346-9.2 Sampling Frequency:** As a minimum, sample and test concrete of each mix design for water to cementitious materials ratio, air content, temperature, slump and compressive strength once per LOT as defined by Table 346-9. The Engineer will randomly verify one of every four consecutive LOTs of each mix design based on a random number generator. The Department may perform Independent Verification (IV) testing to verify compliance with specification requirements. All QC activities, calculations, and inspections will be randomly confirmed by the Department.

Table 346-9 Sampling Frequency	
Class Concrete <sup>(1)</sup>	LOT Size
I	one day's production
I (Pavement)	2,000 square yards, or one day's production, whichever is less <u>According to Section 350</u>
II, II (Bridge Deck), III, IV, V (Special), V, VI, VII	50 cubic yards, or one day's production, whichever is less
IV (Drilled Shaft)	50 cubic yards, or one day's production, whichever is less <sup>(2)</sup>
III (Seal)	Each Seal placement
(1) For any class of concrete used for roadway concrete barrier, the lot size is defined as 100 cubic yards, or one day's production, whichever is less.	
(2) Start a new LOT when there is a gap of more than two hours between the end of one drilled shaft placement and the beginning of the next drilled shaft placement.	

SUBSRICLE 346-9.2.1 is deleted and the following substituted:

**346-9.2.1 Reduced Frequency for Acceptance Tests:** Except for Class I (Pavement), the LOT size may represent 100 cubic yards when produced with the same mix design at the same concrete production facility for the same prime Contractor and subcontractor on a given Contract. As an exception, the requirements for the precast/prestressed production facility will only include the same mix design at the same concrete production facility. The reduced testing frequency of Class I (Pavement) is described in the Section 350.

Submit strength test results indicating that the two following criteria are met:

1. The average of the acceptance compressive strengths is equal to or greater than the specified minimum compressive strength ( $f'_c$ ) plus 2.33 standard deviations minus:

- a. 500 psi, if  $f'_c$  is 5,000 psi or less.
- b.  $0.10 f'_c$ , if  $f'_c$  is greater than 5,000 psi.

2. Every average of three consecutive strength test equals or exceeds the  $f'_c$  plus 1.34 standard deviations.

Base calculations on a minimum of ten consecutive strength test results for a Class IV or higher; or a minimum of five consecutive strength results for a Class III or lower.

The average of the consecutive compressive strength test results, based on the class of concrete, can be established using historical data from a previous Department project. The tests from the previous Department project must be within the last calendar year or may also be established by a succession of samples on the current project. Only one sample can be taken from each LOT. Test data must be from a laboratory meeting the requirements of Section 105. Obtain Department approval before beginning reduced frequency LOTs.

If at any time a strength test is not verified or the average strength of the previous ten or five consecutive samples based on the class of concrete from the same mix design and the same production facility does not conform to the above conditions, return to the frequency represented by the LOT as defined in Table 346-9. Notify the Engineer that the initial frequency is reinstated. In order to reinitiate reduced frequency, submit a new set of strength test results.

SUBARTICLE 346-9.3 is deleted and the following substituted:

**346-9.3 Strength Test Definition:** The strength test of a LOT is defined as the average compressive strengths tests of ~~three~~at least two companion cylinders cast from the same sample of concrete and tested at the same age.





*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 13, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **350**  
Proposed Specification: **3500200 Cement Concrete Pavement.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Jose Armenteros to delete repetitive language requirements in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**CEMENT CONCRETE PAVEMENT.**

(REV ~~9-23~~12-7-21)

ARTICLE 350-2 is deleted and the following substituted:

**350-2 Materials.**

Meet the following requirements except as modified herein:

Concrete .....	Section 346
Grinding Concrete Pavement.....	Section 352
Curing Materials* .....	Section 925
Embedded Items.....	Section 931
Joint Seal.....	Section 932

\*Use products listed on the Department's Approved Product List (APL).

~~Submit a mix design to the Engineer for approval prior to use.~~ Provide concrete with a minimum 28-day compressive strength of 3,000 psi and maximum water to cementitious materials ratio of 0.50. ~~The requirements of Sections 346-3 and 346-4 do not apply. Notify the Engineer if any of the component quantities are adjusted. If any material sources change, resubmit the mix design to the Engineer for approval prior to use.~~

For concrete pavement placed using the slip-form method of construction, utilize concrete with a target slump of 1.5 inches plus or minus 1 inch. For concrete pavement placed by hand in constructed forms, utilize concrete with a target slump of 3 inches plus or minus 1.5 inches. Air content testing for concrete pavement mixes is not required.



*Florida Department of Transportation*

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KEVIN J. THIBAUT, P.E.  
SECRETARY

December 20, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **353**  
Proposed Specification: **3530303 Concrete Pavement Slab Replacement.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The change is proposed by Tom Kunzen to specify that demonstration slabs are to be located "at the project site" in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**CONCRETE PAVEMENT SLAB REPLACEMENT.****(REV 10-12-21)**

SUBARTICLE 353-3.3 is deleted and the following substituted:

**353-3.3 Demonstration Slab:** Prior to batching production concrete, demonstrate the ability to furnish replacement slabs by constructing a demonstration slab at the project site. Demonstrate production techniques for slab removal, dowel installation, concrete placement, finishing, slab curing, sample preparation and curing, and proper timing of joint sawing. Demonstrate the ability to achieve the required compressive strengths. Demonstrate proficiency to the Engineer the ability to determine when the concrete has achieved a compressive strength of 1,600 psi by testing concrete cylinders or by using the maturity-strength curve. Use cylinders to verify the concrete compressive strength at 28 days. Schedule construction of the demonstration slab at the time specified in the Contract Documents. If the Engineer determines that elements of the demonstration slab fail to meet requirements of the Contract Documents, propose adjustments to the construction processes and/or materials for the Engineer's approval.

The demonstration slab may be used in the final work with the approval of the Engineer. No slab replacements will be constructed until the demonstration slab is approved. The Engineer may require additional demonstration slabs until a demonstration slab conforms to the Contract Documents.



*Florida Department of Transportation*

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KEVIN J. THIBAUT, P.E.  
SECRETARY

January 24, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **400**  
Proposed Specification: **REVISED 4000200 Concrete Structures.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Melissa Hollis from the Product Evaluation Office and Jose Armenteros from the State Materials Office. Melissa Hollis's changes were to update APL references for filter fabric and to be consistent with other Division II references. These changes were reflected on Article 400-13, subarticle 400-15.2.6, 400-16.6, and 400-22.2.2. Jose Armenteros's changes were made to eliminate Class I concrete from the list of concrete classifications. Jose Armenteros's changes were reflected in Article 400-16 and Subarticle 400-23.9. The proposed changes are associated with Section 346.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra  
Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## CONCRETE STRUCTURES

(REV ~~11-248-221~~)

ARTICLE 400-2 is deleted and the following substituted:

### 400-2 Materials.

Meet the following requirements:

Concrete .....	Sections 346 and 347
Penetrant Sealer .....	Section 413
High Molecular Weight Methacrylate (HMWM)** .....	Section 413
Reinforcing for Concrete .....	Section 415
Water.....	Section 923
Curing Materials* <u>**</u> .....	Section 925
Epoxy Bonding Compounds** .....	Sections <del>926 and 937</del>
<u>Post Installed Anchor Systems**</u> .....	<u>Section 937</u>
Joint Materials** .....	Section 932
Bearing Pads .....	Section 932
Non-Shrink Grout** .....	Section 934
Class 5 Applied Finish Coatings** .....	Section 975
Galvanizing Compound** .....	Section 562
Dowel Bar Assembly** .....	Section 931
Filter Fabric <u>**</u> .....	Section 985

\*The Engineer will allow clean sand and sawdust for certain curing, when and as specified.

\*\*Use products listed on the Department's Approved Product List (APL).

ARTICLE-13 is deleted and the following substituted:

### 400-13 Epoxy Bonding Compounds.

Where epoxy bonding compounds for bonding concrete are specified or required, apply the epoxy bonding materials only to clean, dry, structurally sound concrete surfaces. Provide surface preparation, application, and curing of epoxy bonding compound in strict accordance with the manufacturer's recommendations for each particular application. ~~Use an epoxy bonding compound listed on the Department's APL.~~

SUBARTICLE 400-15.2.6.1 is deleted and the following substituted:

#### 400-15.2.6 Class 5 Applied Finish Coating:

**400-15.2.6.1 General:** Place an applied finish coating upon all concrete surfaces where the Plans indicate Class 5 applied finish coating. Apply the finish coating after completion of the general surface work specified for all exposed concrete surfaces. ~~Select an applied finish coating from the APL meeting the requirements of Section 975.~~

ARTICLE 400-16 is deleted and the following substituted:

#### **400-16 Curing Concrete.**

**400-16.1 Internal curing:** At the Contractor's option use internal curing in combination with one or more of the external curing methods listed in this Section. Use lightweight fine aggregates from Department-approved sources meeting the requirements of ASTM C1761.

**400-16.2 External curing:** Cure cast-in-place and precast (non-prestressed) concrete as required herein for a minimum duration of 72 hours. If forms are loosened or removed before the 72 hour curing period is complete, expand the curing to cover these surfaces by either coating with curing compound or extending the continuous moist cure area.

\_\_\_\_\_ Until curing has begun, retain concrete surface moisture at all times by maintaining a surface moisture evaporation rate less than 0.1 pound per square foot per hour. Periodically, at the site of concrete placement prior to and during the operation, measure the ambient air temperature, relative humidity and wind velocity with industrial grade weather monitoring instruments to determine the on-site evaporation rate. If the evaporation is, or is likely to become 0.1 pound per square foot per hour or greater, employ measures to prevent moisture loss such as application of evaporation retarder, application of supplemental moisture by fogging or reduction of the concrete temperature during batching. Compute the evaporation rate by using the nomograph in the ACI manual of Concrete Practice Part 2, Section 308R Guide to Curing Concrete, or by using an evaporation rate calculator approved by the Engineer.

**400-16.2.1 Methods:** Except where other curing methods are specified, select from the following options the chosen method(s) for curing all concrete components.

\_\_\_\_\_ 1. Continuous Moisture: Place burlap on the surface and keep it continuously saturated for the curing period by means of soaker hoses or automatic sprinklers. Water flow may be metered to cycle repetitively for five minutes on and five minutes off during the 72 hour curing period. Do not apply moisture manually. If side forms are loosened or removed during the curing period, extend the burlap so as to completely shield the sides of the members.

\_\_\_\_\_ 2. Membrane Curing Compound: Apply a white Type 2 curing compound to all surfaces at a uniform coverage as recommended by the manufacturer but not less than 0.06 gallon per square yard. Allow surfaces covered by the membrane curing compound to remain undisturbed for the curing period. Recoat any cracks, checks or other defects in the membrane seal which are detected during the curing period within one hour. If side forms are loosened during the curing period, maintain surface moisture and remove the forms within one hour and immediately coat the formed surfaces with a membrane curing compound. Bottom surfaces shall be similarly coated after removal of or from the forms.

\_\_\_\_\_ If curing compound is to be applied by spraying, use a compressor driven sprayer of sufficient size to provide uniform mist. Standby equipment is required in case of mechanical failure and hand held pump-up sprayers may be used only as standby equipment.

\_\_\_\_\_ 3. Curing Blankets: Curing blankets may be used for curing the top surfaces of members while the member side forms remain in place. Do not use curing blankets which have been torn or punctured. Securely fasten all edges to provide as tight a seal as practical. Should the system fail to maintain a moist condition on the concrete surface, discontinue use of the blankets and continue curing using another method. Keep curing blankets in place for the duration of the curing period.

\_\_\_\_\_ 4. Accelerated Cure:

\_\_\_\_\_ a. General: Accelerated curing of the concrete can be achieved by use of either low pressure steam curing, radiant heat curing or continuous moisture and heat curing. If accelerated curing is completed before the 72 hour curing period has elapsed, continue curing for the remaining part of the 72 hour curing period in accordance with one of the curing methods listed above.

\_\_\_\_\_ If accelerated curing is used, furnish temperature recording devices that will provide accurate, continuous and permanent records of the time and temperature relationship throughout the entire curing period. Provide one such recording thermometer for each 200 feet of placement length or part thereof. Initially calibrate recording thermometers and recalibrate at least annually.

\_\_\_\_\_ The preheating period shall equal or exceed the time of initial set as determined by ASTM C403 and shall not be less than 4 hours. When the ambient air temperature is above 50°F, allow the member to remain undisturbed in the ambient air for the preheating period. If the ambient air temperature is below 50°F, apply heat during the preheating period to hold the air surrounding the member at a temperature of 50 to 90°F.

\_\_\_\_\_ To prevent moisture loss from exposed surfaces during the preheating period, enclose members as soon as possible after casting or keep the surfaces wet by fog mist or wet blankets. Use enclosures for heat curing that allow free circulation of heat about the member with a minimum moisture loss. The use of tarpaulins or similar flexible covers may be used provided they are kept in good repair and secured in such a manner to prevent the loss of heat and moisture. Use enclosures that cover the entire placement.

\_\_\_\_\_ During the application or removal of the heat, do not allow the temperature rise or fall within the enclosure to exceed 40°F per hour. Do not allow the curing temperature throughout the enclosure to exceed 160°F. Maintain the curing temperature within a temperature range of 130 to 160°F until the concrete has reached the required form removal strength for precast and cast-in-place components or the required release strength for prestressed concrete components.

\_\_\_\_\_ b. Low-Pressure Steam: The steam used shall be in a saturated condition. Do not allow steam jets to impinge directly on the concrete, test cylinders, or forms. Cover control cylinders to prevent moisture loss and place them in a location where the temperature is representative of the average temperature of the enclosure.

\_\_\_\_\_ c. Curing with Radiant Heat: Apply radiant heat by means of pipes circulating steam, hot oil or hot water, or by electric heating elements. Do not allow the heating elements to come in direct contact with the concrete or the forms. Distribute sources of heat in a manner that will prevent localized high temperatures above 160°F. To prevent moisture loss during curing, keep the exposed surfaces wet by fog mist or wet blankets.

\_\_\_\_\_ d. Continuous Moisture and Heat: This method consists of heating the enclosure in combination with the continuous moisture method described above.

\_\_\_\_\_ In addition to the curing blankets, an auxiliary cover for retention of the heat will be required over the entire placement. Support this cover at a sufficient distance above the placement being cured to allow circulation of the heat.

**400-16.3 Silica Fume Concrete:** Cure silica fume concrete a minimum of 72 hours using continuous moisture cure. No substitution of alternative methods nor reduction in the time period is allowed. After completion of the 72 hour curing period, apply a membrane curing compound to all concrete surfaces. Apply curing compound according to 400-16.2.



**400-16.4 Bridge Decks and Approach Slabs:** Cure bridge decks and approach slabs for a duration of seven days. Apply a membrane curing compound to the top surface in accordance with 400-16.2 using a compressor driven sprayer. In general, apply curing compound when the surface is damp and after all pooled water has evaporated. For Short bridges, begin applying curing compound immediately after the initially placed concrete has been floated, straightedged, textured and a damp surface condition exists and continue applying compound as concrete placement progresses with as little interruption as possible until the entire top surface has been coated with compound. For Long bridges, begin applying curing compound to the initially placed concrete as soon as a damp surface condition exists and continue applying compound as concrete placement progresses with as little interruption as possible until the entire top surface has been coated with compound. For all bridges, the elapsed time between the initial placement of deck or approach slab concrete and the completed application of curing compound must not exceed 120 minutes. The 120 minute limit may be extended by the Engineer if project specific factors (cool temperatures, high humidity, retarding admixtures, etc.) prolong wet surface conditions.

Prior to the first deck or approach slab placement, submit to the Engineer the method that will be used to periodically measure the rate of application of curing compound in, gallons per square foot as the concrete placement progresses. Prior to the placement of each deck or approach slab, submit to the Engineer the anticipated quantity of curing compound in gallons along with the corresponding square feet of concrete to be covered to meet the coverage rate in 400-16.2. Compute the actual quantity of curing compound applied at the conclusion of each concrete placement and submit the quantity to the Engineer. Apply the curing compound from a work platform.

Place curing blankets on all exposed surfaces which are not formed as soon as possible with minimal effect on the surface texture. Place the curing blankets with sufficient overlapping seams to form an effective moisture seal. Before using curing blankets, mend tears, splits, or other damage that would make them unsuitable. Discard curing blankets that are not repairable. Wet all curing blankets immediately after satisfactorily placing them and maintain them in a saturated condition throughout the seven-day curing period. Supply sufficient quantity of water meeting the requirements of Section 923 at the job site for wetting the blankets.

Where a bridge deck or approach slab is to be subjected to walking, wheeling or other approved construction traffic within the seven-day curing period, protect the curing blankets and the concrete surface from damage by placing wooden sheeting, plywood or other approved protective material in the travel areas.

When the ends of the curing blankets are rolled back to permit screeding of adjacent concrete, keep the exposed surfaces wet throughout the period of exposure.

Bridge deck bottom and side forms may be removed after 72 hours upon compliance with 400-14. Approach slab side forms may be removed after 72 hours. Apply membrane curing compound to all surfaces stripped of forms within one hour of loosening. Apply curing compound according to 400-16.2.

**400-16.5 Construction Joints:** Cure construction joint areas using either the continuous moisture or curing blankets method.

**400-16.6 Concrete Barriers, Traffic Railings, Parapets and End Post:** Ensure concrete is cured in accordance with 400-16.2(2), except that a clear Type 1-D curing compound that must contain a fugitive dye may be used in lieu of Type 2. If Type 1-D is used, its removal per 400-15.1 during finishing is not required. When construction is by the slip form method, coat

all concrete surfaces with a curing compound that meets the requirements of 925-2, either within 30 minutes of extrusion or before the loss of water sheen, whichever occurs first. Ensure a curing compound coating period of not less than seven days after application. Prior to each concrete placement, submit to the Engineer the method that will be used to periodically measure the rate of application in gallons per square foot. Also, prior to each placement, submit to the Engineer the anticipated quantity of curing compound in gallons that will be used to meet the coverage rate specified in 400-16.2 along with the corresponding square footage of concrete barriers, traffic railings, parapets and end posts to be coated with that quantity. Measure the actual quantity of curing compound that is applied during each concrete placement and submit the quantity to the Engineer. Applied finish coatings, ~~that are on the APL and~~ that are flagged as permitted for use as a curing compound, may be used in lieu of a curing compound. If an applied finish coating is used in lieu of a curing compound, have a backup system that is in full compliance with 400-16.2(2) available at all times to ensure that an effective alternative system will be immediately available if the applied finish coating cannot be applied within 30 minutes of extrusion or before the loss of water sheen.

**400-16.7 Removal of Membrane Curing Compounds:** Provide the longest possible curing duration; however, remove curing compound on portions of members to be bonded to other concrete. Compounds may be removed by either sand or water blasting. Water blasting requires the use of water meeting the requirements of Section 923 and a minimum nozzle pressure of 2,900 psi.

SUBARTICLE 400-22.2.2 is deleted and the following substituted:

**400-22.2.2 Pay Quantity:** The quantity to be paid for will be the original plan quantity, measured as provided in 400-22.2.1, ~~except that where the Plans call for an estimated quantity of miscellaneous concrete for contingent use, the contingent concrete will be measured as the actual quantity in place and accepted.~~

SUBARTICLE 400-23.9 is deleted and the following substituted:

**400-23.9 Payment Items:**

Payment will be made under:

- Item No. 400- 0- Class NS Concrete – per cubic yard.
- ~~Item No. 400- 1- Class I Concrete – per cubic yard.~~
- Item No. 400- 2- Class II Concrete - per cubic yard.
- Item No. 400- 3- Class III Concrete - per cubic yard.
- Item No. 400- 4- Class IV Concrete - per cubic yard.
- Item No. 400- 6- Precast Anchor Beams - each.
- Item No. 400- 7- Bridge Deck Grooving - per square yard.
- Item No. 400- 8- Class V Concrete - per cubic yard.
- Item No. 400- 9- Bridge Deck Planing - per square yard.
- Item No. 400- 16- Class VI Concrete - per cubic yard.
- Item No. 400-143- Cleaning and Coating Concrete Surfaces - per square foot.
- Item No. 400-147- Composite Neoprene Pads - per cubic foot.
- Item No. 400-148- Plain Neoprene Bearing Pads - per cubic foot.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 12, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **413**  
Proposed Specification: **4130302 Sealing Cracks and Concrete Structure Surfaces.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Ronald Simmons from the State Materials Office to clarify requirements and update test methods.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**SEALING CRACKS AND CONCRETE STRUCTURE SURFACES  
(REV 11-8-21)**

SUBARTICLE 413-3.2 is deleted and the following substituted:

**413-3.2 Materials:** Use a methacrylate system that has a three component formulation consisting of methacrylate monomer, cumene hydroperoxide (CHP) initiator, and cobalt promoter. The methacrylate system cannot contain wax. Use a HMWM monomer system that is approved by the Department and included on the Department’s Approved Product List (APL). Use initiator and promoter approved by the monomer manufacturer. Manufacturers seeking evaluation of their products must submit an application conforming to the requirements of Section 6 along with the following documentation:

1. Manufacturer’s material installation instructions showing the product can be installed in accordance with this Section.
2. Independent laboratory test data and results showing the product has been tested in accordance with the requirements of this Section and meets the requirements.
3. Qualification of their on-site representatives.

**413-3.2.1 Properties:** Use a methacrylate material system that meets the following physical and performance requirements:

Table 413-2 Physical Properties of Methacrylate <u>Resin System</u>	
<u>Viscosity (Brookfield RVT)</u>	<u>14-20 cps at 50 rpm</u>
Density (ASTM D1481)	8.5 - 9.0 lb/gl at 77° F
Flash Point (ASTM D93)	> 200°F (Pensky Martens CC)
Odor	Low
Bulk Cure Speed	3 Hours @ 73°F (max.)
Surface Cure	8 Hours @ 73°F (max.)
Gel Time <sup>(1)</sup>	60 minutes (max.) @ 73.4 ± 1.8°F
Tack Free Time	4-6 Hours (max.) (at 72°F and 50% Relative Humidity)
Compressive Strength ( <u>ASTM D695</u> <del>AASHTO T106</del> )	6,500 psi (min)
Tensile Strength (ASTM <del>C307</del> <u>D638</u> )	1,300 psi (min)
Shear Bond Adhesion (ASTM C882)	600 psi (min)
Elongation <sup>(2)</sup> (ASTM D638)	<u>10% to 30% Report</u>
<u>Physical Properties of Methacrylate monomer (Part A)</u>	
<u>Viscosity (ASTM D2196, Method A)</u> <del>Wax Content</del>	<u>14-20 cps using Ultra Low Adapter</u> <del>θ</del>
1. Use a test method capable of measuring the gel time to the nearest 0.5 minute.	
2. Do not use methacrylate with elongation less than 20% for concrete decks supported by steel girders.	

The monomer shall have a shelf life of no less than 12 months and shall be no more than 8 months old at the time of application. Provide each container shipped to the job site with the following information on a manufacturer’s label: manufacturer’s name, product name, lot or batch number, date of production, and drum serial number. Identify the catalysts by their generic classification and provide the date of manufacture.

SUBARTICLE 413-3.4.6 is deleted and the following substituted:

**413-3.4.6 Sand Distribution:** Apply sand over the monomer treated area within a timely period following the application of the polymer based on the manufacturer's recommendations for the existing conditions. Use equipment that will produce a uniform distribution of the sand over the treated area. If wheel mounted, use a sand spreader that has pneumatic tires compatible with the treatment material such that no tire footprints are left on the deck surface.

Use an initial application rate of ~~0.6~~1.0 (plus or minus 0.05) pounds of sand per square yard of treated ~~area, and~~area and adjust the rate as necessary to produce a friction number (FN) of no less than FN40R greater than or equal to 35 at 7 days. If friction numbers below those specified are obtained, completely remove all loose sand from the surface and re-apply the polymer at a rate of 150 square feet per gallon and spread additional sand as necessary to achieve the specified friction numbers. Remove the surface material by grinding, shot blasting, or other approved method if satisfactory friction values are not achieved. Friction tests must be conducted in accordance with AASHTO T242, using the ribbed tire option. Secure the services of an independent enterprise with prior experience on roadway friction testing with the equipment described to perform the friction tests.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
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KEVIN J. THIBAUT, P.E.  
SECRETARY

January 12, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **430**  
Proposed Specification: **4300201 Pipe Culverts.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Melissa Hollis from the Product Evaluation Office to provide consistent formatting of PATH/APL requirements.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**PIPE CULVERTS**  
**(REV 11-10-21)**

SUBARTICLE 430-2.1 is deleted and the following substituted:

**430-2 Materials.**

**430-2.1 Pipe:** Meet the following requirements:

Concrete Pipe .....	Section 449
Steel Pipe .....	556-2.1
Round Rubber Gaskets .....	Section 942
Resilient Connectors* .....	Section 942
Corrugated Steel Pipe and Pipe Arch.....	Section 943
Corrugated Aluminum Pipe and Pipe Arch .....	Section 945
Corrugated Polyethylene Pipe.....	Section 948
Steel Reinforced Polyethylene Ribbed Pipe .....	Section 948
Steel Reinforced Polyethylene Corrugated Pipe.....	Section 948
Corrugated Polypropylene Pipe .....	Section 948
Corrugated Polyvinyl Chloride (PVC) Pipe .....	Section 948
Fiberglass Reinforced Polymer Pipe.....	Section 948
<a href="#">Liner Repair Systems .....</a>	<a href="#">Section 948</a>
Metal Grates.....	Section 962

\*Use resilient connector products listed on the Department’s Approved Product List (APL).

**430-2.2 Joint Materials:** Use joint materials specified in 430-7 through 430-9 according to type of pipe and conditions of usage.

**430-2.3 Mortar:** Use mortar composed of one part Portland cement and two parts of clean, sharp sand, to which mixture the Contractor may add hydrated lime in an amount not to exceed 15% of the cement content. Use mortar within 30 minutes after its preparation.

**430-2.4 End Treatments:** Meet the requirements of Section 425-3.1. For precast end treatments, meet the requirements in 449-1. Use the concrete Class designated in the Plans and Standard Plans, and as specified in Section 346 and 347.

**430-2.5 Grates:** Use metal gratings that meet the requirements of 962-8.

**430-2.6 Filter Fabric:** Use a Type D-3 filter fabric meeting the requirements specified in Section 985, and listed on the Department’s Approved Product List (APL).

SUBARTICLE 430-4.1 is deleted and the following substituted:

**430-4 Laying Pipe.**

**430-4.1 General:** Lay all pipe, true to the lines and grades given, with bells upgrade and spigot end fully entered into the bell. When pipe with quadrant reinforcement or circular pipe with elliptical reinforcement is used, install the pipe in a position such that the manufacturer’s marks designating “top” and “bottom” of the pipe are not more than five degrees from the vertical plane through the longitudinal axis of the pipe. Do not allow departure from and return to plan alignment and grade to exceed 1/16 inch per foot of nominal pipe length, with a total of not more than 1 inch departure from theoretical line and grade. Take up and relay any pipe that is

not in true alignment or which shows any settlement after laying at no additional expense to the Department.

Do not use concrete pipe with lift holes except round pipe which has an inside diameter in excess of 54 inches or any elliptical pipe.

Repair lift holes, if present, with hand-placed, stiff, non-shrink, 1-to-1 mortar of cement and fine sand, after first washing out the hole with water. Completely fill the void created by the lift hole with mortar. Cover the repaired area with a 24 inch by 24 inch piece of filter fabric secured to the pipe. ~~Use a Type D-3 filter fabric meeting the requirements specified in Section 985.~~

~~Follow the manufacturer's instructions, to s~~Secure the filter fabric to the pipe, ~~using a method that holds the fabric in place~~ until the backfill is placed and compacted. ~~Use grout mixtures, mastics, or strapping devices to secure the fabric to the pipe.~~

Do not cut or drill into or through the corrugations or ribs of plastic pipe except when necessary to meet the dimensional requirements shown in the Plans.

When installing pipes in structures, construct inlet and outlet pipes of the same size and kind as the connecting pipe shown in the Plans. Use the same pipe material within each continuous run of pipe. Extend the pipes through the walls for a distance beyond the outside surface sufficient for the intended connections, and construct the concrete around them neatly to prevent leakage along their outer surface as shown on Standard Plans, Index 425-001. Keep the inlet and outlet pipes flush with the inside of the wall. Resilient connectors as specified in 942-3 may be used in lieu of a masonry seal.

Furnish and install a filter fabric jacket around all pipe joints and the joint between the pipe and the structure in accordance with Standard Plans, Indexes 425-001 and 430-001. Use fabric meeting the physical requirements of Type D-3 specified in Section 985. Extend the fabric a minimum of 12 inches beyond each side of the joint or both edges of the coupling band, if a coupling band is used. The fabric must have a minimum width of 24 inches, and a length sufficient to provide a minimum overlap of 24 inches. Secure the filter fabric jacket against the outside of the pipe by metal or plastic strapping or by other methods approved by the Engineer.

Meet the following minimum joint standards:

Pipe Application	Minimum Standard
Storm and Cross Drains	Water-tight
Gutter Drain	Water-tight
Side Drains	Soil-tight

When rubber gaskets are to be installed in the pipe joint, the gasket must be the sole element relied on to maintain a tight joint. Soil tight joints must be watertight to 2 psi. Water-tight joints must be water-tight to 5 psi unless a higher pressure rating is required in the Plans.

When laying pipes that pass through mechanically stabilized earth (MSE) reinforced fill, connect the portion of the pipe within the wall to the external portion of the pipe run only after the full height of the wall supported embankment is in place.

When Wall Zone Pipes are shown in the Plans, meet the following requirements:



1. Use resilient connectors on pipes entering and leaving drainage structures.
2. Provide a 2 to 4 inch pipe overhang beyond the drainage structure internal walls.
3. For pipes without welded joints, meet the following additional requirements:
  - a. Pipe joints must be watertight to 10.8 psi when pulled out 2 inches from the fully homed position in both straight alignment and 5% deflection.
  - b. Do not allow the gap between sections of pipe to exceed 5/8 inch for all pipe diameters.



*Florida Department of Transportation*

RON DESANTIS  
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605 Suwannee Street  
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KEVIN J. THIBAUT, P.E.  
SECRETARY

January 6, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **440**  
Proposed Specification: **4400200 Underdrains.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Melissa Hollis from the Product Evaluation Office to provide consistent formatting of PATH/APL requirements.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**UNDERDRAINS**  
**(REV 11-10-21)**

ARTICLE 440-2 is deleted and the following substituted:

**440-2 Materials.**

Meet the following requirements:

Concrete Pipe .....	Section 449
Filter Aggregate .....	Section 902
Corrugated Steel Pipe .....	Section 943
Corrugated Aluminum Pipe .....	Section 945
Polyvinyl-Chloride Pipe.....	Section 948
Corrugated High Density Polyethylene Pipe .....	Section 948
Corrugated Polypropylene Pipe .....	Section 948
Steel Reinforced Polyethylene Ribbed Pipe .....	Section 948
Filter Fabric Sock.....	Section 948
Geotextile Fabrics*.....	Section 985

\*Use products listed on the Department's Approved Product List (APL).

Use bitumized fiber pipe only when called for in the Contract Documents.

ARTICLE 440-4 is expanded by the following new Subarticle:

**440-4 Laying Pipe.**

**440-4.1 General:** Bed the pipe firmly on the bottom of the trench, with the perforations down and joints securely made.

**440-4.2 Corrugated Steel Pipe - Protection of Coating:** Handle corrugated steel pipe in such a way that the zinc or aluminum coating will not be bruised or broken. Do not use pipe showing bruises or breakage of the zinc or aluminum coating.

**440-4.3 Protection of Drain Inlet:** Protect the influent end of the pipe in a manner which will prevent any soil from entering the drain.

**440-4.4 Lateral Connections:** Make lateral connections with prefabricated wyes, tees, elbows, etc., as required.

**440-4.5 Underdrain Inspection Box:** Construct underdrain inspection boxes in accordance with Standard Plans, Index 440-002 and the Plans.

**440-4.6 Underdrain Cleanout Structures:** Construct underdrain cleanout structures of in-line wye fittings and stub for access where called for in the Plans.

**440-4.7 Underdrain Outlet Pipe:** Use non-perforated pipe. Construct underdrain bends in accordance with Standard Plans, Index 440-002.

ARTICLE 440-7 is deleted and the following substituted:

**440-7 Method of Measurement.**

The quantities to be paid for will be the length, in feet, of underdrain, which includes underdrain cleanout structures, measured in place, along the centerline and gradient of the

4400200

All Jobs

underdrain, completed and accepted. The quantities to be paid for will be the length, in feet, of outlet pipe measured in place, along the centerline and gradient of the outlet pipe, completed and accepted. The quantity of underdrain inspection boxes to be paid for will be the number completed and accepted.

No separate measurement or payment will be made under this Section for underdrains associated with box culverts or the Standard Plans, Index 400-289.



*Florida Department of Transportation*

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KEVIN J. THIBAUT, P.E.  
SECRETARY

December 6, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **446**  
Proposed Specification: **4460400 Edgedrain (Draincrete)**.

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Melissa Hollis from the Production Evaluation Office to be consistent with formatting of PATH/APL requirements.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**EDGEDRAIN (DRAINCRETE)**  
**(REV 9-23-21)**

ARTICLE 446-2 is deleted and the following substituted:

**446-2 Materials.**

Meet the following requirements:

Portland Cement Concrete – Class NS* .....	Section 347
Coarse Aggregate.....	Section 901
Portland Cement.....	Section 921
Water.....	Section 923
Polyvinyl-Chloride Pipe.....	Section 948
Polyethylene Pipe.....	Section 948
Filter Fabric**.....	Section 985

\_\_\_\_\_ \*For draincrete, the concrete requirements of Section 347 are modified as follows:

Use Type I or II portland cement (no supplementary cementitious materials permitted).

Composition:

Grade of coarse aggregate (stone)....	#57, #67 or #89
Maximum Water/Cement ratio .....	0.38
Minimum cement factor.....	385 lb/yd <sup>3</sup> of Draincrete
Maximum Slump Range .....	Not Applicable
Fine Aggregate.....	None
Admixtures.....	None

\_\_\_\_\_ Do not use materials which contain hardened lumps, crusts, or frozen matter, or are contaminated with dissimilar material.

\_\_\_\_\_ \*\*Use products listed on the Department's Approved Products List (APL).



*Florida Department of Transportation*

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GOVERNOR

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KEVIN J. THIBAUT, P.E.  
SECRETARY

January 6, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **450**  
Proposed Specification: **4500203 Precast Prestressed Concrete Construction.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Frank Thomas from the State Materials Office to clarify the language.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## PRECAST PRESTRESSED CONCRETE CONSTRUCTION (REV 11-19-21)

SUBARTICLE 450-2.3 is deleted and the following substituted:

### 450-2.3 Tolerances:

Inspect all prestressed concrete products within five working days of detensioning to ensure their dimensions (other than sweep and camber) conform to the specified tolerances and to determine if there are any deficiencies.

Inspect the product for conformance with the product dimension tolerances shown in Appendix B of PCI Manual MNL-116, except as modified herein.

Apply the tolerances with respect to the theoretical positions and dimensions shown in the Plans. Apply the same tolerances for U-Beams as those specified for I-Beams, when inspecting the product for conformance with dimension tolerances.

For Florida U-Beam diaphragms, the tolerances are:

1. Plus 1 inch and minus 1/2 inch for the thickness of intermediate diaphragms.
2. Plus or minus 3 inches for the location of intermediate diaphragms, relative to design plan positions.
3. Plus 3 inches and minus 1/2 inch for the thickness of the end diaphragms.

The tolerance for beam strand sheathing is plus or minus 2 inches.

Ensure the tolerance on all miscellaneous shaping including, but not limited to, chamfers, miters, bevels, keys, tapers, radii, holes, inserts, and block outs is within plus or minus 1/8 inch of the control dimension of the shape.

The tolerances represent the total allowable tolerance that will be accepted in the finished product. Do not apply tolerances shown for the overall dimensions of a member to violate the tolerances shown for positions of reinforcing and prestressing steel or FRP. Apply the tolerances during and after the fabrication of prestressed products. Do not reduce the concrete cover for reinforcing steel, FRP reinforcing, prestressing steel, FRP prestressing strands, or any other metallic or polymeric objects specified in the Plans more than 1/4 inch. Do not reduce the concrete cover for reinforcing steel, FRP reinforcing, prestressing steel, FRP prestressing strands, or any other metallic or polymeric objects when the cover specified in the Plans is minimum cover.

Limit sweep to 1/2 inch for U-Beams and Inverted T-Beams.

The maximum allowable sweep for I-Beams and piles is 1/8 inch for every 10 feet, and will be determined by the following equation:

$$\text{Sweep (in)} = (0.0125 \text{ in/ft}) \times \text{Length (ft) of beam or pile}$$

Measure and record the sweep and camber of the beams immediately after detensioning and monthly. Beyond 120 days after casting, monthly sweep and camber measurements may be reduced to quarterly if there are no identified issues with the beam, and if the sweep and camber measurements are in tolerance. Once the reduced frequency is applied, camber and sweep shall be measured no more than 7 calendar days prior to shipping. Keep the measurement records on file for review upon request by the Engineer.

Notify the Engineer immediately when the sweep or camber exceeds the specified tolerances.



If the actual camber is less than 50% of the predicted camber at release provided by the Plans, move the dunnage towards the center of the beam to a maximum of 5% of the total length at each end to induce camber.

If the camber is outside of the design camber shown in the Plans by plus or minus 1 inch, take appropriate actions to accommodate the product in the structure.

If the sweep exceeds the tolerance specified, immediately propose measures to the Engineer to bring the sweep of the product back to within tolerance. Special storage conditions for the purpose of removing excessive sweep will not be restricted by requirements of this Section.

ARTICLE 450-5 is deleted and the following substituted:

#### **450-5 Shop Drawings.**

Submit shop drawings for all pretensioned prestressed concrete products containing FRP bars, FRP strands, or stainless steel strands. Submit shop drawings for all other pretensioned prestressed concrete products when the Contract Documents do not contain all the detailed information necessary to fabricate and erect the pretensioned prestressed concrete product. Ensure the submitted shop drawings meet the requirements of ~~5-1 and any additional the~~ Contract Documents ~~requirements~~.

Obtain prior approval of any adjustments to the shop drawings which will result in a net change of prestressing force within the product. Shop drawings are not required to depict negligible, supplemental reinforcement used to facilitate fabrication of products if the additions do not affect the performance of the product.

In lieu of shop drawings, submit the following to the Engineer:

1. The Framing Plan with product designations for all superstructure components.
2. Strand detensioning schedule.
3. Tensioning and elongation calculations.
4. Details of supplemental reinforcement that remains as part of the finished product.
5. Drawings, details and spacing for embedded items associated with fall protection systems used on beams.
6. When proposing to use materials and/or methods that differ from the requirements of the Contract Documents, submit full plan details and Specifications for the alternate materials and methods. Ensure the alternate materials and methods meet the following requirements:
  - a. The provisions of the Contract Documents.
  - b. The AASHTO LRFD Bridge Design Specifications, edition with interims as referenced in Plans.
  - c. The recommendations of the material manufacturer.
  - d. Any materials change proposed by the Contractor and approved by the Engineer.
  - e. Net compressive stress in the concrete due to prestressing acting alone, after all losses, is not less than or 5% greater than that provided by the stranding shown in the Plans.
  - f. Ultimate strength of the structure with the proposed changes is not less than the ultimate strength of the original design.

g. The provisions of the Departments Structures Design Guidelines.

SUBARTICLE 450-10.7.1 is deleted and the following substituted:

**450-10.7 Accelerated Curing:**

**450-10.7.1 General:** Use low-pressure steam curing, radiant heat curing or continuous moisture and heat curing. Submit steam and/or radiant heat curing procedures for CFRP strand products for approval. If accelerated curing is completed before the curing period has elapsed, continue curing for the remaining part of the curing period in accordance with one of the curing methods above.

If accelerated curing is used, furnish and use temperature recording devices that will provide accurate, continuous, and permanent records of the time and temperature relationship of the enclosure and concrete throughout the entire curing period. Place the temperature recording sensors at a minimum of two locations, spaced approximately at or near the third point of bed length, to measure the temperatures of the enclosure and concrete. Initially calibrate recording thermometers and recalibrate them at least annually in accordance with manufacturer's recommendations. Place the sensors at the center of gravity of the bottom flanges for beams. Place the sensors at the center of gravity of the cross sections perpendicular to the length for solid piles or poles, and at the midpoint of the wall thickness for voided piles or poles.

When the ambient air temperature is equal to or higher than 50°F, start the accelerated curing by supplying or retaining moisture and the application of the heat, following the initial set period of concrete. Determine the initial set time in accordance with ASTM C403. During the application of heat, do not allow the temperature rise in the concrete product to exceed 36°F per hour. The maximum curing temperature of the enclosure or concrete must not exceed 150°F. Maintain the maximum curing temperature uniform throughout the enclosure, with variation of not more than 20°F from the maximum peak temperature until concrete reaches the required release strength. Allow the concrete element to cool gradually at the maximum cooling rate of 50°F per hour and continue the cooling at this rate until the concrete temperature is 40°F or less above the ambient temperature outside the curing enclosure.

When the ambient air temperature is below 50°F cure the concrete in two stages. Start the accelerated curing of the first stage during the preset period by applying heat to increase the temperature of concrete at the maximum rate of 10°F per hour. The total temperature gain of concrete during the initial set period cannot exceed 40°F higher than the placement temperature, or 104°F, whichever is less. Upon obtaining the initial set, continue curing as stated above for ambient temperature of 50°F or higher. To prevent moisture loss on exposed surfaces during the preheating period, cover products as soon as possible after casting or keep the exposed surfaces wet by misting or wet blankets. Use enclosures for heat curing that allow free circulation of heat about the product and that are constructed to contain the heat with minimum moisture loss. The use of tarpaulins or similar flexible covers may be used provided they are kept in good repair and secured in such a manner to prevent the loss of heat and moisture. Use enclosures that cover the entire bed from stressing abutment to stressing abutment, including all exposed stranding, except when using CFRP strands. When using CFRP strands, follow the manufacturer's instructions.

SUBARTICLE 450-12.2 is deleted and the following substituted:

**450-12.2 Identification of Defects:** The QC Manager, or QC inspectors under direction of the QC Manager, will examine all deficiencies within the time limit specified in 450-2.3 and 450-2.4, to determine the applicable provisions and requirements of this Article and which course of action is appropriate.

1. If the QC Manager or designee determines that a deficiency is a cosmetic or minor defect, as stated 450-12.3, appropriate repairs may be executed ~~following pre-approved repairs methods described in the Producer QC Plan, or~~ in accordance with 450-13.

2. If the deficiency is major as defined in this Section, and is repairable for acceptance, submit a completed Noncomplying Prestressed/Precast Concrete Component Data Sheet (Form No. 700-030-10) to the Engineer within 30 days of the defect identification.

~~SI~~ ~~requested,~~ submit an Engineering Analysis Scope in accordance with 6-4 for approval, to address the deficiency. ~~Propose a preapproved repair method described in the Producer QC Plan.~~ A previously approved Engineering Analysis Report (EAR) may not be applied to a current major repair without the approval from the original engineer who signed and sealed the previously approved EAR.

Make major repairs under the observation of and to the satisfaction of the QC Manager. The Engineer reserves the right to witness the repairs.

The disposition of deficiencies and repair methods provided herein must at no time, and under no circumstances, be used as an excuse for or applied in such a manner so as to relieve the Contractor of his responsibility for QC. The number and type of deficiencies evaluated under this Specification will, however, be used in evaluating the Contractor's QC.

The Engineer may require a credit on any products with deficiencies that require an EAR and are accepted for use in the structure. Bear the costs of repairs and any actions taken to rectify deficiencies at no expense to the Department.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 4, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **452**  
Proposed Specification: **4520402 Precast Segmental Bridge Construction.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Ben Goldsberry from the Structures Design Office to allow PT systems to be accepted through the shop drawing submittal process instead of through a pre-approved list. The proposed specification change is associated with the changes made to Section 5, 462, and 960.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## PRECAST SEGMENTAL BRIDGE CONSTRUCTION (REV 11-10-21)

SUBARTICLE 452-4.2 is deleted and the following substituted:

**452-4.2 Information Required:** Submit integrated detailed shop drawings, calculations, manuals and other information, including, but not limited to, the following:

### 452-4.2.1 Segment Shop Drawings:

1. A schedule of materials for segment fabrication including concrete, reinforcing steel, prestressing steel, duct filler, and other similar items.
2. Each segment number and the direction of erection.
3. Segment dimensions including widths, lengths, thicknesses, tapers, fillets, radii, working points, post-tensioning, clearances, rebar dimensions and spacing, embedded items, holes, anchorage positions, and other similar items.
4. Post-tensioning hardware components meeting the requirements as outlined in Section 462. ~~Check post tensioning for consistency with pre approved post-tensioning hardware and provide part numbers for Department pre approved systems on the shop drawings. Substitution of parts or materials is not allowed.~~
5. The volume of concrete, weight of reinforcement and weight of post-tensioning in each precast segment and the total weight for reinforcement and post-tensioning for both the superstructure and substructure summarized and tabulated on the shop drawings.
6. Details and calculations for any localized strengthening for concentrated supports and loads or reactions from any special erection equipment placed in locations not already allowed for in the Plans.
7. Details and supporting calculations for any modifications to segment geometry, cross section dimensions, or segment length including any required changes to reinforcing and post-tensioning.
8. Details of permanent and temporary embedded items including inserts, blockouts, temporary openings, holes, and other similar items; and any localized required strengthening and the materials and methods to fill and finish the holes.

SUBARTICLE 452-5.2 is deleted and the following substituted:

**452-5.4 Post-Tensioning Systems:** Use post-tensioning hardware components meeting the requirements of Section 462 and used in field mock-up testing. Components are not interchangeable and must comply with the details of the approved shop drawings.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 13, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **455**  
Proposed Specification: **4550511 Structures Foundations.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Juan Castellanos from the State Construction Office to indicate a timeline for FDOT pile acceptance, include a monitoring plan as part of the installation Plans, include polymer as an APL product, and address requirements to drilled shaft construction. The proposed changes are associated with the changes made to Section 932.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra  
Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## STRUCTURES FOUNDATIONS

(REV ~~121-91~~-21)

SUBARTICLE 455-5.11.2 is deleted and the following substituted:

**455-5.11.2 Bearing Criteria:** For foundations requiring 100% dynamic testing, the Engineer will determine the bearing of all piles using the data received from dynamic load testing equipment utilizing internally or externally mounted sensors according to the methods described in 455-5.12.1.

For foundations not requiring 100% dynamic testing, the Engineer will determine the number of blows required to provide the required bearing according to the methods described herein. Determine the pile bearing by computing the penetration per blow with less than 1/4 inches rebound averaged through 12 inches of penetration. When it is considered necessary by the Engineer, determine the average penetration per blow by averaging the penetration per blow through the last 10 to 20 blows of the hammer.

The Engineer will accept piles within two Working Days after the final drive is performed, including any instrumented restrikes performed to ensure bearing has been met and that any potential relaxation will not reduce the required capacity to less than the required nominal bearing resistance (NBR).

SUBARTICLE 455-10.1 is deleted and the following substituted:

**455-10.1 General:** Submit the completed Pile Driving Installation Plan Form (Form No. 700-020-01) with the following information at the preconstruction conference or no later than 30 days before driving the first pile.

1. List and size of proposed equipment including cranes, barges, driving equipment, jetting equipment, compressors, and preformed pile hole equipment. Include manufacturer's data sheets on hammers.

2. Methods to determine hammer energy in the field for determination of pile capacity. Include in the submittal necessary charts and recent calibrations for any pressure measuring equipment.

3. Detailed drawings of any proposed followers.

4. Detailed drawings of templates.

5. Details of proposed load test equipment and procedures, including recent calibrations of jacks and required load cells.

6. Sequence of driving of piles for each different configuration of pile layout.

7. Details of proposed features and procedures for protection of existing structures.

8. Proposed plan for monitoring settlements and vibrations of adjacent structures, identifying the proposed equipment, the structures and the specific points that will be monitored.

89. Required shop drawings for piles, cofferdams, etc.

~~9~~10. Methods and equipment proposed to prevent displacement of piles during placement and compaction of fill within 15 feet of the piles.

~~10~~11. Methods to prevent deflection of battered piles due to their own weight and to maintain their as-driven position until casting of the pile cap is complete.

~~11~~12. Proposed pile splice locations and details of any proprietary splices anticipated to be used.

~~12~~13. Methods and equipment proposed to prevent damage to voided or cylinder piles due to interior water pressure.

Notify the Engineer of any test pile driving and production pile driving at least one week prior to beginning the installation operations of any pile.

ARTICLE 455-14 is expanded by the following:

**455-14 Materials.**

**455-14.1 Concrete:** Use concrete meeting the requirements of Section 346, unless otherwise shown in the Plans.

**455-14.2 Reinforcing Steel:** Meet the reinforcing steel requirements of Section 415.

**455-14.3 Polymer Slurry:** Use a product listed on the Department's Approved Product List (APL) meeting the requirements of 932-5.

SUBARTICLE 455-15.1.2 is deleted and the following substituted:

**455-15.1.2 Drilled Shaft Installation Plan (DSIP):** At the preconstruction conference submit a DSIP for review by the Engineer. Final approval will be subject to satisfactory performance. Include in this plan the following details:

1. Name and experience record of drilled shaft superintendent or foreman in responsible charge of drilled shaft operations. Ensure the drilled shaft superintendent or foreman in responsible charge of the drilled shaft operations has a minimum of one year of experience of installing drilled shafts of the size and depth shown in the Plans and a minimum of three years' experience in the construction of drilled shafts using the following methods:

- a. Wet Method (mineral and polymer slurry),
- b. Casings up to the length shown in the Plans,
- c. Shaft drilling operations on water under conditions as shown in

the Plans.

2. List and size of proposed equipment, including cranes, drills, augers, bailing buckets, final cleaning equipment, desanding equipment, slurry pumps, core sampling equipment, tremies or concrete pumps, casings, and equipment to install and remove casing.

3. Details of sequence of construction operations and sequence of shaft construction in bents or shaft groups.

4. Details of shaft excavation methods, including casing installation procedures.

5. Details of slurry, including proposed methods to mix, circulate, desand, test methods, and proposed CTQP certified technician that will perform and document the fluid tests.

6. Details of proposed methods to clean the shaft excavation.



7. Details of shaft reinforcement, including methods to ensure centering/required cover, cage integrity during placement, placement procedures, cage support, and tie downs.

8. Details of concrete placement, including elapsed concrete placement times and proposed operational procedures for concrete tremie or pump, including initial placement, raising during placement, and overfilling of the shaft concrete. Include provisions to ensure proper final shaft cutoff elevation.

9. Details of casing removal when removal is required, including minimum concrete head in casing during removal.

10. Required submittals, including shop drawing and concrete design mixes.

11. Details of any required load tests, including equipment and procedures, and recent calibrations for any jacks or load cells.

12. Proposed Cross-Hole Sonic Logging (CSL) and Thermal Integrity Testing for Drilled (TITDS) Specialty Engineer to supervise field testing and report the test results.

13. Methods and equipment proposed to prevent displacement of casing and/or shafts during placement and compaction of fill.

14. Provide the make and model of the shaft inspection device, if applicable.

15. Details of environmental control procedures used to prevent loss of slurry or concrete into waterways or other protected areas.

16. Proposed schedule for test shaft installation, load tests and production shaft installation.

~~17. Other information shown in the Plans or requested by the Engineer.~~

~~17. For drilled shafts constructed using polymer slurry, identify the polymer slurry meeting the requirements of 455-15.8.3, the pH and proposed viscosity ranges recommended by the manufacturer for the materials to be excavated and a description of the mixing method to be used. Submit the Material Safety Data Sheets (SDS) for the product, and a current certification that the polymer slurry and components meet the requirements of 455-15.8.3. The certification shall be attested to within the past one year by a person having legal authority to bind the manufacturing company. Submit the contact information for the manufacturer's representative available for immediate contact during shaft construction and the representative's schedule of availability.~~

18. When settlement and vibration monitoring of adjacent structures are required as per 108-2, submit a proposed monitoring plan identifying the proposed equipment, the structures and the specific points that will be monitored.

19. Procedure for grouting non-destructive testing access tubes.

20. Other information shown in the Plans or requested by the Engineer.

The Engineer will evaluate the DSIP for conformance with the Contract Documents. Within 20 days after receipt of the plan, the Engineer will notify the Contractor of any additional information required and/or changes that may be necessary ~~in the opinion of the Engineer~~ to meet the above requirements and satisfy the Contract Documents. The Engineer will reject any part of the plan that ~~is unacceptable~~ does not meet specifications, plans or has the potential to affect the integrity of adjacent structures or negatively affect the environmental conditions. Submit changes agreed upon for reevaluation. The Engineer will notify the

Contractor within seven days after receipt of proposed changes of their acceptance or rejection. All equipment and procedures are subject to trial and satisfactory performance in the field.

Acceptance by the Engineer does not relieve the Contractor of the responsibility to perform the work in accordance with the Contract Documents. The installation plan is for the Contractor to explain the approach to the work and allow the Engineer an opportunity to comment on the equipment and procedures chosen before field operations begin. The Engineer's acceptance is not a guarantee that the chosen methods and equipment are capable of obtaining the required results, this responsibility lies with the Contractor.

SUBARTICLE 455-15.8 is deleted and the following substituted:

#### **455-15.8 Slurry and Fluid in Excavation:**

**455-15.8.1 General:** Thoroughly premix the slurry in a mixing tank with clean fresh water prior to introduction into the shaft excavation. Introduce slurry before the excavation advances below the bottom of the casing. Ensure that the percentage of polymer or mineral admixture used to make the suspension is such as to maintain the stability of the shaft excavation. ~~The Engineer will require~~ Provide adequate water and/or slurry tanks ~~when necessary~~ to perform the work in accordance with this Section. The Engineer will not allow excavated pits on projects requiring slurry tanks without the written permission of the Engineer. Take the steps necessary to prevent the slurry from "setting up" in the shaft; including, but not limited, to agitation, circulation, and adjusting the composition and properties of the slurry. Provide suitable offsite disposal areas and dispose of all waste slurry in a manner meeting all requirements pertaining to pollution.

For shafts to support sign, signal, lighting, and ITS structures, polymer slurry may be mixed in the casing portion, in accordance with the APL approved instructions if the following conditions are met:

1. Contractor tests and verifies the polymer slurry meets the property requirements of 455-15.8.3, before continuing the excavation below the casing.
2. Polymer mix continues to be added as required below the bottom of the casing, to maintain the slurry properties during the excavation within compliance of 455-15.8.3.
3. Slurry sampling and testing is performed at intervals not exceeding one hour, in the middle of the excavation depth at the time of testing to verify the properties are maintained within compliance throughout the excavation.
4. If failing to demonstrate the properties are maintained within compliance of 455-15.8.3, discontinue this mixing method and use a slurry pre-mixed in a tank.

Provide a CTQP qualified drilled shaft inspector to perform control tests using suitable apparatus on the slurry mixture to determine the slurry and fluid properties as specified in 455-15.8.2 to 455-15.8.4.

Measure the viscosity of the freshly mixed slurry regularly as a check on the quality of the slurry being formed using an approved measuring device.

Perform tests from the fluid in the excavation to determine density, viscosity, and pH value to establish a consistent working pattern, taking into account the mixing process and blending of freshly mixed slurry and previously used slurry. Repeat tests to determine density, viscosity, and pH value at intervals not exceeding 2 hours during the first 8 hours slurry is in use and every 4 hours thereafter, including overnight, until concrete placement. Perform density, viscosity and pH tests again when the excavation reaches the

midpoint. When the contractor operations require the shaft excavation to be interrupted and performed in multiple shifts, the continuous testing may be waived if the excavation at the time of suspension of the operations is not deeper than the bottom of the casing provided.

For shafts to support sign, signal, lighting and ITS structures up to 5 ft diameter and up to 40 ft in depth, when the contractor operations require the shaft to be constructed in multiple shifts, the continuous testing may be waived if the excavation at the time of operations suspension is not deeper than the bottom of the casing provided, or if all the conditions below are met:

1. The shaft location does not pose a safety risk to the public, adjacent lane, utility pole, or any structure, if the excavation fails.

2. Slurry testing is performed at the time of suspending operations and at a time not exceeding 12 hours after that or at the time the operations resume whichever comes first. Testing shall be performed at intervals not exceeding 2 hours for the first 8 hours after resuming operations and every 4 hours thereafter.

3. Slurry testing shall be performed on at least two samples each time, one sample approximately three feet from the bottom and one sample from the middle of the excavation depth at the time the operations were suspended. The results must indicate the polymer slurry meets the viscosity requirements of 455-15.8.3. If this requirement is not met, do not continue without testing for more than 4 hours including the time periods between shifts.

4. The contractor performs soundings of the fluid level, at intervals of 15 minutes or longer, that demonstrate the fluid level is stable over two consecutive soundings.

5. If when resuming operations, slurry does not meet density, pH, or both, adjust the slurry to meet all property requirements of 455-15.8.3. Re-test slurry to verify properties meet the requirements, before resuming operations. Continue testing the slurry every 4 hours after resuming operations until completion of the excavation.

The Department may perform comparison tests as determined necessary during the mineral and polymer slurry operations.

If, at any time in the opinion of the Engineer, the wet construction method fails to stabilize the excavation, discontinue this method of construction, backfill the excavation and submit modifications in procedure or alternate means of construction for approval.

**455-15.8.2 Mineral Slurry:** When mineral slurry is used in an excavation, use only processed attapulgate or bentonite clays with up to 2% (by dry weight) of added polymer. Use mineral slurry having a mineral grain size such that it will remain in suspension and having ~~suffieient~~ viscosity and gel characteristics to transport excavated material to a ~~suitable~~ screening system. Use a percentage and specific gravity of the material to make ~~athe~~ suspension ~~suffieient~~ ~~able~~ to maintain the stability of the excavation and to allow proper placement of concrete. Ensure that the material used to make the slurry is not detrimental to concrete or surrounding ground strata. During construction, maintain the level of the slurry at a height sufficient to prevent caving of the hole. In the event of a sudden significant loss of slurry such that the slurry level cannot ~~practically~~ be maintained by adding slurry to the hole, backfill the excavation and delay the construction of that foundation until an alternate construction procedure has been approved.

Perform the following tests on the mineral slurry supplied to and in the shaft excavation and ensure that the results are within the ranges stated in the table below:

Item to be measured	Range of Results at 68°F <u>fluid temperature</u>	Test Method
Density	64 to 73 lb/ft <sup>3</sup> (in fresh water environment) 66 to 75 lb/ft <sup>3</sup> (in salt water environment)	Mud density balance: FM 8-RP13B-1
Viscosity	30 to 40 seconds	Marsh Cone Method: FM 8-RP13B-2
pH	8 to 11	Electric pH meter or pH indicator paper strips: FM 8-RP13B-4
Sand Content	4% or less	FM 8-RP13B-3

The Contractor may adjust the limits in the above table when field conditions warrant as successfully demonstrated in a test hole or with other methods approved by the Engineer. The Engineer must approve all changes in writing before the Contractor can continue to use them.

During construction, maintain the level of mineral slurry in the shaft excavation within the excavation and at a level not less than 4 feet above the highest expected piezometric water elevation along the depth of a shaft.

**455-15.8.3 Polymer Slurry:** ~~Materials manufactured expressly for use as polymer slurry for drilled shafts that meet the requirements of this Section may be used as slurry for drilled shaft excavations.~~ A representative of the manufacturer must be on-site or available for immediate contact to assist and guide the construction of the first three drilled shafts at no additional cost to the Department. This representative must also be available for on-site assistance or immediate contact if problems are encountered during the construction of the remaining drilled shafts as determined by the Engineer. Use polymer slurry only if the soils below the casing are not classified as organic, and the pH of the fluid in the hole can be maintained in accordance with the manufacturer's ~~published~~ recommendations. ~~Submit the SDS for the product, the manufacturer's published mixing procedures, and the manufacturer's published range of values for pH and viscosity of the mixed slurry. Submit a report in accordance with Section 2.4, Volume II of the Department's Material Manual, which may be viewed at the following URL: [https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/materials/administration/resources/library/publications/materialsmanual/documents/section24vii\\_100517.pdf?sfvrsn=baab750d\\_2](https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/materials/administration/resources/library/publications/materialsmanual/documents/section24vii_100517.pdf?sfvrsn=baab750d_2).~~

~~The report must include test results, certification and documentation that demonstrate the polymer slurry and additives meet the following requirements:~~

~~1. The polymer slurries to be used on the project and their waste products are classified as non-hazardous as defined by Resource Conservation and Recovery Act (RCRA) Subpart C rules, Table 1 of 40 CFR 261.24 Toxicity Characteristic.~~

~~2. Pull out tests demonstrate the bond between the bar reinforcement and the concrete is not materially affected by exposure to the slurry under typical construction conditions, over the typical range of slurry viscosities to be used.~~

~~3. Load tests demonstrate the bond between the concrete and the soil is not materially affected by exposure to the polymer slurry under typical construction conditions, over the typical range of polymer slurry viscosities to be used.~~

~~4. The method of disposal meets the approval of all federal, state and local regulatory authorities.~~

Perform the following tests on the polymer slurry supplied to and in the shaft excavation and ensure that the results are maintained within the ranges stated in the table below:

Item to be measured	Range of Results at 68°F <u>fluid temperature</u>	Test Method
Density	62 to 65 lb/ft <sup>3</sup> (fresh water) 64 to 67 lb/ft <sup>3</sup> (salt water)	Mud density balance: FM 8-RP13B-1
Viscosity <u>for bridges and main structure foundations</u>	50 seconds to upper limit <u>defined</u> <del>published</del> by the <u>APL manufacturer, limited by 455-15.8.3(2) and (3) above, for materials excavated</u>	Marsh Cone Method: FM 8-RP13B-2
<u>Viscosity for miscellaneous structure foundations</u>	<u>50 seconds to upper limit recommended by the manufacturer based on soil type</u>	<u>Marsh Cone Method: FM 8-RP13B-2</u>
pH	Range published by the manufacturer for materials excavated	Electric pH meter or pH indicator paper strips: FM 8-RP13B-4
Sand Content	0.5% or less	FM 8-RP13B-3

Premix polymer slurry in accordance with the manufacturer's published procedures. Do not mix the slurry in the excavation as a means to prepare slurry. When approved by the Engineer, adjustments to slurry properties can be made in the excavation.

During construction, maintain the level of the slurry at a height sufficient to prevent caving of the hole and which should not be lower than 4 feet above the highest expected piezometric water elevation along the depth of the shaft.

Ensure the method of disposal meets the requirements of local authorities.

**455-15.8.4 Fluid in Excavation at Time of Concrete Placement:** When any fluid is present in any drilled shaft excavation, including shafts to support sign, signal, lighting and ITS structures, the applicable test methods and reporting requirements described in 455-15.8.1, 455-15.8.2 and 455-15.8.3 apply to tests of fluid in the shaft prior to placing the concrete.

When mineral slurries are used, ensure the properties at the time of concrete placement are within the acceptable ranges indicated in 455-15.8.2. When polymer slurries are used ensure the properties of the polymer slurry are within the following acceptable ranges at the time of concrete placement:

<u>Table 455-4</u>		
<u>Polymer Slurry Properties at Time of Concrete Placement</u>		
<u>Item to be measured</u>	<u>Range of Results at 68°F fluid temperature</u>	<u>Test Method</u>
<u>Density</u>	<u>62 to 65 lb/ft<sup>3</sup> (fresh water)</u> <u>64 to 67 lb/ft<sup>3</sup> (salt water)</u>	<u>Mud density balance:</u> <u>FM 8-RP13B-1</u>
<u>Viscosity</u>	<u>50 seconds to upper limit defined by the APL</u>	<u>Marsh Cone Method:</u> <u>FM 8-RP13B-2</u>
<u>pH</u>	<u>Range published by the manufacturer for materials excavated</u>	<u>Electric pH meter or pH indicator paper strips:</u> <u>FM 8-RP13B-4</u>
<u>Sand Content</u>	<u>0.5% or less</u>	<u>FM 8-RP13B-3</u>

Test samples of the fluid in the shaft from within 1 inch of the base of the shaft and from the middle of the shaft height for shafts up to 60 feet in depth. Test samples of the fluid in the shaft from within 1 inch of the base of the shaft and at intervals not exceeding 30 feet up the shaft for shafts deeper than 60 feet. Use a sampling tool ~~approved by the Engineer,~~ designed to sample over a depth range of 12 inches or less. Take whatever action is necessary prior to placing the concrete to bring the fluid within the specification and reporting requirements, outlined in the tables in 455-15.8.2 and 455-15.8.3, except as follows:

The Engineer will not require tests for pH or viscosity, nor require the fluid to meet the minimum density specified in 455-15.8.2 and 455-15.8.3 when neither polymer nor mineral slurry has been introduced into the shaft excavation.

SUBARTICLE 455-16.3 is deleted and the following substituted:

**455-16.3 Support, Alignment, and Tolerance:** Tie and support the reinforcing steel in the shaft so that the reinforcing steel will remain within allowable tolerances as specified in 455-20 and Section 415.

Ensure concentric spacing for the entire length of the cage. As a minimum, use centering devices consisting of wheels or other approved noncorrosive spacing devices within 3 feet of the bottom, within 6 feet of the top, and intervals not exceeding 10 feet along the cage length. ~~When a casing with an inside diameter (I.D.) larger than the required shaft diameter is used, provide, within the portion of the oversized casing, centering devices specially dimensioned or other means to ensure the casing and the cage are concentric.~~ Do not use block or wire type spacers. Ensure no permanent metallic elements will be within the concrete cover space. Use a minimum of one spacer per 30 inches of circumference of cage with a minimum of four at each level. Provide spacers at the bottom of the drilled shaft reinforcing cage as required to maintain the proper position of the cage.

For shafts to support sign, signal, lighting and ITS structures, when a casing with an inside diameter (I.D.) larger than the required shaft diameter is used, provide, within the portion of the oversized casing, centering devices specially dimensioned or other means to ensure the shaft, the cage and the upright are concentric. Provide spacers within 3 feet of the

bottom and at intervals not exceeding 10 feet along the reinforcement, with a minimum of two levels of spacers below the bottom of the casing.

Check the elevation of the top of the steel cage before and after placing the concrete. If the cage is not within the specified tolerances, correct, and submit a revised DSIP to the Engineer for approval. Do not construct additional shafts until receiving approval from the Engineer.

ARTICLE 455-47 is deleted and the following substituted:

**455-47 Auger Cast Pile Installation Plan (ACPIP).**

At the preconstruction conference, but no later than 30 days before ACP construction begins, submit an ACP/IP for approval by the Engineer. Provide the following detailed information on the plan:

1. Name and experience record of ACP superintendent or foreman in responsible charge of ACP operations. Place a person in responsible charge of day to day ACP operations who possesses satisfactory prior experience constructing auger cast piles similar to those described in the Contract Documents. The Engineer will give final approval subject to satisfactory performance in the field.

2. List and size of the proposed equipment, including cranes, augers, concrete pumps, mixing equipment etc.

3. Details of grout mixing procedures and proposed pump calibration procedures.

4. Details of pile installation methods.

5. Details of reinforcement placement and method of centering in pile, including details of all temporary supports for reinforcement, anchor bolts, precast columns, etc.

6. Details of how and by whom the grout volumes will be determined, monitored and documented.

7. Required submittals, including shop drawings and cement grout design mixes.

8. Proposed plan for monitoring settlements of adjacent structures, identifying the proposed equipment, the structures and the specific points that will be monitored.

9. Other information shown in the Plans or requested by the Engineer.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 6, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **455**  
Proposed Specification: **4551206 Structures Foundations.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Juan Castellanos from the State Construction Office to include performance tests within the costs of temporary sheet piling.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



**STRUCTURES FOUNDATIONS**  
**(REV 11-9-21)**

SUBARTICLE 455-12.6.2 is deleted and the following substituted:

**455-12.6.2 Temporary Sheet Piling:** For critical temporary steel sheet pile walls, walls which are necessary to maintain the safety of the traveling public or structural integrity of nearby structures, roadways and utilities during construction, that are detailed in the Plans, price and payment will be full compensation for all labor, equipment, and materials required for furnishing and installing steel sheet piling including preformed holes when shown in the Plans, and including wales, anchor bars, dead men, soil anchors, proof tests, performance tests, creep tests, and other incidental items when an anchored wall system is required. Removal of the sheet piling, anchors, and incidentals will be included in the cost per square foot for steel sheet piling (critical temporary). When the temporary steel sheet pile walls are not detailed in the Plans, the cost of furnishing and installation shall be incidental to cost of other related items and no separate payment shall be made. If the wall is not shown in the Plans, but deemed to be critical as determined by the Engineer, then a design shall be furnished by the Department and paid for separately under steel sheet piling (critical temporary).



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 4, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **462**  
Proposed Specification: **4620100 Post-Tensioning.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Ben Goldsberry from the Structures Design Office to provide PT systems will be accepted through the shop drawing submittal process instead of through a pre-approved list. The proposed specification change is associated with changes to Section 5, 452, and 960.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## POST-TENSIONING (REV 11-10-21)

ARTICLE 462-1 is deleted and the following substituted:

### 462-1 Description.

1. Furnish, ~~test,~~ transport, store, handle, and install all components of Post-Tensioning (PT) systems, in accordance with the requirements of this Section and the component manufacturer's recommendations. Constituent components of PT systems include, but are not limited to, anchorage assemblies, filler containment assemblies, filler material, and related steel reinforcement. Use the most stringent requirements, as determined by the Engineer, of those specified in this Section or the component manufacturer's recommendations for protecting components from damage due to environmental exposure, improper handling, or improper installation.

2. With the exception of mild reinforcing and prestressing steel, furnish all PT system components from a single supplier (~~vendor~~).

~~3. Submit PT system shop drawings in accordance with Section 5. Perform PT system testing in accordance with Section 960. Include in the PT system testing all possible combinations of components to be incorporated into the structure.~~

~~4a. Use only approved PT systems meeting the requirements of Section 960 and approved by the Engineer in accordance with Section 5 and selected from the Structures Design Office (SDO) website for Approved Post-Tensioning Systems.~~

~~a. Use only PT systems of appropriate type and size required to construct tendons shown in the Contract Documents.~~

~~b. Use only the exact manufacturer and/or model of major components, as defined in 960-2, that were used in system testing and as listed on the approved PT system shop drawings.~~

~~c. With the exception of local zone reinforcement, do not substitute, modify, or delete any major components, as defined in 960-2, of an approved PT system approved by the Engineer for use on the project. Inclusion of all possible subcomponents is required for PT system and component testing; however, subcomponents of approved systems may be eliminated from final installations based on project-specific requirements, provided all component-to-component interface hardware are included as necessary to maintain connections and PT system integrity.~~

~~5. Provide a mockup test in accordance with this Section. PT system acceptance testing may be performed concurrent with mockup testing if performed prior to installation of any PT system hardware.~~

~~63. Install the PT tendon (e.g., strands, wires, or bars) in ducts. Stress the PT tendon to a predetermined load and anchor ends directly against hardened concrete. After anchoring the PT tendon, install permanent anchorage caps, inject ducts with filler to completely fill voids, and install protection at anchorages.~~

~~74. Submit all required documents in accordance with this Section and Section 5 to the Engineer for review and written approval.~~

~~85. Cable stays and extradosed bridges are not covered by this Specification.~~

~~96. Install duct filler in accordance with the requirements of this Section. Provide fully filled duct and anchorage assemblies free from leaks, blockages, and voids. Submit test data to~~

the Engineer to verify that the work meets the requirements of this Section. Perform filler injection operations in accordance with 462-7.4.

SUBARTICLE 462-2.2.1 is deleted and the following substituted:

**462-2.2 Steel Reinforcing:**

**462-2.2.1 Mild:**

1. Provide reinforcing steel per Section 931.
2. Final design and details of local zone reinforcement are project specific and are the responsibility of PT system supplier (vendor). Design project specific local zone reinforcement for the number of strands or wires a particular ~~approved~~ PT system can accommodate at maximum allowable strand or wire force; do not design project specific local zone reinforcement for a reduced system capacity.
3. Submit signed and sealed project specific local zone reinforcement details to the Engineer for review and written approval.

ARTICLE 462-5 is deleted and the following substituted:

**462-5 Submittals.**

~~462-5.1 Shop and Working Drawings:~~

1. Submit to the Engineer all necessary information, Plans, shop and working drawings, and manuals in accordance with this Section and Section 5. Submit to the Engineer signed and sealed PT related shop drawings designed by the Contractor's Engineer of Record.
2. Prepare shop drawings addressing all requirements stated in the Contract Documents and requirements of this Section. ~~Indicate pre-approved PT systems to be used as shown on the SDO website for Approved Post-Tensioning Systems.~~ Show details of PT hardware components, tendon geometry and locations complying with the Contract Documents and limitations of selected PT system. Include all inlets, outlets, high point inspection port details, anchorage inspection details, permanent anchorage caps, protection system materials, and application limits.

SUBARTICLE 462-7.1 is deleted and the following substituted:

**462-7 Construction.**

**462-7.1 General:**

1. Prior to installing any PT system hardware:
  - a. Submit to the Engineer a list of all PT systems chosen for the project.
  - b. For each PT system, submit a package to the Engineer written certification from PT supplier (vendor) that PT system chosen for the project meets meeting the requirements of this Section, Section 960-3.6, and is a Department approved PT system prior to installing any PT hardware.
2. ~~Submit a list of PT system components and reference drawings to the Engineer.~~
  - c. For each PT system, submit to the Engineer written certification that all major components, as defined in 960-2, furnished to the project and shown on the approved PT system shop drawings exactly match the major components used in PT system testing.

23. Use methods to place and consolidate concrete that will not displace or damage any PT ducts, anchorage assemblies, splices and connections, reinforcement, or other embedded items.

34. Conduct all stressing and filler injection operations in the presence of the Engineer.

SUBARTICLE 462-7.2.1 is deleted and the following substituted:

**462-7.2.1 Ducts:**

1. Construct tendon ducts using the minimum number of splices as practical.

2. Accurately position and align ducts at locations shown in the Contract Documents, or according to approved shop or working drawings, or as approved in writing by the Engineer.

3. Securely fasten all internal ducts at regular intervals not exceeding 30 inches for steel pipes, 24 inches for round plastic ducts, and 12 inches for flat ducts to prevent movement, displacement, or damage from concrete placement and consolidation operations.

4. Show method and spacing of duct supports on appropriate shop drawings.

5. Ensure external tendon ducts are straight between connections to internal ducts at anchorages, diaphragms, and deviation saddles and are supported at intermediate locations according to the Contract Documents including approved shop drawings.

6. Ensure all alignments, including curves and straight portions, are smooth and continuous with no lips, kinks, or dents. This also applies to curves in pre-bent steel pipe.

7. Check and repair all ducts in accordance with 462-7.5 as necessary before placing any concrete.

8. Ensure ducts at end connections to anchorages, splices, inlets, outlets, drains, and all other duct openings are sealed at all times after installing ducts and until tendon installation is complete. Briefly open low point drains just prior to tendon installation and again just prior to filler injection to allow for drainage of any water that may be present within the duct.

9. Provide an absolute seal of anchorage and duct termination locations per the pre-approved system drawings.

10. Use of tape, caulking, epoxy or other sealants is not permitted to make connections or sealing for any reason.

11. Use heat welding techniques, in accordance with duct manufacturer's instructions, to make splices between sections of smooth plastic duct or make connection with electrofusion duct coupler meeting the material requirements of Section 960 and as shown on the approved PT system shop drawings.

12. When connecting steel pipe to plastic pipe with a boot, use a 3/8 inches wide power seated band and clamps in accordance with 960-2.2 on each end of a duct boot to seal against filler leakage. Install band per manufacturer's instructions.

13. Ducts for prestressing used exclusively for temporary erection where PT will be removed from structure are not required to be coupled across segment joints.

SUBARTICLE 462-7.4.1.1 is deleted and the following substituted:

**462-7.4.1.1 Plan:**

1. Submit a Grouting Operations Plan to the Engineer for approval at least six weeks in advance of any scheduled grouting operation.
2. Written approval of Grouting Operations Plan by the Engineer is required before any grouting of permanent structure takes place.
3. At minimum, Grouting Operations Plan will address and provide:
  - a. Names and proof of training for grouting crew and crew supervisor in conformance with this Specification;
  - b. Type, quantity, and brand of materials to be used in grouting, including all required certifications;
  - c. Type of equipment to be used, including capacity in relation to demand and working conditions, as well as, standby equipment and spare parts;
  - d. General grouting procedure;
  - e. Duct pressure test and repair procedures;
  - f. Method to be used to control rate of flow within ducts;
  - g. Theoretical grout volume calculations;
  - h. Mixing and pumping procedures in accordance with the manufacturer's recommendations;
  - i. Direction of grouting accounting for grade and/or slope of tendon;
  - j. Sequence of inlet and outlet pipes use;
  - k. Procedures for handling blockages;
  - l. Procedures for possible post grouting repair.
4. Conduct a joint meeting of the Contractor, grouting crew, and the Engineer before grouting operations begin. Discuss Grouting Operations Plan, required testing, corrective procedures, and any other relevant issues at the meeting.
5. Prior to production grouting, demonstrate to the Engineer's satisfaction successful grout injection by injecting full-scale mockups that are constructed with all associated PT system components using the mockup tendon profiles shown in the Plans and the proposed Grouting Operations Plan. Utilize smooth duct and associated couplers and fittings meeting the requirements of Section 960 for all mockups. Utilize smooth duct for the mockups which has an inside diameter required for a given mockup tendon size. If the mockup is also being used to perform PT system acceptance testing, use the duct type appropriate for the PT system location. Place the mockup tendons specified in the Plans inside the ducts to simulate the in-place PT tendons. Stress mockup tendons to the minimum values shown in the Plans by using jacks or other methods approved by the Engineer. Perform pressure tests on the mockups in accordance with 462-8.2.1 prior to grout injection. For the grout injection operations, utilize the same grout material and types and sizes of grout injection equipment that will be used on the project including but not limited to mixers, pumps, hoses, valves and pressure gauges. Inject grout into the mockups using the proposed Grouting Operations Plan. Allow the grout to harden a minimum of 24 hours after injection before inspecting the mockup. Inspect the mockup in accordance with the requirements of 462-8.3.2.1 and then carefully cut open the duct at all high points and other locations as directed by the Engineer to check for voids. Prepare a report documenting the findings and submit it to the Engineer. If voids are found, determine the cause

and revise the proposed Grouting Operations Plan accordingly. If directed by the Engineer, construct additional mockups and repeat the grout injection operation using the revised Grouting Operations Plan as many times as are required until the results are acceptable.

SUBARTICLE 462-7.4.2.1.1 is deleted and the following substituted:

**462-7.4.2.1.1 Wax Injection Operations Plan:**

1. Prepare a Wax Injection Operations Plan in cooperation with the PT system vendor and the PT wax manufacturer.
2. Submit the Wax Injection Operations Plan to the Engineer for approval at least six weeks in advance of any scheduled injection operation.
3. Written approval of the Wax Injection Operations Plan by the Engineer is required before any injection of permanent structure can begin.
4. At a minimum, the Wax Injection Operations Plan will address and provide the following:
  - a. Names and qualifications for wax injection crew and crew supervisor in conformance with this Specification;
  - b. Type, quantity, and brand of materials to be used in wax injection including all required certifications;
  - c. Type of equipment to be used, including capacity in relation to demand and working conditions, as well as, standby equipment and spare parts;
  - d. Location and sequence of ducts to be injected;
  - e. Calculation of temporary elongation of tendons due to wax injection temperature;
  - f. General wax injection procedure for all duct geometries and types;
  - g. Duct pressure test and repair procedures;
  - h. Method to be used to control rate of flow within ducts and anchorage assembly;
  - i. Theoretical wax volume calculations;
  - j. Injection rate;
  - k. Maximum injection pressure during injection and locking pressure;
  - l. Vacuum (gauge) pressure requirements, vacuum tests and repair procedures;
  - m. Heating, mixing and pumping procedures in accordance with the manufacturer's recommendations;
  - n. Direction of wax injection accounting for grade and/or slope of tendon;
  - o. Location of all high points and all low points accounting for grade and/or slope of tendon;
  - p. Sequence of valve operations at PT system inlets and outlets, including minimum wax discharge quantities;
  - q. Procedures for handling blockages;
  - r. Procedure for sealing duct after wax injection;

- s. Procedure for inspecting the PT system after wax injection, filling voids created by inspection procedures, and sealing duct after PT system inspection;
- t. Procedures for possible post injection repair;
- u. Method(s) and material(s) that will be used to protect concrete surfaces from wax spills, leaks, etc. during wax injection, post injection inspection and post injection repair;
- v. Safety and clean-up procedures;

5. Conduct a joint meeting of the Contractor, wax injection crew, and the Engineer before wax injection operations begin. Discuss Wax Injection Operations Plan, required testing, corrective procedures, and any other relevant issues at the meeting.

6. Prior to production wax injection, demonstrate to the Engineer's satisfaction successful wax injection by injecting full-scale mockups that are constructed with all associated PT system components using the mockup tendon profiles shown in the Plans and the proposed Wax Injection Operations Plan. Utilize smooth duct and associated couplers and fittings meeting the requirements of Section 960 for all mockups. Utilize smooth duct for the mockups which has an inside diameter required for a given mockup tendon size. If the mockup is also being used to perform PT system acceptance testing, use the duct type appropriate for the PT system location. Place the mockup tendons specified in the Plans inside the ducts to simulate the in-place PT tendons. Stress mockup tendons to the minimum values shown in the Plans by using jacks or other methods approved by the Engineer. Perform pressure tests on the mockups in accordance with 462-8.2.1 prior to wax injection. If vacuum assisted wax injection is required to be used, perform vacuum tests on the mockups in accordance with 462-8.2.1 prior to wax injection. For the wax injection operations, utilize the same wax material and types and sizes of wax injection equipment that will be used on the project including but not limited to heaters, pumps, hoses, valves and pressure gauges. Inject wax into the mockups using the proposed Wax Injection Operations Plan. Allow the wax to cool a minimum of 24 hours after injection before inspecting the mockup. Inspect the mockup in accordance with the requirements of 462-8.3.2.2.1 and then carefully cut open the duct at all high points and other locations as directed by the Engineer to check for voids. Prepare a report documenting the findings and submit it to the Engineer. If voids are found, determine the cause and revise the proposed Wax Injection Operations Plan accordingly. If directed by the Engineer, construct additional mockups and repeat the wax injection operation using the revised Wax Injection Operations Plan as many times as are required until the results are acceptable.

SUBARTICLEA 462-7.5.1 is deleted and the following substituted:

#### **462-7.5.1 Lifting and Access Holes:**

1. Repair all holes with magnesium ammonium phosphate concrete meeting requirements of Section 930 or Type Q epoxy grout meeting requirements of Section 926. Immediately before casting concrete (i.e., within 24 hours), mechanically clean and roughen the mating concrete surfaces to remove any laitance and expose small aggregate. Use grit blasting or water blasting using a minimum 10,000 psi nozzle pressure. Flush surface with water and blow dry. Form, mix, place, and cure material in strict compliance with manufacturer's recommendations.



2. Upon completion of deck grooving, ~~C~~coat repaired holes, block-outs, and an area extending six inches outside perimeter of repair with a high molecular weight methacrylate (HMWM) meeting the requirements of Section 413~~listed on the APL upon completion of deck grooving~~. Prepare surface to be coated and apply HMWM in accordance with Section 413. Friction (skid) tests per Section 413 are not required.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 6, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **462**  
Proposed Specification: **4620704 Post-Tensioning.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Ben Goldsberry from the Structures Design Office to allow PT systems to be accepted through the shop drawing submittal process instead of through a pre-approved list.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

*Improve Safety, Enhance Mobility, Inspire Innovation*  
[www.fdot.gov](http://www.fdot.gov)

**POST-TENSIONING**  
**(REV 11-10-21)**

SUBARTICLE 462-7.4.2.1.5.3 is deleted and the following substituted:

**462-7.4.2.1.5.3 Operations:**

1. Open all inlets, outlets, drains and ports before beginning the wax injection operation to remove standing water from duct. Capture and measure the water removed from the duct. If the volume of water is significant, as determined by the Engineer, then utilize compressed air, vacuuming, or other means deemed acceptable by the Engineer to dry the duct interior.

2. Protect concrete surfaces from wax spills, leaks, etc.

3. Inject wax in accordance with approved Wax Injection Operations Plan.

4. Use pumping methods that ensure complete filling of ducts and anchorage assembly with wax.

5. Ensure the entire mass of wax is fully liquefied prior to and throughout injection operations. Establish a non-turbulent, laminar system circulation by continuously recirculating the wax between the pump and the storage container prior to injecting the wax into the duct. Pump components must be at wax injection temperature prior to wax injection into duct. Do not allow wax to free fall during recirculation or injection operations. Maintain a positive head of liquid wax above all withdrawal and recirculation ports and do not allow air intrusion into the pumping system. Do not pour liquid wax into an open pump or hopper.

6. Inject PT wax at a continuous and steady rate in accordance with the approved Wax Injection Operations Plan at a flow rate through duct at a velocity between 40 and 70 feet per minute and pressure limited to 75 psi at the duct inlet and 145 psi at the pump.

7. For tendons in which vacuum assisted injection is used, provide a minimum of 90% vacuum in the duct prior to injection. Connect both the anchorage outlet and the cap outlet to the vacuum system. After the vacuum is established, lock off the air supply to the duct and monitor the vacuum for 1 minute. If the loss of vacuum after 1 minute exceeds 10%, repair leaks as directed by the Engineer and retest the duct. If the results are acceptable, reestablish and maintain a minimum 90% vacuum using the outlets at the higher end anchorage shown on Standard Plans, Index 462-001 while injecting wax using the inlet at the lower end anchorage shown on the same Standard. Close all outlets, inlets, and ports other than at injection and vacuum locations during injection procedure. Pump wax into inlet and continuously vacuum air at the outlet ~~until duct is fully injected with wax.~~ After the duct is fully injected with wax and the wax reaches the vacuum end, close the outlet valve, turn off the vacuum pump and continue the injection pump. Bleed all outlets starting at the anchorage cap at the injection end and proceed to bleed every valve thereafter from injection end to vacuum end, ending with the anchorage cap at the vacuum end. When bleeding each valve, collect a minimum of two gallons of continuously flowing wax free from air before closing the valve. Close outlet valve at anchorage when filled with wax. ~~After all outlet valves are closed, close inlet valve~~ with locking pressure between 30 psi and 45 psi. Do not reuse discharged wax.

8. For tendons in which vacuum assisted injection is not used, inject wax under pressure at locations shown on Standard Plans, Index 462-001. Allow wax to flow from duct and anchorage discharge points until a steady flow of wax free from air is continuously discharged. Collect a minimum of two gallons of continuously flowing wax free from air at discharge point before closing outlet valve. Do not reuse discharged wax. After all outlets are closed, close the inlet valve at locking pressure between 30 and 45 psi.

9. Record the total volume of wax injected into the system.

10. Upon completion of wax injection, seal the duct in accordance with the approved PT system drawings. Remove all excess wax from exposed surfaces.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

February 9, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **520**  
Proposed Specification: **5201000 Concrete Gutter, Curb Elements, and Traffic Separators.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Rich Hewitt from the State Construction Office to address issues with additional asphalt needed when earthwork elevation is low or placed at cross slope different than design cross slope. The proposed specification is associated with the changes made to Section 200, 234, 334, 337, and 339.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra  
Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**CONCRETE GUTTER, CURB ELEMENTS,  
AND TRAFFIC SEPARATOR  
(REV 12-21-21)**

ARTICLE 520-10 is deleted and the following substituted:

**520-10 Surface Requirements.**

**520-10.1 Straightedge:** Test the gutter section of curb and gutter with a 10 foot straightedge laid parallel to the centerline of the roadway and while the concrete is still plastic. Perform straightedging along the edge of the gutter adjacent to the pavement or along other lines on the gutter cross-section, as directed by the Engineer. Immediately correct irregularities in excess of 1/4 inch.

**520-10.2 Elevation and Cross Slope:** Place curb and gutter so the calculated actual roadway or shoulder cross slope to be placed within the curb and gutter is within +/- 0.2% of the calculated design cross slope for that location. Once per 500 feet, check the elevation of lip of curb and gutter and calculate actual cross slope between curb and gutter on each side of a lane or set of adjacent lanes. Perform these checks prior to placement of the curb and gutter and adjust to ensure cross slope tolerance is met. After placement and curing of curb and gutter, perform the above checks again. Correct any curb and gutter found to be outside the cross slope tolerance described above.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 12, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **521**  
Proposed Specification: **5210200 Concrete Barriers, Traffic Railings, and Parapets.\***

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Melissa Hollis to update the Materials Article to be consistent with changes to barrier delineators in Section 705.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

\*Associated with proposed Standard Specification 9930000.

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**CONCRETE BARRIERS, TRAFFIC RAILINGS, AND PARAPETS.  
(REV 11-10-21)**

ARTICLE 521-2 is deleted and the following substituted:

**521-2 Materials.**

Meet the following requirements:

Flowable Fill .....	Section 121
Concrete .....	Sections 346 and 347
Reinforcing Steel .....	Section 415
Joint Materials.....	932-1.1
Joint Materials*.....	932-1.2 and 932-1.3
Barrier Delineators * <del>(1)</del> .....	Sections 705 <del>and 993</del>

\*Use products listed on the Department's Approved Product List (APL).

~~1) Mount delineators on the barriers by adhesive or mechanical means as per the manufacturer's recommendations and in accordance with the details shown in the Plans and the Standard Plans.~~





*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 4, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **522**  
Proposed Specification: **5220400 Concrete Sidewalk And Driveways.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Dino Jameson to clarify the language for density testing on sidewalk in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**CONCRETE SIDEWALK AND DRIVEWAYS.****(REV 10-12-21)**

ARTICLE 522-4 s deleted and the following substituted:

**522-4 Foundation.**

Shape and compact the foundation materials with suitable equipment to a firm, even surface, true to grade and cross-slope. ~~Compact cut and fill areas within 1 foot beyond each side of the sidewalk or driveway, when right-of-way conditions allow.~~ Meet the testing frequency and maximum lift thickness requirements of Section 120. Record density test results in the Earthwork Records System (ERS) section of the Department's database. Compact cut-and-fill areas within 1 foot beyond each side of the sidewalk or driveway, when right-of-way conditions allow. Compact~~for~~ the foundation material below the bottom of concrete for a minimum depth of 1 foot for cut areas, 1 foot for fill areas less than 1 foot, and 2 feet for all other fill areas,~~and 1 foot for cut areas;~~ to a density not less than 95% of the maximum density as determined by FM\_1-T099. Compact the material in the remaining fill areas to match the adjacent area density.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 27, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **523**  
Proposed Specification: **5230000 Patterned Pavement.** \*

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Karen Byram to remove Non-Vehicular references and associated pay item. Also added language consistent with other pavement marking installation instructions.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

\*Associated with proposed Standard Specification revision 9740000.

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**PATTERNED PAVEMENT.****(REV 11-1627-212)**

SECTION 523 is deleted and the following substituted:

**SECTION 523  
PATTERNED PAVEMENT****523-1 Description.**

Patterned pavement is defined as a post applied surface marking ~~overlay material~~ to either the pavement surface or to an imprinted pavement surface. ~~Vehicular traffic areas are defined as areas subject to vehicles within the traveled way, shoulders and bicycle lanes. Non-vehicular traffic areas include medians, islands, curb extensions, sidewalks, borders, plazas and other areas typically subject to foot traffic only.~~

**523-2 Materials.**

~~Use patterned pavement products approved for use in vehicular and non-vehicular areas, as appropriate.~~

Use patterned pavement products listed on the Department's Approved Product List (APL) meeting the requirements of Section 974.

Prior to installation, submit pattern and color samples to the Engineer for confirmation that the product meets the pattern and color specified in the Plans. Do not begin installation until acceptance by the Engineer.

The Engineer will take random samples of all material in accordance with the Department's Sampling, Testing and Reporting Guide schedule.

**523-3 Construction Requirements.**

Install patterned pavement on asphalt or concrete locations with the color and pattern as specified in the Plans. Prepare the surface and install patterned pavement in accordance with the manufacturer's installation instructions, using materials and equipment recommended and approved by the manufacturer. ~~Color shall be integral and consistent throughout the installation.~~

Install overlay products ~~in areas subject to vehicular traffic~~ to a thickness not exceeding 180 mils.

Patterns and Vvariations within the installation shall comply with ADA requirements.

Complete all utility, traffic loop detector, and other items requiring a cut and installation under the finished surface, prior to product installation.

Protect treated surfaces from traffic and environmental effects until the product is completely installed, including drying and curing according to the manufacturer's instructions.

For installation on new asphalt roadways, apply patterned pavement a minimum of 14 days after placement of the adjacent pavement.

Patterned pavements shall be weather resistant, friction resistant, and through normal wear, shall show no signs of failure due to tearing, stretching, rollback, blistering, excessive cracking, chipping, discoloration, poor adhesion to the pavement, pavement damage, or vehicular damage.

Upon completion of the installation, the Engineer will check the area at random locations for geometric accuracy. If any of the chosen areas are found to be deficient, correct the entire patterned area at no additional cost to the Department.

Submit certification to the engineer, including the APL number and that the patterned pavement was installed in accordance with the manufacturer's installation instructions and this Section.

**523-4 Method of Measurement.**

The quantity to be paid will be the plan quantity in square yards of patterned pavement, completed and accepted. No deduction will be made for areas occupied by landscaping, manholes, inlets, drainage structures, or by any public utility appurtenances within the area.

**523-5 Basis of Payment.**

Price and payment will be full compensation for all work specified in this Section.

Payment will be made under:

Item No. 523- 3-      Patterned Pavement (~~Vehicular Areas~~)— per square yard.

~~Item No. 523— 2 ——— Patterned Pavement (Non Vehicular Areas) — per square yard.~~



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 4, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **524**  
Proposed Specification: **5240100 Concrete Ditch and Slope Pavement.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Melissa Hollis to update materials list to be consistent with APL format, update requirements to be consistent with Standard Plans, and add reference to sod paid under Section 570.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**CONCRETE DITCH AND SLOPE PAVEMENT.**

(REV ~~911-1023~~--21)

ARTICLE 524-1 is deleted and the following substituted:

**524-1 Description.**

Construct concrete pavement in the flow channel of drainage ditches and on slopes as shown on the Plans and in accordance with the ~~notes and details shown in the~~ Standard Plans.

ARTICLE 524-2 is deleted and the following substituted:

**524-2 Materials.**

Concrete .....	Section 347
Prefomed Expansion Joint Material and Hot Poured Sealer .....	.....
.....	Section 932
Filter Fabric*.....	Section 985
Reinforcing Steel .....	Section 415

\*Use products listed on the Department's Approved Product List (APL).

SUBARTICLE 524-5.4 is deleted and the following substituted:

**524-5.4 Filter Fabric:** ~~Locate and construct filter fabric as shown in the Plans and Standard Plans~~ Place filter fabric under all concrete ditch pavement.

ARTICLE 524-9 is deleted and the following substituted:

**524-9 Method of Measurement.**

**524-9.1 Concrete Ditch and Slope Pavement:** The quantities to be paid for Concrete Ditch Pavement and Concrete Slope Pavement will be the plan quantity, in square yards, completed and accepted. Where the Plans show headers or cut-off walls at the end or edge of the pavement, the volume of the additional thickness of pavement that constitutes the headers, calculated in accordance with plan dimensions, will be converted into equivalent square yards of standard thickness pavement and included in the quantity to be paid for.

No deduction will be made for any areas occupied by manholes, inlets, or other drainage structures or by public utility appurtenances within the pavement area. The square yard quantity includes any ditch blocks with ditch or slope pavement on top. When steel reinforcement is called for in the Plans, payment will be included in the square yard item.

Sod will be measured and paid in accordance with Section 570.

**524-9.2 Concrete Core Ditch Blocks:** The quantity to be paid for Concrete Core Ditch Blocks will be the plan quantity of concrete, in cubic yards, completed and accepted. When steel reinforcement is called for in the Plans, payment will be included in the cubic yard pay item. The cubic yard pay item includes any ditch block within a grass or earth ditch, without other pavement on top.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 10, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **530**  
Proposed Specification: **5300200 Revetment Systems.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Melissa Hollis to update formatting to be consistent with APL requirements.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



**REVETMENT SYSTEMS.**  
**(REV 11-23-21)**

ARTICLE 530-2 is deleted and the following substituted:

**530-2 Materials.**

**530-2.1 Riprap:**

**530-2.1.1 General Filter Fabric:** Meet the following requirements:

Type D-2 Geotextile Fabric\* .....Section 985

\*Use products listed on the Department's APL.

Schedule work so that covering the fabric with the specified material does not exceed the manufacturer's recommendations for exposure to ultraviolet light or five days, whichever is less. If the Engineer determines the exposure time was exceeded, the Contractor shall replace the fabric at no expense to the Department.

Place the filter fabric (fabric) at locations as shown in the Plans, in accordance with the manufacturer's directions. Place the fabric on areas with a uniform slope that are reasonably smooth, free from mounds, windrows, and any debris or projections which might damage the fabric.

Loosely lay the material. Do not stretch the material. Replace or repair any fabric damaged or displaced before or during placement of overlying layers. Repair in accordance with the manufacturer's instructions.

The Contractor may sew the seams to reduce overlaps as specified in 985-3. Follow the manufacturer's instructions for all seams and overlaps.

**530-2.1.2 Prepackaged Sand-Cement Bags:** Provide prepackaged sand-cement bags that meet the following requirements:

1. Evenly proportioned sand and cement in the ratio of five cubic feet of sand to 94 pounds of cement. Material proportioned by mass shall use a sand density of 85 pounds per cubic foot.

2. Sealed package of 80 pounds of sand-cement in a bag.

3. Bag made of scrim-reinforced paper capable of holding the sand-cement without leakage.

4. Sand meets requirements of Section 902-3.3

5. Type I/II cement meets requirements of Section 921.

Prepackaged Sand-Cement Bags shall be one of the products listed on the Department's Approved Product List. Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6. Include with the submittal a product data sheet, safety data sheet, product label, and a self-certified statement the product meets the requirements of this Section.

**530-2.1.3 Rubble:**

**530-2.1.3.1 Rubble (Bank and Shore Protection):** Provide sound, hard, durable rubble, free of open or incipient cracks, soft seams, or other structural defects, consisting of broken stone with a bulk specific gravity of at least 2.20. Ensure that stones are rough and angular.

For this application, use broken stone meeting the following gradation and thickness requirements:

Weight Maximum Pounds	Weight 50% Pounds	Weight Minimum Pounds	Minimum Blanket Thickness in Feet
670	290	60	2.5
Ensure that at least 97% of the material by weight is smaller than Weight Maximum pounds]. Ensure that at least 50% of the material by weight is greater than Weight 50% pounds]. Ensure that at least 85% of the material by weight is greater than Weight Minimum pounds.			

**530-2.1.3.2 Rubble (Ditch Lining):** Use sound, hard, durable rubble, free of open or incipient cracks, soft seams, or other structural defects, consisting of broken stone or broken concrete with a bulk specific gravity of at least 1.90. Ensure that stones or broken concrete are rough and angular.

Use broken stone or broken concrete meeting the following gradation and thickness requirements:

Weight Maximum Pounds	Weight 50% Pounds	Weight Minimum Pounds	Minimum Blanket Thickness in Feet
75	30	4	1.5
Ensure that at least 97% of the material by weight is smaller than Weight Maximum pounds]. Ensure that at least 50% of the material by weight is greater than Weight 50% pounds]. Ensure that at least 90% of the material by weight is greater than Weight Minimum pounds].			

**530-2.1.3.3 Physical Requirements of Broken Stone and Broken Concrete:** Use broken stone and broken concrete meeting the following physical requirements:

Absorption (FM 1-T 85)	Maximum 5%
Los Angeles Abrasion (ASTM C535)	Maximum loss 45%*
Soundness (Sodium Sulphate) (AASHTO T 104)	Maximum loss 12%** (after five cycles)
Flat and elongated pieces	Materials with least dimension less than one third of greatest dimension not exceeding 10% by weight.
Dirt and Fines	Materials less than 1/2 inch in maximum dimension accumulated from interledge layers, blasting or handling operations not exceeding 5% by weight.
Drop Test***(EM 1110-2-2302)	No new cracks developed, or no existing crack widened additional 0.1 inch, or final largest dimension greater than or equal to 90% original largest dimension of dropped piece.

\* Ensure that granite does not have a loss greater than 55% and that broken concrete does not have a loss greater than 45%.

\*\* The Engineer may accept rubble exceeding the soundness loss limitation if performance history shows that the material will be acceptable for the intended use. The Engineer will waive the soundness specification for rubble riprap (broken stone and broken concrete) when project documents indicate it will be placed in or adjacent to water or soil with a sulfate content less than 150 parts per million and a pH greater than 5.0.

\*\*\* The Engineer will waive the Drop Test unless required to ensure structural integrity. Provide all equipment, labor and testing at no expense to the Department. EM refers to the US Army Corps of Engineer's Specification Engineering Method.

**530-2.1.3.4 Source Approval and Project Control:** The Engineer will approve construction aggregate sources in accordance with 6-2.3.

1. The Engineer may perform Independent Verification tests on all materials placed on the project.

2. The Engineer will check the gradation of the riprap by visual inspection at the project site. Resolve any difference of opinion with the Engineer in accordance with the method provided in FM 5-538. Provide all equipment, labor, and the sorting site at no expense to the Department.

3. The Engineer may test components in a blend of rubble processed from different geologic formations, members, groups, units, layers or seams. The Engineer may select components based on like color, surface texture, porosity, or hardness. The Engineer will reject any blend if a component that makes up at least five percent by volume of the blend does not meet these specifications.

**530-2.1.4 Bedding Stone:** Use Bedding Stone of either a durable quality limestone or other quarry run stone, with a bulk specific gravity of not less than 1.90 and that is reasonably free from thin, flat and elongated pieces. Ensure that the bedding stone is also reasonably free from organic matter and soft, friable particles. Meet the following gradation limits:

Standard Sieve Sizes - Inches	Individual Percentage by Weight Passing
12 inches	100
10 inches	70 to 100
6 inches	60 to 80
3 inches	30 to 50
1 inch	0 to 15

The Engineer will conduct source approval and project control of bedding stone as specified in 530-2.1.3.4. In lieu of limestone or other quarry run stone, the Contractor may substitute non-reinforced concrete from existing pavement that is to be removed and which meets the above requirements for commercial bedding stone.

**530-2.2 Articulating Concrete Block (ACB) Revetment Systems:** Obtain all precast block, cabling, anchors, and necessary incidental materials from the same manufacturer. ACB revetment systems must meet the requirements of ASTM D6684, ASTM D7276 and ASTM D7277. Submit to the Engineer certification from the manufacturer that the ACB revetment system meets the requirements of this Section.

ACB system components must meet the following requirements:

Concrete .....Section 347, ASTM D6684

Cables and Fittings.....ASTM D6684

Type D-2 Geotextile Fabric \* .....Section -985

Granular Underlay .....Section -901

\*Use products listed on the Department's APL.

Cables must maintain at least 85% of original tensile strength (ASTM D638) after 1,000 hours exposure to a saturated solution of calcium hydroxide (pH greater than or equal to 11) at 73°F, plus or minus three degrees. Cables must not exceed a maximum of 0.5% moisture

absorption at seven days, per ASTM D570. Cable crimps must be aluminum or stainless steel Type 304 or 316.

### 530-2.3 Gabions:

**530-2.3.1 General:** Provide gabions meeting the requirements of ASTM A974 and ASTM A975 as modified herein.

Allowable Gabion Wire and Connector Material	Substructure Environmental Classification
Polymeric	Any
Metallic	Slightly Aggressive
Metallic – Galvanized and PVC coated	Slightly Aggressive Moderately Aggressive
Metallic – Type 304 Stainless Steel, Size W1.4 (MW10) or larger	Slightly Aggressive Moderately Aggressive Extremely Aggressive (< 2,000 ppm Chlorides)
Metallic – Type 316 Stainless Steel, Size W1.4 (MW10) or larger	Any

**530-2.3.2 Metallic Gabions:** The components of metallic gabions must meet the following requirements:

Wire Mesh and Fabric\* .....ASTM A974 and A975  
Spiral Binders, Lacing Wire, Stiffeners, and Ring Wire  
Fasteners .....ASTM A974 and A975  
Stainless Steel Wire, Wire Fabric, and .....  
Lacing Wire- .....  
.....ASTM A1022

\*Wire mesh must be Style 1 or Style 3. Wire fabric must be Style 1 or Style 5.

**530-2.3.3 Polymeric Gabions:** Polymeric gabions must be constructed in general accordance with ASTM A974 using a single layer of structural geogrid instead of welded wire, and polymeric braid instead of ring wire fasteners. The structural geogrid must be Type R-1, 2, 3, 4, or 5 meeting the requirements of Section 985 and the following:

Tensile Strength @2% strain MD\* .....575 lb/ft  
Tensile Strength @ 2% strain XD\*\* .....575 lb/ft  
Junction Strength (% of Tensile Strength)..... 90%  
Min UV Stability..... 85%  
Min. Carbon Black Content (by Weight)..... 2%  
\*MD = machine direction  
\*\*XD = cross direction

Polymeric braid for seaming polymeric gabions or connecting metallic gabions must have a minimum tensile strength of 400 pounds for a 36 inch long specimen and contain at least 2% carbon black by weight.

**530-2.3.4 Gabion Rock:** Use rock meeting the requirements of ASTM D6711 to fill gabions. The rock must be reasonably free from thin, flat or elongated pieces. Rock size must be at least 1.25 times greater than the aperture size of the wire mesh or fabric. Each range of

sizes may allow for a variation of 5% oversize rock by weight, 5% undersize rock by weight, or both.

Physical Property Requirements	Acceptable Range
Los Angeles Abrasion and ASTM C535	Maximum loss 40%
Bulk Specific Gravity	Minimum 2.20
Absorption, ASTM C127 and ASTM C128	Maximum 3%

**530-2.3.5 Miscellaneous Components:** Miscellaneous components for gabion installations must meet the following requirements:

Type D-2 Geotextile Fabric\* .....Section 985

Granular Underlay .....Section 901

Anchors ....Section 451 or manufacturer's recommendations

\*Use products listed on the Department's APL.

SUBARTICLE 530-3.1 is deleted and the following substituted:

### **530-3 Construction and Installation.**

**530-3.1 Geotextile Fabric:** ~~Place geotextile fabric under all revetment in accordance with Section 514.~~

Overlap adjacent strips of fabric a minimum of 24 inches, and anchor them with securing pins (as recommended by the manufacturer) inserted through both strips of fabric along a line through the midpoint of the overlap and to the extent necessary to prevent displacement of the fabric.

Place the fabric so that the upstream (upper) strip of fabric overlaps the downstream (lower) strip.

Stagger vertical laps a minimum of 5 feet. Use full rolls of fabric whenever possible in order to reduce the number of vertical laps.

Do not drop bedding stone or riprap from heights greater than 3 feet onto the fabric.

SUBARTICLE 530-5.4 is deleted and the following substituted:

**530-5.4 Geotextile Fabric:** Include the cost of materials and installation of the geotextile fabric, including any repairs or replacement, in the Contract unit price for riprap or ACB revetment system.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 10, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **530**  
Proposed Specification: **5300201 Revetment Systems.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by John Shoucair to eliminate the requirement for Sodium Sulphate Soundness in ditch-lining erosion protection for aggregate products made with broken concrete.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**REVETMENT SYSTEMS.**  
**(REV 11-23-21)**

SUBARTICLE 530-2.1.3.3 is deleted and the following substituted:

**530-2.1.3.3 Physical Requirements of Broken Stone and Broken**

**Concrete:** Use broken stone and broken concrete meeting the following physical requirements:

Absorption (FM 1-T 85)	Maximum 5%
Los Angeles Abrasion (ASTM C535)	Maximum loss 45%*
Soundness (Sodium Sulphate) (AASHTO T 104)	Maximum loss 12%** (after five cycles)
Flat and elongated pieces	Materials with least dimension less than one third of greatest dimension not exceeding 10% by weight.
Dirt and Fines	Materials less than 1/2 inch in maximum dimension accumulated from interledge layers, blasting or handling operations not exceeding 5% by weight.
Drop Test***(EM 1110-2-2302)	No new cracks developed, or no existing crack widened additional 0.1 inch, or final largest dimension greater than or equal to 90% original largest dimension of dropped piece.

\* Ensure that granite does not have a loss greater than 55% and that broken concrete does not have a loss greater than 45%.

\*\* The Engineer may accept rubble exceeding the soundness loss limitation if performance history shows that the material will be acceptable for the intended use. The Engineer will waive the soundness specification for rubble riprap (broken stone ~~and broken concrete~~) when project documents indicate it will be placed in or adjacent to water or soil with a sulfate content less than 150 parts per million and a pH greater than 5.0. Soundness is not required for broken concrete.

\*\*\* The Engineer will waive the Drop Test unless required to ensure structural integrity. Provide all equipment, labor and testing at no expense to the Department. EM refers to the US Army Corps of Engineer's Specification Engineering Method.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 6, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **611**  
Proposed Specification: **6110203 Acceptance Procedures for Traffic Control Signals, Devices, and Intelligent Transportation System Devices.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from the Traffic Engineering and Operations Office to provide clarification to the language.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



**ACCEPTANCE PROCEDURES FOR TRAFFIC CONTROL SIGNALS, DEVICES, AND INTELLIGENT TRANSPORTATION SYSTEM DEVICES  
(REV 11-10-21)**

SUBARTICLE 611-2.3.3 is deleted:

~~611-2.3.3 Compensation: All costs incurred in submitting as built documentation are incidental to the other items of work associated with traffic control signals and devices. Payment for ITSFM files will be compensated as specified in this Section.~~

SUBARTICLE 611-4.2 is deleted and the following substituted:

**611-4.2 Intelligent Transportation System Device Installation:** Test all stand-alone functions of the ITS devices as detailed in the Contract Documents and as approved by the Engineer.

For the managed field Ethernet switch (MFES), complete FDOT Form Number 750-040-07 for all installed field switches or other procedure approved by the Engineer.

For the closed-circuit television (CCTV) camera, complete FDOT Form Number 750-040-08 for all installed CCTV cameras or other procedure approved by the Engineer.

For microwave vehicle detection system (MVDS), complete FDOT Form Number 750-040-09 for all installed MVDS sensors or other procedure approved by the Engineer.

For the camera lowering device (CLD), complete FDOT Form Number 750-040-10 for all installed CLD or other procedure approved by the Engineer.

For ITS devices without official FDOT forms, evaluate ITS devices as per Contract Documents and as approved by the Engineer.

Complete approved data forms and turn them over to the Engineer for approval. Provide a minimum notice of 10 calendar days prior to all tests to permit the Engineer or their representative to observe each test.

If any unit fails to pass its stand-alone test, correct the unit, or substitute another unit in its place, then repeat the test.

If a unit has been modified as a result of a stand-alone test failure, prepare a report describing the nature of the failure and the corrective action taken and submit it to the Engineer prior to re-testing the unit. If a failure pattern develops, the Engineer may direct that modifications be made to all units without additional cost to the Department or an extension of the Contract Time.

ARTICLE 611-9 is expanded by the following:

**611-9 Method of Measurement.**

**611-9.1 General:** Measurement for payment will be in accordance with the following work tasks.

**611-9.2 ITSFM Sub-surface Documentation:** The Contract unit price per mile of documented conduit, cable, boxes, vaults, enclosures, and all other subsurface utilities will include furnishing all hardware, tools, and materials and all data collection, verification, and

submission as specified in this Section and the Contract Documents, and all labor, travel, MOT, programs, training, equipment, and other requirements necessary for a complete and accepted documentation submission. Payment for facilities located underground will be based on the linear length of the project as stated in the Contract Documents regardless of the length or number of conduits, cables, enclosures, or other subsurface facilities documented. No allowance will be made for sweeps or vertical distances below the ground.

**611-9.3 ITSFM Location Documentation:** The Contract unit price per location, will include documenting all above ground ITS Facilities at, or associated with, an ITS location as specified in this Section and the Contract Documents, and all labor, travel, training, equipment, programs, MOT, and other requirements necessary for a complete and accepted documentation submission. Payment for location documented will be based on the ITS location including cabinets, poles, utility hardware such as meter cans, utility demarcation sites, disconnects, etc., as well as all ITS devices, auxiliary devices, and other items, attributes, and fields called for in the ITSFM documentation and Contract Documents, regardless of the type or number of devices installed.

**611-9.4 As-Built Drawings:** All costs incurred in submitting as-built drawings are incidental to the other items of work associated with traffic control signals and devices.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
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KEVIN J. THIBAUT, P.E.  
SECRETARY

January 6, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **620**  
Proposed Specification: **6200302 Grounding and Lightning Protection.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from the Traffic Engineering and Operations Office to update term splice vault to splice box for consistency with other Sections and the Standard Plans.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**GROUNDING AND LIGHTNING PROTECTION**  
**(REV 11-10-21)**

SUBARTICLE 620-3.2.2 is deleted and the following substituted:

**620-3.2.2 Minimum Resistance Not Required:** Install a single ground rod assembly for the following applications. No resistance to ground measurements are required.

1. Conventional lighting
2. External lighting for signs
3. Signal cable & span wire
4. Aerial interconnect messenger wire
5. Pedestals for pedestrian signals
6. Pull boxes with metal covers when 120 volts (or greater) AC power is present
7. Splice ~~vaults~~ boxes with wire grounding units.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 10, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **641**  
Proposed Specification: **6410500 Prestressed Concrete Poles.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Olivia Townsend from the State Construction Office to clarify the depth of foundation removal and provide consistency with the modified language in Section 649, 700, and 715.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## **PRESTRESSED CONCRETE POLES**

**(REV 11-10-21)**

ARTICLE 641-5 is deleted and the following substituted:

### **641-5 Pole Removal.**

When ~~shallow pole removal~~ removal of the pole and partial foundation removal is specified in the Plans, the remaining pole, foundation and any protrusions, such as pole keys, dead men, guying apparatus, conduit, anchor bolts, or reinforcing steel, must be removed to a minimum depth of 4 feet below existing grade.

When ~~deep pole removal~~ removal of the pole and complete foundation removal is specified in the Plans completely remove each pole including the foundation and all accessories and attachments, such as pole keys, dead men, guying apparatus, conduit, anchor bolts, and reinforcing steel.

Disconnect span wires carefully at the pole, and salvage all usable hardware and attachment devices as determined by the Engineer. Remove all devices supported by the span wire (including wiring) prior to the removal of the span wire.

SUBARTICLE 641-6.3 is deleted and the following substituted:

### **641-6.3 Pole Removal:**

**641-6.3.1 Pole Removal ~~Shallow~~ Partial:** The quantity to be paid for will be the removal of each pole, including the foundation and all accessories and attachments, to a depth of not less than 4 feet below existing grade.

**641-6.3.2 Pole Removal ~~Deep~~ Complete:** The quantity to be paid for will be the complete removal of the pole, foundation and all accessories and attachments.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 24, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **646**  
Proposed Specification: **6460000 Aluminum Poles, Pedestals, and Posts.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

This change was proposed by Rick Jenkins from the Roadway Design Office to update material formatting, delete redundant language, and remove Class I concrete as an option to reference Class II.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**ALUMINUM POLES, PEDESTALS, AND POSTS**  
**(REV 11-10-21)**

SECTION 646 is deleted and the following substituted:

**646-1 Description.**

The work in this Section consists of furnishing and installing aluminum poles, pedestals, and posts at the locations shown in the Plans and in accordance with the details shown in the Plans and Standard Plans, subject to a five-year warranty period as defined herein. The warranty period will apply only when aluminum poles, pedestals, and posts are painted as called for in the Contract Documents. An aluminum pedestal consists of a pole and a transformer base.

**646-2 Materials.**

Meet the following requirements:

<u>Portland Cement Concrete*</u>	<u>.....Section 346</u>
<u>Anchor Bolts and Shims</u>	<u>.....Section 962</u>
<u>Poles and Posts</u>	<u>.....Section 965</u>
<u>Transformer Base**</u>	<u>.....Section 965</u>

\*Class II

\*\*Use products listed on the Department's Approved Products List (APL)

~~**646-2.1 Poles and Posts:** Use nominal 4 inch diameter Schedule 40 aluminum poles and posts meeting the requirements of The Aluminum Association Alloy 6061-T6 and ASTM B429. Poles used with transformer bases must be threaded with No. 8 NPT threads. Sufficient threads are required to fully seat the pole into the hub of the pedestal base.~~

~~**646-2.2 Transformer Base:** Use transformer bases listed on the Department's Approved Product List (APL).~~

~~Manufacturers seeking APL approval of proprietary transformer bases must submit an application in accordance with Section 6, independent laboratory test report, and calculations and drawings showing details, notes, materials, dimensions, and sizes that the transformer base meets the following requirements:~~

~~1. Materials: Meets the material requirements of Aluminum Association Alloy 319 or 356-T6 and ASTM B26 or ASTM B108.~~

~~2. Height: Base is 12 to 18 inches in height with a threaded hub at the top for mounting a nominal 4 inch Schedule 40 aluminum pole. The threaded hub must be tapped to allow full pole engagement.~~

~~3. Fastening: Provides for fastening to a foundation with four 3/4 inch anchor bolts located 90 degrees apart. The bolt circle diameter must be in accordance with the base manufacturer recommendations. The base design must allow for bolts that are placed off-center.~~

~~4. Door: Provides a door opening of not less than 8 inches by 8 inches. The door must be constructed of fiberglass or other non-combustible, non-aluminum material. Attach the door to the base with cleats and one stainless steel socket button head screw or by other means suitable for NEMA 3 electrical enclosures.~~



~~5. Moment Capacity: Supports an ultimate moment capacity of 10,000 foot-pounds. Submit certified test reports from the manufacturer verifying that each base model meets the moment capacity without breaking, cracking or rupturing in any manner.~~

~~6. Breakaway: Meets the requirements in the AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals. Submit the FHWA certification for product approval.~~

~~7. Identification: Is legibly and visibly marked with the manufacturer's name or logo and the model number.~~

**646-2.23 Anchor Bolts:** Provide ~~ASTM F1554~~ Grade 55 anchor bolts, 3/4-inch diameter, 18-inches long, with double nuts ~~per ASTM F1554 Grade 55~~. For each bolt, provide two 3/4-inch ~~ASTM A563 Grade A or higher~~ heavy hex nuts and one 3/16-inch thick by 3-inch round ~~ASTM A36~~ plate washer or one ~~ASTM F436~~ Type 1 washer. ~~Anchor bolts, washers and hex nuts must be galvanized in accordance with ASTM F2329.~~

**646-2.34 End Caps:** Provide end caps sized for nominal 4-inch ~~diameter~~ Schedule 40 ~~4-1/2-inch outside diameter~~ aluminum poles. The cap must be a minimum of 1/4-inch thick and tapped for at least two set screws. Set screws will be provided with the end cap.

**646-2.45 Shims:** Provide U-shaped galvanized steel shims 2-inches wide by 2-1/2 inches long, shaped to fit around a 3/4-inch anchor bolt.

~~646-2.6 Concrete: Use Class 1 concrete meeting the requirements of Section 346.~~

### **646-3 Coatings.**

#### **646-3.12.7 Painting:**

**646-3.1.12.7.1 General:** When required by the Contract Documents, provide painted aluminum poles, pedestals, and posts. Provide products that will meet specification requirements throughout the warranty period. Meet the color requirement as specified in the Contract Documents. Provide the Engineer with two metal sample coupons, a minimum of 2 inches by 4 inches, painted concurrently and with the same paint as was used on the first lot of any aluminum poles, pedestals, and posts delivered to the jobsite. Submit sample coupons and manufacturer product data sheets to the Engineer along with the delivery of the first shipment of any painted aluminum poles, pedestals, and posts delivered to the jobsite. At the time of their delivery, the sample coupons described in this paragraph must match the color of the aluminum poles, pedestals, and posts to within 1ΔE measured as specified in 975-4. If the delivered sample coupons exhibit a difference in color from the poles, pedestals, and posts greater than 1ΔE then the sample coupons will be considered unacceptable and no payment shall be made for the materials which the sample coupons represent. Those materials shall not be accepted by the Department until acceptable representative sample coupons in accordance with the requirements of this Section have been submitted to the Engineer.

**646-3.1.22.7.2 Responsible Party Warranty:** When the Contract Documents call for painted aluminum poles, pedestals, and posts, the Contractor shall designate a responsible party to accept responsibility. The responsible party designated by the Contractor must execute and submit to the Department a form, provided by the Department, prior to the first delivery to the jobsite of any painted aluminum poles, pedestals, and posts, stipulating that the responsible party accepts responsibility for ensuring the coating system adhesion and color retention requirements as specified in 975-4 are met for a period of five years after final acceptance in accordance with 5-11. The responsible party shall also bear the continued responsibility for performing all remedial work associated with repairs of any adhesion or color retention failure as defined in Section 975, as to which notice was provided to the responsible party within the five

year warranty period. Failure to timely designate the responsible party will result in the Contractor being the responsible party unless otherwise agreed to in writing by the Department. The responsible party shall be either the Contractor or the supplier of the painted aluminum poles, pedestals, and posts. When the responsible party is the fabricator, the responsible party shall be one of the fabricators listed on the Prequalified Painted Galvanized Steel and Aluminum Products Fabricators List. This list may be viewed on the Department's website at the following URL: <https://www.fdot.gov/construction/Engineers/PaintedPoleSuppliers.shtm>.

Upon final acceptance of the Contract in accordance with 5-11, the Contractor's responsibility to ensure that the coating system adhesion and color retention requirements specified in 975-4 will terminate. The obligations of the responsible party set forth in this Section shall start at final acceptance of the Contract in accordance with 5-11 and continue thereafter until expiration of the five-year warranty period.

#### **646-43 Remedial Work.**

During the painting warranty period, the responsible party shall perform all painting remedial work necessary to meet the requirements of this Specification at no cost to the Department. Such remedial work shall be performed within 180 days of notification of a failure by the Department or by the determination of the Statewide Disputes Review Board. Failure to perform such remedial work within the time frame specified will result in the work being performed by other forces at the responsible party's cost.

If the responsible party is the fabricator, the fabricator will be removed from the Prequalified Painted Galvanized Steel and Aluminum Products Fabricators List for a minimum of six months or until payment in full for the correction of the deficiencies or defects has been made, whichever is longer.

If the responsible party is the Contractor, the Department will suspend, revoke, or deny the responsible party's certificate of qualification under the terms of Section 337.16(d)(2), Florida Statutes, for a minimum of six months or until payment in full for the correction of the deficiencies or defects has been made, whichever is longer.

#### **646-54 Statewide Disputes Review Board.**

The Statewide Disputes Review Board in effect for this Contract will resolve any and all disputes that may arise involving administration and enforcement of this Specification related to the painting remedial work performed during the warranty period. The Responsible Party and the Department acknowledge that use of the Statewide Disputes Review Board is required, and the determinations of the Statewide Disputes Review Board for disputes arising out of this Specification will be binding on both the Responsible Party and the Department, with no right of appeal by either party. Meet the requirements of 8-3.

#### **646-65 Installation.**

**646-65.1 General:** Verify the length of the column supports in the field prior to fabrication to permit the appropriate sign or signal height.

**646-65.2 Foundations:** Construct foundations in accordance with the applicable Standard Plans.

The Contractor may use precast foundations in augered or excavated holes that are a minimum of 12 inches larger than each axis dimension of the precast foundation. The holes must be clean and without loose material. Obtain precast foundations from a manufacturing plant that is currently on the Department's Production Facility Listing. Producers seeking inclusion on

the list shall meet the requirements of Section 105. Fill the voids around precast foundations with flowable fill meeting the requirements of Section 121 or clean sand placed using hydraulic methods to a level of 6 inches below grade.

**646-65.3 Setting Anchor Bolts:** Set anchor bolts 90 degrees apart with a bolt circle diameter of 14 inches. Adjust anchor bolts to a plumb line and hold rigidly in position to prevent displacement while pouring concrete.

**646-65.4 Installation:** Do not erect poles until the concrete strength is at least 2500 psi. Plumb the poles after erection using shims if necessary to obtain precise alignment.

**646-65.5 Grounding:** Meet the requirements of Section 620 and the applicable Standard Plans.

**646-76 Method of Measurement.**

The Contract unit price per each for aluminum pedestals and posts, furnished and installed, will include all materials and equipment as specified in the Contract Documents, and all labor and materials necessary for a complete and accepted installation.

Payment for removal of aluminum poles will include the complete removal of the pole and foundation, pedestrian detector and pedestrian signal. Separate payment for the removal of the pedestrian detector and pedestrian signal will be made only when the pole/pedestal is to remain.

Payment for grounding will be incidental to the pedestal or post.

**646-87 Basis of Payment.**

Price and payment will be full compensation for all work specified in this Section.

Payment will be made under:

Item No. 646- Aluminum Poles - per each.



*Florida Department of Transportation*

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GOVERNOR

605 Suwannee Street  
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KEVIN J. THIBAUT, P.E.  
SECRETARY

January 10, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **649**  
Proposed Specification: **6491000 Galvanized Steel Poles, Mast Arms, and Monotube Assemblies.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Olivia Townsend from the State Construction Office to clarify the depth of foundation removal and provide consistency with the following proposed specification changes to Section 641, 700, and 715.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**GALVANIZED STEEL POLES, MAST  
ARMS, AND MONOTUBE ASSEMBLIES  
(REV 11-10-21)**

ARTICLE 649-10 is deleted and the following substituted:

**649-10 Method of Measurement.**

The Contract unit price each for poles, mast arms, and monotube assemblies, furnished and installed, will include all materials specified in the Contract Documents, including the foundation, cover plates, caps, clamps, blank sign panel, luminaire bracket, all labor, equipment, miscellaneous materials and hardware necessary for a complete and acceptable installation.

The Contract unit price for removal of poles, mast arms, and monotube assemblies will include the removal of all attachments (arms, vehicle signals, light fixtures, pedestrian signals, pedestrian detectors and other incidentals).

When removal of the pole and partial foundation ~~shallow pole~~ removal is called for, remove the pole, foundation, and all accessories or attachments (including pole keys, dead men, guying apparatus, conduit, anchor bolts and reinforcing steel) to a minimum depth of four feet below existing grade.

When removal of the pole and complete foundation ~~deep pole~~ removal is called for ~~in the Plans~~, completely remove the pole including the foundation and all accessories or attachments as listed above.



*Florida Department of Transportation*

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KEVIN J. THIBAUT, P.E.  
SECRETARY

January 12, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **654**  
Proposed Specification: **6540000 Midblock Crosswalk Enhancement Assemblies.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from the Traffic Engineering and Operations Office to move all the materials from Division II to Division III. The proposed specification change is associated with changes to Section 995.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## MIDBLOCK CROSSWALK ENHANCEMENT ASSEMBLIES (REV 11-22-21)

SECTION 654 is deleted and the following substituted:

### 654-1 Description.

Furnish and install midblock crosswalk enhancement assemblies.

### 654-2 Materials.

Use ~~midblock crosswalk enhancement~~In-roadway light assemblies and rectangular rapid flashing beacon (RRFB) assemblies that meet the requirements of Section 995 and are listed on the Department's Approved Product List (APL).

~~Midblock crosswalk enhancement assemblies are classified as the following types: In-Roadway Light Assemblies, Rectangular Rapid Flashing Beacon Assemblies (RRFB), and Pedestrian Hybrid Beacon Assemblies.~~

~~**654-2.1 In-Roadway Light Assemblies:** In-roadway light assemblies must meet the physical and operational requirements of the latest edition of the MUTCD, Chapter 4N.~~

~~In-roadway light assemblies can include a passive detector in addition to a pedestrian pushbutton. In-roadway light assemblies must be normally dark and initiate operation upon pedestrian actuation via a pedestrian pushbutton or a passive detector. The In-roadway light assembly will cease operation at a predetermined time after the pedestrian actuation. If a passive detector is used, the In-roadway light assembly may cease operation after the pedestrian clears the crosswalk. The duration of the predetermined period shall be programmable and capable of matching the pedestrian clearance time for pedestrian signals as determined by MUTCD procedures. The timer that controls flashing must automatically reset each time a pedestrian call is received.~~

~~In-roadway light assemblies must have a minimum luminance of 101 candelas and a minimum viewing angle of 20 degrees.~~

~~**654-2.2 Rectangular Rapid Flashing Beacon (RRFB):** RRFB must include two rapidly and alternately flashed rectangular yellow indications having LED array-based pulsing light sources. Each rectangular yellow indication must be a minimum of five inches wide by two inches high. RRFB installations shall comply with the use and technical conditions of FHWA MUTCD Interim Approval 21—Rectangular Rapid Flashing Beacons at Crosswalks. The two RRFB indications shall be aligned horizontally, with the longer dimension horizontal and with a minimum space between the two indications of approximately 7 inches measured from inside edge of one indication to inside edge of the other indication.~~

~~**654-2.2.1 RRFB Sign Assemblies:** RRFB assemblies must be used to supplement W11-2 (Pedestrian), S1-1 (School), or W11-15 (Trail) crossing warning sign and includes a diagonal downward arrow (W16-7p) plaque and a single column ground sign post. Use attachment hardware in accordance with Standard Plans, Index 700-010.~~

~~Optional mast arm and pole installation may be used if shown in the Plans. Follow the manufacturer's specifications on the number of RRFB units that are connected to the timer's output driver. Mast arm mounted RRFB assemblies include a W11-2 or S1-1 sign and attachment hardware. Pole mounted RRFB assemblies include a W16-7p sign and attachment hardware. Use attachment hardware in accordance with Section 659.~~

~~\_\_\_\_\_ The outside edges of the RRFB indications, including any housings, shall not project beyond the outside edges of the W11-2, S1-1, or W11-15 sign.~~

~~\_\_\_\_\_ **654-2.2.2 Beacon Flashing Requirements:** The light intensity of the yellow indications shall meet the minimum specifications of Society of Automotive Engineers (SAE) standard J595 for Class 1 (Directional Flashing Optical Warning Devices for Authorized Emergency, Maintenance, and Service Vehicles) dated January 2005. Ensure RRFB assemblies are capable of automatically dimming to reduce brightness of the LEDs at nighttime.~~

~~\_\_\_\_\_ The flash rate of each individual yellow indication, as applied over the full on-off sequence of a flashing period of the indication, shall not be between 5 and 30 flashes per second. When activated, the two yellow indications in each RRFB shall have a flash rate of 75 flash cycles per minute using the following sequence: left side beacon on for 50 milliseconds (msec), both beacons off for 50 msec, right side beacon on for 50 msec, both beacons off for 50 msec, left side beacon on for 50 msec, both beacons off for 50 msec, right side beacon on for 50 msec, both beacons off for 50 msec, both beacons on for 50 msec, both beacons off for 50 msec, both beacons on for 50 msec, both beacons off for 250 msec. No other flash patterns shall be selectable via hardware or software.~~

~~\_\_\_\_\_ **654-2.2.3 RRFB Operation:** RRFB can include a passive detector in addition to a pedestrian pushbutton. RRFBs must be normally dark and initiate operation only upon pedestrian actuation via a pedestrian pushbutton, or a passive detector. The RRFB will cease operation at a predetermined time after the pedestrian actuation. If the passive detector is used, the RRFB may cease operation after the pedestrian clears the crosswalk. The duration of the predetermined period shall be programmable and capable of matching the pedestrian clearance time for pedestrian signals as determined by MUTCD procedures. The timer that controls flashing must automatically reset each time a pedestrian call is received.~~

~~\_\_\_\_\_ All RRFBs associated with a single crosswalk (including those with an overhead or advance crossing sign, if used) shall simultaneously commence operation of their alternating rapid flashing indications and shall cease operation simultaneously.~~

~~\_\_\_\_\_ RRFBs must include an instruction sign (FTP 68C-21) mounted adjacent to or integral with each pedestrian pushbutton.~~

~~\_\_\_\_\_ A confirmation light directed at and visible to pedestrians in the crosswalk must be installed integral to the RRFB to give confirmation that the RRFB is in operation.~~

~~\_\_\_\_\_ **654-2.2.4 Accessible Pedestrian Pushbutton:** If an accessible pedestrian pushbutton is shown in the Plans, the assembly must contain a speaker, audio amplifier, and noise monitoring microphone for auto volume control.~~

~~\_\_\_\_\_ The accessible pedestrian pushbutton detector must meet 665-2.2 for the locator tone feature. The pushbutton must not include a vibrotactile indication or percussive indications. The audible message must be programmable.~~

~~\_\_\_\_\_ **654-2.3 Pedestrian Hybrid Beacon Assemblies:** Pedestrian hybrid beacon assemblies must meet the physical and operational requirements of the latest edition of the MUTCD, Chapter 4F. The cabinet, signals, controller, pedestrian detectors, and other traffic control devices used to create a pedestrian hybrid beacon assembly must be listed on the APL.~~

~~\_\_\_\_\_ **654-2.4 Cabinets, Housings, and Hardware:** Cabinets used as part of the midblock crosswalk enhancement assembly must meet the applicable criteria of Section 676.~~

~~\_\_\_\_\_ All housings other than approved cabinets must be powder coat painted dull black (FED-STD-595-37038) with a reflectance value not exceeding 25 percent as measured by~~



~~American Society for Testing and Material E1347. Cabinets and housings must prevent unauthorized access.~~

~~\_\_\_\_\_ Pole mount assemblies shall allow installation on 4-1/2 inch outer diameter posts.~~

~~\_\_\_\_\_ Ensure all assembly hardware, including nuts, bolts, external screws, and locking washers less than 5/8 inch in diameter, are Type 304 or 316 passivated stainless steel. Stainless steel bolts, screws, and studs must meet ASTM F593. Stainless steel nuts must meet ASTM F594. All assembly hardware greater than or equal to 5/8 inch in diameter must be galvanized. Carbon steel bolts, studs, and threaded rod must meet ASTM A307. Structural bolts must meet ASTM F3125, Grade A325.~~

~~\_\_\_\_\_ **654-2.5 Electrical Specifications:** Equipment must operate on solar power or a nominal voltage of 120 V alternating current (V<sub>AC</sub>). If the device requires operating voltages of less than 120 V<sub>AC</sub>, supply the appropriate voltage converter. Solar powered systems must be designed to operate for minimum of 100 activations per day and provide 10 days of operation without sunlight. Each activation must be 30 seconds in duration. Solar powered systems must automatically charge batteries and prevent overcharging and over discharging. Solar powered systems must include a charge indicator.~~

### **654-3 Installation Requirements.**

Restore any areas impacted by the installation of the crosswalk enhancement assembly to original condition unless otherwise shown in the Plans. Install crosswalk enhancement assembly in accordance with the Americans with Disabilities Act Standards for Transportation Facilities.

Install post mounted RRFB assemblies in accordance with Standard Plans, Index 654-001. Use sign panel attachment hardware in accordance with Standard Plans, Index 700-010.

Optional mast arm and pole installation may be used if shown in the Plans. Follow the manufacturer's specifications on the number of RRFB units that are connected to the timer's output driver. Use attachment hardware in accordance with Section 995. The outside edges of the RRFB indications, including any housings, shall not project beyond the outside edges of the associated warning sign.

If installed with highlighted signs or flashing yellow beacons, in-roadway light assemblies shall operate in unison and with an identical flash rate as the signs or beacons.

### **654-4 Warranty.**

Ensure the midblock crosswalk enhancement assembly has a manufacturer's warranty covering defects for two years from the date of final acceptance in accordance with 5-11 and Section 608. Ensure the warranty includes providing replacements within 10 calendar days of notification for defective parts and equipment during the warranty period at no cost to the Department or the maintaining agency.

### **654-5 Method of Measurement.**

**654-5.1 General:** All midblock crosswalk assemblies will include all materials, equipment, and labor necessary for a complete and accepted installation.

**654-5.2 In-Roadway Light Assembly:** The in-roadway light assembly includes in-roadway lights, signs, sign support structures, cabinet, electronics, wiring, and pedestrian detectors for a complete crossing. Solar panels are included in the cost of the assembly, when shown in the Plans.

**654-5.3 Rectangular Rapid Flashing Beacon (RRFB) Assembly:** Post mounted assemblies include the rectangular beacon and signs for each approach, sign support structure,

cabinet, electronics, wiring, and pedestrian detectors. Solar panels are included in the cost of the assembly, when shown in the Plans.

Pole mounted assemblies include the rectangular beacon and signs, pole mount bracket, cabinet, electronics, wiring, and pedestrian detector. Solar panels are included in the cost of the assembly when shown in the Plans. Poles will be paid for separately.

Mast arm mounted assemblies include the rectangular beacon and signs, attachment hardware, and wiring for a single direction unit for non-standard installations. Mast arms will be paid for separately.

**654-5.4 Pedestrian Hybrid Beacon Assembly:** The Contract unit price for each pedestrian hybrid beacon assembly will consist of all labor and materials necessary for a complete and accepted installation. The assembly includes the 3-section signal, hardware, and backplate. Pedestrian signals, cabinet, signs, mast arms, strain poles or other support structures, and signal cable will be paid under the applicable sections for each item.

**654-6 Basis of Payment.**

Price and Payment will be full compensation for all work specified in this Section.

Payment will be made under:

- |                 |   |
|-----------------|---|
| Item No. 654- 1 | Midblock Crosswalk - In-Roadway Light Assembly - per assembly.                  |
| Item No. 654- 2 | Midblock Crosswalk - Rectangular Rapid Flashing Beacon Assembly - per assembly. |
| Item No. 654- 3 | Midblock Crosswalk - Pedestrian Hybrid Beacon Assembly - per assembly.          |



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
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KEVIN J. THIBAUT, P.E.  
SECRETARY

January 12, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **659**

Proposed Specification: **6590000 Mast Arm, Span Wire, and Pole Mounting Assemblies.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from the Traffic Engineering and Operations Office to move the materials language from Division II to Division III. The proposed specification change is associated with the changes to Section 995.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## MAST ARM, SPAN WIRE, AND POLE MOUNTING ASSEMBLIES (REV 11-10-21)

ARTICLE 659 is deleted and the following substituted:

### 659-1 Description.

Furnish and install mounting assemblies for vehicular and pedestrian traffic signals, signs, cameras, detectors, and other devices in accordance with the Contract Documents.

### 659-2 Materials.

**659-2.1 General:** Use mounting assemblies that meet the requirements of Section 995 and are listed on the Department's Approved Product List (APL). Meet the requirements of Section 603.

Fastening hardware such as bolts, nuts, washers, set screws, studs, u-bolts, cable and cable swags, must be provided by the mounting assembly manufacturer, must be SAE Type 316 or 304 stainless steel. Hardware (studs, bolts and u-bolts) must be a minimum of 5/16 inch diameter unless otherwise specified in this Section. SAE Grade 8 bolts and nuts are also acceptable. ~~Metallic mounting assemblies must meet ASTM B117 for corrosion resistance.~~

~~Connections that provide an entrance to the interior of a traffic device must be weather resistant.~~

~~All assemblies must be constructed to support the weight of any combination of signal indications with all accessories such as back plates and visors.~~

~~Connections between signal, disconnect and disconnect hanging hardware must be of the tri-stud design unless otherwise specified in this Section. Tri-stud washers must be a minimum 0.090 inches thick unless otherwise specified in this Section.~~

~~Connections must be designed to mate with a standard traffic signal's two-inch I.D. opening and must be capable of providing positive positioning and alignment of the traffic device. Connection type may be a 72-tooth serrated edge or other connection type as long as all other specifications are met. For 72-tooth serrated edge connections, the teeth must be clean, sharp, and at least 1/8 inch wide and 3/64 inch deep. All connection types must be weather resistant.~~

~~All mounting assemblies must be capable of providing adjustment in multiple directions for proper alignment of the attached traffic device and to prevent rotation around the vertical axis or misalignment after installation.~~

~~Use studs that are either cast directly into the aluminum during the casting process or tapped and locked with a locking material. In each case, a pull-out force must be provided. Messenger wire clamps must be extruded aluminum six inches long or cast U-bolt type.~~

~~Torque specifications must be included for all fastening hardware with the assembly installation instructions.~~

~~**659-2.2 Product Identification:** Mounting assemblies must be permanently marked with the name or trademark of the manufacturer, part number and date of manufacture. Identification must be cast into, or metal marked on, the assembly in a legible manner. When the assembly is made up of multiple components, each component must be identified with the manufacturer's name or trademark.~~

~~**659-2.3 Finish:** Unless otherwise specified, mounting assemblies and components must be supplied with a natural finish with mill scale removed in accordance with Military Standard~~

MIL-PRF-24712A or AAMA-2603-02 and must meet the requirements of ASTM-3359 and ASTM-D3363. Disconnect (interior and exterior) and disconnect hub must be powder coat painted dull black (Federal Standard 595A-37038) with a reflectance value not exceeding 25 percent as measured by ASTM-E97. All finished surfaces must have a smooth finish free from cracks, blow holes, shrinks, excessive material, and other flaws.

**659-2.4.2 Mast Arm Mounting Assemblies:** Mast arm mounting assemblies must include the following components: mast arm saddle, swivel, attachment cables (with cable clamp mechanism) or bands, support tube, and top and bottom support arms. Mast arm mounting assemblies must be designed to be attached to a mast arm by cables or bands. All connections must be designed to prevent movement when 250 pounds of downward force is applied to the completed vehicular traffic signal assembly.

**659-2.4.1 Saddle:** Saddles must be aluminum or stainless steel and must have a minimum yield strength of 16 ksi and a minimum ultimate tensile strength of 23 ksi in accordance with ASTM B26, ASTM B108, ASTM B85 or ASTM A240.

**659-2.4.2 Swivel:** Swivels must be aluminum or stainless steel and must have a minimum yield strength of 16 ksi and a minimum ultimate tensile strength of 23 ksi in accordance with ASTM B26, ASTM B108, ASTM B85 or ASTM A240. The swivel must provide at least two connection devices to secure the support tube to the swivel and be configured to permit the support tube to provide adjustment in multiple directions in a plane parallel to the mast arm. Any castings used to attach the support tube to the swivel must be manufactured from the same alloy as the swivel.

**659-2.4.3 Saddle Attachment Cables and Bands:** Mast arm saddle attachment cables must be 3/16 inch minimum diameter, Type 316 or 304 stainless steel aircraft type wire strand cable. The swage at the ends of the cable (used to tighten the cable against the saddle) must be Type 316 or 304 stainless steel with a minimum 3/8 inch diameter thread. The swage must permit use of a wrench to prevent rotation while tightening the nut at the end of the swage. If the attachment cable does not have swaged clamp screws at each end (double ended), the unclamped end of the cable must be sintered, welded, or otherwise secured without adhesives to prevent unraveling of the cable. Banding must use two Type 304 or 201 series stainless steel 3/4 inch wide bands and Type 316 stainless steel buckles (clamp screws). De-burr the edges of the bands.

**659-2.4.4 Cable Clamp Mechanism:** Mast arm mount components used to secure the cable to the saddle must be aluminum or stainless steel and must have a minimum yield strength of 23 ksi and a minimum ultimate tensile strength of 30 ksi in accordance with ASTM B26, ASTM B221, ASTM B85 or ASTM A240.

**659-2.4.5 Support Tube:** Support tubes used in mast arm mounting assemblies must be aluminum or stainless steel and must have a minimum yield strength of 25 ksi and a minimum ultimate tensile strength of 30 ksi in accordance with ASTM B221 or ASTM A240. A gusseted hollow design may be used to provide for the routing of necessary wiring. The tube cross-sectional area's principal moments of inertia must average; at a minimum, that of a 1-1/2 inch standard aluminum Schedule 40 pipe and the cross-sectional metal area must not be less than that of a 1-1/2 inch Schedule 40 pipe. The bottom portion of the tube that supports the vertical load of the hanging device must be threaded using National Pipe Thread Taper (NPT), National Pipe Thread Straight (NPS), non-threaded U-bolt secured, or a continuous arm support tube. Threaded support tubes that are fully slotted must have an aluminum insert in the 3/4 inch

slot extending a minimum of 1/2 inch beyond the threaded section. To provide easy installation of wiring, the tube must have a minimum 0.562 inch wire entrance slot running the full length of the tube, or either stopping a minimum of 8 inches above the threaded or U-bolt secured end. Edges of slot must be supported with internal gusseting. The tube interior and slot must be free of sharp edges that may damage wiring. Provide an easily installed and removable UV-stabilized seal to completely fill the wire entrance slot after installation.

**659-2.4.6 Top Support Arm:** The top support arm of the mounting assembly must be of one-piece solid construction, or continuous arm with support tube, and capable of holding the signal head firmly in place. Top support arms must be aluminum with a minimum ultimate tensile strength of 30 ksi and minimum yield strength of 18 ksi in accordance with ASTM B26, or be die cast with a minimum ultimate tensile strength of 27 ksi and a minimum yield strength of 24 ksi.

A one or two piece top arm is acceptable. For a one piece top arm, use at least two 1/4 inch minimum diameter Type 316 or 304 stainless steel set screws to secure its position on the support tube. When a two piece top arm is used, hardware required to connect components of the top arm must be 3/8 inch minimum diameter, Type 316 or 304 stainless steel.

The top support arm must have three 1/4 inch 20 UNC 2B threaded holes to accept bolts for a tri-stud washer and gasket, or at least one imbedded or tapped and locked 5/16 inch 18 threaded stud within the industry's standard 72 tooth serrated circular design that facilitates 5-degree increment positioning. Provide 0.090 inch thick (minimum) Type 316 or 304 stainless steel washers, nuts, and lock washers for attaching signal heads. A rubber washer, with dimensions similar to the large stainless steel washer, must be provided for traffic signals. When mast arm clamps are used to support illuminated signs with tri-stud arrangements, a rubber washer with dimensions similar to the steel washer must also be used.

**659-2.4.7 Bottom Support Arm:** The bottom support arm, when not continuous arm with support tube, must be hollow to allow the routing and enclosing of all signal wiring. Bottom support arms must be aluminum with a minimum ultimate tensile strength of 30 ksi and minimum yield strength of 18 ksi in accordance with ASTM B26, or be die cast with a minimum ultimate tensile strength of 27 ksi and a minimum yield strength of 24 ksi. Plastic bottom arm covers must be constructed of ABS with a UV inhibitor and be strong enough to contain the signal cable in the bottom arm cavity without bending during installation and warping over time.

The end of the bottom support arm that attaches to the support tube must have a 1-1/2 inch steel coupling imbedded and cast directly into the part during the solidification of the aluminum, or a 1-1/2 inch NPT or NPS pipe thread cut directly into the casting. For non-threaded versions, the arm must allow the support tube to sit a minimum of 2 inches into an arm pocket and be secured to the arm with minimum 5/16 full U-shape U-bolt to distribute the load evenly to the lower arm casting.

The end of the bottom support arm that connects to the signal must have either three equally spaced and plumb imbedded 5/16 inch Type 316 or 304 stainless steel threaded studs located in the center of the 72 tooth serrated circular design, or three 1/4 inch 20 UNC 2B tapped holes to accept bolts for a tri-stud washer.

**659-2.4.7.1 Arms with Steel Coupling:** If a threaded steel coupling is imbedded into the casting, the bottom arm must be aluminum alloy 535.0 F in accordance with ASTM B26, with a minimum ultimate tensile strength of 23 ksi, meeting all standards listed in ASTM B26, including chemical composition listed in Table 1 and material mechanical

properties listed in Table 2. The end of the bottom support arm must have at least two 1/4 inch diameter Type 316 or 304 stainless steel set screws to secure its position on the support tube.

~~659-2.4.7.2 Threaded Arms:~~ If threads are cut directly into the casting, the bottom arm must be aluminum alloy 535.0 F in accordance with ASTM B26, with a minimum ultimate tensile strength of 35 ksi and elongation of 9.0% in a two inch section, meeting all standards listed in ASTM B26, including chemical composition listed in Table 1 and material mechanical properties listed in Table 2. As an alternative, the arm can be die cast in aluminum with a minimum ultimate tensile strength of 27 ksi and a minimum yield strength of 24 ksi. The end of the bottom arm must have at least two 1/4 inch minimum diameter Type 316 or 304 stainless steel set screws to secure its position on the support tube.

~~659-2.4.7.3 Non-threaded Arms:~~ Lower arm must be aluminum 356 having a minimum ultimate tensile strength of 30 ksi and meeting all standards listed in ASTM B26, including chemical composition listed in Table 1 and material mechanical properties listed in Table 2. The arm must have a locator tab to receive the support tube and be secured by a U bolt.

~~659-2.4.7.4 Continuous Arm Support Tube:~~ The continuous arm support tube must be of single form construction to support the weight of any combination of signal indicators with all accessories such as backplates and visors. Continuous support tubes must be Type 316 or 304 stainless steel with a minimum ultimate tensile strength of 75 ksi and a minimum yield strength of 30 ksi in accordance with ASTM A554, or aluminum with a minimum yield strength of 25 ksi and a minimum ultimate tensile strength of 30 ksi in accordance with ASTM B221.

~~The continuous arm support tube attachment to the signal head must have a minimum of two 5/16 18 Type 316 or 304 stainless steel bolts, nuts and washers. A rubber seal must be provided between the support tube and signal head.~~

**659-2.5.3 Span Wire Mounting Assemblies:** Span wire mounting assemblies must include a span wire clamp, a hanging device such as a drop pipe, adjustable hanger, or adjustable pivotal hanger with extension bar, messenger clamp, disconnect hanger, and multi-brackets.

~~659-2.5.1 Span Wire Clamp:~~ Span wire clamps must be aluminum or stainless steel and must have a minimum ultimate tensile strength of 32 ksi and minimum yield strength of 22 ksi in accordance with ASTM B28, ASTM B108, ASTM B85, or ASTM A240.

~~659-2.5.2 Drop Pipe:~~ Drop pipe hangers must be galvanized 1 1/2 inch steel aluminum having a minimum yield strength of 35 ksi and a minimum ultimate tensile strength of 42 ksi in accordance with ASTM B221 and have NPT on each end for assembly.

~~659-2.5.3 Aluminum Adjustable Hanger:~~ Aluminum adjustable hangers must be aluminum alloy 535.0 F in accordance with ASTM B26 with a minimum ultimate tensile strength of 35 ksi and elongation of 9.0% in a two inch section, meeting the chemical composition listed in Table 1 and material mechanical properties listed in Table 2 in ASTM B26.

~~659-2.5.4 Stainless Steel Adjustable Hanger:~~ Stainless steel adjustable hangers must be Type 316 or 304 stainless steel with a minimum ultimate tensile strength of 75 ksi and a minimum yield strength of 30 ksi in accordance with ASTM A276.

~~659-2.5.5 Aluminum Adjustable Pivotal Hanger:~~ Aluminum pivotal hangers must be aluminum alloy 535.0 F in accordance with ASTM B26 with a minimum ultimate tensile strength of 35 ksi and elongation of 9.0% in a two inch section, meeting the chemical composition listed in Table 1 and material mechanical properties listed in Table 2 in ASTM B26.

~~659-2.5.6 Stainless Steel Adjustable Pivotal Hanger:~~ Stainless steel pivotal hangers must be either Type 316 or 304 stainless steel with a minimum ultimate tensile strength of 75 ksi and a minimum yield strength of 30 ksi in accordance with ASTM A276.

~~659-2.5.7 Aluminum Extension Bar:~~ Extension bars used to extend the length of the adjustable hanger must be T6061-T6 extrusion aluminum having a minimum yield strength of 35 ksi and a minimum ultimate tensile strength of 42 ksi in accordance with ASTM B221.

~~659-2.5.8 Stainless Steel Extension Bar:~~ Stainless steel extension bar used to extend the length of adjustable hangers must be Type 316 or 304 stainless steel with a minimum ultimate tensile strength of 75 ksi and a minimum yield strength of 30 ksi in accordance with ASTM A276.

~~659-2.5.9 Disconnect Hanger:~~ The disconnect hanger must be supplied with the following as a minimum:

~~1. Wired screw type/compression terminal block and wiring rated at 600 V<sub>AC</sub> Root Mean Square (rms) with 12 or 18 circuits. The terminal block must be easily accessible for connection of the field wiring. Attach the terminal block to the disconnect with Type 316 or 304 stainless steel or brass fastening hardware.~~

~~2. Weather resistant grommets in each signal cable entrance of the disconnect hanger to prevent insect and animal access and to protect the signal cable from chafing.~~

~~3. A two inch opening in the top of the disconnect hanger with an integral serrated area (or 1-1/2 inch NPT threaded top section) to interface with the hanger method employed above it.~~

~~4. A securable door that allows access to all areas of the interior. The door securing device must be Type 316 or 304 stainless steel and captive. Hinge or groove pins for the door must be Type 316, 304, 303, or 302 stainless steel.~~

~~659-2.5.10 Multi-Brackets:~~ Top and bottom (multi) brackets used in the assembly of span wire mounted multi-directional signals must be constructed of aluminum having a minimum yield strength of 13 ksi and a minimum ultimate tensile strength of 23 ksi per ASTM B26.

~~Top brackets must be of one piece hollow design, with a cross-sectional diameter of at least 1-1/2 inch I.D. for receiving signal wires. The wall thickness must be at least 3/16 inch. Each top bracket (2-way, 3-way, and 4-way) must have a two inch diameter hole (with integral serrated boss as specified above) in the top side of the bracket for receiving a 1-1/2 inch entrance fitting. The underside of the top bracket must have a covered hole of at least three inches in diameter for the installation of the signal wires.~~

~~Bottom brackets must be of one piece solid construction and must hold the signal heads firmly in place.~~

~~For the five section cluster configuration, provide 3/8 inch thick Type 316 or 304 stainless steel tri-stud washers and nylock nuts with lock washers to secure the top and lower signal sections of the cluster to the top multi-bracket. Washer distortion must not occur after assembly of the five section cluster. Multi-brackets must include all fastening hardware necessary to attach to the signal.~~

~~659-2.6 Pole (Pedestal and Post) Mounting Assemblies:~~ All trunnions, brackets, and suspensions used in mounting vehicular and pedestrian signals to concrete, steel, aluminum, or wood poles must be an aluminum alloy cast fitting, pipe or equivalent as approved by the



~~Engineer. The aluminum alloy must have a minimum ultimate tensile strength of 35 ksi in accordance with ASTM B221, ASTM B85, or ASTM B26.~~

~~————— Pole side mount brackets used for pedestrian signals may be constructed of polycarbonate material.~~

~~**659-2.7 Mounting Assemblies for Signs, Cameras, Detectors, and Other Traffic Control Devices:** Mounting assemblies or assembly components used for signs, cameras, detectors, and other traffic control devices must be constructed of the same material, and meet the same mechanical and chemical properties as mounting assemblies for signals.~~

~~**659-2.8 Miscellaneous Mounting Components:** Miscellaneous mast arm, span wire, and pole mounting components and accessories included with assemblies must meet the mechanical properties for its associated main assembly components or be listed separately on the APL. Mounting assemblies not approved with a specific primary device (such as a camera, detector, etc.), must be approved and listed separately on the APL.~~

### **659-3 Installation.**

Install all mounting assemblies and torque all fastening hardware in accordance with the manufacturer's recommendations.

When connecting the extension bar to the top and bottom parts of the adjustable hanger, use maximum overlap of the two pieces and use a minimum of two bolts to connect the top and bottom portion of the hanger to the extension bar, separated with one hole between the top and bottom.

### **659-4 Warranty.**

Ensure mounting assemblies have a manufacturer's warranty covering defects for a minimum of three years from the date of final acceptance in accordance with 5-11 and Section 608. The warranty must include providing replacements, within 10 calendar days of notification, for defective parts and equipment during the warranty period at no cost to the Department or the maintaining agency.

### **659-5 Method of Measurement.**

The Contract unit price per assembly for each mounting assembly, furnished and installed, will include all materials specified in the Contract Documents and all labor, equipment, and miscellaneous items necessary for a complete and acceptable installation.

No separate payment will be made for mounting assemblies for new installations. All incidentals required by the Plans for new installations, including mounting hardware, will be included in cost of the new signal, sign, camera, detector, or other traffic control device.

### **659-6 Basis of Payment.**

Price and Payment will be full compensation for all work specified in this Section.

Payment will be made under:

Item No. 659- 1      Mast Arm, Span Wire and Pole Mounting Assemblies - each.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 26, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **663**  
Proposed Specification: **REVISED 6630000 Signal Priority and Preemption Systems.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from the Traffic Engineering and Operations Office to move the materials language from Division II to Division III. The proposed specification change is associated with the changes made to Section 995.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## SIGNAL PRIORITY AND PREEMPTION SYSTEMS

(REV ~~11-2617-221~~)

SECTION 663 is deleted and the following substituted:

### 663-1 Description.

Furnish and install a signal priority and preemption system as shown in the Plans. The signal preemption system must recognize and respond to the priority of each user. Meet the requirements of Section 603.

### 663-2 Materials.

Use signal priority and preemption system equipment that meet the requirements of Section 995 and are listed on the Department's Approved Product List (APL). Ensure that all materials furnished, assembled, fabricated or installed are new products.

Signal priority and preemption system equipment may utilize optical, GPS, and radio frequency based technologies.

~~**663-2.1 Functional Requirements:** Ensure that in-vehicle equipment operates without requiring any action from the vehicle operator or occupants once power is applied.~~

~~**663-2.1.1 Security:** The system must include features that secure the system and restrict its configuration and operation to authorized users and vehicles only.~~

~~**663-2.1.2 Vehicle Identification:** The system must be able to assign a unique identifier for each authorized vehicle. The system must be able to associate the identifier with vehicle information such as vehicle classification (e.g., fire, police, rescue, transit), owner/operator, and priority level.~~

~~**663-2.1.3 Configuration and Management:** The system must allow authorized local and remote users to set and read all user-programmable features and retrieve data collected by the system. The manufacturer must provide computer software required to configure, operate, and maintain the system at no additional cost to the Department.~~

~~**663-2.1.4 Logging:** The system installed in the field cabinet must store a record of events, including time, vehicle ID, class, priority level, and approaching direction for all vehicles detected. The log must operate on a first in, first out (FIFO) principle with a minimum capacity of 5,000 events.~~

~~**663-2.1.5 Detection Range and Accuracy:** The priority and preemption system must be capable of detecting and identifying multiple authorized vehicles at various ranges up to 2,500 feet. The system must be able to determine the approaching direction of authorized vehicles. The detection range and programming of emergency (high priority) and transit signal (low priority) preemption shall be adjustable from within the traffic signal cabinet. High priority calls must override low priority calls.~~

~~The system must service preemption calls having equal priority on a first-come, first-served basis.~~

~~**663-2.2 Preemption System Cabinet Electronics:** The priority and preemption system must be compatible with NEMA TS 1, NEMA TS 2, Type 170, and Type 2070 traffic signal controllers and their respective cabinets.~~

~~The system must be able to provide calls to the controller via input file and detector rack. The system must include two channel or four channel detector card units compatible with NEMA TS 2 2003 v02.06. The system must include a shelf mount option.~~

The system must be able to provide emergency preemption (high priority) and transit signal (low priority) preemption calls to the controller. Detectors must include programmable timers that allow the operator to configure detector call extension as well as limit the length of channel output calls.

Channel outputs must deliver a constant signal while emergency vehicles are detected for high priority preemption activation. Channel outputs must deliver a pulsed output for low priority preemption activation. Inputs and outputs must be optically isolated.

**663-2.2.1 Serial Interface:** Ensure that the serial ports support data rates up to 115 kbps; error detection procedures utilizing parity bits (i.e., none, even, and odd); and stop bits (1 or 2). Serial interface ports may utilize RJ-45 connectors, D-sub connectors, or screw terminals.

**663-2.2.2 Network Interface:** Ensure that local area network (LAN) connections support the requirements detailed in the Institute of Electrical and Electronics Engineers (IEEE) IEEE 802.3 Standard for 10/100 Ethernet connections. Ensure that the connector complies with applicable Electronic Industries Alliance (EIA) and Telecommunications Industry Association (TIA) requirements.

**663-2.3 Optical Preemption Detectors:** Optical preemption detectors must respond to light impulses generated from a visible or infrared light source.

**663-2.4 Intersection Radio/GPS Modules:** Radio/GPS preemption systems must include radio/GPS modules that transmit a beacon signal and receive data transmitted by Radio/GPS vehicle equipment.

**663-2.5 Mechanical Specifications:** Ensure equipment is permanently marked with manufacturer name or trademark, part number, and date of manufacture or serial number.

Ensure that every conductive contact surface or pin is gold-plated or made of a noncorrosive, conductive metal. Do not use self-tapping screws on the exterior of the assembly.

All external parts must be made of corrosion-resistant materials, such as plastic, stainless steel, anodized aluminum, brass, or gold-plated metal.

Detector cards must include indicators for power and vehicle detection. Detector cards must include a test switch that can be used to manually generate detector calls that the system provides during normal operations.

**663-2.6 Electrical Specifications:** Provide equipment that operates on a nominal voltage of 120 volts alternating current ( $V_{AC}$ ). If the device requires operating voltages of less than 120  $V_{AC}$ , supply the appropriate voltage converter.

**663-2.7 Environmental Specifications:** Ensure system electronics perform all required functions during and after being subjected to the environmental testing procedures described in NEMA TS-2, Sections 2.2.7, 2.2.8, and 2.2.9. Detectors and detector connections that are exposed to the elements must be weatherproof and designed for outdoor use.

### 663-3 Installation.

Installation of materials must be in accordance with the manufacturer's instructions. Install the emergency preemption system including installation of detectors with all necessary hardware and software, mounting hardware, cabling, and all other associated electronics in cabinet necessary to create a fully functional emergency preemption system.

Ensure that status indicators remain unobstructed and visible.

**663-43.1 Field Testing.**

-Subject the system to field acceptance tests (FATs). Develop and submit a test plan for FATs to the Engineer for approval. The Engineer reserves the right to witness all FATs.

**663-54 Warranty.**

Ensure that the manufacturer will furnish replacements for any part or equipment found to be defective during the warranty period at no cost to the Department or the maintaining agency within 10 calendar days of notification.

Ensure that the priority and preemption system has a manufacturer's warranty covering defects for five years.

**663-65 Method of Measurement.**

The Contract unit price for each signal priority and preemption system, furnished and installed, will include furnishing, placement, and testing of all equipment and materials, and for all tools, labor, hardware, operational software packages and firmware, supplies, support, personnel training, shop drawings, documentation, and incidentals necessary to complete the work.

**663-76 Basis of Payment.**

Price and payment will be full compensation for all work specified in this Section.

Payment will be made under:

Item No. 663- 1- Signal Priority and Preemption System



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 12, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **665**  
Proposed Specification: **6650000 Pedestrian Detection System.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from the Traffic Engineering and Operations Office to move the materials language from Division II and Division III. The proposed specification change is associated with changes to Section 995.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## PEDESTRIAN DETECTION SYSTEM (REV 11-10-21)

SECTION 665 is deleted and the following substituted:

### 665-1 Description.

Install a pedestrian detection system. ~~Use pedestrian detection systems and components listed on the Department's Approved Product List (APL).~~ Pedestrian detection systems are classified into three categories: Standard Pedestrian Pushbutton Detectors, Accessible (Audible/Tactile) Pedestrian Pushbutton Detectors, and Passive Detectors. The components of the pedestrian detection system include pushbuttons, pedestrian actuation signs, electronics, wiring, and mounting hardware.

### 665-2 Materials.

~~665-2.1 Standard Pedestrian Pushbutton Detector: Pushbuttons must be raised from or flush with their housings and be a minimum of 2 inches in the smallest dimension. The pushbutton must require no more than 5 pounds of force to activate. The detector must be weather tight and tamper resistant. Use pedestrian detection systems and components that meet the requirements of Section 995 and are listed on the Department's Approved Product List (APL).~~

~~665-2.1.1 Housing: The housing must be a two piece unit consisting of a base housing and a removable cover. The housing must be cast aluminum meeting the physical characteristics and chemical content established in ASTM B26 for alloys S5A and CS72A.~~

~~The housing or adapter (saddle) must conform to the shape of a pole and provide a flush, secure fit. Saddles must be of the same material and construction as the housing. Pushbuttons for wood pole mounting must have threaded holes for 1/2 inch conduit provided in the housing top or bottom. A 3/4 inch hole with an insulated bushing shall be provided through the back of the housing. Unused openings shall be closed with a weatherproof closure and painted to match the housing.~~

~~The housing must have a powder coat finish and painted in accordance with Military Standard MIL PRF 24712A. The housing must be permanently marked with manufacturer name or trademark, part number, date of manufacture, and serial number.~~

~~665-2.1.2 Pushbutton: The pushbutton must include a normally open, mechanical phenolic enclosed, positive-acting, spring loaded, audible (i.e., click) snap-action switch with single pole, single throw contacts, or a Piezo driven solid state switch rated for a minimum of 50 V. The Piezo driven solid state switch, when activated, must give an audible (i.e., two-tone chirp) indication of actuation. A visual indication of actuation is optional. The visual indication must remain illuminated until the pedestrian's WALKING PERSON (symbolizing WALK) signal indication is displayed. Switch connections inside the housing must allow wiring and installation without binding. The switch must have a design life of one million operations (minimum) at rated load.~~

~~665-2.1.3 Electrical Requirements: The wiring must be No. 18 AWG stranded (minimum) with 600 V outdoor insulation rating.~~

~~665-2.2 Accessible (Audible/Tactile) Pedestrian Pushbutton Detector: The accessible pedestrian pushbutton detector must consist of all electronic control equipment, wiring, mounting hardware, pushbuttons, and pedestrian actuation signs designed to provide both a~~

pushbutton with a raised, vibrating tactile arrow on the button as well as a variety of audible indications for differing pedestrian signal functions:

~~665-2.2.1 Electronic Control Equipment:~~ The accessible pedestrian pushbutton detector must include electronic control equipment that is programmable and adjustable using a laptop computer or vendor supplied programmer. Electronic control equipment must be able to be installed within a traffic controller cabinet or within a pedestrian signal housing. Electronic control equipment installed within a traffic controller cabinet must allow the use of up to 16 pushbuttons (4 maximum per channel) with a single traffic controller cabinet. The accessible pedestrian pushbutton detector must receive timing from Walk and Don't Walk signals.

~~665-2.2.1.1 Audible Messages:~~ Audible messages must be programmable. All audible messages and tones must emanate from the accessible pedestrian pushbutton housing. The accessible pedestrian pushbutton detector must utilize digital audio technology. The system shall have, at a minimum, three programmable locator tones. The accessible pedestrian pushbutton detector must have independent minimum and maximum volume limits for the Locator Tone, Walk, and Audible Beaconing features. The Wait message must only annunciate once per actuation.

~~665-2.2.1.2 Pushbutton locator tone:~~ The accessible pedestrian pushbutton detector must provide independent ambient sound adjustment for the locator tone feature. The accessible pedestrian pushbutton detector must allow the locator tone to be deactivated.

~~665-2.2.1.3 Vibrating Pushbutton (VPB):~~ The accessible pedestrian pushbutton detector must include a Vibrating Pushbutton (VPB). The VPB must be a single assembly containing an ADA compliant, vibro-tactile, directional arrow button, weatherproof audible speaker and pedestrian actuation sign with optional placard Braille messages. The VPB tactile arrow must be 2 inches in length, be field adjustable to two directions, and require no more than 5 pounds of applied force to activate.

~~665-2.2.1.4 Conflict Monitoring:~~ The accessible pedestrian pushbutton detector must monitor the Walk condition for conflict operation. The accessible pedestrian detector system must disable the Walk functionality if a conflict is detected.

~~665-2.2.1.5 Cabinet Control Unit (CCU):~~ The accessible pedestrian pushbutton detector may include a CCU for interfacing and connecting the system. The CCU shall have labeled LED indicators for each channel operation. The CCU must reset upon loss of internal communication.

~~665-2.2.2 Inputs and Outputs:~~ All inputs and outputs must use Mil Spec Multi-pin connectors.

~~665-2.2.2.1 Inputs:~~ Walk and Don't Walk inputs must be optically isolated 80-150 volts AC/DC, 5mA max. General purpose inputs must be optically isolated 10-36 volts AC/DC, 10mA max.

~~665-2.2.2.2 Outputs:~~ Outputs must be optically isolated 36 volts AC/DC peak, 300mA solid state fused contact closures. CCUs must include a normally open relay contact fault output.

~~665-2.2.3 Communication:~~ The CCU must include an Ethernet interface. The CCU must have an integral web server that provides information on audible/tactile pedestrian pushbutton detector status, access to event logs, and provides for remote Configuration of accessible pedestrian pushbutton detector system options. VPBs must include an Ethernet, serial, USB, or Bluetooth programming interface.



~~665-2.3 Passive Detectors:~~ The passive detector must consist of all electronic control equipment, wiring, and mounting hardware.

~~665-2.3.1 General:~~ A passive detector system uses one or more sensors and analytics hardware and software to detect the presence and direction of pedestrians and activate the traffic control device without any required action by the pedestrian.

~~665-2.3.2 Configuration and Management:~~ Ensure that the passive detector is provided with software that allows local and remote configuration and monitoring. Ensure that the system can display detection zones and detection activations overlaid on live passive detector inputs. Ensure that the passive detector allows a user to edit previously defined configuration parameters, including size, placement, and sensitivity of detection zones.

~~Ensure that the passive detector retains its programming in nonvolatile memory. Ensure that the detection system configuration data can be saved to a computer and restored from a saved file. Ensure that all communication addresses are user programmable.~~

~~665-2.3.3: Solid State Detection Outputs:~~ Ensure outputs meet the requirements of NEMA TS2 2016, 6.5.2.26.

~~665-2.3.4: Electrical Requirements:~~ Ensure the system operates using a nominal input voltage of 120V of alternating current ( $V_{AC}$ ). Ensure that the system will operate with an input voltage ranging from 89 to 135  $V_{AC}$ . If a system device requires operating voltages other than 120  $V_{AC}$ , supply a voltage converter.

~~665-2.4 Electrical:~~ All wiring must meet applicable NEC requirements. The accessible pedestrian pushbutton detector must operate using a nominal input voltage of 120 V alternating current ( $V_{AC}$ ). If any device requires nominal input voltage of less than 120  $V_{AC}$ , furnish the appropriate voltage converter.

~~Accessible pedestrian pushbutton detector control electronics that are mounted in a pedestrian signal head must be able to receive power from the Walk and Don't Walk circuits of the signal head. Control electronics shall not require more than four wires for each pushbutton connection, and no more than two wires for each controller pedestrian input. Voltage at the pushbutton shall not exceed 24  $V_{AC}$ .~~

~~665-2.5 Mechanical:~~ Equipment must be permanently marked with manufacturer name or trademark, part number, date of manufacture, and serial number. Do not use self-tapping screws on the exterior of the assembly.

~~Ensure that all parts are made of corrosion-resistant materials, such as plastic, stainless steel, anodized aluminum, brass, or gold-plated metal. Ensure that all assembly hardware, including nuts, bolts, external screws and locking washers less than 5/8 inch in diameter, are Type 304 or 316 passivated stainless steel. Stainless steel bolts, screws and studs must meet ASTM F593. Nuts must meet ASTM F594. All assembly hardware greater than or equal to 5/8 inch in diameter must be galvanized. Bolts, studs, and threaded rod must meet ASTM A307. Structural bolts must meet ASTM F3125, Grade A325.~~

~~Enclosures must have a NEMA 4X rating. Pushbutton housings for intersections must be black.~~

### **665-3 Warranty.**

Ensure that pedestrian detection systems have a manufacturer's warranty covering defects for a minimum of 5 years from the date of final acceptance by the Engineer in accordance with 5-11 and Section 608. Ensure the warranty includes providing replacements, within 10 calendar days of notification, for defective parts and equipment during the warranty period at no cost to the Department or the maintaining agency.

**665-4 Installation.**

Install pedestrian detectors at the locations and in a manner as shown in the Plans and Standard Plans, Index 665-001. Ensure all detectors are the same manufacturer and model.

Pushbuttons mounted on wood poles must be serviced by a conduit riser. Pushbuttons mounted on steel or aluminum (poles, pedestals, or posts) must be serviced by wiring inside the pole. Pushbuttons mounted on existing concrete poles may be serviced by a conduit riser. Pushbuttons mounted on new concrete poles or pedestals must be serviced by wiring on the inside.

A pedestrian actuation sign must be included with each pushbutton assembly. Provide the sign type, size and legend as specified on the plans or as directed. Tactile arrows of accessible pedestrian pushbuttons must align parallel with the direction of the crossing.

The Engineer will direct any variation from the locations shown. When mounting, place the detector housing or saddle in complete contact with the pole or controller cabinet. When a post is required in the installation of the pedestrian detector, restore the area around the post to its original condition or as required by the Plans.

**665-5 Method of Measurement.**

The Contract unit price for pedestrian detectors, will be paid per each, and will include the pedestrian actuation sign, all mounting hardware, wiring, materials and equipment, and all labor and miscellaneous materials necessary for a complete and accepted installation.

Payment for poles, pedestals, and posts will be made under their respective pay item numbers.

**665-6 Basis of Payment.**

Price and payment will be full compensation for all work specified in this Section.

Payment will be made under:

Item No. 665- 1- Pedestrian Detector - each.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 6, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **670**  
Proposed Specification: **6700400 Traffic Controller Assemblies.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Melissa Hollis from the Program Management Office to clarify that separate payment will not be made for completing the installation of components.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**TRAFFIC CONTROLLER ASSEMBLIES**  
**(REV 11-14-21)**

ARTICLE 670-4 is deleted and the following substituted:

**670-4 Method of Measurement.**

The Contract unit price per assembly for traffic controller assembly or intersection control beacon controller assembly will include all labor, equipment, and miscellaneous materials necessary for a complete and accepted installation.

No separate payment will be made under this item for wiring, programming, signal operating plan, or other modifications needed to complete the installation of new signal cables or auxiliary equipment.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 24, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **676**  
Proposed Specification: **6760205 Traffic Cabinets.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by This change was proposed by Derek Vollmer from the Traffic Engineering and Operations Office to provide additional ITS cabinet sizes as they are being deployed on projects.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**TRAFFIC CABINETS**  
**(REV 11-10-21)**

SUBARTICLE 676-2.5 is deleted and the following substituted:

**676-2.5 Intelligent Transportation System Cabinets:** The cabinet shell must conform to NEMA 3R requirements, be constructed of unpainted sheet aluminum alloy 5052-H32 with a minimum thickness of 0.125 inches and have a smooth, uniform natural aluminum finish without rivet holes, visible scratches or gouges on the outer surface. Other finishes are acceptable if approved.

The ~~minimum~~ dimensions for cabinets are listed below.

Table 676-1			
<del>Minimum</del> Cabinet Dimensions in Inches			
Cabinet Type	Height	Width	Depth
<del>340</del>	<del>66" - 68"</del>	<del>44" - 46"</del>	<del>26" - 28"</del>
336	36" - 39"	24" - 26"	20" - 22"
336S	46" - 48"	24" - 26"	22" - 24"
334	66" - 68"	24" - 26"	30" - 32"
<del>332D</del>	<del>66" - 68"</del>	<del>48" - 50"</del>	<del>30" - 32"</del>
P44	55" - 59"	<del>26" - 29"</del> 44" - 46"	<del>44" - 46"</del> 26" - 29"

The cabinet must be weather resistant and constructed with a crowned top to prevent standing water. All exterior cabinet welds must be gas tungsten arc (TIG) welds and all interior cabinet welds must be gas metal arc (MIG) or TIG welds. All exterior cabinet and door seams must be continuously welded and smooth and all inside and outside edges of the cabinet must be free of burrs, rounded and smoothed for safety. All welds must be neatly formed and free of cracks, blow holes and other irregularities. Use ER5356 aluminum alloy bare welding electrodes conforming to AWS A5.10 requirements for welding on aluminum. Procedures, welders and welding operators must conform to AWS requirements as contained in AWS B3.0 and C5.6 for aluminum.

The cabinet must have a lifting eye plate on both sides of the top of the cabinet for lifting and positioning it. Each lifting eye must be secured with a minimum of two bolts to the cabinet body and have a lift point opening diameter of 0.75 inches and capable of supporting a weight load of 1,000 pounds. All external bolt heads must be tamperproof.

Ground-mount cabinets must include a removable base plate and two aluminum plates, welded inside, for anchoring the cabinet to a concrete or composite type base as shown in the Plans. Fabricate the plates from aluminum alloy 5052-H32 a minimum of 4 inches wide by 0.125 inches thick. Provide the cabinet with four 1 inch diameter holes for anchoring.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 3, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **677**  
Proposed Specification: **6770202 Equipment Shelter.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Jose Armenteros from the State Materials Office to eliminate Class I concrete from the list of concrete classes. Replaced Class I concrete with Class II concrete. The proposed changes are associated with Section 346.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra\_

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**EQUIPMENT SHELTER.**  
**(REV 9-20-21)**

ARTICLE 677-2.2 is deleted and the following substituted:

**677-2.2 Shelter Floor and Foundation:** The floor is to be constructed of concrete or concrete composite material.

The foundation is a monolithic slab with appropriate footings and the final top of slab elevation is set a minimum of 2 feet above final grade, or as shown in the Plans. Concrete is to be Class **4-II** for extremely aggressive environments and in accordance with Section 346. Perform concrete structures work in accordance with Section 400.

The equipment shelter must not bend or break during moving, towing, or hoisting.

The equipment room's interior floor covering is to be industrial-grade vinyl flooring fastened to the shelter floor with waterproof adhesive. Provide an air gap between the equipment shelter floor and the foundation slab, or alternatively, construct the foundation slab with a vapor barrier to prevent moisture penetration. Insulate the floor to provide a minimum insulating factor of R-11.

ARTICLE 677-3.1 is deleted and the following substituted:

**677-3.1 General:** Provide and detail the equipment shelter installation, including site layout, fencing, and all other features. Submit this drawing for approval prior to the start of construction.

Concrete is to be Class **4-II** in accordance with Section 346. Perform concrete structures work in accordance with Section 400. Obtain precast products from a plant that is currently on the Department's Production Facility Listing. Producers seeking inclusion on the list shall meet the requirements of Section 105. Submit to the Engineer all permit documents for approval prior to starting the work.

Complete construction of the shelter foundation prior to delivery of the equipment shelter. Provide primary electrical power service, or generator power, to the site prior to delivery of the equipment shelter.

Begin shelter installation on the foundation within two days of shelter delivery to the jobsite. Complete the grounding and electrical connections to the shelter.

Upon completion of shelter installation dehumidify the shelter. Keep the shelter door closed for a period of 15 minutes and cycle the heat with the HVAC thermostat set on 85°F. The vendor shall return the HVAC units to normal operation mode once the dehumidification process is complete.

In the event that shelter installation and primary or back up power connections to the shelter are delayed, then a portable dehumidifier shall be installed and operated until the shelter installation and power connection is complete. Install the portable dehumidifier with minimum performance capability, at 80°F and 60% relative humidity, of 30 pints per day water removal rate. Install a drain to route water away from the shelter.





*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 10, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **682**  
Proposed Specification: **6820202 Video Equipment.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from the Traffic Engineering and Operations Office to remove APL requirement for video wall controllers.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**VIDEO EQUIPMENT**  
**(REV 11-10-21)**

SUBARTICLE 682-2.2.1 is deleted and the following substituted:

**682-2.2.1 Video Display Control System:** Furnish a video display control system that meets the requirements of Section 996 ~~and listed on the APL.~~

Provide the video display control system with a minimum configuration of 4 composite video inputs, 4 component (red, green, and blue (RGB)) video inputs, and 4 DVI inputs as well as network connections, decoders, and associated hardware and software required to display 32 inputs simultaneously at a minimum resolution of 720 pixels x 480 pixels and a frame rate of 30 fps, or as shown in the Plans.

Provide the video display control system with a minimum configuration of 4 composite video outputs, 2 component (RGB video outputs), and 4 DVI outputs, or as shown in the Plans. If the projection device requires an analog signal, then breakout cables may be used to convert the DVI output connector to a HD15 analog RGB connector.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 3, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **700**  
Proposed Specification: **7000201 Highway Signing.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derwood Sheppard to clarify language and allow use of set screws for mounting strips to attachment bands.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**HIGHWAY SIGNING.**  
**(REV 11-10-21)**

SUBARTICLE 700-2.1.6 is deleted and the following substituted:

**700-2.1.6 Retroreflective Strips for Signs:** Use only on signs where the retroreflective ~~sign~~ strip is called for in the Plans. Install retroreflective strips in accordance with the manufacturer's instructions. If a panel is required to install the retroreflective sheeting, use a 0.040~~0.040~~-inch minimum aluminum ~~panels plate~~ or ~~an~~ other material approved by the sheeting manufacturer. Use stainless steel attachment hardware for the installation. ~~The~~ Install retroreflective ~~sign~~ strips ~~must be fastened~~ in a manner that does not require drilling ~~of~~ holes ~~through~~ ~~in~~ the column (post). A set screw no larger than 1/4 inch may be used with band attachments. ~~The~~ Rretroreflective ~~sign~~ strips panel and sheeting must be 2 inches in width and a height of 5 feet in height for all signs, except for ~~when~~ signs ~~are~~ mounted at a height of 4 feet, then use a retroreflective ~~sign~~ strip ~~will be~~ 2 feet in height. ~~If a panel is required for installation, the panel for the retroreflective sheeting must be the same dimensions as the retroreflective sheeting.~~ For the back of ~~Rail Road~~ Railroad Crossbuck signs, the retroreflective ~~sign~~ strip will be 2 inches wide for the full length of the blade. Match the color of the retroreflective sheeting to the background color of the sign except for YIELD signs and DO NOT ENTER signs, where the color must be red.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 14, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **700**  
Proposed Specification: **7000203 Highway Signing.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Olivia Townsend to clarify language for the depth of removal foundations for highway signing.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**HIGHWAY SIGNING.**  
**(REV 11-3-21)**

SUBARTICLE 700-2.3 is deleted and the following substituted:

**700-2.3 Method of Measurement:** For single post and multi post sign assemblies, an assembly consists of all the signs mounted on a single structure. The Contract unit price per assembly for ground mounted signs (single post and multi-post), furnished and installed, will include furnishing the sign panels, support structure, foundation, hardware, and labor necessary for a complete and accepted installation.

The retroreflective sign strip will be paid for separately, and the Contract unit price per each will include furnishing the retroreflective sign strip, hardware and labor necessary for a complete and accepted installation.

For overhead signs, sign panels will be paid separately from support structures. The Contract unit price per each for sign panel, furnished and installed, will include furnishing the sign panels, hardware, and labor necessary for a complete and accepted installation. The Contract unit price for each overhead static sign structure, furnished and installed, will include furnishing the support structure, foundation, hardware, and labor necessary for a complete and accepted installation.

For the removal of overhead static sign structures, the quantity to be paid for will be the number of overhead static sign structures, including the foundation, to be removed.

When partial foundation removal is called for, remove the support structure, and foundation to a minimum depth of four feet below existing grade.

When complete foundation removal is called for, completely remove the support structure including the foundation.

Relocation of signs will consist of removing the existing sign assembly and installing the sign on a new foundation at the location shown in the Plans.

When the Plans call for existing ground-mounted signs to be relocated or removed, after removing the sign panel from the assembly, remove supports and footings. Restore the area of the sign removal or relocation to the condition of the adjacent area.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 3, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **700**  
Proposed Specification: **7000413 Highway Signing.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The change is proposed by Derek Vollmer to add language specifying sign ventilation needs to be operational per manufacturer recommendation.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**HIGHWAY SIGNING.****(REV 11-~~130~~-21)**

SUBARTICLE 700-4.13 is deleted and the following substituted:

**700-4.13 Installation Requirements:** Provide a walk-in DMS for locations over interstate travel lanes. ~~Do not install the sign prior to the availability of electric power.~~ Verify that any ventilation system incorporated within the sign is operational ~~within per 72 hours after sign installation~~ the manufacturer's recommendations.

Ensure that the location of the lifting eyebolts, left in place or removed, is sealed to prevent water entry after installation.

Load the initial message libraries on both the sign control software and the sign controller. The Engineer will furnish the messages to be placed in these libraries.





*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 12, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **705**  
Proposed Specification: **7050000 Object Markers and Delineators.\***

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derwood Sheppard to move non-APL requirements from 993, add references to Standard Plans and Section 700 (sheeting), and renumber articles for new text.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

\*Associated with proposed Standard Specification 9930000.

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**OBJECT MARKERS AND DELINEATORS.**  
**(REV 11-18-21)**

SECTION 705 is deleted and the following substituted:

**SECTION 705**  
**OBJECT MARKERS AND DELINEATORS**

**705-1 Description.**

Furnish and install object markers to mark obstructions within or adjacent to the roadway of the types and at the locations called for in the Standard Plans or in the Plans.

Furnish and install delineators along the side of the roadway to indicate the alignment of the roadway as indicated in the Standard Plans or in the Plans.

**705-2 Materials.**

**705-2.1 General:** Meet the following requirements:

~~Object Markers and Flexible Post Delineators\*..Section- 993~~  
~~Barrier Delineators\* .....Section- 993~~  
~~Retroreflective and Nonreflective~~  
~~Sign Sheeting\*.....Section -994700~~

**705-2.2 Product Acceptance on the Project:** Ensure that delineators and delineator posts are\*Use products listed on the Department's Approved Product List (APL).

**705-2.2 Flanged U-Channel Posts:** Meet the mechanical requirements of ASTM A499, Grade 60. Galvanize after fabrication in accordance with ASTM A123, to produce a smooth uniform finish free from defects affecting strength, durability, and appearance. Punch or drill 3/8-inch diameter holes on 1-inch centers through the center of the post, starting approximately 1 inch from the top and extending the full length of the post. Punching or drilling operations shall be completed prior to galvanization. The weight per foot of a manufacturer's U-channel size shall not vary more than plus or minus 3.5% of its specified weight per foot. Machine-straighten the U-channel to a tolerance of 0.4% of the length.

**705-2.3 Round Aluminum Posts:** Meet the requirements of Standard Plans, Index- 700--010.

**705-2.4 Retroreflective Sheeting:** Use Types IV, V or XI sheeting. The retroreflective area shall be in accordance with the MUTCD.

**705-2.5 Aluminum Panel:** For Object Markers and Nonflexible Delineators, adhere retroreflective sheeting to 6061 T6 aluminum meeting ASTM B209. Use 0.040-inch sheet aluminum for Type 2 markers and nonflexible delineators. Use 0.080-inch sheet aluminum for Type 1, Type 3, and Type 4 markers. Prepare aluminum in accordance with recommendations of the sheeting manufacturer.

**705-3 Installation Requirements.**

Install delineators and object markers in accordance with the MUTCD, Standard Plans and Plans.

**705-3.1 Object Markers:** For uniformity, all Type 1 markers shall be OM1-3 style markers, all Type 2 markers shall be OM2-2V style markers, and all Type 4 (end of road)

markers shall be OM4-3 style markers. Install object markers at a mounting height of 4 feet measured in accordance with Standard Plans, Index 700-101.

Attach Type 1 and Type 4 object markers to round aluminum posts in accordance with Standard Plans, Index 700-010. Install Type 2 and Type 3 object markers directly to 3 lb/ft flanged U-Channel posts using two 1/4-inch bolts spaced to fit holes on the post.

Use attachment hardware (nuts, bolts, clamps, brackets, braces, etc.) of aluminum or galvanized steel.

**705-3.2 Flexible Post Delineators:** Install in accordance with the manufacturer's instructions.

**705-3.3 Nonflexible Post Delineators:** Install nonflexible post delineators on 1.1 lb/ft flanged U-Channel. The retroreflective sheeting shall have a minimum width of 4- inches and have a minimum area of 32 square inches.

**705-3.4 Barrier Delineators:** Install barrier delineators by adhesive or mechanical means as per the manufacturer's recommendations and in accordance with the details shown in the Plans and the Standard Plans. ~~Place~~ Install barrier delineators at a spacing of 25 feet for the first 100 feet of barrier; and at 100 feet spacing thereafter. For installations with guardrail, install barrier delineators in accordance with Standard Plans, Index 536-001. Orient barrier delineators as detailed in the ~~Standard Plans or APL drawings~~ manufacturer's instructions.

#### **705-4 Method of Measurement.**

The quantity to be paid will be the number of delineators or object markers furnished, installed and accepted, with the exception of barrier delineators on new barriers, which are included in the cost of the barrier.

#### **705-5 Basis of Payment.**

Prices and payments will be full compensation for work specified in this Section, including the cost of labor, materials, and incidental items required to complete the work.

Payment will be made under:

Item No. 705- 10	Object Marker - each.
Item No. 705- 11	Delineator - each.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 24, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **710**  
Proposed Specification: **7100403 Painted Pavement Markings. \***

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Karen Byram to change the black retroreflectivity value.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

\* This revision is associated with proposed Standard Specification revision 9710000.

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**PAINTED PAVEMENT MARKINGS.****(REV 11-29-21)**

SUBARTICLE 710-4.3 is deleted and the following substituted:

**710-4.3 Retroreflectivity:** Apply white and yellow standard paint that will attain an initial retroreflectance of not less than  $300 \text{ mcd/lx}\cdot\text{m}^2$  and not less than  $250 \text{ mcd/lx}\cdot\text{m}^2$ , respectively. Apply white and yellow durable paint that will attain an initial retroreflectance of not less than  $450 \text{ mcd/lx}\cdot\text{m}^2$  and not less than  $300 \text{ mcd/lx}\cdot\text{m}^2$ , respectively. Black pavement markings must have a retroreflectance of less than  $20 \text{ mcd/lx}\cdot\text{m}^2$ .

Measure, record and certify on a Department approved form and submit to the Engineer, the retroreflectivity of white and yellow pavement markings in accordance with FM 5-541.

The Department reserves the right to test the markings within three days of receipt of the Contractor's certification. Failure to afford the Department opportunity to test the markings will result in non-payment. The test readings should be representative of the Contractor's pavement marking performance. If the retroreflectivity values measure below values shown above, reapply the pavement marking at no additional cost to the Department.

For standard paint, ensure that the minimum retroreflectance of white and yellow pavement markings are not less than  $150 \text{ mcd/lx}\cdot\text{m}^2$ . If the retroreflectivity values for standard paint fall below the  $150 \text{ mcd/lx}\cdot\text{m}^2$  value within 180 days of initial application, the pavement marking will be reapplied at the Contractor's expense. If the retroreflectivity values for durable paint fall below the initial values of  $450 \text{ mcd/lx}\cdot\text{m}^2$  value for white and  $300 \text{ mcd/lx}\cdot\text{m}^2$  for yellow within 180 days of initial application, the pavement marking will be reapplied at the Contractor's expense.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 24, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **711**  
Proposed Specification: **7110000 Thermoplastic Pavement Markings.** \*

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

he changes are proposed by Karen Byram to modify retroreflectivity value, clarify thermoplastic language, and add black contrast language.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

\*This revision is associated with proposed Standard Specification revision 9710000.

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**THERMOPLASTIC PAVEMENT MARKINGS.**

**(REV ~~12-213-212~~)**

SECTION 711 is deleted and the following substituted:

**SECTION 711  
THERMOPLASTIC PAVEMENT MARKINGS**

**711-1 Description.**

Apply new thermoplastic pavement markings, or refurbish existing thermoplastic pavement markings, in accordance with the Contract Documents.

**711-2 Materials.**

Use only materials listed on the Department’s Approved Product List (APL) meeting the following requirements.

<u>Hot-Applied</u> Standard and Refurbishment Thermoplastic ....	971-1 and 971-5
.....	
Preformed Thermoplastic.....	971-1 and 971-6
<u>Hot-Applied</u> High Friction Thermoplastic	971-1 and 971-10
Glass Spheres .....	971-1 and 971-2

The Engineer will take random samples of all material in accordance with the Department’s Sampling, Testing and Reporting Guide schedule.

**711-3 Equipment.**

Use equipment capable of providing continuous, uniform heating of the pavement marking material to temperatures exceeding 390°F, mixing and agitation of the material in the reservoir to provide a homogeneous mixture without segregation. Use equipment that will maintain the pavement marking material in a plastic state, in all mixing and conveying parts, including the line dispensing device until applied. Use equipment which can produce varying line widths lines and which meets the following requirements:

1. Capable of traveling at a uniform, predetermined rate of speed, both uphill and downhill, to produce a uniform application of pavement marking material and capable of following straight lines and making normal curves in a true arc.
2. Capable of applying glass spheres to the surface of the completed pavement marking by a double drop application for standard thermoplastic pavement markings and a single drop application for recapping and refurbishment thermoplastic pavement markings. The bead dispenser for the first bead drop shall be attached to the pavement marking machine in such a manner that the beads are dispensed closely behind the installed line. The second bead dispenser bead shall be attached to the pavement marking machine in such a manner that the beads are dispensed immediately after the first bead drop application. Use glass spheres dispensers equipped with an automatic cut-off control that is synchronized with the cut-off of the thermoplastic material and applies the glass spheres uniformly on the entire pavement markings surface with 50 to 60% embedment.
3. Equipped with a special kettle for uniformly heating and melting the pavement marking material. The kettle must be equipped with an automatic temperature control device and

material thermometer for positive temperature control and to prevent overheating or scorching of the thermoplastic material.

4. Meet the requirements of the National Fire Protection Association, state, and local authorities.

#### **711-4 Application.**

**711-4.1 General:** Remove existing thermoplastic pavement markings using a method approved by the Engineer such that pavement surface scars or traces of the removed thermoplastic pavement markings will not conflict with new pavement markings. Do not use paint to blackout, hide, or disguise existing pavement markings.

Before applying pavement markings, remove any material that would adversely affect the bond of the pavement markings by a method approved by the Engineer.

Before applying pavement markings to any portland cement concrete surface, apply a primer, sealer, or surface preparation adhesive of the type recommended by the manufacturer. Offset longitudinal lines at least 2 inches from any longitudinal joints of portland cement concrete pavement.

Apply pavement markings to dry surfaces only, and when the ambient air and surface temperature is at least 50°F and rising for asphalt surfaces and 60°F and rising for concrete surfaces.

Apply pavement markings to the same tolerances in dimensions and in alignment specified in 710-5. When applying pavement markings over existing markings, ensure that no more than 2 inches on either end and not more than 1 inch on either side of the existing line is visible.

Apply thermoplastic material to the pavement by extrusion or other means approved by the Engineer.

When thermoplastic pavement markings are to be removed and replaced, apply new thermoplastic pavement markings prior to opening to traffic.

Conduct field tests in accordance with FM 5-541. Take test readings representative of the pavement marking performance. Remove and replace pavement markings not meeting the requirements of this Section at no additional cost to the Department.

With the exception of short-term raised rumble strips, wait at least 14 days after constructing the final asphalt surface course to place thermoplastic pavement markings. Installation of thermoplastic on concrete requires a clean, dry surface. Follow the manufacturer's recommendations for surface preparation for thermoplastic on concrete. Provide temporary pavement markings during the interim period prior to opening the road to traffic.

**711-4.1.1 Preformed Thermoplastic:** Apply markings to dry surfaces only and when ambient air temperature is at least 32°F. Prior to installation, follow the manufacturer's recommendations for pre-heating. For railroad dynamic envelopes, keep all equipment and personnel out of the foul area.

**711-4.1.2 Hot-Applied High Friction Thermoplastic:** Hot-applied high friction thermoplastic may be used as an alternative to preformed thermoplastic for special emphasis crosswalk markings. Apply markings only by gravity or air pressure thermoplastic hand liners set-up with double drop bead attachments. Install markings in accordance with the manufacturer's recommendations.

#### **711-4.2 Thickness:**

**711-4.2.1 Hot-Applied Standard Thermoplastic Markings:** Apply or recap standard thermoplastic pavement markings for longitudinal lines to attain a minimum thickness



of 0.10 inch or 100 mils and a maximum thickness 0.15 inch or 150 mils when measured above the pavement surface.

~~All chevrons, diagonal and transverse lines, messages, symbols, and arrows~~ Markings other than longitudinal lines, wherever located, will have a thickness of 0.09 inch or 90 mils to 0.12 inch or 120 mils when measured above the pavement surface.

Measure, record and certify on Department approved form and submit to the Engineer, the thickness of white and yellow pavement markings in accordance with FM 5-541.

The Engineer will verify the thickness of the pavement markings in accordance with FM 5-541 within 30 days of receipt of the Contractor's certification.

**711-4.2.2 Hot-Applied Refurbishment Thermoplastic Markings:** Apply a minimum of 0.06 inch or 60 mils of thermoplastic material. Ensure that the combination of the existing marking and the overlay after application of glass spheres does not exceed the maximum thickness of 0.150 inch or 150 mils for all lines.

Measure, record and certify on Department approved form and submit to the Engineer, the thickness of white and yellow pavement markings in accordance with FM 5-541.

The Engineer will verify the thickness of the pavement markings in accordance with FM 5-541 within 30 days of receipt of the Contractor's certification.

**711-4.2.3 Preformed Thermoplastic Markings:** Apply 0.125 inch or 125 mils of preformed thermoplastic material.

Use preformed thermoplastic for bicycle markings, shared use path markings, 24-inch markings on special emphasis crosswalks, route shields, ramp exit numbers, roundabout informational markings, railroad dynamic envelopes, white dotted lines (2'-4') with trailing black contrast, 12-inch transverse crosswalk lines with black contrast, 24-inch stop line with black contrast, and black contrast arrows, messages, and symbols.

Measure, record and certify on Department approved form and submit to the Engineer, the thickness of the pavement markings in accordance with FM 5-541.

**711-4.2.4 Hot-Applied High Friction Thermoplastic:** Apply lines to attain a minimum thickness of 0.09 inch or 90 mils and a maximum thickness of 0.12 inch or 120 mils, when measured above the pavement surface.

Measure, record and certify on Department approved form and submit to the Engineer, the thickness of the pavement markings in accordance with FM 5-541.

### **711-4.3 Retroreflectivity:**

**711-4.3.1 General:** Measure, record and certify on Department approved form and submit to the Engineer, the retroreflectivity of white and yellow pavement markings in accordance with FM 5-541.

**711-4.3.2 Longitudinal Lines:** Apply ~~white and yellow~~ hot-applied standard and refurbishment thermoplastic pavement markings that will attain an initial retroreflectivity of not less than 450 mcd/lx·m<sup>2</sup> and not less than 350 mcd/lx·m<sup>2</sup> for white and yellow, respectively ~~for all longitudinal lines~~.

**711-4.3.3 Markings Other Than Longitudinal Lines:** Apply ~~hot-applied standard and refurbishment thermoplastic markings that chevrons, diagonal lines, stop lines, messages, symbols, and arrows~~ will attain an initial retroreflectivity of not less than 300 mcd/lx·m<sup>2</sup> and 250 mcd/lx·m<sup>2</sup> for white and yellow, respectively.

**711-4.3.4 Preformed and Hot-Applied High Friction Markings:** Apply ~~white~~ white preformed thermoplastic crosswalks, railroad dynamic envelopes and bicycle markings and hot-applied high friction thermoplastic markings that shall will attain an initial retroreflectivity of not less than ~~275~~200 mcd/lx·m<sup>2</sup>. Black pavement markings must have a retroreflectance of less than 520 mcd/lx·m<sup>2</sup>.

~~Measure, record and certify on Department approved form and submit to the Engineer, the retroreflectivity of white and yellow pavement markings in accordance with FM 5-541.~~

#### **711-4.4 Glass Spheres:**

**711-4.4.1 Longitudinal Lines:** For hot-applied standard thermoplastic markings, apply the first drop of Type 4 or larger glass spheres immediately followed by the second drop of Type 1 glass spheres. For hot-applied refurbishment thermoplastic markings, apply a single drop of Type 3 glass spheres. Apply retroreflective glass spheres to all markings at the rates provided in the manufacturer's installation instructions.~~determined by the manufacturer's recommendations.~~

**711-4.4.2 Chevrons, Diagonal and Transverse Lines, Messages, Symbols, and Arrows**Markings Other Than Longitudinal Lines: For hot-applied standard ~~and~~or refurbishment thermoplastic markings, apply a single drop of Type 1 glass spheres and sharp silica sand at the rates provided in the manufacturer's installation instructions. Use sharp silica sand materials meeting the requirements of 971-5.4. For hot-applied high friction thermoplastic markings, apply retroreflective and friction elements at the rates provided in the manufacturer's installation instructions.

~~Apply retroreflective glass spheres to all markings at the rates determined by the manufacturer's recommendations.~~

~~Apply a mixture consisting of 50% glass spheres and 50% sharp silica sand to all standard thermoplastic crosswalk lines at the rates determined by the manufacturer's recommendations.~~

**711-4.4.3 Preformed Markings:** These markings are factory supplied with glass spheres and skid-friction resistant material elements. Apply additional glass spheres and skid-friction resistant material elements in accordance with the manufacturer's instructions.

#### **711-5 Contractor's Responsibility for Notification.**

Notify the Engineer prior to the placement of the materials. At the time of notification, submit a certification to the Engineer with the APL number and the batch or Lot numbers of the thermoplastic and glass spheres to be used. Packaging labels that contain the information required by 971-1.1 will be accepted in place of a certification.

#### **711-6 Protection of Newly Applied Thermoplastic Pavement Markings.**

Do not allow traffic onto or permit vehicles to cross newly applied pavement markings until they are sufficiently dry. Remove and replace any portion of the pavement markings damaged by passing traffic or from any other cause, at no additional cost to the Department.

#### **711-7 Observation Period.**

Longitudinal pavement markings are subject to a 180 day observation period under normal traffic. The observation period shall begin with the satisfactory completion and acceptance of the work.

The longitudinal pavement markings shall show no signs of failure due to blistering, excessive cracking, chipping, discoloration, poor adhesion to the pavement, loss of retroreflectivity or vehicular damage. The retroreflectivity shall meet the initial requirements of 711-4.3. The Department reserves the right to check the retroreflectivity any time prior to the end of the observation period.

Replace, at no additional expense to the Department, any longitudinal pavement markings that do not perform satisfactorily under traffic during the 180 day observation period.

### **711-8 Corrections for Deficiencies.**

Recapping applies to conditions where additional pavement marking material is applied to new or refurbished pavement markings to correct a thickness deficiency. Correct deficiencies by recapping or removal and reapplication of a 1 mile section centered around the deficiency, as determined by the Engineer, at no additional cost to the Department.

### **711-9 Method of Measurement.**

**711-9.1 Thermoplastic Pavement Markings:** The plan quantity, acceptably applied and subject to 9-1.3.2, under this Section will be paid as follows:

1. The length, in gross miles, of solid, 10'-30' skip, 3'-9' dotted, 6'-10' dotted, 2'-2' dotted, and 2'-4' dotted lines.
2. The length, in linear feet, of transverse lines, diagonal lines, chevrons, parking spaces, special emphasis crosswalk markings, and railroad dynamic envelope markings.
3. The number of pavement messages, symbols, and arrows. Each arrow is paid as a complete marking, regardless of the number of "points" or directions.

The gross mile measurement will be taken as the distance from the beginning of the thermoplastic line to the end of the thermoplastic line and will include the unmarked gaps for skip and dotted lines. The gross mile measurement will not include designated unmarked lengths at intersections, turn lanes, etc.

**711-9.2 Removal of Existing Thermoplastic Markings:** The quantity for removal of existing thermoplastic pavement markings to be paid will be the area, in square feet, acceptably removed. Payment for removal of thermoplastic pavement markings will only be made for locations where the existing pavement surface is to remain.

### **711-10 Basis of Payment.**

Prices and payments will be full compensation for all work specified in this Section, including, all cleaning and preparing of surfaces, furnishing of all materials, application, curing and protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work. Final payment will be withheld until all deficiencies are corrected.

Payment will be made under:

Item No. 711	Thermoplastic Pavement Markings
	Solid - per gross mile.
	Solid - per linear foot.
	Skip - per gross mile.
	Dotted - per gross mile.
	Message or Symbol - each.
	Arrows - each.
	Yield Line - per linear foot.

7110000D01

All Jobs

Railroad Dynamic Envelope - per linear foot.

Remove - per square foot.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 24, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **713**  
Proposed Specification: **7130403 Permanent Tape Pavement Markings.** \*

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The change is proposed by Karen Byram modify the retroreflectivity value for black pavement markings.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

\* This revision is associated with proposed Standard Specification revision 9710000.

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**PERMANENT TAPE PAVEMENT MARKINGS.**  
**(REV 11-16-21)**

SUBARTICLE 713-4.3 is deleted and the following substituted:

**713-4.3 Retroreflectivity:** Apply white and yellow pavement markings that will attain an initial retroreflectivity of not less than  $450 \text{ mcd/lx}\cdot\text{m}^2$  for white markings and not less than  $350 \text{ mcd/lx}\cdot\text{m}^2$  for yellow markings. Black pavement markings must have a retroreflectance of less than 520  $\text{mcd/lx}\cdot\text{m}^2$ .

Measure, record and certify on Department approved form and submit to the Engineer, the retroreflectivity of white and yellow pavement markings in accordance with FM 5-541.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 13, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **715**  
Proposed Specification: **7150100 Highway Lighting System.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Richard Stepp in the Roadway Design Office to replace the term "ballast" with "LED driver" or "driver" to accurately reflect LED lighting terminology in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**HIGHWAY LIGHTING SYSTEM.**  
**(REV 10-25-21)**

ARTICLE 715-1 is deleted and the following substituted:

**715-1 Description.**

Install a highway lighting system in accordance with the details shown in the Plans. Use pole assemblies as shown in the Standard Plans when standard aluminum pole assemblies or standard high mast light assemblies are required by the Contract Documents. Include in the system the light poles, bases, luminaires, ~~ballasts~~drivers, cable, conduit, protective devices, and control devices; all as specified or required for the complete facility.

Obtain conventional light pole and high mast light pole assemblies from a fabrication facility that is listed on the Department's Production Facility Listing. Producers seeking inclusion on the list shall meet the requirements of Section 105.

Provide metal lighting poles, excluding high mast lighting, with internal vibration damping devices in accordance with Standard Plans, Index 715-002 in all installations on bridges, walls, and median concrete barriers.

ARTICLE 715-5 is deleted and the following substituted:

**715-5 Shop Drawings and Working Drawings.**

Submit shop drawings and working drawings with descriptive specifications and engineering data for the service main, control panel enclosure, control panel main disconnect, lighting contactor, electrical panel, transformer, in-line fuse holders, surge protective devices, non-standard light poles (including brackets), luminaires, ~~ballast~~LED drivers, photo-electric cell, conduit and cable or any other item requested by the Engineer as specified in Section 5.

SUBARTICLE 715-6.2 is deleted and the following substituted:

**715-6.2 Luminaires:** Use the make and model of the luminaire(s) shown in the Plans. Luminaires other than those shown in the Plans may be substituted if the Contractor proves photometric and electrical equivalence per the approval of the lighting EOR.

Use only luminaires listed on the Department's Approved Product List (APL).

SUBARTICLE 715-13.4 is deleted and the following substituted:

**715-13.4 Electrical Connections:** Make primary ~~ballast~~LED driver connections in accordance with manufacturer's instructions. Install sufficient cable to allow all connections to be made outside the light pole base. Connect the ground conductor to the ground stud provided.





*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 14, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **715**  
Proposed Specification: **7151800 Highway Lighting System.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Olivia Townsend to add language specifying depth of foundation removal.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**HIGHWAY LIGHTING SYSTEM.**  
**(REV 11-3-21)**

ARTICLE 715-18 is deleted and the following substituted:

**715-18 Method of Measurement.**

The quantities to be paid for will be as follows, completed and accepted:

1. Conduit: Payment will be made in accordance with Section 630.
2. Luminaire and Truss Arm: The Contract unit price will include the truss arm, luminaire with lamp, and all necessary mounting hardware as indicated in the Plans and Standard Plans.
3. Service Point: Payment will be made in accordance with Section 639.
4. Load Center: The Contract unit price will include the enclosure, panel boards, breakers, lightning arrestor, contactors, photo electric switch, grounding, and the concrete pad as shown in the Plans and Standard Plans.
5. Luminaire: The Contract unit price will include the luminaire with lamp and necessary mounting hardware as indicated in the Plans and Standard Plans.
6. Pull Box: Payment will be made in accordance with Section 635.
7. High Mast Lighting Pole Complete: The Contract unit price will include the pole, luminaires with lamps, lowering system, breakers and anchor bolts with lock nuts and washers, and foundation as indicated in the Plans and Standard Plans.

When partial foundation removal is called for, remove the pole and foundation to a minimum depth of four feet below existing grade.

When complete foundation removal is called for, completely remove the pole and foundation.

8. Conductor: The quantity to be paid for will be the plan quantity, in feet, completed and accepted. Measurement will be based on the horizontal distance between pull boxes, or between pull boxes and luminaire poles, plus 8 feet for each conductor entering and 8 feet for each conductor leaving the pull box and 8 feet for each conductor entering the luminaire pole.
9. Lighting Pole Complete: The Contract unit price will include the pole, internal vibration damping device, truss arm, luminaire with lamp, anchor bolts with lock nuts and washers, frangible base and foundation.
10. Pole Cable Distribution System: The Contract unit price will include the surge protector, fuse holders with fuses, waterproof connectors and the waterproof wiring connection to the luminaires.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

February 2, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **921**  
Proposed Specification: **9210100 Portland Cement and Blended Cement.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Thomas Frank to identify Type IT cement.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**PORTLAND CEMENT AND BLENDED CEMENT.****(REV 10-26-21)**

ARTICLE 921-1 is deleted and the following substituted:

**921-1 General.**

Cement shall conform to the requirements of AASHTO M 85 or AASHTO M 240, as applicable, except as provided in this Section.

**921-1.1 Type of Cement:** Cement may be Types I, II, II (MH), III, IV, V (as defined by AASHTO M 85), or IL, IP, IS, IT (as defined by AASHTO M 240). Cement type shall be selected based on component and environmental conditions in accordance with Section 346. Different brands of cement, cement of the same brand from different facilities, or different types of cement shall be stored separately, identified, and shall not be mixed.

**921-1.2 Heat of Hydration:** The cement heat of hydration for Type II (MH), Type IT, and Type IL shall be tested in accordance with ASTM C1702 and reported at three days.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 20, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **923**  
Proposed Specification: **9230300 Water for Concrete.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Vimal Patel to replace the ASTM D512 with SM 4500 CL B and SM 4110 B in Tables 923-1 and 923-2 in the Standard Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**WATER FOR CONCRETE.****(REV 10-23-21)**

ARTICLE 923-3 is deleted and the following substituted:

**923-3 Chemical Requirements.**

**923-3.1 Testing:** All chemical analysis shall be performed in accordance with the test methods listed in Tables 923-1 and 923-2 or equivalent Standard Methods for the Examination of Water and Wastewater (SM). Inorganic Anions (Chlorides and Sulfates) ~~may~~ shall be determined simultaneously using SM 4110B Ion Chromatography or separately using SM 4500 Cl<sup>-</sup> B and SM 4500 SO<sub>4</sub><sup>2-</sup> E. ~~in lieu of ASTM D512 and~~ ASTM D516 may be used as an alternative method for sulfates. The test method used shall be included in the concrete producer report.

**923-3.2 Recycled and Reclaimed Water:** Recycled and reclaimed water shall be tested before use and shall not exceed the limits in Table 923-1:

Table 923-1		
Chemical Test	Test Method	Maximum (%)
Total Solids	SM 2540 B	5.00
Total Chlorides as Cl <sup>-</sup>	<del>ASTM D512</del> <u>SM 4500 Cl<sup>-</sup> B or</u> <u>SM 4110 B</u>	0.05
Total Sulfates as SO <sub>4</sub> <sup>2-</sup>	ASTM D516	0.30

**923-3.3 Open Bodies of Water and Well Water:** Open bodies of water and well water shall be tested before use and shall not exceed the limits of Table 923-2:

Table 923-2		
Chemical Test	Test Method	Maximum (%)
Alkalinity Calculated in terms of Calcium Carbonate	SM 2320 B	0.05
Total Organic Solids	SM 2540 E	0.05
Total Inorganic Solids	SM 2540 E	0.08
Total Chlorides as Cl <sup>-</sup>	<del>ASTM D512</del> <u>SM 4500 Cl<sup>-</sup> B or</u> <u>SM 4110 B</u>	0.05



*Florida Department of Transportation*

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Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

February 2, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **929**  
Proposed Specification: **9290100 Supplementary Cementitious Materials.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Thomas Frank to remove restriction to not use fly ash, slag cement, and ultra fine fly ash in conjunction with Type IP or IS.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**SUPPLEMENTARY CEMENTITIOUS MATERIALS.****(REV 10-26-21)**

ARTICLE 929-1 is deleted and the following substituted:

**929-1 General.**

Supplementary cementitious materials (SCMs) shall conform to the requirements of this Section. SCMs shall be used in concrete mix designs in accordance with Section 346.

~~Fly ash, slag cement, and ultra-fine fly ash shall not be used in conjunction with Type IP or Type IS cements.~~

Repulvable bags may be accepted by the Engineer, provided a successful demonstration by the producer has indicated complete degradation of the repulvable bags during the mixing operation and before the mix is discharged.

The Engineer may require additional testing beyond the requirements of this Section prior to the acceptance of any SCM sources.

**929-1.1 Definitions.**

The following definitions are applicable to the production and quality control (QC) of SCMs:

1. Approved Laboratory: A laboratory that is currently inspected by the Cement and Concrete Reference Laboratory (CCRL), is actively participating in the CCRL proficiency program and has corrected all deficiencies noted at the time of inspection. The laboratory must authorize the CCRL to send a copy of the final inspection report and proficiency sample results to the State Materials Office (SMO).

2. SCM Producer: Indicates an SCM supplier, including but not limited to a plant, a terminal, or a transfer facility, that has been qualified by the SMO. The Cementitious Materials Production Facility Listing will be maintained by the SMO.

3. Test Report: A certification from the SCM producer showing that the SCM meets the requirements of this Section. The test report must include, at a minimum, the following information:

- a. The Type of SCM.
- b. The production period.
- c. Chemical and physical analysis of the SCM.
- d. The silo numbers where the SCM is stored.
- e. The specific gravity of the SCM.
- f. The approved laboratory that performed all tests.

4. Purchaser: The term "purchaser" in the ASTM requirements shall be taken as the Department.





*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 13, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **931**  
Proposed Specification: **9310203 Metal Accessory Materials for Concrete Pavement  
and Concrete Structures.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Tim McCullough to move materials requirements to a table and add quality and emission requirements when paint is applied in the field.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## METAL ACCESSORY MATERIALS FOR CONCRETE PAVEMENT AND CONCRETE STRUCTURES.

(REV ~~10-612-8-21~~)

SUBARTICLE 931-2.3 is deleted and the following substituted:

**931-2.3 Dowel Bars:** Dowel bars must meet the requirements of Table 931-1. ~~shall be plain steel bars conforming to the requirements of ASTM A615 for any grade of steel shown.~~ They shall be of the length, size and spacing as shown in the Plans. ~~When coated dowel bars are specified, coat with epoxy meeting the requirements of ASTM A775 by a producer with Epoxy Coating Certification from the Concrete Reinforcing Steel Institute, or one coat of zinc rich primer meeting the requirements of SSPC Paint 20.~~

The Contractor shall submit to the Engineer a certified test report from the manufacturer of the dowel bars confirming that the requirements of this Section are met. The certified test report shall conform to the requirements of Section 6 and include metallurgical mill analysis, grade, length and size. Each certification shall cover only one LOT for dowel bars.

SUBARTICLE 931-3.1 is deleted and the following substituted:

### 931-3 Metal Dowel Bar Assemblies for Joints in Concrete Pavement.

**931-3.1 Approved Product List (APL):** The dowel bars and basket assembly ~~used~~ must meet the requirements of Table 931-1 and shall be a product included on the Department's APL.

Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6 and shall submit product photo and drawings, technical data sheets, and certifications that ~~or distributors seeking approval of their material in accordance with this specification shall~~ demonstrate the performance of their products in accordance with the requirements in 931-3.~~2-1~~ thru 931-3.~~65~~.

<u>Table 931-1 Material Requirement for Dowel Bar and Basket Assemblies</u>		
<u>Component</u>	<u>Base Metal</u>	<u>Coating</u>
<u>Dowel Bar</u>	<u>ASTM A615</u>	<u>ASTM A775 or SSPC Paint 20</u>
<u>Wire Basket Assembly</u>	<u>ASTM A1064</u>	<u>ASTM A775 or SSPC Paint 20 or Primer with <math>\geq</math> 40% Solids (by weight)</u>

Produce dowel bars coated in the shop. Wire basket assemblies may be coated in the shop or the field. For welded wire basket assemblies fabricated after coating, apply touch-up coating in the shop or field over all welded connections. All field applied coatings must have a volatile organic compound (VOC) content  $\leq$  420g/L.

SUBARTICLE 931-3.6 is deleted.

~~931-3.6 Materials: The wire for the welded assembly shall be in accordance with all applicable requirements of ASTM A1064.~~

~~After fabrication of dowel bar assemblies, apply coating in accordance with the requirements of 931-2.3.~~



*Florida Department of Transportation*

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GOVERNOR

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KEVIN J. THIBAUT, P.E.  
SECRETARY

December 13, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **932**  
Proposed Specification: **9320500 Nonmetallic Accessory Materials for Concrete Pavement and Concrete Structures.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Juan Castellanos from the State Construction Office to include polymer as an APL product.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**NONMETALLIC ACCESSORY MATERIALS  
FOR CONCRETE PAVEMENT AND CONCRETE STRUCTURES  
(REV ~~120-928~~-21)**

SECTION 932 is expanded by the following new Article:

**932-5 Polymer Slurries for Drilled Shafts.**

**932-5.1 General Requirements:** Synthetic polymer slurry are products that can be used to facilitate the construction of drilled shafts. The type of synthetic polymers used in drilling slurry are long chain-like hydrocarbon molecules which interact with each other, with the soil, and with the water to effectively increase the viscosity of the fluid. Commercial polymer products may come in powder, granular or liquid forms and shall be fully mixed with potable water prior to introducing it to the drilled shaft excavation.

**932-5.2 Product Acceptance:** All materials shall be one of the products listed on the Department's Approved Product List (APL). Manufacturers seeking evaluation of products for inclusion on the APL shall submit an application in accordance with Section 6 and including documentation that meets the requirements of Table 932-10. A separate application must be submitted for each product type to be evaluated, showing that the product meets the applicable requirements.

<u>Table 932-10</u> <u>Documentation Requirements</u>	
<b><u>Documentation</u></b>	<b><u>Requirements</u></b>
<u>Installation Instructions</u>	<u>Include mixing and disposal instructions and the Safety Data Sheet (SDS).</u>
<u>Product Photo</u>	<u>Displays the significant features of the product as required in this section. Displays location of Manufacturer name and model number.</u>
<u>Product Label Photo</u>	<u>Displays the Product Name</u>
<u>Technical Data Sheet</u>	<u>Uniquely identifies the product and includes product specifications, storage instructions, and recommended installation materials and equipment as applicable.</u>
<u>Test Reports</u>	<u>Submit test results and reports as required by Materials Manual, Vol 2 Section 2.4</u>



*Florida Department of Transportation*

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KEVIN J. THIBAUT, P.E.  
SECRETARY

January 4, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **960**  
Proposed Specification: **9600100 Post Tensioning Systems.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Ben Goldsberry from the Structures Design Office to allow PT systems to be accepted through the show drawing submittal process instead of through a pre-approved list. The proposed specification change is associated with the changes made to Section 5, 452, and 462.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra  
Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## POST-TENSIONING ~~SYSTEMS~~COMPONENTS (REV 12-1-21)

ARTICLE 960-1 is deleted and the following substituted:

### 960-1 Description.

This Section covers all post-tensioning (PT) systems and components remaining in a completed structure, including temporary erection PT left in-place and permanent PT for design capacity.

~~The submittal for~~Manufacturers seeking approval of PT systems ~~for inclusion on the Structures Design Office (SDO) list of Approved Post Tensioning Systems~~ must use materials and components meeting the requirements of this Section and Section 462. Submit ~~a complete~~ PT ~~System Application Package~~shop drawings to the Engineer for review and acceptance in accordance with Section 5. The PT system shop drawings must include ~~including~~ component drawings, system drawings, and test reports ~~from a certified laboratory (or laboratories), as defined in 960 3.1, to the SDO for review, acceptance and inclusion on the list of Approved Post Tensioning Systems.~~ The acceptance of a PT system for use on the project is based on the exact major components, as defined in 960-2, that were used in system testing and that are shown on the approved PT system shop drawings.

~~Any marked variations from original test values or any evidence of inadequate field performance of a PT system, will result in the PT System being removed from the list of Approved Post Tensioning Systems.~~

ARTICLE 960-2 is deleted and the following substituted:

### 960-2 Component Standards.

All PT system components must be materials compatible with the filler material and installation process used to encapsulate the tendons. The component materials must not chemically degrade during the ~~design~~service life of the structure. The service life of the structure is 75-years unless specified otherwise in the Contract Documents.

The following are major components and must be marked with the manufacturer's name, trademark, model number, and size corresponding to catalog designation: anchorages, bearing plates, trumpets, caps, duct couplers, connections, "O"-rings, heat shrink tubing, duct, and local zone reinforcement. Any of these items that cannot be marked must be contained in packaging or appropriately tagged with the necessary information.

The following are examples of common off-the-shelf accessories and need not be stamped: bolts, washers, inlets, outlets, drains, ports, valves, plugs, nipples, hose adapters, and grease.

~~Substitution, modification, or deletion of any major components of the PT systems as shown on the SDO website for Approved Post Tensioning Systems, excluding local zone reinforcement, after system testing and approval by the Engineer is not permitted. Inclusion of all possible subcomponents is required for PT system and component testing; however, subcomponents of approved systems may be eliminated from final installations based on project specific requirements, provided all component to component interface hardware are included as necessary to maintain connections and PT system integrity.~~

Provide only PT systems utilizing tendons completely encapsulated in grout or flexible filler filled anchorages and ducts. Do not use systems transferring prestress force by bonding prestress steel strand directly to concrete. Embedded anchorages for bars are permitted. Strand or strand-tendon couplers are not permitted.

~~Stamp all components of a PT system with the supplier's name, trademark, model number, and size corresponding to catalog designation.~~

~~—All miscellaneous hardware components, including but not limited to splices, joints, duct couplers, connections, inlets, outlets, drains, ports, valves, and plugs, are part of approved PT systems.~~

SUBARTICLE 960-2.2.1.5 is deleted and the following substituted:

**960-2.2.1.5 Connections, Fittings, and Tolerance:**

1. Devices or methods for all duct connections (e.g., splices, joints, couplers, connection to anchorages), shall produce smooth interior alignment with no lips or kinks.
2. Use of tape, caulking, epoxy, or other sealants is not permitted to join or repair duct, to make connections, or for any other purpose.
3. Use a reducer when adjacent sections of duct are directly connected to each other and the outside diameters vary more than plus or minus 0.08 inch.
4. Provide all connections that are external to the concrete with a minimum pressure rating of 150 psi.
5. Use heat shrink sleeves and circular sleeve couplers made from high-density polyethylene or polypropylene material, or duct couplers made from high-density polyethylene or polypropylene material with O-rings or seals to make connections between sections of corrugated plastic duct or between corrugated plastic duct and trumpets.
6. Use heat shrink sleeves and circular sleeve couplers made from high-density polyethylene or polypropylene material to make connections between corrugated plastic duct and steel pipe.
7. Use heat shrink sleeves with or without circular sleeve couplers made from high-density polyethylene or polypropylene material to make connections between corrugated plastic duct and anchorages with integral trumpets.
8. Use heat welding techniques, electrofusion duct couplers, or elastomer sleeves and stainless steel band clamps to make connections between sections of smooth plastic duct.
9. Use elastomer sleeves and stainless steel band clamps to make connections between smooth plastic duct and steel pipe.
10. Use welding or elastomer sleeves and stainless steel band clamps to make connections between sections of steel pipe that are external to the concrete.
11. Use welding, elastomer sleeves and stainless steel band clamps or heat shrink sleeves and circular sleeve couplers made from high-density polyethylene or polypropylene material to make connections between steel pipe and trumpets that are internal to the concrete.
12. Use elastomer sleeves with a minimum wall thickness of 3/8 inches and reinforced with a minimum of four ply polyester reinforcement. Use a 3/8 inch wide stainless steel power seated band and clamps on each end of the elastomer sleeves to secure



the sleeves to plastic ducts or steel pipes. Seat the bands with a 120 pound force prior to clamping them in place.

SUBARTICLE 960-2.2.2.2 is deleted and the following substituted:

**960-2.2.2.2 Inlets, Outlets, Drains, Ports, Valves, and Plugs:**

1. Provide permanent inlets, outlets, drains, ports, valves, and threaded plugs made of nylon, high-density polyethylene or polypropylene materials, or stainless steel.

2. For unbonded post-tensioning systems using flexible filler, provide permanent inlets, outlets and drains made from steel. Provide temporary inlets, outlets, drains and valves made from brass or steel.

3. All inlets, outlets, drains and ports shall have pressure rated mechanical shut-off valves or plugs. Mechanical shut-off valves must be 1/4 turn ball valves.

4. Inlets, outlets, drains, ports, valves, and plugs shall have a minimum pressure rating of 150 psi.

5. Inlets, outlets and ports shall have a minimum inside diameter of 3/4 inches for strand and 3/8 inches for single bar tendons and four-strand ducts.

6. Drains shall have a minimum inside diameter of 3/8 inches. Locate drains, and inlets and outlets serving as drains, at the bottom of the duct cross section.

7. Specifically designate temporary items, not part of the permanent structure, on the PT system shop drawings.

SUBARTICLE 960-2.3 is deleted and the following substituted:

**960-2.3 Steel Reinforcing:**

**960-2.3.1 Mild:**

1. Reinforcing steel shall conform to Section 415 and Section 462.

2. Test typical local zone reinforcement for compliance with AASHTO LRFD Bridge Design Specifications and AASHTO LRFD Bridge Construction Specifications, as applicable. Include reinforcement details in the PT system shop drawings submitted for system approval.

ARTICLE 960-3 is deleted and the following substituted:

**960-3 System ~~Pre~~-Approval Requirements.**

**960-3.1 Independent Testing:** Use independent laboratories meeting the credentials described in this Section to perform all testing, other than field testing, and to submit certified test reports for materials and components. Certification may be performed by a qualified independent laboratory outside of the United States, only if the facility is pre-approved by the State Materials Office.

Conform all testing procedures used for materials or components to applicable American Society of Testing and Materials (ASTM) and International Federation of Structural Concrete (fib) Specifications or as modified in this Section.

**960-3.1.1 Material Laboratory:** Test plastic components in a certified independent laboratory accredited through the laboratory accreditation program of the Geosynthetic Accreditation Institute (GAI), the American Association for Laboratory Accreditation (A2LA) or qualified by an ISO 17025 accreditation agency using personnel with documented experience running the required test methods.

**960-3.1.2 Component and System Laboratory:** Test individual components and the PT system as a whole witnessed by and/or performed in a certified independent laboratory audited by the AASHTO Materials Reference Laboratory (AMRL), or with an AASHTO R18 Accreditation as set forth by the AASHTO Highway Subcommittee on Materials or qualified by an ISO 17025 accreditation agency using personnel with documented experience running the required test methods.

**960-3.1.3 System Testing:** In lieu of performing PT system tests witnessed by and/or performed in a certified independent laboratory, the PT system tests may be performed at the project site and witnessed by the Engineer.

**960-3.2 Testing Requirements:**

**960-3.2.1 Component and System Tests:** Corrugated duct, smooth duct and all associated components that are used for both internal and external PT systems, e.g. couplers, anchorages, inlets, outlets, drains, ports, valves, plugs, etc., shall meet the requirements of fib Technical Report Bulletin 75 titled, Polymer-Duct Systems for Internal Bonded Post-Tensioning, Performance Level 2 (PL2), with modifications as shown in Table 960-6.

Table 960-6 Required Component and System Tests					
Reference to fib Bulletin 75			Required Tests for each PT System Type <sup>(1)</sup>		
Procedures	Appendix	Test Description	Internal PT System with Grout	Internal PT System with Flexible Filler	External PT System with Flexible Filler
Component Assessment	A.1	Dimensional requirement	Yes	No	No
	A.2	Stiffness of duct	Yes <sup>(2)</sup>	No	No
	A.3	Longitudinal load resistance	Yes	Yes	Yes
	A.4	Lateral load resistance	Yes	No	No
	A.5	Flexibility of duct system	Yes	Yes	No
	A.6	Leak tightness of duct system	Yes	Yes	No
	A.7	Concrete pressure on duct	Yes <sup>(3)</sup>	No	No
	A.8	Wear resistance of duct	Yes	No	No
	A.9	Wear resistance of duct under sustained load	Yes	No	No
	A.10	Bond behavior of duct	Yes	No	No
	A.11	Precast segmental duct coupler system	Yes <sup>(4)</sup>	Yes <sup>(4)</sup>	No
	A.12	Fracture resistance of duct	No	No	No
System Assessment	B.1	Leak tightness of anchorage-duct assembly	Yes <sup>(5)</sup>	Yes <sup>(5)</sup>	Yes <sup>(5)</sup>
	B.2	EIT performance of duct system	No	No	No
	B.3	EIT performance of anchorage-duct assembly	No	No	No
	B.4	Full scale duct system assembly	Yes <sup>(5)(6)</sup>	Yes <sup>(5)(6)</sup>	Yes <sup>(5)(6)</sup>
	B.5	Leak tightness of assembled duct system	Yes <sup>(5)(6)</sup>	Yes <sup>(5)(6)</sup>	No
<p>(1) Yes = Test is required; No = Test is not required.  (2) Do not preload strand into duct prior to testing.  (3) Identify duct as meeting Performance Class I or II criteria.  (4) Use an epoxy compound meeting the requirements of Section 926, Type AB.  (5) Perform tests on the largest assembly and the smallest assembly for each family of PT systems. A family of PT systems is defined a group of PT strand/bar assemblies of various sizes using common anchorage devices and design.  (6) For each test, use a PT system assembly consisting of at least one of each component and connection type required to install a tendon from anchorage cap to anchorage cap. For bar tendon systems, use between 15 and 50 feet of duct with a straight profile.</p>					

**960-3.2.2 Filler Containment Assembly Pressure Test:** In addition to the other testing specified in this Section, test all filler containment assemblies, i.e., anchorages, anchorage caps, inlets, outlets, drains, ports, valves, plugs, etc., for all system sizes as follows:

1. Assemble the anchorage and anchorage cap with all required filler injection attachments.
2. Seal the opening in the anchorage where the duct/trumpet connects.

3. Condition the assembly by maintaining a pressure of 150 psi in the system for three hours.
4. After conditioning, lock off the air supply to the assembly.
5. After lock off, the assembly must sustain 150 psi internal pressure for five minutes with no more than 15 psi, or 10%, reduction in pressure.

This test may be combined with the External Duct Systems Pressure Test for external PT systems.

**960-3.2.3 External PT Systems Pressure Test:** In addition to the other testing specified in this Section, test all sizes of external PT systems as follows:

1. Prepare a system assembly consisting of at least one of each component and connection type required to install a tendon from anchorage cap to anchorage cap using between 15 and 50 feet of duct with a straight profile.
2. Condition the assembly by maintaining a pressure of 100 psi in the system for three hours.
3. After conditioning, lock off the air supply to the assembly.
4. After lock off, the assembly must sustain 100 psi internal pressure for five minutes with no more than 10 psi reduction in pressure.

**960-3.2.4 Vacuum Test for Internal and External PT Systems with Flexible Filler:** In addition to the other testing specified in this Section, test all sizes of internal PT systems with flexible filler and all external PT as follows:

1. Prepare a system assembly consisting of at least one of each component and connection type required to install a tendon from anchorage cap to anchorage cap using between 15 and 50 feet of duct Do not cast any component into concrete.
2. Condition the assembly by maintaining a 90% vacuum in it for 1 hour.
3. After conditioning, lock off the air supply to the assembly.
4. After lock off, the assembly must sustain a 90% vacuum for 5 minutes with no more than a 10% loss of vacuum.

**960-3.3 Standard Tendon Sizes:** Develop and test PT systems for the sizes and types shown in the Contract Documents. ~~both internal and external applications that can accommodate the following Department standard tendon sizes that are used for designing and detailing:~~

1. ~~Standard strand tendon sizes: 4, 7, 12, 15, 19, 27, and 31 strand tendons, each using 0.6 inch diameter strand. Systems using alternate anchorage sizes or 1/2 inch diameter strand that provide equivalent force to these standard sizes may be submitted for approval.~~
2. ~~Standard bar tendon diameters: 1, 1 1/4, 1 3/8, 1 3/4, 2 1/2 and 3 inch diameter bars.~~

**960-3.4 System Modifications:** Contact the Engineer ~~SDO~~ for direction before ~~attempting to change pre-approved PT system~~ changing any materials or components of a PT system that has been approved by then Engineer for use on the project. Repeat all appropriate material, component, and entire system tests if the manufacturer and/or model of any major component, as defined in 960-2, of a pre-approved PT system is modified or replaced, excluding local zone reinforcement. ~~Submit an updated application to the SDO containing test reports and revised system drawings for proposed modified systems.~~

**960-3.5 Component Samples:** Furnish all required material samples to laboratories for testing and to the Department as requested, at no cost to the Department.

**960-3.6 Calculations, Shop Drawings, Test Reports, and Certification:** Show fully detailed shop drawings of all component configurations, connections, anchorages, inlets, outlets,

drains, high point inspection port details, anchorage inspection details, permanent anchorage caps, application limits of the PT system, and installation procedures of components ~~for approval and posting on the SDO's website for Approved Post-Tensioning Systems.~~ On the first page of each PT system shop drawing set, provide a list of all system components in tabular format that includes the following information, at a minimum: part/item number, description, material, manufacturer and model. The manufacturer need not be identified for common off-the-shelf accessories as defined in 960-2. Submit details of typical local zone reinforcement in the PT system shop drawings signed and sealed by a Specialty Engineer. Indicate that all major PT system components, as defined in 960-2, are stamped with the following:

1. Manufacturer's name
2. Trademark model number
3. Size corresponding to catalog description on PT system drawings.

For each PT system, submit an application package cover letter a package that includes calculations, shop drawings, test reports, proof of current laboratory accreditations, and all material and component certifications required throughout this Section. Proof of current laboratory accreditation must specifically indicate applicable accreditation categories related to PT systems.

Include a cover letter with the package signed by an officer of the PT system supplier (vendor) certifying that:

1. The submitted PT system, as a whole and all of its individual components, meet or exceed all material and component/system requirements of this Section, as demonstrated by the submittal.

2. All testing required by this Section was performed by a certified independent laboratory (or laboratories), as defined in 960-3.1, and that all tests were performed to applicable ASTM and fib Specifications. Submit proof of current laboratory accreditation specifically indicating applicable accreditation categories related to PT systems. Submit all material and component certifications required throughout this Section.

3. The PT system meets the requirements of Section 462.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 6, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **965**  
Proposed Specification: **9650000 General Provisions for Aluminum Items (Including Welding)**.

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Tim McCullough from the State Materials Office to update the language that will meet project needs and provide the ability for a quick review of project requirements.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**GENERAL PROVISIONS FOR ALUMINUM ITEMS  
(INCLUDING WELDING)  
(REV 11-10-21)**

SECTION 965 is deleted and the following substituted:

**965-1 General.**

This Section covers the material and fabrication requirements for aluminum components. All aluminum light poles, J-arms, and railings supplied under this Specification shall be from producers currently on the Department's Production Facility Listing. Producers seeking inclusion on the Department's Production Facility Listing must meet the requirements of Section 105.

**965-2 Fabrication.**

Provide fabricated components in accordance with AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, the Design Plans, and this section. Verify the strength of each Lot by tensile test. Alternate testing will not be accepted. ~~Provide certifications as specified in 965-4, upon request.~~ Protect against damage and marring during transit and delivery.

<u>Table 965-1</u>			
<u>Material Requirements for Aluminum Components</u>			
<u>Product</u>	<u>Test Method</u>	<u>Alloy/Temper</u>	<u>Reported Properties</u>
<u>Pole, Arm, Extrusions</u>	<u>ASTM B221</u>	<u>6061-T6</u>	<u>Alloy, Temper, Thickness, Tensile Strength</u>
		<u>6063-T6</u>	
<u>Pedestal, Posts</u>	<u>ASTM B429</u>	<u>6061-T6</u>	
<u>Bars, Plates, Stiffeners, Backing Ring, Shims, Shapes</u>	<u>ASTM B221</u>	<u>6063-T6</u>	
	<u>ASTM B209</u>	<u>6061-T6</u>	
<u>Railing</u>	<u>ASTM B221</u>	<u>6351-T5</u>	
	<u>ASTM B241</u>	<u>6061-T6</u>	
	<u>ASTM B210</u>		
	<u>ASTM B429</u>		
<u>J-Arm Tube</u>	<u>ASTM B429</u>	<u>6061-T6</u>	
	<u>ASTM B221</u>		
<u>J-Arm Connection Plate</u>	<u>ASTM B209</u>	<u>6061-T6</u>	
<u>Sheet</u>	<u>ASTM B209</u>	<u>6061-T6</u>	
		<u>5154-H38</u>	
		<u>5052-H38</u>	
<u>Structural Shapes</u>	<u>ASTM B308</u>	<u>6061-T6</u>	
<u>Single Column Ground Sign Sand Castings</u>	<u>ASTM B26</u>	<u>A356-T6</u>	
	<u>ASTM B108</u>		

**965-2.1 Light Poles:** Provide aluminum lighting poles in accordance with this section and Table 965-1. Weld arms and poles in the T4 condition, using the filler metal ER4043, ER4047, ER5183, ER5356, or ER5556 in accordance with AWS D1.2 Aluminum Structural welding Code. Weld to castings in accordance with 965-2.3. Heat treat the arm and pole, until aged to the T6 condition. Transverse welds are only allowed at the base. Equip poles with a vibration damper, when specified in the contract documents.

Provide exterior surface with a clean, uniform silvery appearance, free of dark streaks and discoloration. Finish the pole and arm with a satin rubbed finish.

**965-2.2 Overhead Sign Components:** Provide aluminum toll gantry J-arms in accordance with this section and Table 965-1. Weld tube to plate connections in the T4 or T6 condition, using the filler metal ER4043, ER4047, ER5183, ER5356, or ER5556 in accordance with AWS D1.2 Aluminum Structural welding Code. Heat treat tube and plate in the T4 condition until aged to the T6 condition.

Provide exterior surface with a clean, uniform silvery appearance, free of dark streaks and discoloration.

**965-2.3 Castings:** Provide aluminum castings in accordance with this section and Table 965-1. Weld aluminum castings to itself or aluminum tube to castings using the filler metal ER4043, in accordance with AWS D1.2 Aluminum Structural welding Code. Heat treat the castings, until aged to the T6 condition.

**965-2.4 Railing:** Provide aluminum railing in accordance with this section and Table 965-1. Weld aluminum railing using the filler metal ER4043, ER4047, ER5183, ER5356, or ER5556 in accordance with AWS D1.2 Aluminum Structural welding Code.

**965-2.5 Static Sign Assemblies:** Provide aluminum sheet, plate and structural shapes in accordance with this section and Table 965-1. Weld structural profiles to itself or aluminum components using ER4043, ER4047, ER5183, ER5356 or ER5556 in accordance with AWS D1.2 Aluminum Structural Welding Code. Heat treat the structural profiles, until aged to the T6 condition.

**965-2.6 Transformer Bases (Excluding Lighting):**

**965-2.6.1 Product Acceptance:** Manufacturers seeking evaluation of products for inclusion on the APL shall submit an application in accordance with Section 6 and include the following documentation, showing that the product meets the applicable requirements.

<u>Table 965-2</u> <u>Submittal Compliance Requirements</u>	
<u>Documentation</u>	<u>Requirements</u>
<u>Certified Test Report</u>	<u>Shows that product meets Moment Capacity</u>
<u>Installation Instructions</u>	<u>Include installation instructions</u>
<u>Product Identification Photo</u>	<u>Display's the manufacturer's name or logo and the model number.</u>
<u>Product Photo</u>	<u>Displays the significant features of the product as required in this section.</u>
<u>Technical Data Sheet or Product Drawing</u>	<u>Uniquely identifies the product and includes product details, notes, material specifications, dimensions, and sizes meeting the specification</u>



965-2.6.2 Physical Requirements: Meet the requirements of Table 965-3

Table 965-1 Material Requirements for Aluminum Components				
Product	ASTM	Alloy/Temper	Reportable Properties	Supplementary Requirements
Pole, Arm, Extrusions	B221	6061-T6	Alloy, Temper, Thickness	Report Tensile Strength
		6063-T6		
Bars, Plates, Stiffeners, Backing Ring, Shims, Shapes	B221	6063-T6		
	B209	6061-T6		
Castings	B26	356-T6		
	B108			
Railing	B221	6351-T5		
	B241	6061-T6		
	B210			
	B429			
J-Arm Tube	B429	6061-T6		
	B221			
J-Arm Connection Plate	B209	6061-T6		
Sheet	B209	6061-T6		
		5154-H38		
		5052-H38		
Structural Shapes	B308	6061-T6		

Table 965-3 Physical Requirements for Transformer Base		
Feature	Requirement	Documentation
<u>Height</u>	<u>Base is 12 to 18 inches in height</u>	<u>Technical Data Sheet or Product Drawing</u>
<u>Base Material</u>	<u>ASTM B26, 356 T6 or 319</u>	<u>Technical Data Sheet or Product Drawing</u>
<u>Threaded Hub</u>	<u>Hub located at the top for mounting a nominal 4-inch Schedule 40 (4-1/2-inch outside diameter) aluminum pole. The threaded hub must be tapped to allow full pole engagement.</u>	<u>Technical Data Sheet or Product Drawing</u>
<u>Fastening</u>	<u>Provides for fastening to a foundation with four 3/4-inch anchor bolts located 90 degrees apart. The base design must allow for bolts that are placed off-center.</u>	<u>Technical Data Sheet or Product Drawing</u>

<u>Door Size</u>	<u>Provides a door opening of not less than 8 inches by 8 inches.</u>	<u>Technical Data Sheet or Product Drawing</u>
<u>Door Material</u>	<u>The door must be constructed of fiberglass or other non-combustible, non-aluminum material.</u>	<u>Technical Data Sheet or Product Drawing</u>
<u>Door Attachment</u>	<u>Attach the door to the base with cleats and one stainless steel socket button head screw or by other means suitable for NEMA 3 electrical enclosures.</u>	<u>Technical Data Sheet or Product Drawing</u>
<u>Moment Capacity</u>	<u>Supports an ultimate moment capacity of 10,000 foot-pounds, without breaking, cracking or rupturing in any manner.</u>	<u>Certified Test Report</u>
<u>Breakaway</u>	<u>Meets the requirements in the AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.</u>	<u>FHWA Eligibility Letter.</u>

### 965-3 Paint for Poles, Pedestals, and Posts.

Paint systems used on aluminum poles, pedestals, and posts shall meet the color requirements as specified in the Contract Documents. All paint systems shall possess physical properties and handling characteristics that are compatible with the application requirements of Section 646. Materials shall be specifically intended for use over aluminum. Paint systems shall exhibit no loss of adhesion or total color difference ( $\Delta E^*_{ab}$ ) greater than 8.0 units for five years after final acceptance as specified in 5-11. An aluminum pole, pedestal, post, or sign panel that exhibits a cumulative surface area of delamination in excess of 50 square inches will constitute an adhesion failure. Delamination shall be defined as any area of exposed metal surface subsequent to hand tool cleaning. A  $\Delta E^*_{ab}$  value exceeding 8.0 units per the International Commission on Illumination L\*a\*b\* 1976 (CIELAB) space and color difference formula, measured in accordance with ASTM D2244, will constitute a color retention failure.

The Department will measure and enter in the Department's database the CIELAB color chromaticity coordinates for the color of the top coat of sample coupons provided as required by 646-2.7 using a BYK-Gardner Handicolor colorimeter using D65 illuminant and 2-degree geometry settings. The Department-measured CIELAB chromaticity coordinates shall define the initial color and will be used for resolution of color retention failures and the resolution of color retention disputes.

### 965-4 Certification.

Produce a certificate of compliance for ~~all aluminum castings~~ non-APL products, upon request of the Engineer. ~~Produce other certificates of compliance at the request of the Engineer.~~ Certificates of compliance shall identify the reportable properties of Table 965-1 ~~that the material has been sampled and tested in accordance with the applicable ASTM and shall include the reportable properties and supplementary requirements of the applicable Sections listed above.~~



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 24, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **971**  
Proposed Specification: **9710000 Pavement Marking Materials. \***

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Karen Byram to change preform materials, revise retroreflectivity value, change skid testing, and remove skid resistance from Permanent Tape.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

\*This revision is associated with proposed Standard Specification revisions 7100403, 7110000, and 7130403.

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**PAVEMENT MARKING MATERIALS.****(REV ~~12-213-212~~)**

SECTION 971 is deleted and the following substituted:

**SECTION 971  
PAVEMENT MARKING MATERIALS****971-1 General Requirements.**

**971-1.1 Packaging and Labeling:** The name and address of the manufacturer shall be shown on the label. The label must also show the color, date of manufacturer, lot number and APL number. The label shall warn the user of any special handling or precautions of the material, as recommended by the manufacturer. Any packaging and labeling not so marked will not be accepted.

**971-1.2 Storage:** All materials must have a container storage life of one year from date of manufacture. Any pavement marking materials, which although inspected and approved at the point of manufacture, hardens or livers in the containers will be rejected even though it conforms to these Specifications in all other respects.

**971-1.3 Mixing:** All paints shall be delivered to the project completely mixed, and ready to be used without additional oil or thinner. Thinners shall not be used under any circumstances.

**971-1.4 Approved Product List (APL):** All pavement marking materials shall be one of the products listed on the Department's Approved Product List (APL). Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6 and the infrared identification curve (2.5 to 15  $\mu\text{m}$ ) for the vehicle component. The Department will test hot-applied standard thermoplastic and profiled thermoplastic pavement marking materials in accordance with FM 5-541, Part-B. The Department will test preformed thermoplastic and hot-applied high friction thermoplastic pavement marking materials in accordance with FM 5-622, Part A. For standard paint, durable paint, ~~preformed thermoplastic~~, two reactive component material, ~~high friction thermoplastic~~, and permanent tape, manufacturers shall provide National Transportation Product Evaluation Program (NTPEP) field test data meeting FDOT Specification requirements. A notation of the number of coats and the thickness of each coat at which the product passes testing may be placed on the APL. When listed, this will be the minimum criteria for application of the pavement marking material.

**971-1.5 Samples:** Field samples will be obtained in accordance with the Department's Sampling, Testing and Reporting Guide Schedule.

**971-1.6 Color:** Materials other than ~~white and~~ yellow shall meet the color requirements as identified in 23-CFR-665 Table 5 Appendix to Part 655, Subpart F. ~~White colored materials will only be required to meet the initial daytime chromaticity requirements.~~

Yellow materials for pavement markings shall meet the following performance requirements. The initial daytime chromaticity for yellow materials shall fall within the box created by the following coordinates:

Table 971-1				
Initial Daytime Chromaticity Coordinates (Corner Points)				
	1	2	3	4
x	0.530	0.510	0.455	0.472

y	0.456	0.485	0.444	0.400
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The nighttime chromaticity for yellow materials shall fall within the box created by the following coordinates:

Table 971-2				
Nighttime Chromaticity Coordinates (Corner Points)				
	1	2	3	4
x	0.575	0.508	0.473	0.510
y	0.425	0.415	0.453	0.490

**971-1.7 Additional Requirements:** Pavement marking materials shall be characterized as non-hazardous as defined by Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Provide supporting independent analytical data or product material safety data sheets (SDS) identifying any components listed in Table 1 of 40 CFR 261.24.

Additionally, retroreflective elements shall contain no more ~~that~~than 200 ppm by weight of lead or arsenic when tested in accordance with the Environmental Protection Agency (EPA) Testing Methods 3052, 6010B, and 6010C.

## 971-2 Glass Spheres.

**971-2.1 General Requirements:** Glass spheres shall be of a composition designed to be highly resistant to traffic wear and to the effects of weathering for the production of a retroreflective surface, without altering day visibility of the marking. The general requirements of 971-1 apply to glass spheres.

**971-2.2 Specific Properties:** The large (Type 3 or larger) glass spheres used for drop on beads shall have an adhesion coating. Type 1 glass spheres used for drop on beads shall have a dual coating. Beads used in the intermix of materials are not required to be coated.

The following physical requirements apply:

Table 971-3		
Property	Test Method	Specification
Roundness*	AASHTO- <u>R-98</u>	Min: 70% by weight
Roundness**	AASHTO- <u>R-98</u>	Min: 80% by weight
Refractive Index*	Becke Line Method (25+/-5C)	1.5 minimum
Refractive Index**	Becke Line Method (25+/-5C)	1.9 minimum

\*Type 1, 3, 4 and 5 beads

\*\*High Index beads

Table 971-4					
Sieve Size	Percent by Mass Passing Designated Sieve (AASHTO R 98)				
	Grading Designation				
	Type 1* (AASHTO)	Type 3*-(FP 96)	Type 4*-(FP 96)	Type 5*-(FP 96)	High Index**
No. 8				100	
No. 10			100	95 - 100	
No. 12		100	95 - 100	80 - 95	
No. 14		95 - 100	80 - 95	10 - 40	
No. 16	100	80 - 95	10 - 40	0 - 5	100
No. 18		10 - 40	0 - 5	0 - 2	
No. 20	95 - 100	0 - 5	0 - 2		95 - 100
No. 25		0 - 2			
No. 30	75 - 95				55 - <del>8</del> 75
No. 40					15 - <del>4</del> 35
No. 50	15 - 35				0 - 5
No. 80					
No. 100	0 - 5				
*AASHTO M247					
** Federal Specification TT-B-1325D17					

**971-2.3 Sampling:** A random 50-pound sample of glass spheres shall be obtained for each 50,000 pounds shipped. Send each 50-pound sample to the State Materials Office.

**971-2.4 Containers:** The spheres shall be furnished in new 50-pound moisture-proof bags or 2,000-pound triwall boxes. All containers shall meet Interstate Commerce Commission requirements for strength and type.

### 971-3 Standard Paint.

**971-3.1 General:** Standard paints shall include water reducible products that are single packaged and ready mixed. The paint shall have the capability of being cleaned and flushed from the pavement marking machines using regular tap water and any required rust inhibitors. The manufacturer shall have the option of formulating the paint according to his own specifications. However, the requirements delineated in this Specification and Section 710 shall apply regardless of the type of formulation used. The paint shall be free from all skins, dirt, and foreign objects.

#### 971-3.2 Composition:

Component	Test Method	Criteria
Total Solids, by weight	ASTM- <u>D2369</u>	minimum 75%
Pigments, by weight	ASTM- <u>D3723</u>	minimum 57%
Vehicle Solids % of Vehicle*		minimum 40%
TiO <sub>2</sub> , Type II Rutile (white paint only)	ASTM- <u>D476</u>	minimum 1.0 lb/gal
Volatile Organic Content, (VOC)	ASTM- <u>D3960</u>	maximum 150 g/L

\*Vehicle Solids % of Vehicle =  $(\% \text{ total solids} - \% \text{ pigment}) / (100 - \% \text{ pigment})$

**971-3.3 Physical Requirements:** Test laboratory samples in accordance with ASTM E811 and E1349 and also meet the following criteria:

Property	Test Method	Minimum	Maximum
Density	ASTM- <u>D1475</u>	13.5 ± 1.4 lb/gal	-
Viscosity at 77°F	ASTM- <u>D562</u>	80 KU	100 KU
Fineness of Grind	ASTM- <u>D1210</u>	3(HS)	
Dry Opacity at 5-mils WFT	ASTM- <u>D2805</u>	0.92	-
Bleed Ratio	ASTM- <u>D868</u>	0.95	-
Flexibility	ASTM- <u>D522</u> Method B	Pass	-
Abrasion Resistance	ASTM- <u>D4060</u>	Pass	-

**971-3.3.1 Set To Bear Traffic Time:** The paint shall set to bear traffic in not more than two minutes.

**971-3.3.2 Abrasion Resistance:** Test four samples using a Taber Abrader. The paint shall be applied to specimen plates using a drawdown blade having a clearance of 20 mils. Clean with a soft brush and weigh each sample. Abrade samples for 1,000 cycles with a combined load of 500 g (arm plus auxiliary weight) on each arm and CS-10 wheels. Clean the samples with a soft brush and weigh again. The average weight loss for the four plates shall not exceed 75 mg per plate.

**971-3.3.3 Retroreflectivity:** The white and yellow pavement markings shall attain an initial retroreflectance of not less than 300 mcd/lx·m<sup>2</sup> and 250 mcd/lx·m<sup>2</sup>, respectively. Black pavement markings shall have a retroreflectance of less than 20 mcd/lx·m<sup>2</sup>. The retroreflectance of the white and yellow pavement markings at the end of the six-month period shall not be less than 150 mcd/lx·m<sup>2</sup>.

**971-3.4 Application Properties:** Meet the requirements of Section-710 for application properties.

**971-3.5 Packaging and Labeling:** The paint shall be placed in 55 gallon open-end steel drums with a re-usable multi-seal sponge gasket or 275 gallon Intermediate Bulk Container (IBC). No more than 50 gallons of paint shall be placed in any drum or 250 gallons in any IBC to allow for expansion during transport and storage. Clearly mark the containers with the weight in pounds per gallon, the volume of materials in units of gallons.

**971-4 Durable Paint.**

**971-4.1 General:** Durable paints shall include water reducible products that are single packaged and ready mixed. The paint shall have the capability of being cleaned and flushed from the pavement marking machines using regular tap water and any required rust inhibitors. The manufacturer shall have the option of formulating the material according to his own specifications. However, the requirements delineated in this Specification and Section 710 shall apply regardless of the type of formulation used. The paint shall be free from all skins, dirt and foreign objects. The manufacturer shall provide the recommended thickness prior to installation.



**971-4.2 Composition:**

Component	Test Method	Criteria
Total Solids, by weight	ASTM- D2369	75% minimum
Pigments, by weight	ASTM- D3723	57% minimum
Vehicle Solids, % on Vehicle*	-	40% minimum
TiO <sub>2</sub> , Type II Rutile (white paint only)	ASTM- D476	1.0 lb/gal minimum
Volatile Organic Content, (VOC)	ASTM- D3960	150 g/L maximum

\*Vehicle Solids % of Vehicle =  $\frac{(\% \text{ total solids} - \% \text{ pigment})}{(100 - \% \text{ pigment})}$

Vehicle solids shall be 100% acrylic emulsion polymer.

**971-4.3 Physical Requirements:** Test laboratory samples in accordance with ASTM E811 and E1349. Samples shall meet the following criteria:

Property	Test Method	Minimum	Maximum
Density	ASTM- D1475	13.5 ± 1.4 lb/gal	N/A
Viscosity at 77°F	ASTM- D562	80 KU	100 KU
Fineness of Grind	ASTM- D1210	3(HS)	-
Dry Opacity at 5 mils WFT	ASTM- D2805	0.92	-
Bleed Ratio	ASTM- D868	0.95	-
Flexibility	ASTM- D522 Method B	Pass	-
Abrasion Resistance	ASTM- D4060	Pass	-

**971-4.3.1 Set To Bear Traffic Time:** The paint shall set to bear traffic in not more than ten minutes.

**971-4.3.2 Abrasion Resistance:** Test four samples using a Taber Abrader. The paint shall be applied to specimen plates using a drawdown blade having a clearance of 20 mils. Air dry each sample until fully cured based on the manufacturer's product recommendation. Clean with a soft brush and weigh each sample. Abrade samples for 1,000 cycles with a combined load of 500 g (arm plus auxiliary weight) on each arm and CS-10 wheels. Clean the samples with a soft brush and weigh again. The average weight loss for the four plates shall not exceed 75 mg per plate.

**971-4.3.3 Retroreflectivity:** The white and yellow pavement markings shall attain an initial retroreflectance of not less than 450 mcd/lx·m<sup>2</sup> and 300 mcd/lx·m<sup>2</sup>, respectively. The retroreflectance of the white and yellow pavement markings at the end of the 18 month period shall not be less than 150 mcd/lx·m<sup>2</sup>.

**971-4.4 Application Properties:** Application properties shall meet the requirements of Section 710.

**971-4.5 Packaging and Labeling:** The paint shall be placed in 55 gallon open-end steel drums with a re-usable multi-seal sponge gasket or 275-gallon Intermediate Bulk Container

(IBC). No more than 50 gallons of paint shall be placed in any drum or 250-gallons in any IBC to allow for expansion during transport and storage. Clearly mark the containers with the weight in pounds per gallon, the volume of materials in units of gallons.

**971-5 Hot-Applied Standard Thermoplastic Material.**

**971-5.1 General:** The manufacturer shall utilize alkyd based materials only and shall have the option of formulating the material according to his own specifications. However, the requirements delineated in this Specification and Section 711 shall apply regardless of the type of formulation used. The pigment, glass spheres, and filler shall be well dispersed in the resin.

**971-5.2 Composition:**

Table 971-9			
Component	Test Method	White	Yellow
Binder	ASTM- <u>D4797</u>	20% minimum	20% minimum
TiO <sub>2</sub> , Type II Rutile	ASTM- <u>D476</u>	10% minimum	-
Glass Spheres	ASTM- <u>D4797</u>	40% minimum	40% minimum
Yellow Pigment		-	% minimum per manufacturer
Calcium Carbonate and Inert Filler (-200 mesh sieve)		30% maximum	37% maximum

Percentages are by weight.

The alkyd/maleic binder must consist of a mixture of synthetic resins (at least one synthetic resin must be solid at room temperature) and high boiling point plasticizers. At least one-half of the binder composition must be 100% maleic-modified glycerol of rosin and be no less than 15% by weight of the entire material formulation.

**971-5.3 Glass Spheres:** The glass spheres in the intermix shall consist of 50% Type 1 and 50% Type 3 and meeting the requirements of this Section.

**971-5.4 Sharp Silica Sand:** Sharp silica sand ~~used for bicycle markings and pedestrian crosswalk lines~~ shall meet the following gradation requirements:

Table 971-10	
Sieve Size	Percent by Mass Passing Designated Sieve (ASTM- <u>D1214</u> )
20	100
50	0 to 10

**971-5.5 Physical Requirements:** Laboratory samples shall be tested in accordance with ASTM D4960 and shall meet the following criteria:

Property	Test Method	Minimum	Maximum
Water Absorption	ASTM D570	-	0.5%
Softening Point	ASTM D36	195°F	-
Low Temperature Stress Resistance	AASHTO T 250	Pass	-
Specific Gravity	Water displacement	1.9	2.3
Indentation Resistance	ASTM D7735* Type A Durometer	40	75
Impact Resistance	ASTM D256, Method A	1.0 N·m	-
Flash Point	ASTM D92	475°F	-

\* The durometer and panel shall be at 115°F with a 1,000 g load applied. Instrument measurement shall be taken after 15 seconds.

**971-5.5.1 Set To Bear Traffic Time:** The thermoplastic shall set to bear traffic in not more than two minutes.

**971-5.5.2 Retroreflectivity:** The white and yellow pavement markings shall attain an initial retroreflectance of not less than 450 mcd/lx·m<sup>2</sup> and not less than 350 mcd/lx·m<sup>2</sup>, respectively. The retroreflectance of the white and yellow pavement markings at the end of the three-year APL testing period shall not be less than 250 mcd/lx·m<sup>2</sup>.

**971-5.6 Application Properties:** Application properties shall meet the requirements of Section 711.

**971-5.7 Packing and Labeling:** The thermoplastic material shall be packaged in suitable biodegradable or thermo-degradable containers which will not adhere to the product during shipment and storage. The container of thermoplastic material shall weigh approximately 50 pounds. The label shall also warn the user that the material shall be heated in the range as recommended by the manufacturer.

## 971-6 Preformed Thermoplastic Material.

**971-6.1 General:** The manufacturer shall have the option of formulating the material according to his own specifications. However, the requirements delineated in this Specification and Section 711 shall apply regardless of the type of formulation used. The pigment, friction elements, glass spheres, and filler shall be well dispersed in the resin.

**971-6.2 Composition:** The preformed thermoplastic shall consist of high quality materials, pigments, friction elements, and glass spheres or other retroreflective material uniformly distributed throughout their cross-sectional area, with a retroreflective layer of spheres or other retroreflective material embedded in the top surface.

~~971-6.3 Glass Spheres: Material shall contain no less than 30% glass spheres by weight.~~

**971-6.43 Color:** Materials shall meet the performance requirements specified in 971-1.6 and the following additional requirements. The initial luminance factor, Cap Y, shall not be less than 55.

**971-6.54 Physical Requirements:** Laboratory samples shall be tested in accordance with ASTM D4960 and shall meet the following criteria:

Property	Test Method	Minimum	Maximum
Softening Point	ASTM D36	195°F	-
Low Temperature Stress Resistance	AASHTO T 250	Pass	-
Indentation Resistance	ASTM D7735* Type A Durometer	40	75
Impact Resistance	ASTM D256, Method A**	1.0 N·m	-

\*The durometer and panel shall be at 115°F with a 1,000 g load applied. Instrument measurement shall be taken after 15 seconds.  
\*\*The test specimen for ASTM D256 shall be 1 in. x 1 in. x 6 in. and shall not be notched.

**971-6.54.1 Retroreflectivity:** The white pavement markings ~~other than crosswalks and bicycle markings~~ shall attain an initial retroreflectance of not less than ~~300~~200 mcd/lx·m<sup>2</sup>. ~~Crosswalks and bicycle markings shall attain initial retroreflectivity of not less than 275 mcd/lx·m<sup>2</sup>.~~ Black pavement markings shall have a retroreflectance of less than ~~520~~ mcd/lx·m<sup>2</sup>. The retroreflectance of the white pavement markings at the end of the three-year period shall not be less than 150 mcd/lx·m<sup>2</sup>.

**971-6.54.2 Friction Skid Resistance:** ~~The surface of the~~ Initial performance of pavement markings shall provide a minimum skid resistance value of 35 BPN (British Pendulum Number) when tested according to ASTM E303. Bicycle markings and pedestrian crosswalks shall provide a minimum skid resistance value of 55 BPN. shall provide a minimum Dynamic Friction Tester (DFT40) value of 45 or greater in accordance with FM 5-622 – Part A. In-service pavement markings shall maintain a DFT40 value of 40 or greater for a three-year period as tested per FM 5-622 – Part B.

**971-6.65 Application Properties:** Application properties shall meet the requirements of Section 711.

**971-6.76 Packing and Labeling:** The thermoplastic material shall be packaged in suitable biodegradable or thermo-degradable containers which will not adhere to the product during shipment and storage. Clearly mark each container with the thickness of the preformed material in units of inches.

## 971-7 Permanent Tape Materials.

**971-7.1 General:** The materials for permanent tape pavement markings shall consist of white or yellow weather-resistant retroreflective film as specified herein. The pigment, glass spheres, and filler shall be well dispersed in the resin. However, the requirements delineated in this Specification and Section 713 shall apply.

**971-7.2 Composition:** Permanent tape pavement markings shall consist of high-quality plastic materials, pigments, and glass spheres uniformly distributed throughout their cross-sectional area, with a retroreflective layer of spheres embedded in the top surface.

~~971-7.3 Skid Resistance: The surface of the pavement markings shall provide a minimum skid resistance value of 35 BPN when tested according to ASTM E303. Bicycle markings and pedestrian crosswalks shall provide a minimum skid resistance value of 55 BPN.~~

**971-7.43 Thickness:** The APL will list the specified thickness of each approved product.

**971-7.54 Durability and Wear Resistance:** The film shall be weather resistant and, through normal wear, shall show no significant tearing, rollback or other signs of poor adhesion.

**971-7.65 Conformability and Resealing:** The pavement markings shall be capable of conforming to pavement contours, breaks and faults under traffic at pavement temperatures

recommended by the manufacturer. The film shall be capable of use for patching worn areas of the same types of film in accordance with the manufacturer's recommendations.

**971-7.76 Tensile Strength:** The pavement markings shall have a minimum tensile strength of 40 psi when tested according to ASTM D638. A rectangular test specimen 6 inches by 1 inch by 0.05 inches minimum thickness shall be tested at a temperature range of 40 to 80°F using a jaw speed of 0.25 inch/min.

**971-7.87 Pigmentation:** The pigment shall be selected and blended to provide a material which is white or yellow conforming to standard highway colors through the expected life of the pavement markings. Test laboratory samples in accordance with ASTM E811 and E1349.

**971-7.98 Glass Spheres:** The pavement markings shall have glass retention qualities such that, when at room temperature a 2 inches by 6 inches specimen is bent over a 0.5 inch diameter mandrel axis, a microscopic examination of the area on the mandrel shall show no more than 10% of the spheres with entrapment by the material of less than 40%. The bead adhesion shall be such that spheres are not easily removed when the film surface is scratched firmly with a thumbnail.

**971-7.109 Retroreflectivity:** The materials shall attain an initial retroreflectance of not less than 450 mcd/lx·m<sup>2</sup> for white markings and not less than 350 mcd/lx·m<sup>2</sup> for yellow markings. The pavement markings shall retain a minimum retroreflectance for two years of not less than 300 mcd/lx·m<sup>2</sup> for white markings and not less than 250 mcd/lx·m<sup>2</sup> for yellow markings. The retroreflectance of the white, yellow and contrast pavement markings at the end of the five-year APL testing period shall not be less than 150 mcd/lx·m<sup>2</sup>.

**971-7.110 Packaging and Labeling:** Ship all permanent tape materials in containers which will not adhere to the product during shipment and storage. Clearly mark each container with the thickness of the preformed material in units of inches.

## 971-8 Two Reactive Component Material.

**971-8.1 General:** Two reactive component materials intended for use under this Specification shall include, but not be limited to, epoxies, polyesters and urethanes. The manufacturer shall have the option of formulating the material according to his own specifications. However, the criteria outlined in this Specification and Section 709 shall apply regardless of the type of formulation used. The material shall be free from all skins, dirt and foreign objects.

### 971-8.2 Composition:

Component	Test Method	Criteria
TiO <sub>2</sub> , Type II Rutile (white material only)	ASTM-D476	minimum 10% by weight
Volatile Organic Content, (VOC)	ASTM-D3960	maximum 150 g/L

**971-8.3 Physical Requirements:** Test laboratory samples in accordance with ASTM and also meet the following criteria:

Property	Test Method	Minimum	Maximum
Adhesion to Concrete	ASTM-D4541, ASTM-D7234 or ACI 503	Concrete Failure	-
Hardness	ASTM-D7735, Type D	75	-
Abrasion Resistance	ASTM-D4060	Pass	-

**971-8.3.1 Set To Bear Traffic Time:** The material shall set to bear traffic in not more than two minutes.

**971-8.3.2 Abrasion Resistance:** Test four samples using a Taber Abrader. The material shall be applied to specimen plates using a drawdown blade having a clearance of 15 mils. Clean with a soft brush and weigh each sample. Abrade samples for 1,000 cycles with a combined load of 500 g (arm plus auxiliary weight) on each arm and CS-10 wheels. Clean the samples with a soft brush and weigh again. The average weight loss for the four plates shall not exceed 60 mg per plate.

**971-8.3.3 Retroreflectivity:** The white and yellow pavement markings shall attain an initial retroreflectance of not less than 450 mcd/lx·m<sup>2</sup> and not less than 350 mcd/lx·m<sup>2</sup>, respectively. The retroreflectance of the white and yellow pavement markings at the end of the three-year period shall not be less than 150 mcd/lx·m<sup>2</sup>.

**971-8.4 Application Properties:** Application properties shall meet the requirements of Section 709.

**971-8.5 Packaging and Labeling:** The two reactive component material shall be placed in 55 gallon open-end steel drums with a re-usable multi-seal sponge gasket or 275-gallon Intermediate Bulk Container (IBC). No more than 50 gallons of material shall be placed in any drum or 250-gallons in any IBC to allow for expansion during transport and storage. Clearly mark the containers with the volume of materials in units of gallons and the product name.

### 971-9 Profiled Thermoplastic Material.

**971-9.1 General:** The manufacturer shall utilize alkyd based materials only and shall have the option of formulating the material according to his own specifications. However, the requirements delineated in this Specification shall apply regardless of the type of formulation used. The pigment, **retro**reflective elements, and filler shall be well dispersed in the resin.

#### 971-9.2 Composition:

Component	Test Method	White	Yellow
Binder	ASTM D4797	20% minimum	20% minimum
TiO <sub>2</sub> , Type II Rutile	ASTM D476	10% minimum	-
<b>Retro</b> reflective Elements	ASTM D4797	% minimum per manufacturer	% minimum per manufacturer
Yellow Pigment		-	% minimum per manufacturer
Calcium Carbonate and Inert Filler (-200 mesh sieve)		% minimum per manufacturer	% minimum per manufacturer

Note: Percentages are by weight.

The alkyd/maleic binder must consist of a mixture of synthetic resins (at least one synthetic resin must be solid at room temperature) and high boiling point plasticizers. At least one-half of the binder composition must be 100% maleic-modified glycerol of rosin and be no less than 15% by weight of the entire material formulation.

**971-9.3 Retroreflective Elements:** The retroreflective elements in the intermix shall be determined by the manufacturer and identified for the APL.

**971-9.4 Physical Requirements:** Laboratory samples shall be tested in accordance with ASTM D4960 and shall meet the following criteria:

Property	Test Method	Minimum	Maximum
Water Absorption	ASTM D570	-	0.5%
Softening Point	ASTM D36	210°F	-
Low Temperature Stress Resistance	AASHTO T 250	Pass	-
Specific Gravity	Water displacement	1.9	2.3
Indentation Resistance	ASTM D7735* Type A Durometer	65	-
Impact Resistance	ASTM D256, Method A	1.0 N·m	-
Flash Point	ASTM D92	475°F	-

\*The durometer and panel shall be at 80°F, with a 1,000 g load applied. Instrument measurement shall be taken after 15 seconds.

**971-9.4.1 Set ~~to~~ To Bear Traffic Time:** When applied at the temperatures and thickness specified by Section 701, the baseline material shall set to bear traffic in not more than two minutes. The bumps shall set to bear traffic in not more than 10 minutes at ambient air temperatures of 80°F or less and in not more than 15 minutes for ambient air temperatures exceeding 80°F.

**971-9.4.2 Retroreflectivity:** The white and yellow pavement markings shall attain an initial retroreflectance of not less than 300 mcd/lx·m<sup>2</sup> and not less than 250 mcd/lx·m<sup>2</sup>, respectively. The retroreflectance of the white and yellow pavement markings at the end of the three-year period shall not be less than 150 mcd/lx·m<sup>2</sup>.

**971-9.4.3 Durability:** Durability shall include flattening of the profile or raised portions of the line. The flattening of the profile or raised portion of the line shall not exceed 25% at the end of the three-year period.

**971-9.5 Application Properties:** Application properties shall meet the requirements of Section 701.

**971-9.6 Packing and Labeling:** The thermoplastic material shall be packaged in suitable biodegradable or thermo-degradable containers which will not adhere to the product during shipment and storage. The container of thermoplastic material shall weigh approximately 50 pounds. The label shall warn the user that the material shall be heated in the range as recommended by the manufacturer.

## 971-10 Hot-Applied High Friction Thermoplastic Material.

**971-10.1 General:** The manufacturer shall utilize alkyd based materials only and have the option of formulating the material according to his own specifications. However, the requirements of this Specification shall apply regardless of the formulation used. The pigment, retroreflective elements, and filler shall be well dispersed in the resin.

**971-10.2 Composition:**

Component	Test Method	White
Binder	ASTM D4797	18% minimum
TiO <sub>2</sub> , Type II Rutile	ASTM D476	10% minimum
<del>Reflective Elements</del>	<del>ASTM D4797</del>	<del>30% minimum per manufacturer</del>
<del>Skid Resistant Elements</del>		<del>10% minimum per manufacturer</del>

Note: Percentages are by weight.

The alkyd/maleic binder shall consist of a mixture of synthetic resins (at least one synthetic resin must be solid at room temperature) and high boiling point plasticizers. At least one-half of the binder composition must be 100% maleic-modified glycerol of rosin and be no less than 15% by weight of the entire material formulation.

**971-10.3 Retroreflective and Friction Elements:** The retroreflective and friction elements in the intermix shall be determined by the manufacturer and identified on the APL.

**971-10.4 Physical Requirements:** Laboratory samples shall be tested in accordance with ASTM D4960 and shall meet the following criteria:

Property	Test Method	Minimum	Maximum
Softening Point	ASTM D36	195°F	-
Hardness of <del>Skid Resistance</del> <u>Friction</u> Elements	Moh's Scale	9	-
Indentation Resistance	ASTM D7735* Type A Durometer	55	85
Impact Resistance	ASTM D256, Method A	1.0 N·m	-
Flash Point	ASTM D92	475°F	-

\*The durometer and panel shall be at 115°F, with a 1,000 g load applied. Instrument measurement shall be taken after 15 seconds.

**971-10.4.1 Set To Bear Traffic Time:** When applied at the temperatures and thicknesses specified by Section 711, the material shall set to bear traffic in not more than two minutes.

**971-10.4.2 Retroreflectivity:** The white pavement markings shall attain an initial retroreflectance of not less than ~~275~~200 mcd/lx·m<sup>2</sup>. The retroreflectance of the white pavement markings at the end of the three-year period shall not be less than 150 mcd/lx·m<sup>2</sup>.

**971-10.4.3 SkidFriction Resistance:** ~~The surface Initial performance~~ of the pavement markings ~~shall provide a minimum initial skid resistance value of 55 BPN when tested in accordance to ASTM E303,~~ shall provide a minimum Dynamic Friction Tester (DFT40) value of 45 or greater in accordance with FM 5-622 – Part A. In-service pavement markings shall maintain a DFT40 value of 40 or greater for a three-year period as tested per FM 5-622 – Part B.

**971-10.4.4 Color:** ~~The initial luminance factor, Cap Y, shall not be less than 55.~~

**971-10.5 Application Properties:** Application properties shall meet the requirements of Section 711.



**971-10.6 Packaging and Labeling:** The thermoplastic material shall be packaged in suitable biodegradable or thermo-degradable containers which will not adhere to the product during shipment and storage. The container of thermoplastic material shall weigh approximately 50 pounds. The label shall warn the user that the material is to be heated in the range as recommended by the manufacturer.



*Florida Department of Transportation*

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KEVIN J. THIBAUT, P.E.  
SECRETARY

January 27, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **974**  
Proposed Specification: **9740000 Surface Applications.** \*

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Karen Byram to modify the detectable warnings requirement for NTPEP to allow independent laboratory reports, add testing criteria for snowplow, remove Non-Vehicular references from Patterned Pavement, and change friction testing to DFT.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

\*Associated with proposed Standard Specification revision 5230000.

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**SURFACE APPLICATIONS.****(REV 11-297-212)**

SECTION 974 is deleted and the following substituted:

**SECTION 974  
SURFACE APPLICATIONS****974-1 Description.**

This section specifies the material requirements for detectable warnings and patterned pavement.

**974-2 Detectable Warnings.**

Provide detectable warnings in accordance with the Americans with Disabilities Act Standards for Transportation Facilities, Section 705. Provide detectable warnings consisting of materials intended for exterior use subject to routine pedestrian traffic and occasional vehicular traffic. Provide detectable warnings with size and pattern comprised of truncated domes aligned in parallel rows. Detectable warnings with a diagonal pattern are not permitted. Detectable warnings consisting of truncated domes fabricated in the field are not permitted.

**974-2.1 Approved Product List Submittal Requirements:** Manufacturers seeking evaluation of products for inclusion on the APL shall submit an application in accordance with Section 6 and include the documentation identified in the Table 974-1. Documentation and reports must demonstrate that the product meets the requirements of this Section, Section 527, and the Standard Plans, Index 522-002.

Table 974-1	
Documentation	Requirements
Product Photo	Displays the significant features of the product.
Technical Data Sheet	Uniquely identifies the product and includes product specifications, storage instructions, and recommended installation materials and equipment as applicable.
Product Label	For each component of the product system.
Safety Data Sheet (SDS)	SDS meeting OSHA requirements for product and manufacturer recommended installation materials as applicable. <u>Non-Hazardous, per RCRA Subtitle C Table 1 of 40 CFR 261.24 "Toxicity Characteristic" and not exude fumes which are hazardous, toxic, or detrimental to persons or property.</u>
National <del>Testing</del> <u>Transportation</u> Product Evaluation Program (NTPEP) Test Report <u>or Independent Laboratory Test Report</u>	Testing must be conducted using the <del>p</del> Project Work Plan for NTPEP Laboratory Testing of Detectable Warning Systems, using the cold exposure category <u>[i.e., 4 repetitions of the following exposure series: Abrasion (4 cycles) followed by freeze-thaw (15 cycles)]</u> .
Independent Laboratory	<del>Color/Contrast testing as identified in Table 974-2</del> <u>Test CAP Y</u>

Documentation	Requirements
Test Report	<u>in accordance with ASTM E1349.</u>
Installation Instructions	Surface preparation and installation procedures for different substrates. The minimum curing time prior to installing the product for surface-applied materials.
Product Sample	Submit upon request from the Department. If the product is a system, a sample of each component must be submitted.

**974-2.2 Performance Requirements:** Provide detectable warnings that meet the performance requirements of Table 974-2. Manufacturers shall provide before exposure testing and proof that the product has been submitted for exposure testing. All testing shall be complete by July 1, 2023.

Property	Documentation	Test Value	
Domes and Spacing Dimensional Testing <sup>1</sup>	Provide NTPEP Test Report <u>or Independent Laboratory Test Report</u>	Meets the requirements <del>with of</del> the Americans with Disabilities Act Standards for Transportation Facilities, Section 705.	
Slip Resistance <sup>1</sup>	Provide NTPEP Test Report <u>or Independent Laboratory Test Report</u>	Dry Coefficient of Friction – 0.8 min. Wet Coefficient of Friction – 0.65 min. (include recessed areas between truncated domes).	
Visual and Microscopic Evaluation <sup>1</sup>	Provide NTPEP Test Report <u>or Independent Laboratory Test Report</u>	No lifting, debonding, <del>cracking</del> , flaking, <del>and</del> missing <del>domes</del> , <del>or</del> partial domes, <u>or significant cracking</u> .	
<del>Color Measurement<sup>+</sup></del>	<del>Provide NTPEP Test Report</del>	<del>Uniform color, for each color.</del>	
<del>Resistance to Impact from Falling Tup<sup>+</sup></del>	<del>Provide NTPEP Test Report</del>	<del>No cracking, flaking, missing or partial domes, 20 ft-lb energy.</del>	
<del>Adhesive, Coating, and Single Dome Bond Strength on Uncured (<math>\leq</math> 72 hours) Concrete Panel [AASHTO T 388]; <del>uncured concrete panel<sup>3</sup></del></del>	<del>Independent Laboratory Test Report</del> <del>Provide NTPEP Test Report</del>	<u>For surface applied detectable warning systems installed on uncured concrete: 150 psi min. with an elapsed <u>concrete</u> panel cure time of less than 72 hours.</u>	
Color/Contrast <sup>1,2</sup> <u>[ASTM G155 / D4355]</u>	Independent Laboratory Test Report	<del>Meets the requirements of this Section</del>	
		Color	CAP Y
		Safety Yellow	25 – 45
		Brick Red	5 – 15
		Black	0 – 5

<sup>1</sup> Report values before and after exposure testing.

<sup>2</sup> 1,000 hours, UV exposure only.

**974-3 Patterned Pavement.**

Provide patterned pavement products that produce an adherent, weather resistant, skid friction resistant, and wear resistant surface that meets the requirements of this Section, and Section 523.

Material color and friction elements shall be integral and homogenous.

Patterned pavement installations requiring removal of pavement are not permitted.

**974-3.1 Approved Product List Submittal Requirements:** Manufacturers seeking evaluation of products for inclusion on the APL shall submit an application in accordance with Section 6 and include the documentation identified in Table 974-3. Documentation and reports must demonstrate that the product meets the requirements of this Section and Section 523.

Table 974-3	
Documentation	Requirements
Product Photo	Displays the significant features of the product.
Technical Data Sheet	Uniquely identifies the product and includes product specifications, storage instructions, and recommended installation materials and equipment as applicable. Include the following information as applicable: <ol style="list-style-type: none"> <li>1. Use on concrete surfaces.</li> <li>2. Use on asphalt surfaces.</li> <li><del>3. Use as "Vehicular".</del></li> <li><del>4. Use as "Non-vehicular".</del></li> <li><del>5</del>3. Patterns, textures, and templates.</li> <li><del>6</del>4. Resin, sealers, coatings, coloring, and friction materials.</li> <li><del>7</del>5. Friction material source <u>and rate of application.</u></li> </ol>
Product Label	For each component of the product system.
Safety Data Sheet (SDS)	SDS meeting OSHA requirements for each material used in the product system. <u>Non-Hazardous, per RCRA Subtitle C Table 1 of 40 CFR 261.24 "Toxicity Characteristic" and not exude fumes which are hazardous, toxic, or detrimental to persons or property.</u>
<del>Independent Laboratory Test Report</del>	<del>Skid Test and Integral Color testing as identified in Table 974-4.</del>
Installation Instructions	Surface preparation and installation procedures for different substrates.
Product Sample	Submit upon request from the Department. A sample of each component must be submitted.

~~974-3.2 Performance Requirements: Provide patterned pavement products that meet the performance requirements of Table 974-4.~~

Table 974-4		
Property	Documentation	Test Method and Value

Skid Test <sup>1</sup>	Independent Laboratory Report	ASTM E303 using the British Pendulum Tester, British Pendulum Number (BPN) of at least 40.
Integral Color <sup>1,2</sup>	Independent Laboratory Report	Visual inspection, Color is integral and uniform.
Non-Hazardous Classification <sup>1,2</sup>	Material Safety Data Sheet (SDS)	Non-Hazardous, per RCRA Subtitle C Table 1 of 40 CFR 261.24 "Toxicity Characteristic" and not exude fumes which are hazardous, toxic, or detrimental to persons or property.
Friction Resistance <sup>2</sup>	Product Sample Panel for FDOT Laboratory Test	FM 5-622—Part A, Initial Dynamic Friction Test (DFT40) value of 40 or greater.
<sup>1</sup> For Non-vehicular use. <sup>2</sup> For Vehicular use.		

**974-3.32 Performance Requirements for Products in Vehicular Traffic Areas:** ~~Manufacturers shall install the product on a site provided by the Department and test the installation using an independent testing facility in accordance with FM 5-592. Provide patterned pavement products that meet the performance requirements of Table 974-45.~~

**974-3.2.1 Department Testing:** Submit product samples and panels for Department analysis upon request from the Department and in accordance with this Specification. Products are subject to verification testing in accordance with this Section and infrared identification curve (2.5 to 15 μm) for the vehicle component.

**974-3.2.2 Friction Resistance:** In-service pavement markings shall maintain a DFT40 value of 40 or greater, or FN 40R value of 35 or greater for a three-year period as tested per FM 5-622-Part B.

Property	Documentation	Test Method and Value
Wear	Field Service Test Photos	Visual, Wearing shall not expose more than 15% of the underlying surface area as measured within the traveled way for 3 years.
<u>Initial Friction Resistance [FM 5-622 Part A]</u>	<u>Department Testing Reports</u>	<u>Dynamic Friction Tester (DFT40) ≥ 50</u>
Friction	Independent Testing Facility	<del>FM 5-592, Test using one of the following: a. Locked Wheel Friction Tester—minimum FN40R value of 35 or greater at all testing intervals for 3 years, or b. Dynamic Friction Tester—minimum DFT40 value of 40 or greater at all testing intervals for 3 years.</del>



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SECRETARY

January 10, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **985**  
Proposed Specification: **9850000 Geosynthetic Materials.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Melissa Hollis from the Product Evaluation Office to modify text to be consistent with the PATH/APL requirements. The proposed changes are also associated Section 400.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## GEOSYNTHETIC MATERIALS

(REV 10-26-21)

SECTION 985 is deleted and the following substituted:

### 985-1 Description.

Geosynthetic materials are used for nonstructural and structural applications and shall be either geotextiles (woven or non-woven) or geogrids (woven or extruded) that are used for drainage, erosion control, reinforcement, separation or stabilization.

### 985-2 ~~General Requirements~~ **Materials**.

**985-2.1 ~~Product Acceptance~~ **General Requirements**:** All geosynthetic materials shall be one of the products listed on the Department's Approved Product List (APL). Manufacturers seeking evaluation of products for inclusion on the APL shall submit an application in accordance with Section 6 and include the following documentation. A separate application must be submitted for each geotextile type to be evaluated, showing that the product meets the applicable requirements. ~~Unless restricted in the Plans or Specifications, the geosynthetic material shall be a woven, non woven or extruded material consisting of long chain polymeric filaments or yarns such as polypropylene, polyethylene, polyester, polyamides or polyvinylidene chloride formed into a stable network such that the filaments or yarns retain their relative position to each other. The base plastic shall contain stabilizers and/or inhibitors to make the filaments resistant to deterioration due to ultra violet light, heat exposure and potential chemically damaging environment. The edges of the material shall be selvaged or otherwise finished to prevent the outer yarn from pulling away from the material and shall be free of any treatment which may significantly alter its physical properties.~~

<u>Documentation</u>	<u>Requirements</u>
<u>Installation Instructions</u>	<u>Include surface preparations, installation, overlap or sewing instructions, and repair procedures.</u>
<u>NTPEP Audit Report, for Structural Geosynthetic Materials Only</u>	<u>manufacturer's facility included on NTPEP's list of compliant producers.</u>
<u>NTPEP Test Results</u>	<u>Product meets requirements of this Section</u>
<u>Product Label Photo</u>	<u>Displays the Product Name</u>
<u>Product Photo</u>	<u>Displays the significant features of the product as required in this section. Displays location of Manufacturer name and model number.</u>
<u>Technical Data Sheet</u>	<u>Uniquely identifies the product and includes product specifications, reporting requirements, and storage instructions</u>

Products will be listed on the APL according to the geosynthetic application type.

**985-2.2 ~~Material Application~~ **Physical Requirements**:** ~~Each geosynthetic material shall be tested by an independent third party in accordance with the following methods as they apply to the specific application type. All testing and reported values, except apparent opening size (AOS), are to be minimum average roll values in the weakest principal direction unless indicated~~



otherwise in this Section. Values for AOS are maximum average roll values In addition to the general requirements, meet the following physical requirements:

- Drainage ..... 985-3
- Erosion Control ..... 985-4
- Structural ..... 985-5

Table 985-1 Geotextile Selection	
In-situ Soil Type or Drainage Application	Class for Type D1, D2, D3 Materials (see Table 985-2)
< 15% passing a No. 200 Sieve*	a
15% to 50% passing a No. 200 Sieve*	b
> 50% passing a No. 200 Sieve*	e
> 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 T 88.

Table 985-2 Drainage Geotextiles Test Methods and Requirements for Types D-1, D-2 and D-3			
Property/Test Method	D-1	D-2	D-3
Minimum Permittivity (Sec-1) per ASTM D4491	D-1a = 0.7 D-1b = 0.2 D-1c = 0.1 D-1d = 0.1 D-1e = 0.25 D-1f = 1.5	D-2a = 0.7 D-2b = 0.2 D-2c = 0.1 D-2d = 0.1 D-2e = 0.25 D-2f = 1.5	D-3a = 0.5 D-3b = 0.2 D-3c = 0.1 D-3d = 0.1 D-3e = 0.7
Maximum AOS (mm, US Sieve No.) per ASTM D4751	D-1a = 0.425 (40) D-1b = 0.250 (60) D-1c = 0.212 (70) D-1d = 0.300 (50) D-1e = 0.212 (70) D-1f = 0.600 (30)	D-2a = 0.425 (40) D-2b = 0.250 (60) D-2c = 0.212 (70) D-2d = 0.300 (50) D-2e = 0.212 (70) D-2f = 0.600 (30)	D-3a = 0.425 (40) D-3b = 0.250 (60) D-3c = 0.212 (70) D-3d = 0.300 (50) D-3e = 0.212 (70)
Minimum Grab Tensile Strength (lbs) per ASTM D4632	315	Woven Monofilament = 248 Other Woven Geotextiles = 315	Elongation <50% = 248 Elongation ≥50% = 158
Mass per Unit Area (oz/sy) per ASTM D5261	Provide Test Result	Provide Test Result	Provide Test Result

Minimum Puncture Strength (lbs) per ASTM D6241	618	Woven Monofilament = 495 Other Woven Geotextiles = 618	Elongation <50% = 495 Elongation ≥50% = 309
Minimum Trapezoidal Tear (lbs) per ASTM D4533	113	Woven Monofilament = 57 Other Woven Geotextiles: = 113	Woven Monofilament = 57 Other Geotextiles: Elongation <50% = 90 Elongation ≥50% = 57
Minimum UV Resistance per ASTM D4355 (% Retained Strength)	50% @500 hours	50% @500 hours	50% @500 hours
Limitations	Woven Monofilament Geotextiles only	Woven Geotextiles only. No Slit Film Geotextiles allowed.	No Slit Film Geotextiles allowed.

Table 985-3 Test Methods and Requirements for Drainage Geotextiles Types D-4 and D-5		
Property/Test Method	D-4	D-5
Minimum Permittivity (Sec <sup>-1</sup> ) per ASTM D4491	0.5	0.5
Maximum AOS (mm, US Sieve No.) per ASTM D4751	0.425 (40)	0.212 (70)
Minimum Grab Tensile Strength (lbs) per ASTM D4632	180	90
Mass per Unit Area (oz/sy) per ASTM D5261	Provide Test Result	Provide Test Result
Minimum Puncture Strength (lbs) per ASTM D6241	223	223
Minimum Trapezoidal Tear (lbs) per ASTM D4533	70	40
Minimum UV Resistance per ASTM D4355 (% Retained Strength)	50% @500 hours	50% @500 hours

Table 985-4 Test Methods and Requirements for Erosion Control Materials					
Property/Test Method	E-1	E-2	E-3	E-4	E-5
Permittivity (Sec <sup>-1</sup> ) per ASTM D4491	0.05	0.05			
Grab Tensile Strength (lbs) per ASTM D4632	90	90			
Minimum UV Resistance per ASTM D4355 (% Retained Strength)	80% @500 hours	80% @150 hours	80% @500 hours		
Tensile Strength ** (lbs/ft)			135x70	275x135	550x275

Table 985-4 Test Methods and Requirements for Erosion Control Materials					
Property/Test Method	E-1	E-2	E-3	E-4	E-5
per ASTM D6818 or D5035					
Filtration Efficiency (%) per ASTM D5141	75% and min. flow rate of 0.3 gal/sf/min				
Design Shear***			≥2.1 psf	≥3.6 psf	≥5.0 psf
**Tensile Strength is expressed in units of measure of lbs/ft, in machine direction and cross direction as MD x CD. ***Design Shear limits for Erosion mats must be determined by 30 minutes sustained flow in an unvegetated state as determined by tests performed by Utah State University, Texas Transportation Institute or an independent testing laboratory approved by the State Drainage Engineer.					

Table 985-5 Test Methods and Requirements for Structural Geosynthetics			
Property/Test Method	Structural Application Type	Test Methods for Woven Geotextiles	Test Methods for Woven or Extruded Geogrids
Permittivity (sec <sup>-1</sup> )	R-1, 2, 3, 4, 5	ASTM D4491	
UV Stability (Min Retained Strength @500 hr)	R-3	ASTM D4355	ASTM D4355
Puncture Strength (lbs)	R-5	ASTM D6241	
Grab Strength (lbs)	R-5	ASTM D4632	
Opening Size	R-1, 2, 3, 4, 5	AOS (US Sieve No.) ASTM D4751	Aperture Size (in x in)
Tensile Strength (lbs/ft)		ASTM D4595	ASTM D6637
Machine Direction Ultimate, (T <sub>ult</sub> )			
2% Strain	R-1, 3		
5% Strain	R-2, 3, 4, 5		
10% Strain	R-1, 2, 3, 4, 5		
Cross Direction Ultimate			
2% Strain	R-1, 3,		
5% Strain	R-2, 3, 4, 5		
10% Strain	R-1, 2, 3, 4, 5		
Strain @ Ultimate Tensile Strength	R-1, 2, 3, 4, 5		
Tear Strength (lbs)		ASTM D4533	
Machine Direction	R-5		
Cross Direction	R-5		
Soil Geosynthetic Friction	R-1, 2, 3	ASTM D5321	ASTM D5321/6706

Property/Test Method	Structural Application Type	Test Methods for Woven Geotextiles	Test Methods for Woven or Extruded Geogrids
Pullout Resistance	R-3	ASTM-D6706	ASTM-D6706
Creep Resistance $T_{creep}$ (lbs/ft)	R-2,3	ASTM-D5262	ASTM-D5262
Creep Reduction Factor ( $T_{ult}/T_{creep}$ )	R-2,3		
Installation Damage (RF <sub>ID</sub> )			
Sand	R-2,3,4	AASHTO-R-69	AASHTO-R-69
Limestone	R-2,3,4		
Durability (RF <sub>D</sub> )			
Chemical	R-2,3,4	AASHTO-R-69	AASHTO-R-69
Biological	R-2,3,4	AASHTO-R-69	AASHTO-R-69
Joint Strength (RF <sub>j</sub> )			
Mechanical	R-2,3	GRI-GT7	GRI: GG4(a) & GG4(b)
Sewn	R-2,3	ASTM-D4884	

**985-2.3 Materials Overlaps and Seams:** The geosynthetic material shall be a woven, non-woven or extruded material consisting of long-chain polymeric filaments or yarns such as polypropylene, polyethylene, polyester, polyamides or polyvinylidene chloride formed into a stable network such that the filaments or yarns retain their relative position to each other. The base plastic shall contain stabilizers and/or inhibitors to make the filaments resistant to deterioration due to ultra-violet light, heat exposure and potential chemically damaging environment. The edges of the material shall be selvaged or otherwise finished to prevent the outer yarn from pulling away from the material and shall be free of any treatment which may significantly alter its physical properties.

Overlaps shall be in accordance with the manufacturer's recommendations unless specified otherwise in the Contract Documents for a particular application. To reduce overlaps, the geosynthetic material may be sewn together in accordance with the manufacturer's recommendations. Sew the seams with thread meeting the chemical requirements and minimum seam strength requirements in Tables 985-2, 985-3 and 985-5.

**985-2.4 Physical Requirements Packaging and Labeling:** Geosynthetics shall be packaged in a protective covering sufficient to protect the material from temperatures greater than 140 F, sunlight, dirt, and other debris during shipment and storage. The manufacturer's name, product name, style number, roll dimensions and LOT numbers must be clearly labeled on all packaging. Each geosynthetic material shall be tested by an independent third party in accordance with the methods shown. All testing and reported values, except Apparent Opening Size (AOS), are to be minimum average roll values in the weakest principal direction, unless indicated otherwise in this Section. Values for AOS are maximum average roll values.

**985-2.5 Packaging and Labeling:** Geosynthetics shall be packaged in a protective covering sufficient to protect the material from temperatures greater than 140 F, sunlight, dirt, and other debris during shipment and storage. The manufacturer's name, product name, style number, roll dimensions and LOT numbers must be clearly labeled on all packaging.

**985-2.6 Overlaps and Seams:** Overlaps shall be in accordance with the manufacturer's recommendations, unless specified otherwise in the Contract Documents for a particular application. To reduce overlaps, the geosynthetic material may be sewn together in accordance with the manufacturer's recommendations. Sew the seams with thread meeting the chemical requirements and minimum seam strength requirements for the application.

### 985-3 ~~Drainage~~ **Product Acceptance and Certification.**

**985-3.1 ~~Application~~ **Product Acceptance:**** All geosynthetic materials shall be one of the products listed on the Department's Approved Product List (APL).

~~Manufacturers seeking evaluation of structural and drainage products must submit an application in accordance with Section 6 and include test reports from the National Testing Product Evaluation Program (NTPEP) that document the material meets the requirements of this Section. Acceptance for structural geosynthetic materials requires the manufacturer's facility to be on NTPEP's list of compliant producers. These requests must also include the current NTPEP audit report.~~

~~Manufacturers seeking evaluation of erosion control products must submit an application in accordance with Section 6 and include independently certified test reports that the material meets the requirements of this Section.~~

~~Products will be listed on the APL according to geosynthetic application type. For products with limited APL approvals, installations and design alternatives must not rely on the limitation. Structural geosynthetics are listed with property values. Select geotextile materials based on the following applications:~~

<u>Table 985-1</u> <u>Drainage Applications</u>		
<u>Geotextile Type</u>	<u>Description</u>	<u>Standard Plans Index</u>
<u>D-1</u>	<u>Revetment (Special)</u>	
	<u>Rock, Rubble without bedding stone</u>	
	<u>Ditch Pavement (Rubble Riprap) without bedding stone</u>	<u>524-001</u>
<u>D-2</u>	<u>Revetment (Standard)</u>	
	<u>Articulating Block</u>	
	<u>Gabions</u>	<u>524-001</u>
	<u>Rock, Rubble, and Broken Concrete with bedding stone</u>	
	<u>Ditch Pavement (Rubble Riprap) with bedding stone</u>	<u>524-001</u>
	<u>Joint Cover for Mechanically Stabilized Retaining Wall with Coarse Aggregate Backfill</u>	
<u>D-3</u>	<u>Joint Cover for Mechanically Stabilized Retaining Wall Supporting Spread Footing Foundations</u>	
	<u>Underdrain: Types II, III, and V</u>	<u>440-001</u>
	<u>French Drain</u>	<u>443-001</u>

<u>Table 985-1</u> <u>Drainage Applications</u>		
<u>Geotextile Type</u>	<u>Description</u>	<u>Standard Plans Index</u>
	<u>Sheet Piling Filter</u>	
	<u>Filter Fabric Jacket (Culvert)</u>	<u>430-001</u>
	<u>Box Culvert Joints</u>	<u>400-289 and</u> <u>400-291</u>
	<u>Concrete Pavement Subdrainage</u>	<u>446-001</u>
	<u>Joint Cover for Mechanically Stabilized Retaining Wall with Sand or Limerock Backfill</u>	
<u>D-4</u>	<u>Slope Pavement</u>	
	<u>Ditch Pavement (Sand-Cement Riprap or Concrete)</u>	<u>524-001</u>
<u>D-5</u>	<u>Separation Geotextile</u>	
	<u>Cast-In-Place Retaining Wall</u>	

**985-3.2 Physical Requirements Certification:** Materials for drainage applications must be tested in accordance with and meet the following physical requirements: ~~The Contractor shall submit to the Engineer a current certification from the manufacturer confirming that the material meets the requirements of this Section and is appropriate for the intended use. The Contractor shall also provide two 8 inch by 10 inch samples of the geosynthetic material for product identification. The manufacturer's certification shall be attested to within the past one year by a person having legal authority to bind the manufacturing company.~~

~~The manufacturer shall maintain test records as required by this Specification and these records shall be made available to the Department upon request~~

<u>Table 985-2</u> <u>Geotextile Selection</u>	
<u>In-situ Soil Type or Drainage Application</u>	<u>Class for Type D1, D2, D3 Materials</u>
<u>&lt; 15% passing a No. 200 Sieve*</u>	<u>a</u>
<u>15% to 50% passing a No. 200 Sieve*</u>	<u>b</u>
<u>&gt; 50% passing a No. 200 Sieve*</u>	<u>c</u>
<u>&gt; 50% passing a No. 200 Sieve* with Plastic Index &gt;7</u>	<u>d</u>
<u>MSE Joint Cover for Sand or Limerock Backfill</u>	<u>e</u>
<u>MSE Joint Cover for Coarse Aggregate Backfill</u>	<u>f</u>

\*as per AASHTO T88.

<u>Table 985-3</u> <u>Drainage Geotextiles</u> <u>Test Methods and Requirements for Types D-1, D-2 and D-3</u>			
<u>Property/Test Method</u>	<u>D-1</u>	<u>D-2</u>	<u>D-3</u>

<u>Limitation</u>	<u>Woven Monofilament Geotextiles only</u>	<u>Woven Geotextiles only. No Slit Film Geotextiles</u>	<u>No Slit Film Geotextiles</u>
<u>Minimum Permittivity (Sec - 1) per ASTM D4491</u>	<u>D-1a = 0.7</u> <u>D-1b = 0.2</u> <u>D-1c = 0.1</u> <u>D-1d = 0.1</u> <u>D-1e = 0.25</u> <u>D-1f = 1.5</u>	<u>D-2a = 0.7</u> <u>D-2b = 0.2</u> <u>D-2c = 0.1</u> <u>D-2d = 0.1</u> <u>D-2e = 0.25</u> <u>D-2f = 1.5</u>	<u>D-3a = 0.5</u> <u>D-3b = 0.2</u> <u>D-3c = 0.1</u> <u>D-3d = 0.1</u> <u>D-3e = 0.7</u>
<u>Maximum AOS (mm, US Sieve No.) per ASTM D4751</u>	<u>D-1a = 0.425 (40)</u> <u>D-1b = 0.250 (60)</u> <u>D-1c = 0.212 (70)</u> <u>D-1d = 0.300 (50)</u> <u>D-1e = 0.212 (70)</u> <u>D-1f = 0.600 (30)</u>	<u>D-2a = 0.425 (40)</u> <u>D-2b = 0.250 (60)</u> <u>D-2c = 0.212 (70)</u> <u>D-2d = 0.300 (50)</u> <u>D-2e = 0.212 (70)</u> <u>D-2f = 0.600 (30)</u>	<u>D-3a = 0.425 (40)</u> <u>D-3b = 0.250 (60)</u> <u>D-3c = 0.212 (70)</u> <u>D-3d = 0.300 (50)</u> <u>D-3e = 0.212 (70)</u>
<u>Minimum Grab Tensile Strength (lbs) per ASTM D4632</u>	<u>315</u>	<u>Woven Monofilament = 248</u> <u>Other Woven Geotextiles = 315</u>	<u>Elongation &lt;50% = 248</u> <u>Elongation ≥50% = 158</u>
<u>Mass per Unit Area (oz/sy) per ASTM D5261</u>	<u>Provide Test Result</u>	<u>Provide Test Result</u>	<u>Provide Test Result</u>
<u>Minimum Puncture Strength (lbs) per ASTM D6241</u>	<u>618</u>	<u>Woven Monofilament = 495</u> <u>Other Woven Geotextiles = 618</u>	<u>Elongation &lt;50% = 495</u> <u>Elongation ≥50% = 309</u>
<u>Minimum Trapezoidal Tear (lbs) per ASTM D4533</u>	<u>113</u>	<u>Woven Monofilament = 57</u> <u>Other Woven Geotextiles: = 113</u>	<u>Woven Monofilament = 57</u> <u>Other Geotextiles: Elongation &lt;50% = 90</u> <u>Elongation ≥50% = 57</u>
<u>Minimum UV Resistance per ASTM D4355 (% Retained Strength)</u>	<u>50% @500 hours</u>	<u>50% @500 hours</u>	<u>50% @500 hours</u>

<u>Table 985-4</u>		
<u>Test Methods and Requirements for Drainage Geotextiles</u>		
<u>Types D-4 and D-5</u>		
<u>Property/Test Method</u>	<u>D-4</u>	<u>D-5</u>
<u>Minimum Permittivity (Sec<sup>-1</sup>) per ASTM D4491</u>	<u>0.5</u>	<u>0.5</u>
<u>Maximum AOS (mm, US Sieve No.) per ASTM D4751</u>	<u>0.425 (40)</u>	<u>0.212 (70)</u>
<u>Minimum Grab Tensile Strength (lbs) per ASTM D4632</u>	<u>180</u>	<u>90</u>

<u>Table 985-4</u> <u>Test Methods and Requirements for Drainage Geotextiles</u> <u>Types D-4 and D-5</u>		
<u>Property/Test Method</u>	<u>D-4</u>	<u>D-5</u>
<u>Mass per Unit Area (oz/sy) per ASTM D5261</u>	<u>Provide Test Result</u>	<u>Provide Test Result</u>
<u>Minimum Puncture Strength (lbs) per ASTM D6241</u>	<u>223</u>	<u>223</u>
<u>Minimum Trapezoidal Tear (lbs) per ASTM D4533</u>	<u>70</u>	<u>40</u>
<u>Minimum UV Resistance per ASTM D4355</u> <u>(% Retained Strength)</u>	<u>50% @ 500 hours</u>	<u>50% @ 500 hours</u>

**985-4 Erosion Control Applications.**

**985-4.1 Application Nonstructural:** Materials may contain natural fibers added to acceptable plastic erosion mats for the sole purpose of facilitating turf growth. However, materials used for erosion control applications must be tested without any natural fiber components in accordance with and meet the physical requirements Table 985-6.

<u>Table 985-5</u> <u>Erosion Control Applications</u>	
<u>Type</u>	<u>Description</u>
<u>E-1</u>	<u>Staked Silt Fence</u>
<u>E-2</u>	<u>Wind Screen</u>
<u>E-3</u>	<u>Plastic Erosion Mat (Turf Reinforcement Mat) (Type 1)</u>
<u>E-4</u>	<u>Plastic Erosion Mat (Turf Reinforcement Mat) (Type 2)</u>
<u>E-5</u>	<u>Plastic Erosion Mat (Turf Reinforcement Mat) (Type 3)</u>

**985-4.1.1 Drainage:** Select geotextile materials that meet the required permeability and AOS based on test results on the soil or fill adjacent to the geotextile for gradation. Materials for drainage applications must be tested in accordance with and meet the physical requirements in 985-2.2, Table 985-2.

<u>Table 985-6</u> <u>Drainage Applications</u>		
<u>Geotextile Type</u>	<u>Description</u>	<u>Standard Plans Index</u>
<u>D-1</u>	<u>Revetment (Special)</u>	
	<u>Rock, Rubble without bedding stone</u>	
	<u>Ditch Pavement (Rubble Riprap) without bedding stone</u>	<u>524-001</u>
<u>D-2</u>	<u>Revetment (Standard)</u>	
	<u>Articulating Block</u>	
	<u>Gabions</u>	<u>524-001</u>
	<u>Rock, Rubble, and Broken Concrete with bedding stone</u>	
	<u>Ditch Pavement (Rubble Riprap) with bedding stone</u>	<u>524-001</u>
	<u>Joint Cover for Mechanically Stabilized Retaining Wall with Coarse Aggregate Backfill</u>	



Table 985-6 Drainage Applications		
Geotextile Type	Description	Standard Plans Index
	Joint Cover for Mechanically Stabilized Retaining Wall Supporting Spread Footing Foundations	
D-3	Underdrain	440-001
	French Drain	443-001
	Sheet Piling Filter	
	Filter Fabric Jacket (Culvert)	430-001
	Concrete Pavement Subdrainage	446-001
	Joint Cover for Mechanically Stabilized Retaining Wall with Sand or Limerock Backfill	
D-4	Slope Pavement	
	Ditch Pavement (Sand-Cement Riprap or Concrete)	524-001
D-5	Separation Geotextile	
	Cast-In-Place Retaining Wall	

~~985-4.1.2 Erosion Control:~~ Materials may contain natural fibers added to acceptable plastic erosion mats for the sole purpose of facilitating turf growth. However, materials used for erosion control applications must be tested without any natural fiber components in accordance with and meet the physical requirements in 985-2.2, Table 985-4.

Table 985-7 Erosion Control Applications	
Type	Description
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)

**985-4.2 Physical Requirements Structural:** Each geosynthetic material shall meet the following requirements:

Table 985-6 Test Methods and Requirements for Erosion Control Materials					
Property/Test Method	E-1	E-2	E-3	E-4	E-5
<u>Permittivity (Sec<sup>-1</sup>) per ASTM D4491</u>	<u>0.05</u>	<u>0.05</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>
<u>Grab Tensile Strength (lbs) per ASTM D4632</u>	<u>90</u>	<u>90</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>
<u>Minimum UV Resistance per ASTM D4355</u>	<u>80% @ 500 hours</u>	<u>80% @ 150 hours</u>	<u>80% @ 500 hours</u>		

<u>Property/Test Method</u>	<u>E-1</u>	<u>E-2</u>	<u>E-3</u>	<u>E-4</u>	<u>E-5</u>
<u>(% Retained Strength)</u>					
<u>Tensile Strength</u> <u>** (lbs/ft)</u> <u>per ASTM D6818 or</u> <u>D5035</u>	<u>NA</u>	<u>NA</u>	<u>135x70</u>	<u>275x135</u>	<u>550x275</u>
<u>Filtration Efficiency (%)</u> <u>per ASTM D5141</u>	<u>75% and min.</u> <u>flow rate of</u> <u>0.3 gal/sf/min</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>
<u>Design Shear***</u>	<u>NA</u>	<u>NA</u>	<u>≥2.1 psf</u>	<u>≥3.6 psf</u>	<u>≥5.0 psf</u>

\*\*Tensile Strength is expressed in units of measure of lbs/ft, in machine direction and cross direction as MD x CD.  
\*\*\*Design Shear limits for Erosion mats must be determined by 30 minutes sustained flow in an unvegetated state as determined by tests performed by Utah State University, Texas Transportation Institute or an independent testing laboratory approved by the State Drainage Engineer.

~~985 4.2.1 Reinforcement, Separation and Stabilization: Materials for reinforcement, separation and stabilization applications must be tested in accordance with and meet the physical requirements in 985 2.2, Table 985 5. The ultimate tensile strength of all R-1 materials must be at least 4800 pounds per foot in both the machine and cross machine directions.~~**985-5 Structural.**

**985-5.1 Applications:** Materials for reinforcement, separation and stabilization applications must be tested in accordance with and meet the physical requirements below. The ultimate tensile strength of all R-1 materials must be at least 4800 pounds per foot in both the machine and cross machine directions.

<u>Type</u>	<u>Description</u>
<u>R-1</u>	<u>Geosynthetic Reinforced Soil (GRS-IBS)</u>
<u>R-2</u>	<u>Reinforcement of Foundations over Soft Soils</u>
<u>R-3</u>	<u>Reinforced Soil Slopes</u>
<u>R-4</u>	<u>Reinforced Embankment</u>
<u>R-5</u>	<u>Construction Expedient</u>

**985-5.2 Physical Requirements:** Each geosynthetic material shall be tested in accordance with the following requirements:

<u>Property/Test Method</u>	<u>Structural Application Type</u>	<u>Test Methods for Woven Geotextiles</u>	<u>Test Methods for Woven or Extruded Geogrids</u>
<u>Permittivity (sec<sup>-1</sup>)</u>	<u>R - 1, 2, 3, 4, 5</u>	<u>ASTM D4491</u>	<u>NA</u>
<u>UV Stability</u> <u>(Min Retained Strength @500 hr)</u>	<u>R - 3</u>	<u>ASTM D4355</u>	<u>ASTM D4355</u>

Table 985-58 Test Methods and <u>Reporting</u> Requirements for Structural Geosynthetics			
Property/Test Method	Structural Application Type	Test Methods for Woven Geotextiles	Test Methods for Woven or Extruded Geogrids
Puncture Strength (lbs)	R - 5	ASTM D6241	<u>NA</u>
Grab Strength (lbs)	R - 5	ASTM D4632	<u>NA</u>
Opening Size	R - 1, 2, 3, 4, 5	AOS (US Sieve No.) ASTM D4751	Aperture Size (in x in)
Tensile Strength (lbs/ft)		ASTM D4595	ASTM D6637
Machine Direction Ultimate, ( $T_{ult}$ )			
2% Strain	R - 1, 3		
5% Strain	R - 2, 3, 4, 5		
10% Strain	R - 1, 2, 3, 4, 5		
Cross Direction Ultimate			
2% Strain	R - 1, 3,		
5% Strain	R - 2, 3, 4, 5		
10% Strain	R - 1, 2, 3, 4, 5		
Strain @ Ultimate Tensile Strength	R - 1, 2, 3, 4, 5		
Tear Strength (lbs)		ASTM D4533	<u>NA</u>
Machine Direction	R - 5		
Cross Direction	R - 5		
Soil-Geosynthetic Friction	R - 1, 2, 3	ASTM D5321	ASTM D5321/6706
Pullout Resistance	R - 3	ASTM D6706	ASTM D6706
Creep Resistance- $T_{creep}$ (lbs/ft)	R - 2, 3	ASTM D5262	ASTM D5262
Creep Reduction Factor ( $T_{ult}/T_{creep}$ )	R - 2, 3	<u>NA</u>	<u>NA</u>
Installation Damage (RF <sub>ID</sub> )		AASHTO R69	AASHTO R69
Sand	R - 2, 3, 4		
Limestone	R - 2, 3, 4		
Durability (RF <sub>D</sub> )		AASHTO R69 <del>AASHTO R69</del>	<del>AASHTO R69</del> AASHTO R69
Chemical	R - 2, 3, 4		
Biological	R - 2, 3, 4		
Joint Strength (RF <sub>j</sub> )			
Mechanical	R - 2, 3	GRI: GT7	GRI: GG4(a) & GG4(b)
Sewn	R - 2, 3	ASTM D4884	<u>NA</u>

Table 985-8 Test Methods and Reporting Requirements for Structural Geosynthetics			
Property/Test Method	Structural Application Type	Test Methods for Woven Geotextiles	Test Methods for Woven or Extruded Geogrids
Biological	R - 2, 3, 4		
Joint Strength (RF <sub>j</sub> )			
Mechanical	R - 2, 3	GRI: GT7	GRI: GG4(a) & GG4(b)
Sewn	R - 2, 3	ASTM D4884	NA



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

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KEVIN J. THIBAUT, P.E.  
SECRETARY

January 10, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **990**  
Proposed Specification: **9900400 Temporary Traffic Control Device Materials.\***

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Karen Byram to remove friction testing and change the black retroreflectivity value.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

\* This revision is associated with proposed Standard Specification revision 1021000.

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**TEMPORARY TRAFFIC CONTROL DEVICE MATERIALS.****(REV 12-1-21)**

ARTICLE 990-4 is deleted and the following substituted:

**990-4 Removable Tape.**

**990-4.1 General:** Removable tape shall be one of the products listed on the Department's Approved Product List (APL). Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6. Evaluation of Removable Tape will utilize data from an independent laboratory or data from the National Transportation Product Evaluation Program (NTPEP).

**990-4.2 Composition:** Removable tape shall be one of the products listed on the APL. The pavement stripes and markings shall consist of high quality plastic materials, pigments, and glass spheres or other retroreflective materials uniformly distributed throughout their cross-sectional area, with a reflective layer of spheres or other retroreflective material embedded in the top surface. No foil type materials shall be allowed.

**990-4.3 Skid Resistance:** ~~The surface of the stripes and markings shall provide a minimum skid resistance value of 35 BPN (British Pendulum Number) when tested according to ASTM E303. Bike lane symbols and pedestrian crosswalks shall provide a minimum skid resistance value of 55 BPN.~~ **Retroreflectivity:** The white and yellow pavement markings shall attain an initial retroreflectance of not less than 300 mcd/lx·m<sup>2</sup> and 250 mcd/lx·m<sup>2</sup>, respectively. Black pavement markings shall have a retroreflectance of less than 20 mcd/lx·m<sup>2</sup>. The retroreflectance of the white and yellow pavement markings at the end of the six-month period shall not be less than 150 mcd/lx·m<sup>2</sup>.

**990-4.4 Thickness:** The APL will list the specified thickness of each approved product.

**990-4.5 Durability and Wear Resistance:** When properly applied, the material shall provide neat, durable stripes and markings. The materials shall provide a cushioned resilient substrate that reduces sphere crushing and loss. The film shall be weather resistant and, through normal wear, shall show no significant tearing, rollback or other signs of poor adhesion. Durability is the measured percent of pavement marking material completely removed from the pavement. The pavement marking material line loss must not exceed 5.0% of surface area.

**990-4.6 Conformability and Resealing:** The stripes and markings shall be capable of conforming to pavement contours, breaks and faults under traffic at pavement temperatures recommended by the manufacturer. The film shall be capable of use for patching worn areas of the same types of film in accordance with the manufacturer's recommendations.

**990-4.7 Tensile Strength:** The stripes and markings shall have a minimum tensile strength of 40 psi when tested according to ASTM D638. A rectangular test specimen 6 inches by 1 inch by 0.05 inches minimum thickness shall be tested at a temperature range of 40°F to 80°F using a jaw speed of 0.25 inches per minute.

**990-4.8 Elongation:** The stripes and markings shall have a minimum elongation of 25% when tested in accordance with ASTM D638.

**990-4.9 Plastic Pull test:** The stripes and markings shall support a dead weight of 4 pounds for not less than five minutes at a temperature range of 70°F to 80°F. Rectangular test specimen size shall be 6 inches by 1 inch by 0.05 inches minimum thickness.

**990-4.10 Adhesive:** Precoat removable tape with a pressure sensitive adhesive capable of being affixed to asphalt concrete and portland cement concrete pavement surfaces without the

use of heat, solvents, and other additional adhesives or activators. Ensure that the adhesive does not require a protective liner when the removable tape is in rolled form for shipment. Ensure that the adhesive is capable of temporarily bonding to the roadway pavement at temperatures of 50°F and the above without pick-up distortion by vehicular traffic.

**990-4.11 Color:** Meet the requirements of 971-1.6.

**990-4.12 Removability:** Ensure that the manufacturer shows documented reports that the removable tape is capable of being removed intact or in substantially large strips after being in place for a minimum of 90 days and under an average daily traffic count per lane of at least 5,000 vehicles per day.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

February 9, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **991**  
Proposed Specification: **9910000 Channelizing Device Materials. (REVISED after Initial Approval)**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification. This reflects the approved revision from January 26, 2022.

This subsequent revision to the approval allows an additional year grace period (2024) for required testing. Subarticle 991-1.5 is the only affected language, highlighted for your convenience.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



**CHANNELIZING DEVICE MATERIALS.****(REV 2-8-22)**

SECTION 991 is deleted and the following substituted:

**SECTION 991  
CHANNELIZING DEVICE MATERIALS****991-1 Durable Tubular Markers.**

**991-1.1 General:** This subarticle describes the material requirements for tubular markers installed in accordance with Section 704. All Durable Tubular Marker products shall be listed on the Department's Approved Products List (APL).

**991-1.2 Dimensions:** The post shall have a minimum diameter of 3 inches. The base of the tubular marker shall have a maximum diameter, width, or length of 8 inches. The height of the tubular marker above the pavement surface shall be 36 inches.

**991-1.3 Color:** Tubular Marker color must be uniform and integral throughout entire height of the post. The base may be black in color.

**991-1.3.1 White:** The yellowness index shall not exceed 12, tested in accordance with ASTM E313. The daytime 45 degrees, 0 degrees luminance factor, Cap Y, shall be a minimum of 70, tested in accordance with ASTM E1349.

**991-1.3.2 Yellow:** The daytime 45 degrees, 0 degrees luminance factor, Cap Y, shall be a minimum of 60, tested in accordance with ASTM E1349.

**991-1.4 Retroreflective Sheeting:** The color of the retroreflective sheeting shall match the color of the tubular marker. The retroreflective sheeting shall be abrasion resistant Type IV or Type V and meet the requirements of Section 994. The retroreflective sheeting shall meet supplementary requirements for reboundable sheeting as stated in section S.2 of ASTM D4956. The sheeting shall wrap around the entire circumference of the tube and have a minimum vertical dimension of 10 inches. The top of sheeting shall be 1-1/2 inches plus or minus 1/2 inch below the top of post.

**991-1.5 Product Testing:** Manufacturers seeking evaluation of Durable Tubular Markers must include test reports from the National Transportation Product Evaluation Program (NTPEP) documenting the product meets the requirements of this Section. NTPEP impact testing must be performed on each substrate (concrete and open-graded friction course asphalt) in accordance with NTPEP Evaluation of Temporary Traffic Control Devices: Flexible Delineators for the category of High Speed Applications and for hot weather test temperature only.

Impact tests shall be performed only on tubular markers measuring 36 inches above the pavement surface.

Products listed on the IPL for Managed Lane Markers prior to July 2021 will be acceptable on projects until June 30, 2023-2024 to allow a grace period to complete the required testing.

Acceptable products are those meeting the following requirements after receiving an average of 75 bumper impacts per sample and an average of 175 tire impacts per sample:

1. All posts shall self-restore to within 15 degrees list or lean from vertical.

2. All posts shall have a minimum of 50% of its cross-section, at any point along the post height, free of tears or cracks.

**991-1.6 Approved Product List Submission Requirements:** Manufacturers seeking evaluation of Durable Tubular Marker products for inclusion on the APL shall submit an application in accordance with Section 6 and include the following documentation.

Table 991-1	
Documentation	Requirement
Installation Instructions	Include mounting surface preparations, and touch-up and repair procedures. Separate installation instructions are required for different substrates. Identify adhesive types and mechanical anchor types for attachment of base to substrate.
National Testing Product Evaluation Program (NTPEP) audit report	See Section 991-1.5
Product Label Photo	Displays the Product Name. Displays additional label requirements, if needed.
Product Photo	Displays the significant features of the product. Displays location of Manufacturer name and model number.
Technical Data Sheet, marker	Uniquely identifies the product and includes product specifications, storage instructions, and recommended installation materials and equipment as applicable.
Product Sample	Upon request from the Department, submit a sample of the tubular marker mounting material or hardware. If the product is a system comprised of multiple parts, a sample of each part must be submitted.

**991-2 Standard Tubular Markers.**

**991-2.1 General:** This subarticle describes the material requirements for tubular markers installed in accordance with Section 704. All Standard Tubular Marker products shall be listed on the Department’s Approved Products List (APL). Standard Tubular Markers must be approved for project-specific use with an issued project-specific pay item.

**991-2.2 Dimensions:** The post shall have a minimum diameter of 2 inches. The minimum height of the tubular marker above the pavement surface shall be 36 inches.

**991-2.3 Color:** Tubular Marker color must be uniform and integral throughout entire height of the post. The base may be black in color.

**991-2.3.1 White:** The yellowness index shall not exceed 12, tested in accordance with ASTM E313. The daytime 45 degrees, 0 degrees luminance factor, Cap Y, shall be a minimum of 70, tested in accordance with ASTM E1349.

**991-2.3.2 Yellow:** The daytime 45 degrees, 0 degrees luminance factor, Cap Y, shall be a minimum of 60, tested in accordance with ASTM E1349.

**991-2.4 Retroreflective Sheeting:** The color of the retroreflective sheeting shall match the color of the tubular marker. The retroreflective sheeting shall be abrasion resistant Type IV or Type V and meet the requirements of Section 994. The retroreflective sheeting shall meet supplementary requirements for reboundable sheeting as stated in section S.2 of ASTM D4956. The sheeting shall wrap around the entire circumference of the tube and have a minimum vertical dimension of 15 inches. The top of sheeting shall be 1-1/2 inches plus or minus 1/2 inch below the top of post.

**991-2.5 Product Testing:** Manufacturers seeking evaluation of Standard Tubular Markers must include test reports from the National Transportation Product Evaluation Program (NTPEP) documenting the product meets the requirements of this Section. NTPEP impact testing must be performed on each substrate (concrete and open-graded friction course asphalt) in accordance with NTPEP Evaluation of Temporary Traffic Control Devices: Flexible Delineators for the category of High Speed Applications and for hot weather test temperature only.

Impact tests shall be performed only on tubular markers measuring 36 inches above the pavement surface.

Acceptable products are those meeting the following requirements after receiving an average of 50 bumper impacts per sample and an average of 50 tire impacts per sample:

1. Six out of eight posts shall self-restore to within 15 degrees list or lean from vertical.
2. All posts shall have a minimum of 50% of its cross-section, at any point along the post height, free of tears or cracks.

**991-2.6 Approved Product List Submission Requirements:** Manufacturers seeking evaluation of Standard Tubular Marker products for inclusion on the APL shall submit an application in accordance with Section 6 and include the following documentation.

Table 991-2	
Documentation	Requirement
Installation Instructions	Include mounting surface preparations, and touch-up and repair procedures. Separate installation instructions are required for different substrates. Identify adhesive types and mechanical anchor types for attachment of base to substrate.
National Testing Product Evaluation Program (NTPEP) audit report	See Section 991-2.5
Product Label Photo	Displays the Product Name. Displays additional label requirements, if needed.
Product Photo	Displays the significant features of the product. Displays location of Manufacturer name and model number.
Technical Data Sheet, marker	Uniquely identifies the product and includes product specifications, storage instructions, and recommended installation materials and equipment as applicable.
Product Sample	Upon request from the Department, submit a sample of the tubular marker mounting material or hardware. If the product is a system comprised of multiple parts, a sample of each part must be submitted.



*Florida Department of Transportation*

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KEVIN J. THIBAUT, P.E.  
SECRETARY

January 11, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **992**  
Proposed Specification: **REVISED 9920205 Highway Lighting Materials.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Richard Stepp from the Roadway Design Office to clarify the luminaire cable ground wire color, provide a more practical and effective fuse holder connection and slug material.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**HIGHWAY LIGHTING MATERIALS****(REV 10-113-221)**

SUBARTICLE 992-2.5 is deleted and the following substituted:

**992-2.5 Luminaire Cable:** Pole and bracket cable shall be multi-conductor Type XHHW-2 XLP TC with three No. 10 AWG wires. The ground wire must have green-colored insulation.

SUBARTICLE 992-2.6 is deleted and the following substituted:

**992-2.6 In Line Fuse Holders:** In line fuse holders shall provide a breakaway connection and be UL recognized per Guide IZLT2 and rated for 600V. The wire connections in the fuse holders shall be of the copper or equivalent type setscrew type. Fused connections shall utilize an ATQ or FNQ 10 amp time delay fuse rated for 500V. Fuses shall be UL listed to Standard 248-14. The rating for the fuse holders shall be water resistant or submersible rated.

SUBARTICLE 992-2.8.2 is deleted and the following substituted:

**992-2.8 Pole Cable Distribution System:**

**992-2.8.1 General:** These requirements are applicable for all systems rated up to and including 600V. The installed system shall be in compliance with Standard Plans, Index 715-001.

                    Systems installed as alternates to the Standard Plans shall be one of the products listed on the APL. Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6. Alternate Systems shall meet the following requirements:

A modular color coded cable system consisting of rubber cords with integrally molded watertight submersible connectors, inline fuses, submersible surge arrester and breakaway connectors shall be installed. The cables shall extend from an underground pull box near the base of the pole to the luminaires at the top of the pole. A cable system shall be required at each pole.

The cable system shall consist of the following described components:

1. Distribution Block: The red molded body shall contain a three wire female outlet integrally molded to a 24 inch length of 10/3 SOOW cable with an end molded to the body and the other end shall be spliced in the field to the distribution cable that feeds through the underground pull box near the base of the pole. The block shall be watertight and submersible when the integrally fused plug on the power cable is engaged and fully seated. Dimensions shall be approximately 2 inches by 3 inches by 3 inches. The size is important because of limited space.

2. Surge Arrester Cable: Provide a 12 inch length of 10/2 SOOW cable with a red male plug to match the red female connector cable extending from the fused plug on the power cable. The other end of the surge arrester cable shall be integrally molded to a MOV waterproof surge arrester. The red male plug shall make a submersible connection when mated to the red female connector on the power cable. A separate 12 inch length of

No. 10 THWN green ground wire shall be provided from the surge arrester to attach to the ground system in the pull box.

3. Power Cable: This cable feeds the luminaire cable and the surge arrester cable from the load side of its integrally fused red male plug end. The red fused plug shall contain 10A 500V fuses (13/32 inch by 1-1/2 inch) or equal. ~~A solid copper slug~~ The fuse holder manufacturer's suggested slug (blank or dummy fuse) ~~shall~~ must be installed on the neutral side for line to neutral service. Both lines shall be fused for line to line service. The section that feeds the luminaire cable shall be a 10 foot section of 10/3 SOOW cable with an orange female connector molded to the end extending up into the base of the pole. This female connector shall pass easily through a standard size 1-1/4 inch PVC elbow and make a submersible connection when mated with the orange male plug on the luminaire cable. The section that feeds the surge arrester cable shall be 12 inches in length of 10/2 SOOW cable with a red female connector on the end. The red female connector shall make a submersible connection when mated to the red male plug on the surge arrester cable.

4. Luminaire Cable: This cable is Type XHHW-2 XLP-TC with three No. 10 AWG an orange male molded plug molded to match the orange female end of the power cable. The connector shall require 25 pounds of force to mate or disengage from the female end. When engaged the connection shall be watertight and submersible. The cable strain relief shall extend approximately 2 inches from the connector.

The distribution block and each connector shall be made of thermosetting synthetic polymer which is non-flame supporting and which remains flexible over a temperature range of minus40°F to plus 190°F. Hardness of the molded rubber shall be 65 durometer.



*Florida Department of Transportation*

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KEVIN J. THIBAUT, P.E.  
SECRETARY

January 12, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **993**  
Proposed Specification: **9930000 Object Markers and Delineators.** \*

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derwood Sheppard to add the APL requirements table and renumber the entire Section after moving non-APL information to Section 705

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 850-414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

\*Associated with proposed Standard Specifications 7050000 and 5210200.

DS/dh

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



**OBJECT MARKERS AND DELINEATORS.**  
**(REV 11-10-21)**

SECTION 993 is deleted and the following substituted:

**SECTION 993**  
**~~OBJECT MARKERS AND DELINEATORS~~**

**993-1 Description.**

This section specifies the material requirements for flexible post delineators and barrier delineators.

**993-2 Approved Product List.**

All flexible post and barrier delineators shall be one of the products listed on the Department's Approved Product List (APL). Manufacturers seeking evaluation of products for inclusion on the APL shall submit an application in accordance with Section 6 and include the following documentation. A separate application must be submitted for each product to be evaluated, showing that the product meets the applicable requirements.

<u>Table 993-1</u> <u>Submittal Compliance Requirements</u>	
<u>Documentation</u>	<u>Requirements</u>
<u>Installation Instructions</u>	<u>Surface preparation and installation procedures</u>
<u>Label</u>	<u>Displays the name of the manufacturer, Name of product, APL number.</u>
<u>National Testing Product Evaluation Program (NTPEP) Test Report</u>	<u>For flexible post delineators: NTPEP Evaluation of Temporary Traffic Control Devices- Flexible Delineators, for the proposed mounting category</u>
<u>Product Photo</u>	<u>Displays the significant features of the product and product packaging.</u>
<u>Technical Data Sheet</u>	<u>a. Uniquely identifies the product,</u> <u>b. Product specifications,</u> <u>c. Installation materials and equipment.</u> <u>d. Surface preparation</u>

**993-1 Object Markers.**

~~**993-1.1 General:** Object markers shall meet the general requirements outlined in the Manual of Uniform Traffic Control Devices (MUTCD). For uniformity, all Type 1 markers shall be OM1-3 style markers, all Type 2 markers shall be OM2-2V style markers, and all Type 4 (end of road) markers shall be OM4-3 style markers.~~

~~**993-1.2 Retroreflective Sheeting:**~~

~~**993-1.2.1 Retroreflective Sheeting:** The retroreflective sheeting for object markers shall meet the requirements of Section 994, sheeting Types IV, V or XI. The retroreflective area shall be in accordance with the MUTCD. The retroreflective sheeting shall be permanently adhered to 0.040 inch sheet aluminum for Type 2 markers and 0.080 inch sheet~~

aluminum for Type 1, Type 3, and Type 4 markers. Aluminum shall be of 6061-T6 (ASTM B209) prepared in accordance with recommendations of the sheeting manufacturer.

~~993-1.2.2 Assembly:~~ Type 2 and 3 markers shall be mounted directly to the post by two holes on the face of the marker. The mounting holes shall be 1/4 inch square holes to receive 1/4 inch carriage bolts, or other 1/4 inch bolts and shall be spaced to fit holes on the post spaced at 1 inch centers.

~~993-1.3 Posts:~~ The marker posts shall be of steel or aluminum as shown in the Standard Plans or the Plans. Steel posts shall be 3 lb/ft. flanged U-Channel. The U-channel posts shall meet the mechanical requirements of ASTM A499, Grade 60. Provide U-channel posts that have been galvanized after fabrication in accordance with ASTM A123 and have a smooth uniform finish free from defects affecting strength, durability, and appearance. For each U-channel, punch or drill 3/8 inch diameter holes on 1 inch centers through the center of the post, starting approximately 1 inch from the top and extending the full length of the post. Punching or drilling operations shall be completed prior to galvanization. The weight per foot of a manufacturer's U-channel size shall not vary more than plus or minus 3.5% of its specified weight per foot. Machine straighten the U-channel to a tolerance of 0.4% of the length. U-channel posts shall be listed on the APL. Round aluminum posts shall meet the requirements of Standard Plans, Index 700-010.

~~Use attachment hardware (nuts, bolts, clamps, brackets, braces, etc.) of aluminum or galvanized steel.~~

### **993-2.3 Flexible Post Delineators.**

~~993-2.1 General:~~ Delineators shall be classified into the following types: flexible post delineators, nonflexible post delineators, and barrier delineators.

#### ~~993-2.2 Flexible Post Delineators:~~

~~993-2.2.1 Dimensions:~~ The post shall have a minimum width of 3 inches facing traffic and of such length to generally provide a height of 48 inches above the pavement surface.

~~993-2.2.2 Color:~~ The post shall be opaque white. The yellowness index shall not exceed 12 when tested in accordance with ASTM E313. The daytime 45 degrees, 0 degrees luminance factor, Cap Y, shall be a minimum of 70, tested in accordance with ASTM E1347 or ASTM E1164.

~~993-2.2.3 Retroreflective Sheeting:~~ The reflective sheeting shall be Types IV, V, or XI and meet the requirements of Section 994. The reflective sheeting shall have a minimum width of 3 inches and have a minimum area of 30 square inches.

~~993-2.2.3.4 Impact Performance:~~ Six of the eight posts shall be capable of returning to a vertical position plus or minus 10 degrees with no delaminating. No post shall split, crack, break, or separate from base. Posts shall be tested and evaluated according to the National Testing Product Evaluation Program (NTPEP) Evaluation of Temporary Traffic Control Devices: Flexible Delineators, for the following categories:

~~993-2.2.3.4.1 Pavement/Surface Mounted:~~ Use the Metropolitan Delineator Applications category for Hot Weather with a minimum of 10 impacts (default testing procedure uses a maximum of 200 impacts).

~~993-2.2.3.4.2 Ground Mounted:~~ Use the Ground Mount Side of Roadway Applications category for Hot Weather (default testing procedure uses a maximum of 10 impacts).

#### ~~993-2.3 Nonflexible Post Delineators:~~

~~—————~~ **993-2.3.1 Posts:** The posts shall meet the requirements of 993-1.3, except the steel delineator post shall be 1.1 lb/ft.

~~—————~~ **993-2.3.2 Retroreflective Sheeting:** The retroreflective sheeting shall be Types IV, V or XI sheeting and meet the requirements of Section 994. The reflective sheeting shall have a minimum width of 4 inches and have a minimum area of 32 square inches. The retroreflective sheeting shall be permanently adhered to 0.040-inch sheet aluminum.

~~—————~~ **993-2.4.4 Barrier Delineators:**

~~—————~~ **993-2.4.1 General:** Barrier delineators shall consist of retroreflective sheeting permanently adhered to 0.090-inch minimum thick body. The body shall have a flexible hinge which allows the reflector to fold down and spring back to an upright position after impact. Barrier delineators for guardrail shall be designed for mounting to the web of steel posts or designed for mounting to the top of wood posts. Barrier delineators for concrete barrier, traffic railings, and vehicular longitudinal channelizing devices (LCDs) shall be designed for mounting to the top of ~~each device~~ barrier.

~~—————~~ **993-2.4.2 Retroreflective Sheeting:** The sheeting for barrier delineators shall be Type IV or XI meeting the requirements of Section 994. The sheeting shall be yellow or white, depending on the locations of use for each. The dimensions of the retroreflective sheeting shall be a minimum of 3 inches wide by 4 inches high. The sheeting shall be installed by the delineator manufacturer. Delineators for use on median barriers must have yellow sheeting on both sides.

~~993-3 Product Acceptance on the Project.~~

~~—————~~ Acceptance will be made in accordance with the requirements of Section 705. Manufacturers seeking evaluation of their product must submit an application in accordance with Section 6.



*Florida Department of Transportation*

RON DESANTIS  
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605 Suwannee Street  
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KEVIN J. THIBAUT, P.E.  
SECRETARY

January 12, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **995**  
Proposed Specification: **9950100 Traffic Control Signal and Device Materials.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from the Traffic Engineer and Operations Office to provide clarification to the language by adding a new Article for Midblock Crosswalk Enhancement Assemblies. The proposed specification change is associated with changes to Section 663, 654, 659, and 665.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## TRAFFIC CONTROL SIGNAL AND DEVICE MATERIALS (REV 11-10-21)

ARTICLE 995-1 is deleted and the following substituted:

### **995-1 Description.**

This Section governs the requirements for all permanent traffic control signals and devices. All equipment shall be permanently marked with manufacturer name or trademark, part number, and date of manufacture or serial number.

SECTION 995 is expanded by the following new Articles:

### **995-6 Midblock Crosswalk Enhancement Assemblies.**

**995-6.1 General:** Midblock crosswalk enhancement assemblies shall be listed on the Department's Approved Product List (APL). Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6.

Midblock crosswalk enhancement assemblies are classified as the following types: In-Roadway Light Assemblies and Rectangular Rapid Flashing Beacon Assemblies (RRFB).

**995-6.2 In-Roadway Light Assemblies:** In-roadway light assemblies must meet the physical and operational requirements of the latest edition of the MUTCD, Chapter 4N.

In-roadway light assemblies can include a passive detector in addition to a pedestrian pushbutton. In-roadway light assemblies must be normally dark and initiate operation upon pedestrian actuation via a pedestrian pushbutton or a passive detector. The In-roadway light assembly will cease operation at a predetermined time after the pedestrian actuation. If a passive detector is used, the In-roadway light assembly may cease operation after the pedestrian clears the crosswalk. The duration of the predetermined period shall be programmable and capable of matching the pedestrian clearance time for pedestrian signals as determined by MUTCD procedures. The timer that controls flashing must automatically reset each time a pedestrian call is received.

In-roadway light assemblies must have a minimum luminance of 101 candelas and a minimum viewing angle of 20 degrees.

**995-6.3 Rectangular Rapid Flashing Beacon (RRFB):** RRFB must include two rapidly and alternately flashed rectangular yellow indications having LED-array based pulsing light sources. Each rectangular yellow indication must be a minimum of five inches wide by two inches high. RRFB installations shall comply with the use and technical conditions of FHWA MUTCD Interim Approval 21 – Rectangular Rapid-Flashing Beacons at Crosswalks. The two RRFB indications shall be aligned horizontally, with the longer dimension horizontal and with a minimum space between the two indications of approximately 7 inches measured from inside edge of one indication to inside edge of the other indication.

**995-6.3.1 Beacon Flashing Requirements:** The light intensity of the yellow indications shall meet the minimum specifications of Society of Automotive Engineers (SAE) standard J595 for Class 1 (Directional Flashing Optical Warning Devices for Authorized Emergency, Maintenance, and Service Vehicles) dated January 2005. Ensure RRFB assemblies are capable of automatically dimming to reduce brightness of the LEDs at nighttime.

The flash rate of each individual yellow indication, as applied over the full on-off sequence of a flashing period of the indication, shall not be between 5 and 30 flashes per second. When activated, the two yellow indications in each RRFB shall have a flash rate of 75 flash cycles per minute using the following sequence: left side beacon on for 50 milliseconds (msec), both beacons off for 50 msec, right side beacon on for 50 msec, both beacons off for 50 msec, left side beacon on for 50 msec, both beacons off for 50 msec, right side beacon on for 50 msec, both beacons off for 50 msec, both beacons on for 50 msec, both beacons off for 50 msec, both beacons on for 50 msec, both beacons off for 250 msec. No other flash patterns shall be selectable via hardware or software.

**995-6.3.2 RRFB Operation:** RRFB can include a passive detector in addition to a pedestrian pushbutton. RRFBs must be normally dark and initiate operation only upon pedestrian actuation via a pedestrian pushbutton, or a passive detector. The RRFB will cease operation at a predetermined time after the pedestrian actuation. If the passive detector is used, the RRFB may cease operation after the pedestrian clears the crosswalk. The duration of the predetermined period shall be programmable and capable of matching the pedestrian clearance time for pedestrian signals as determined by MUTCD procedures. The timer that controls flashing must automatically reset each time a pedestrian call is received.

All RRFBs associated with a single crosswalk (including those with an overhead or advance crossing sign, if used) shall simultaneously commence operation of their alternating rapid flashing indications and shall cease operation simultaneously.

RRFBs must include an instruction sign (FTP-68C-21) mounted adjacent to or integral with each pedestrian pushbutton.

A confirmation light directed at and visible to pedestrians in the crosswalk must be installed integral to the RRFB to give confirmation that the RRFB is in operation.

**995-6.3.3 Accessible Pedestrian Pushbutton:** If an accessible pedestrian pushbutton is shown in the Plans, the assembly must contain a speaker, audio amplifier, and noise monitoring microphone for auto volume control.

The accessible pedestrian pushbutton detector must meet 995-9.3 for the locator tone feature. The pushbutton must not include a vibrotactile indication or percussive indications. The audible message must be programmable.

**995-6.4 Cabinets, Housings, and Hardware:** Cabinets used as part of the midblock crosswalk enhancement assembly must meet the applicable criteria of Section 676.

All housings other than approved cabinets must be powder coat painted dull black (FED-STD-595-37038) with a reflectance value not exceeding 25 percent as measured by American Society for Testing and Material E1347. Cabinets and housings must prevent unauthorized access.

Pole-mount assemblies shall allow installation on 4-1/2 inch outer diameter posts.

Ensure all assembly hardware, including nuts, bolts, external screws, and locking washers less than 5/8 inch in diameter, are Type 304 or 316 passivated stainless steel. Stainless steel bolts, screws, and studs must meet ASTM F593. Stainless steel nuts must meet ASTM F594. All assembly hardware greater than or equal to 5/8 inch in diameter must be galvanized. Carbon steel bolts, studs, and threaded rod must meet ASTM A307. Structural bolts must meet ASTM F3125, Grade A325.

**995-6.5 Electrical Specifications:** Equipment must operate on solar power or a nominal voltage of 120 V alternating current (V<sub>AC</sub>). If the device requires operating voltages of less than 120 V<sub>AC</sub>, supply the appropriate voltage converter. Solar powered systems must be designed to

operate for minimum of 100 activations per day and provide 10 days of operation without sunlight. Each activation must be 30 seconds in duration. Solar powered systems must automatically charge batteries and prevent overcharging and over-discharging. Solar powered systems must include a charge indicator.

**995-6.6 Environmental Specifications:** All electronic assemblies shall operate as specified during and after being subjected to the transients, temperature, voltage, humidity, vibration, and shock tests described in National Electrical Manufacturers Association (NEMA) TS2, 2.2.7, 2.2.8, and 2.2.9. Electronics must meet Federal Communications Commission (FCC) Title 47, Subpart B, Section 15. The optical portion of the housing shall be sealed to provide an IP 67 rating.

### **995-7 Mast Arm, Span Wire, and Pole Mounting Assemblies.**

**995-7.1 General:** Mast arm, span wire, and pole mounting assemblies shall be listed on the Department's Approved Product List (APL) and meet the requirements of Section 603. Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6.

Fastening hardware such as bolts, nuts, washers, set screws, studs, u-bolts, cable and cable swags, must be provided by the mounting assembly manufacturer, must be SAE Type 316 or 304 stainless steel. Hardware (studs, bolts and u-bolts) must be a minimum of 5/16 inch diameter unless otherwise specified in this Section. SAE Grade 8 bolts and nuts are also acceptable. Metallic mounting assemblies must meet ASTM B117 for corrosion resistance.

Connections that provide an entrance to the interior of a traffic device must be weather-resistant.

All assemblies must be constructed to support the weight of any combination of signal indications with all accessories such as back plates and visors.

Connections between signal, disconnect and disconnect hanging hardware must be of the tri-stud design unless otherwise specified in this Section. Tri-stud washers must be a minimum 0.090 inches thick unless otherwise specified in this Section.

Connections must be designed to mate with a standard traffic signal's two inch I.D. opening and must be capable of providing positive positioning and alignment of the traffic device. Connection type may be a 72 tooth serrated edge or other connection type as long as all other specifications are met. For 72 tooth serrated edge connections, the teeth must be clean, sharp, and at least 1/8 inch wide and 3/64 inch deep. All connection types must be weather resistant.

All mounting assemblies must be capable of providing adjustment in multiple directions for proper alignment of the attached traffic device and to prevent rotation around the vertical axis or misalignment after installation.

Use studs that are either cast directly into the aluminum during the casting process or tapped and locked with a locking material. In each case, a pull-out force must be provided. Messenger wire clamps must be extruded aluminum six inches long or cast U-bolt type.

Torque specifications must be included for all fastening hardware with the assembly installation instructions.

**995-7.2 Product Identification:** Mounting assemblies must be permanently marked with the name or trademark of the manufacturer, part number and date of manufacture. Identification must be cast into, or metal-marked on, the assembly in a legible manner. When the assembly is made up of multiple components, each component must be identified with the manufacturer's name or trademark.

**995-7.3 Finish:** Unless otherwise specified, mounting assemblies and components must be supplied with a natural finish with mill scale removed in accordance with Military Standard MIL-PRF-24712A or AAMA 2603-02 and must meet the requirements of ASTM 3359 and ASTM D3363. Disconnect (interior and exterior) and disconnect hub must be powder-coat painted dull black (Federal Standard 595A-37038) with a reflectance value not exceeding 25 percent as measured by ASTM E97. All finished surfaces must have a smooth finish free from cracks, blow-holes, shrinks, excessive material, and other flaws.

**995-7.4 Mast Arm Mounting Assemblies:** Mast arm mounting assemblies must include the following components: mast arm saddle, swivel, attachment cables (with cable clamp mechanism) or bands. Unless the assembly uses a free swinging mounting method, mast arm mounting assemblies must include the support tube, and top and bottom support arms. Mast arm mounting assemblies must be designed to be attached to a mast arm by cables or bands. All connections must be designed to prevent movement when 250 pounds of downward force is applied to the completed vehicular traffic signal assembly.

**995-7.4.1 Saddle:** Saddles must be aluminum or stainless steel and must have a minimum yield strength of 16 ksi and a minimum ultimate tensile strength of 23 ksi in accordance with ASTM B26, ASTM B108, ASTM B85 or ASTM A240.

**995-7.4.2 Swivel:** Swivels must be aluminum or stainless steel and must have a minimum yield strength of 16 ksi and a minimum ultimate tensile strength of 23 ksi in accordance with ASTM B26, ASTM B108, ASTM B85 or ASTM A240. The swivel must provide at least two connection devices to secure the support tube to the swivel and be configured to permit the support tube to provide adjustment in multiple directions in a plane parallel to the mast arm. Any castings used to attach the support tube to the swivel must be manufactured from the same alloy as the swivel.

**995-7.4.3 Saddle Attachment Cables and Bands:** Mast arm saddle attachment cables must be 3/16 inch minimum diameter, Type 316 or 304 stainless steel aircraft type wire strand cable. The swage at the ends of the cable (used to tighten the cable against the saddle) must be Type 316 or 304 stainless steel with a minimum 3/8 inch diameter thread. The swage must permit use of a wrench to prevent rotation while tightening the nut at the end of the swage. If the attachment cable does not have swaged clamp screws at each end (double-ended), the unclamped end of the cable must be sintered, welded, or otherwise secured without adhesives to prevent unraveling of the cable. Banding must use two Type 304 or 201 series stainless steel 3/4 inch wide bands and Type 316 stainless steel buckles (clamp screws). De-burr the edges of the bands.

**995-7.4.4 Cable Clamp Mechanism:** Mast arm mount components used to secure the cable to the saddle must be aluminum or stainless steel and must have a minimum yield strength of 23 ksi and a minimum ultimate tensile strength of 30 ksi in accordance with ASTM B26, ASTM B221, ASTM B85 or ASTM A240.

**995-7.4.5 Support Tube:** Support tubes used in mast arm mounting assemblies must be aluminum or stainless steel and must have a minimum yield strength of 25 ksi and a minimum ultimate tensile strength of 30 ksi in accordance with ASTM B221 or ASTM A240. A gusseted hollow design may be used to provide for the routing of necessary wiring. The tube cross-sectional area's principal moments of inertia must average; at a minimum, that of a 1-1/2 inch standard aluminum Schedule 40 pipe and the cross-sectional metal area must not be less than that of a 1-1/2 inch Schedule 40 pipe. The bottom portion of the tube that supports the vertical load of the hanging device must be threaded using National Pipe Thread Taper (NPT).



National Pipe Thread Straight (NPS), non-threaded U-bolt secured, or a continuous arm support tube. Threaded support tubes that are fully slotted must have an aluminum insert in the 3/4 inch slot extending a minimum of 1/2 inch beyond the threaded section. To provide easy installation of wiring, the tube must have a minimum 0.562 inch wire entrance slot running the full length of the tube, or either stopping a minimum of 8 inches above the threaded or U-bolt secured end. Edges of slot must be supported with internal gusseting. The tube interior and slot must be free of sharp edges that may damage wiring. Provide an easily installed and removable UV stabilized seal to completely fill the wire entrance slot after installation.

**995-7.4.6 Top Support Arm:** The top support arm of the mounting assembly must be of one-piece solid construction, or continuous arm with support tube, and capable of holding the signal head firmly in place. Top support arms must be aluminum with a minimum ultimate tensile strength of 30 ksi and minimum yield strength of 18 ksi in accordance with ASTM B26, or be die cast with a minimum ultimate tensile strength of 27 ksi and a minimum yield strength of 24 ksi.

A one or two piece top arm is acceptable. For a one piece top arm, use at least two 1/4 inch minimum diameter Type 316 or 304 stainless steel set screws to secure its position on the support tube. When a two-piece top arm is used, hardware required to connect components of the top arm must be 3/8 inch minimum diameter, Type 316 or 304 stainless steel.

The top support arm must have three 1/4 inch - 20 UNC-2B threaded holes to accept bolts for a tri-stud washer and gasket, or at least one imbedded or tapped and locked 5/16 inch - 18 threaded stud within the industry's standard 72 tooth serrated circular design that facilitates 5 degree increment positioning. Provide 0.090 inch thick (minimum) Type 316 or 304 stainless steel washers, nuts, and lock washers for attaching signal heads. A rubber washer, with dimensions similar to the large stainless steel washer, must be provided for traffic signals. When mast arm clamps are used to support illuminated signs with tri-stud arrangements, a rubber washer with dimensions similar to the steel washer must also be used.

**995-7.4.7 Bottom Support Arm:** The bottom support arm, when not continuous arm with support tube, must be hollow to allow the routing and enclosing of all signal wiring. Bottom support arms must be aluminum with a minimum ultimate tensile strength of 30 ksi and minimum yield strength of 18 ksi in accordance with ASTM B26, or be die cast with a minimum ultimate tensile strength of 27 ksi and a minimum yield strength of 24 ksi. Plastic bottom arm covers must be constructed of ABS with a UV inhibitor and be strong enough to contain the signal cable in the bottom arm cavity without bending during installation and warping over time.

The end of the bottom support arm that attaches to the support tube must have a 1-1/2 inch steel coupling imbedded and cast directly into the part during the solidification of the aluminum, or a 1-1/2 inch NPT or NPS pipe thread cut directly into the casting. For non-threaded versions, the arm must allow the support tube to sit a minimum of 2 inches into an arm pocket and be secured to the arm with minimum 5/16 full U-shape U-bolt to distribute the load evenly to the lower arm casting.

The end of the bottom support arm that connects to the signal must have either three equally spaced and plumb imbedded 5/16 inch Type 316 or 304 stainless steel threaded studs located in the center of the 72 tooth serrated circular design, or three 1/4 inch – 20 UNC-2B tapped holes to accept bolts for a tri-stud washer.

**995-7.4.7.1 Arms with Steel Coupling:** If a threaded steel coupling is imbedded into the casting, the bottom arm must be aluminum alloy 535.0-F in accordance with ASTM B26, with a minimum ultimate tensile strength of 23 ksi, meeting all standards listed in

ASTM B26, including chemical composition listed in Table 1 and material mechanical properties listed in Table 2. The end of the bottom support arm must have at least two 1/4 inch diameter Type 316 or 304 stainless steel set screws to secure its position on the support tube.

**995-7.4.7.2 Threaded Arms:** If threads are cut directly into the casting, the bottom arm must be aluminum alloy 535.0-F in accordance with ASTM B26, with a minimum ultimate tensile strength of 35 ksi and elongation of 9.0% in a two inch section, meeting all standards listed in ASTM B26, including chemical composition listed in Table 1 and material mechanical properties listed in Table 2. As an alternative, the arm can be die cast in aluminum with a minimum ultimate tensile strength of 27 ksi and a minimum yield strength of 24 ksi. The end of the bottom arm must have at least two 1/4 inch minimum diameter Type 316 or 304 stainless steel set screws to secure its position on the support tube.

**995-7.4.7.3 Non-threaded Arms:** Lower arm must be aluminum 356 having a minimum ultimate tensile strength of 30 ksi and meeting all standards listed in ASTM B26, including chemical composition listed in Table 1 and material mechanical properties listed in Table 2. The arm must have a locator tab to receive the support tube and be secured by a U-bolt.

**995-7.4.7.4 Continuous Arm Support Tube:** The continuous arm support tube must be of single form construction to support the weight of any combination of signal indicators with all accessories such as backplates and visors. Continuous support tubes must be Type 316 or 304 stainless steel with a minimum ultimate tensile strength of 75 ksi and a minimum yield strength of 30 ksi in accordance with ASTM A554, or aluminum with a minimum yield strength of 25 ksi and a minimum ultimate tensile strength of 30 ksi in accordance with ASTM B221.

The continuous arm support tube attachment to the signal head must have a minimum of two 5/16-18 Type 316 or 304 stainless steel bolts, nuts and washers. A rubber seal must be provided between the support tube and signal head.

**995-7.5 Span Wire Mounting Assemblies:** Span wire mounting assemblies must include a span wire clamp, a hanging device such as a drop pipe, adjustable hanger, or adjustable pivotal hanger with extension bar, messenger clamp, disconnect hanger, and multi-brackets.

**995-7.5.1 Span Wire Clamp:** Span wire clamps must be aluminum or stainless steel and must have a minimum ultimate tensile strength of 32 ksi and minimum yield strength of 22 ksi in accordance with ASTM B28, ASTM B108, ASTM B85, or ASTM A240.

**995-7.5.2 Drop Pipe:** Drop pipe hangers must be galvanized 1-1/2 inch steel aluminum having a minimum yield strength of 35 ksi and a minimum ultimate tensile strength of 42 ksi in accordance with ASTM B221 and have NPT on each end for assembly.

**995-7.5.3 Aluminum Adjustable Hanger:** Aluminum adjustable hangers must be aluminum alloy 535.0-F in accordance with ASTM B26 with a minimum ultimate tensile strength of 35 ksi and elongation of 9.0% in a two inch section, meeting the chemical composition listed in Table 1 and material mechanical properties listed in Table 2 in ASTM B26.

**995-7.5.4 Stainless Steel Adjustable Hanger:** Stainless steel adjustable hangers must be Type 316 or 304 stainless steel with a minimum ultimate tensile strength of 75 ksi and a minimum yield strength of 30 ksi in accordance with ASTM A276.

**995-7.5.5 Aluminum Adjustable Pivotal Hanger:** Aluminum pivotal hangers must be aluminum alloy 535.0-F in accordance with ASTM B26 with a minimum ultimate tensile strength of 35 ksi and elongation of 9.0% in a two inch section, meeting the chemical composition listed in Table 1 and material mechanical properties listed in Table 2 in ASTM B26.

**995-7.5.6 Stainless Steel Adjustable Pivotal Hanger:** Stainless steel pivotal hangers must be either Type 316 or 304 stainless steel with a minimum ultimate tensile strength of 75 ksi and a minimum yield strength of 30 ksi in accordance with ASTM A276.

**995-7.5.7 Aluminum Extension Bar:** Extension bars used to extend the length of the adjustable hanger must be T6061-T6 extrusion aluminum having a minimum yield strength of 35 ksi and a minimum ultimate tensile strength of 42 ksi in accordance with ASTM B221.

**995-7.5.8 Stainless Steel Extension Bar:** Stainless steel extension bar used to extend the length of adjustable hangers must be Type 316 or 304 stainless steel with a minimum ultimate tensile strength of 75 ksi and a minimum yield strength of 30 ksi in accordance with ASTM A276.

**995-7.5.9 Disconnect Hanger:** The disconnect hanger must be supplied with the following as a minimum:

1. Wired screw type/compression terminal block and wiring rated at 600 V<sub>AC</sub> Root Mean Square (rms) with 12 or 18 circuits. The terminal block must be easily accessible for connection of the field wiring. Attach the terminal block to the disconnect with Type 316 or 304 stainless steel or brass fastening hardware.

2. Weather resistant grommets in each signal cable entrance of the disconnect hanger to prevent insect and animal access and to protect the signal cable from chafing.

3. A two inch opening in the top of the disconnect hanger with an integral serrated area (or 1-1/2 inch NPT threaded top section) to interface with the hanger method employed above it.

4. A securable door that allows access to all areas of the interior. The door securing device must be Type 316 or 304 stainless steel and captive. Hinge or groove pins for the door must be Type 316, 304, 303, or 302 stainless steel.

**995-7.5.10 Multi-Brackets:** Top and bottom (multi) brackets used in the assembly of span wire mounted multi-directional signals must be constructed of aluminum having a minimum yield strength of 13 ksi and a minimum ultimate tensile strength of 23 ksi per ASTM B26.

Top brackets must be of one-piece hollow design, with a cross-sectional diameter of at least 1-1/2 inch I.D. for receiving signal wires. The wall thickness must be at least 3/16 inch. Each top bracket (2- way, 3-way, and 4-way) must have a two inch diameter hole (with integral serrated boss as specified above) in the top side of the bracket for receiving a 1-1/2 inch entrance fitting. The underside of the top bracket must have a covered hole of at least three inches in diameter for the installation of the signal wires.

Bottom brackets must be of one-piece solid construction and must hold the signal heads firmly in place.

For the five section cluster configuration, provide 3/8 inch thick Type 316 or 304 stainless steel tri-stud washers and nylock nuts with lock washers to secure the top and lower signal sections of the cluster to the top multi bracket. Washer distortion must not occur after assembly of the five section cluster. Multi-brackets must include all fastening hardware necessary to attach to the signal.

**995-7.6 Pole (Pedestal and Post) Mounting Assemblies:** All trunnions, brackets, and suspensions used in mounting vehicular and pedestrian signals to concrete, steel, aluminum, or wood poles must be an aluminum alloy cast fitting, pipe or equivalent as approved by the

Engineer. The aluminum alloy must have a minimum ultimate tensile strength of 35 ksi in accordance with ASTM B221, ASTM B85, or ASTM B26.

Pole side-mount brackets used for pedestrian signals may be constructed of polycarbonate material.

**995-7.7 Mounting Assemblies for Signs, Cameras, Detectors, and Other Traffic Control Devices:** Mounting assemblies or assembly components used for signs, cameras, detectors, and other traffic control devices must be constructed of the same material, and meet the same mechanical and chemical properties as mounting assemblies for signals.

**995-7.8 Miscellaneous Mounting Components:** Miscellaneous mast arm, span wire, and pole mounting components and accessories included with assemblies must meet the mechanical properties for its associated main assembly components or be listed separately on the APL. Mounting assemblies not approved with a specific primary device (such as a camera, detector, etc.), must be approved and listed separately on the APL.

### **995-8 Signal Priority and Preemption Systems.**

**995-8.1 General:** Signal priority and preemption system equipment shall be listed on the Department's Approved Product List (APL). Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6.

Signal priority and preemption system equipment may utilize optical, GPS, and radio frequency based technologies.

**995-8.2 Functional Requirements:** Ensure that in-vehicle equipment operates without requiring any action from the vehicle operator or occupants once power is applied.

**995-8.2.1 Security:** The system must include features that secure the system and restrict its configuration and operation to authorized users and vehicles only.

**995-8.2.2 Vehicle Identification:** The system must be able to assign a unique identifier for each authorized vehicle. The system must be able to associate the identifier with vehicle information such as vehicle classification (e.g., fire, police, rescue, transit), owner/operator, and priority level.

**995-8.2.3 Configuration and Management:** The system must allow authorized local and remote users to set and read all user-programmable features and retrieve data collected by the system. The manufacturer must provide computer software required to configure, operate, and maintain the system at no additional cost to the Department.

**995-8.2.4 Logging:** The system installed in the field cabinet must store a record of events, including time, vehicle ID, class, priority level, and approaching direction for all vehicles detected. The log must operate on a first-in, first out (FIFO) principle with a minimum capacity of 5,000 events.

**995-8.2.5 Detection Range and Accuracy:** The priority and preemption system must be capable of detecting and identifying multiple authorized vehicles at various ranges up to 2,500 feet. The system must be able to determine the approaching direction of authorized vehicles. The detection range and programming of emergency (high priority) and transit signal (low priority) preemption shall be adjustable from within the traffic signal cabinet. High priority calls must override low priority calls.

The system must service preemption calls having equal priority on a first-come, first-served basis.

**995-8.3 Preemption System Cabinet Electronics:** The priority and preemption system must be compatible with NEMA TS 1, NEMA TS 2, Type 170, and Type 2070 traffic signal controllers and their respective cabinets.

The system must be able to provide calls to the controller via input file and detector rack. The system must include two channel or four channel detector card units compatible with NEMA TS 2-2003 v02.06. The system must include a shelf mount option.

The system must be able to provide emergency preemption (high priority) and transit signal (low priority) preemption calls to the controller. Detectors must include programmable timers that allow the operator to configure detector call extension as well as limit the length of channel output calls.

Channel outputs must deliver a constant signal while emergency vehicles are detected for high priority preemption activation. Channel outputs must deliver a pulsed output for low priority preemption activation. Inputs and outputs must be optically isolated.

**995-8.3.1 Serial Interface:** Ensure that the serial ports support data rates up to 115 kbps; error detection procedures utilizing parity bits (i.e., none, even, and odd); and stop bits (1 or 2). Serial interface ports may utilize RJ-45 connectors, D-sub connectors, or screw terminals.

**995-8.3.2 Network Interface:** Ensure that local area network (LAN) connections support the requirements detailed in the Institute of Electrical and Electronics Engineers (IEEE) IEEE 802.3 Standard for 10/100 Ethernet connections. Ensure that the connector complies with applicable Electronic Industries Alliance (EIA) and Telecommunications Industry Association (TIA) requirements.

**995-8.4 Optical Preemption Detectors:** Optical preemption detectors must respond to light impulses generated from a visible or infrared light source.

**995-8.5 Intersection Radio/GPS Modules:** Radio/GPS preemption systems must include radio/GPS modules that transmit a beacon signal and receive data transmitted by Radio/GPS vehicle equipment.

**995-8.6 Mechanical Specifications:** Ensure equipment is permanently marked with manufacturer name or trademark, part number, and date of manufacture or serial number.

Ensure that every conductive contact surface or pin is gold-plated or made of a noncorrosive, conductive metal. Do not use self-tapping screws on the exterior of the assembly.

All external parts must be made of corrosion-resistant materials, such as plastic, stainless steel, anodized aluminum, brass, or gold-plated metal.

Detector cards must include indicators for power and vehicle detection. Detector cards must include a test switch that can be used to manually generate detector calls that the system provides during normal operations.

**995-8.7 Electrical Specifications:** Provide equipment that operates on a nominal voltage of 120 volts alternating current (V<sub>AC</sub>). If the device requires operating voltages of less than 120 V<sub>AC</sub>, supply the appropriate voltage converter.

**995-8.8 Environmental Specifications:** Ensure system electronics perform all required functions during and after being subjected to the environmental testing procedures described in NEMA TS 2, Sections 2.2.7, 2.2.8, and 2.2.9. Detectors and detector connections that are exposed to the elements must be weatherproof and designed for outdoor use.

## **995-9 Pedestrian Detection System.**

**995-9.1 General:** Pedestrian detection system equipment shall be listed on the Department's Approved Product List (APL). Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6.

Pedestrian detection systems are classified into three categories: Standard Pedestrian Pushbutton Detectors, Accessible (Audible/Tactile) Pedestrian Pushbutton Detectors,

and Passive Detectors. The components of the pedestrian detection system include pushbuttons, pedestrian actuation signs, electronics, wiring, and mounting hardware.

**995-9.2 Standard Pedestrian Pushbutton Detector:** Pushbuttons must be raised from or flush with their housings and be a minimum of 2 inches in the smallest dimension. The pushbutton must require no more than 5 pounds of force to activate. The detector must be weather-tight and tamper resistant.

**995-9.2.1 Housing:** The housing must be a two piece unit consisting of a base housing and a removable cover. The housing must be cast aluminum meeting the physical characteristics and chemical content established in ASTM B26 for alloys S5A and CS72A.

The housing or adapter (saddle) must conform to the shape of a pole and provide a flush, secure fit. Saddles must be of the same material and construction as the housing. Pushbuttons for wood pole mounting must have threaded holes for 1/2 inch conduit provided in the housing top or bottom. A 3/4 inch hole with an insulated bushing shall be provided through the back of the housing. Unused openings shall be closed with a weatherproof closure and painted to match the housing.

The housing must have a powder-coat finish and painted in accordance with Military Standard MIL-PRF-24712A. The housing must be permanently marked with manufacturer name or trademark, part number, date of manufacture, and serial number.

**995-9.2.2 Pushbutton:** The pushbutton must include a normally open, mechanical phenolic enclosed, positive-acting, spring-loaded, audible (i.e., click) snap-action switch with single pole, single throw contacts, or a Piezo driven solid state switch rated for a minimum of 50 V. The Piezo driven solid state switch, when activated, must give an audible (i.e., two-tone chirp) indication of actuation. A visual indication of actuation is optional. The visual indication must remain illuminated until the pedestrian's WALKING PERSON (symbolizing WALK) signal indication is displayed. Switch connections inside the housing must allow wiring and installation without binding. The switch must have a design life of one million operations (minimum) at rated load.

**995-9.2.3 Electrical Requirements:** The wiring must be No. 18 AWG stranded (minimum) with 600 V outdoor insulation rating.

**995-9.3 Accessible (Audible/Tactile) Pedestrian Pushbutton Detector:** The accessible pedestrian pushbutton detector must consist of all electronic control equipment, wiring, mounting hardware, pushbuttons, and pedestrian actuation signs designed to provide both a pushbutton with a raised, vibrating tactile arrow on the button as well as a variety of audible indications for differing pedestrian signal functions.

**995-9.3.1 Electronic Control Equipment:** The accessible pedestrian pushbutton detector must include electronic control equipment that is programmable and adjustable using a laptop computer or vendor supplied programmer. Electronic control equipment must be able to be installed within a traffic controller cabinet or within a pedestrian signal housing. Electronic control equipment installed within a traffic controller cabinet must allow the use of up to 16 pushbuttons (4 maximum per channel) with a single traffic controller cabinet. The accessible pedestrian pushbutton detector must receive timing from Walk and Don't Walk signals.

**995-9.3.1.1 Audible Messages:** Audible messages must be programmable. All audible messages and tones must emanate from the accessible pedestrian pushbutton housing. The accessible pedestrian pushbutton detector must utilize digital audio technology. The system shall have, at a minimum, three programmable locator tones. The accessible pedestrian pushbutton detector must have independent minimum and maximum

volume limits for the Locator Tone, Walk, and Audible Beacons features. The Wait message must only announce once per actuation.

**995-9.3.1.2 Pushbutton locator tone:** The accessible pedestrian pushbutton detector must provide independent ambient sound adjustment for the locator tone feature. The accessible pedestrian pushbutton detector must allow the locator tone to be deactivated.

**995-9.3.1.3 Vibrating Pushbutton (VPB):** The accessible pedestrian pushbutton detector must include a Vibrating Pushbutton (VPB). The VPB must be a single assembly containing an ADA compliant, vibro-tactile, directional arrow button, weatherproof audible speaker and pedestrian actuation sign with optional placard Braille messages. The VPB tactile arrow must be 2 inches in length, be field adjustable to two directions, and require no more than 5 pounds of applied force to activate.

**995-9.3.1.4 Conflict Monitoring:** The accessible pedestrian pushbutton detector must monitor the Walk condition for conflict operation. The accessible pedestrian detector system must disable the Walk functionality if a conflict is detected.

**995-9.3.1.5 Cabinet Control Unit (CCU):** The accessible pedestrian pushbutton detector may include a CCU for interfacing and connecting the system. The CCU shall have labeled LED indicators for each channel operation. The CCU must reset upon loss of internal communication.

**995-9.3.2 Inputs and Outputs:** All inputs and outputs must use Mil-Spec Multi-pin connectors.

**995-9.3.2.1 Inputs:** Walk and Don't Walk inputs must be optically isolated 80-150 volts AC/DC, 5mA max. General purpose inputs must be optically isolated 10-36 volts AC/DC, 10mA max.

**995-9.3.2.2 Outputs:** Outputs must be optically isolated 36 volts AC/DC peak, 300mA solid state fused contact closures. CCUs must include a normally open relay contact fault output.

**995-9.3.3 Communication:** The CCU must include an Ethernet interface. The CCU must have an integral web server that provides information on audible/tactile pedestrian-pushbutton detector status, access to event logs, and provides for remote Configuration of accessible pedestrian pushbutton detector system options. VPBs must include an Ethernet, serial, USB, or Bluetooth programming interface.

**995-9.4 Passive Detectors:** The passive detector must consist of all electronic control equipment, wiring, and mounting hardware.

**995-9.4.1 General:** A passive detector system uses one or more sensors and analytics hardware and software to detect the presence and direction of pedestrians and activate the traffic control device without any required action by the pedestrian.

**995-9.4.2 Configuration and Management:** Ensure that the passive detector is provided with software that allows local and remote configuration and monitoring. Ensure that the system can display detection zones and detection activations overlaid on live passive detector inputs. Ensure that the passive detector allows a user to edit previously defined configuration parameters, including size, placement, and sensitivity of detection zones.

Ensure that the passive detector retains its programming in nonvolatile memory. Ensure that the detection system configuration data can be saved to a computer and restored from a saved file. Ensure that all communication addresses are user programmable.

**995-9.4.3: Solid State Detection Outputs:** Ensure outputs meet the requirements of NEMA TS2-2016, 6.5.2.26.

**995-9.4.4: Electrical Requirements:** Ensure the system operates using a nominal input voltage of 120V of alternating current ( $V_{AC}$ ). Ensure that the system will operate with an input voltage ranging from 89 to 135  $V_{AC}$ . If a system device requires operating voltages other than 120  $V_{AC}$ , supply a voltage converter.

**995-9.5 Electrical:** All wiring must meet applicable NEC requirements. The accessible pedestrian pushbutton detector must operate using a nominal input voltage of 120 V alternating current ( $V_{AC}$ ). If any device requires nominal input voltage of less than 120  $V_{AC}$ , furnish the appropriate voltage converter.

Accessible pedestrian pushbutton detector control electronics that are mounted in a pedestrian signal head must be able to receive power from the Walk and Don't Walk circuits of the signal head. Control electronics shall not require more than four wires for each pushbutton connection, and no more than two wires for each controller pedestrian input. Voltage at the pushbutton shall not exceed 24  $V_{AC}$ .

**995-9.6 Mechanical:** Equipment must be permanently marked with manufacturer name or trademark, part number, date of manufacture, and serial number. Do not use self-tapping screws on the exterior of the assembly.

Ensure that all parts are made of corrosion-resistant materials, such as plastic, stainless steel, anodized aluminum, brass, or gold-plated metal. Ensure that all assembly hardware, including nuts, bolts, external screws and locking washers less than 5/8 inch in diameter, are Type 304 or 316 passivated stainless steel. Stainless steel bolts, screws and studs must meet ASTM F593. Nuts must meet ASTM F594. All assembly hardware greater than or equal to 5/8 inch in diameter must be galvanized. Bolts, studs, and threaded rod must meet ASTM A307. Structural bolts must meet ASTM F3125, Grade A325.

Enclosures must have a NEMA 4X rating. Pushbutton housings for intersections must be black.

**995-9.7 Environmental:** Ensure equipment performs all required functions during and after being subjected to the environmental testing procedures described in NEMA TS2-2016, Sections 2.2.7, 2.2.8, and 2.2.9.





*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 10, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **996**  
Proposed Specification: **9960201 Intelligent Transportation System Device Materials.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Derek Vollmer from the Traffic Engineering and Operations Office to remove the video display system as it does not need to be compatible with the Department's SunGuide software system.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

## INTELLIGENT TRANSPORTATION SYSTEM DEVICE MATERIALS (REV 11-10-21)

SUBARTICLE 996-2.1 is deleted and the following substituted:

**996-2.1 General:** All ~~video~~-CCTV camera equipment shall be listed on the Department's Approved Product List (APL). Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6.

All equipment shall be permanently marked with manufacturer name or trademark, part number, and date of manufacture or serial number. All parts shall be constructed of corrosion-resistant materials, such as plastic, stainless steel, anodized aluminum, brass, or gold-plated metal. All fasteners exposed to the elements shall be Type 304 or 316 passivated stainless steel.

SUBARTICLE 996-2.3.2 is deleted and the following substituted:

**996-2.3.2 Display Control Software:** The display control software shall allow multiple operators to control all features and functions of the video display control system. These features and functions include, but are not limited to, selection of video sources for display; adjusting the size, location, and layout of video and other graphic information the system displays; and system configuration and setup. The control software shall be able to operate a video wall composed of multiple display components as though it were a single, high-resolution display.

~~The display control software is compatible with the Department's SunGuide<sup>®</sup> software system.~~

The display control software shall include a non-proprietary Software Development Kit (SDK) including, but not limited to, an Application Programming Interface (API) that describes interfaces and protocols which can be used to integrate system features and functions with third-party applications.

**INTELLIGENT TRANSPORTATION SYSTEM DEVICE MATERIALS  
(REV 11-10-21)**

SUBARTICLE 996-2.1 is deleted and the following substituted:

**996-2.1 General:** All CCTV camera equipment shall be listed on the Department's Approved Product List (APL). Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6.

All equipment shall be permanently marked with manufacturer name or trademark, part number, and date of manufacture or serial number. All parts shall be constructed of corrosion-resistant materials, such as plastic, stainless steel, anodized aluminum, brass, or gold-plated metal. All fasteners exposed to the elements shall be Type 304 or 316 passivated stainless steel.

SUBARTICLE 996-2.3.2 is deleted and the following substituted:

**996-2.3.2 Display Control Software:** The display control software shall allow multiple operators to control all features and functions of the video display control system. These features and functions include, but are not limited to, selection of video sources for display; adjusting the size, location, and layout of video and other graphic information the system displays; and system configuration and setup. The control software shall be able to operate a video wall composed of multiple display components as though it were a single, high-resolution display.

The display control software shall include a non-proprietary Software Development Kit (SDK) including, but not limited to, an Application Programming Interface (API) that describes interfaces and protocols which can be used to integrate system features and functions with third-party applications.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 25, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **004**  
Proposed Specification: **SP0040100 Scope of Work – Intent of Contract.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Tim Lattner from the Office of Design to delete the summary of pay items statement because it will be included in the Estimated Quantities Report and will no longer be listed in the Plans.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**SCOPE OF WORK – INTENT OF CONTRACT.**  
**(REV 10-25-21)**

ARTICLE 4-1 is expanded by the following:

The Improvements under this Contract consist of **Place description here.**

~~The summary of pay items for this project is listed in the Plans.~~

**SCOPE OF WORK – INTENT OF CONTRACT.**  
**(REV 10-25-21)**

ARTICLE 4-1 is expanded by the following:

The Improvements under this Contract consist of Place description here.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 17, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **007**  
Proposed Specification: **SP0070104-5 Legal Requirements and Responsibility to the Public - Laws to be Observed - Compliance with Federal Endangered Species Act and Other Wildlife Regulations (Smalltooth Sawfish).**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Special Provision.

The changes are proposed by Katasha Cornwell from the State Environmental Management Office to remove an unnecessary pre-construction meeting item and to clarify when to operate at "Idle Speed/No Wake.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

Use when called for by the District Environmental Permit Office (Sawfish).

**LEGAL REQUIREMENTS AND RESPONSIBILITY TO THE PUBLIC – LAWS TO BE OBSERVED - COMPLIANCE WITH FEDERAL ENDANGERED SPECIES ACT AND OTHER WILDLIFE REGULATIONS (SMALLTOOTH SAWFISH).**

**(REV 10-21-21)**

SUBARTICLE 7-1.4 is expanded by the following:

The Department has determined that the project occurs within the known habitat of smalltooth sawfish (*Pristis pectinata*).

The Department will provide instruction at a preconstruction meeting regarding:

1. The presence of species and limits of critical habitat.
2. The appearance, habits and biology of the species.
3. Their protected status.
4. The need to avoid collisions with these species.
5. ~~The need to avoid any actions that would jeopardize the existence of these species.~~

56. The civil and criminal penalties for harming, harassing, or killing of these species.

Advise all work crews of this information.

Provide sediment and turbidity barriers constructed of material in which a smalltooth sawfish cannot become entangled. Secure and monitor the sediment and turbidity barriers to avoid protected species entrapment. Sediment and turbidity barriers may not block smalltooth sawfish entry to or exit from designated critical habitat without prior approval of the Engineer and concurrence from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.

Operate all vessels at the minimum safe speed when transiting and maintain vigilant watch for smalltooth sawfish to avoid striking them. Operate at "Idle Speed/No Wake" at all times speeds while in the construction area and ~~while~~ in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom and in all depths after smalltooth sawfish has been observed and recently departed the area. Follow marked channels or routes of deep water whenever possible. Maintain a distance of 150 feet or greater between smalltooth sawfish and the vessel. When visibility is limited, assign a designated individual to observe for smalltooth sawfish and limit vessel operation to only daylight hours.

All on-site project personnel are responsible for observing water-related activities for the presence of smalltooth sawfish. When smalltooth sawfish are observed, follow the smalltooth sawfish guidelines posted in the URL address in 7-1.4.





*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 17, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **007**  
Proposed Specification: **SP0070104-6 Legal Requirements and Responsibility to the Public - Laws to be Observed - Compliance with Federal Endangered Species Act and Other Wildlife Regulations (Sea Turtle).**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Special Provision.

The changes are proposed by Katasha Cornwell from the State Environmental Management Office to remove an unnecessary pre-construction meeting item and to clarify when to operate at "Idle Speed/No Wake.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**LEGAL REQUIREMENTS AND RESPONSIBILITY TO THE PUBLIC – LAWS TO BE OBSERVED - COMPLIANCE WITH FEDERAL ENDANGERED SPECIES ACT AND OTHER WILDLIFE REGULATIONS (SEA TURTLE).**

**(REV 10-21-21)**

SUBARTICLE 7-1.4 is expanded by the following:

The Department has determined that the project occurs within the known habitat of sea turtles (*Caretta caretta*, *Chelonia mydas*, *Dermochelys coriacea*, *Lepidochelys kempi*, *Eretmochelys imbricate*).

The Department will provide instruction at a pre-construction meeting regarding:

1. The presence of species and limits of critical habitat.
2. The appearance, habits and biology of the species.
3. Their protected status.
4. The need to avoid collisions with these species.
- ~~5. The need to avoid any actions that would jeopardize the~~

~~existence of these species.~~

~~\_\_\_\_\_~~ ~~65.~~ The civil and criminal penalties for harming, harassing, or killing these species.

Advise all work crews of this information.

Provide sediment and turbidity barriers constructed of material in which a sea turtle cannot become entangled. Secure and monitor the sediment and turbidity barriers to avoid protected species entrapment. Sediment and turbidity barriers may not block sea turtle entry to or exit from designated critical habitat without prior approval of the Engineer and concurrence from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.

Operate all vessels at the minimum safe speed when transiting and maintain vigilant watch for sea turtles to avoid striking them. Operate at "Idle Speed/No Wake" at all times speeds while in the construction area ~~and while~~ in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom, and in all depths after sea turtles have been observed and recently departed the area. Follow marked channels or routes of deep water whenever possible. Maintain a distance of 150 feet or greater between sea turtles and the vessel. When visibility is limited, assign a designated individual to observe for sea turtles and limit vessel operation to only daylight hours.

All on-site project personnel are responsible for observing water-related activities for the presence of sea turtles. When sea turtles are observed, follow the sea turtle species guidelines posted in the URL address in 7-1.4.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 27, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **007**

Proposed Specification: **SP0071153B Legal Requirements and Responsibility to The Public – Preservation of Existing Property - Utilities – Utility Adjustments (Utility Work Schedules).**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Special Provision.

The changes are proposed by Melissa Hollis from the Product Evaluation Office to move general note text for Utility Locations to Subarticle 7-11.5.1.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

When there are utility work schedules.

**LEGAL REQUIREMENTS AND RESPONSIBILITY TO THE PUBLIC –  
PRESERVATION OF EXISTING PROPERTY - UTILITIES – UTILITY  
ADJUSTMENTS (UTILITY WORK SCHEDULES).**

**(REV ~~5-19-21~~1-26-22)**

SUBARTICLE 7-11.5.1 is expanded by the following:

The location(s) of the underground utilities identified in the Plans (including those designated Vv, Vh, and Vvh) are based on limited investigation techniques and should be considered approximate only. The verified locations/elevations identified in the Plans apply only at the specific points shown. Interpolations between these points have not been verified.

SUBARTICLE 7-11.5.3 is expanded by the following:

The utility work which will be accomplished concurrently with the highway construction Contract will involve facilities owned by other agencies. Utility Schedules (Utility Relocation and/or Work Schedules) for these agencies are posted on the Department's website at the following URL address:

<https://ftp.fdot.gov/public/folder/HkSWIK59G0qRNsAJUh3xXg/permitsandorutilityworkschedules>. Take responsibility to obtain this information and comply with all requirements posted on this website up through five calendar days before the opening of bids.

Where utility work must be coordinated with highway construction operations, the portion of the anticipated utility work period covering such concurrent work may or may not begin on the day highway construction commences and may or may not be consecutive days.

The anticipated scheduling of new work, adjustments and/or relocation work is included on the Utility Schedules.

More precise scheduling to accomplish utility work in the most expeditious manner that is feasible will be established at the preconstruction conference as provided in 8-3.5.

The Utility Schedules shall be used in conjunction with the utility sheets included in the roadway plans.

If the Department's website cannot be accessed, contact the Department's Specifications Office Web Coordinator at (850) 414-4101.



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 17, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **008**  
Proposed Specification: **SP0080604 Prosecution and Progress - Suspension of Contractor's Operations- Special Events.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Special Provision.

The changes are proposed by Melissa Hollis from the Product Evaluation Office to move general note text for Special Events to a Special Provision with a listing of the Date/Event.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/vc

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**PROSECUTION AND PROGRESS - SUSPENSION OF CONTRACTOR'S  
OPERATIONS- SPECIAL EVENTS.  
(REV 5-19-21)**

ARTICLE 8-6 is expanded by the following:

**8-6.4 Suspension of Contractor's Operations - Holidays and Special Events: For this  
Contract, Special event days for this project include:  
{List special events}**



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 25, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **SP4550000DB**  
Proposed Specification: **Additional Change to SP4550000DB Structures Foundations  
(Design Build).**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Special Provision.

The changes are proposed by Juan Castellanos from the State Construction Office to include language for pile driving system requirements. The proposed changes are an addition to the changes made to include polymer as an APL product and to provide requirements to drilled shaft construction, that has already been sent out for review. Change is made to Subarticle 455-5.3.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**STRUCTURES FOUNDATIONS (DESIGN BUILD).****(REV ~~12~~7-14-21) (FA ~~7-19-21) (71-22)~~**

SUBARTICLE 455-5.3 is deleted and the following substituted:

**455-5.3 Pile Hammers:** All equipment is subject to satisfactory field performance during and without dynamic testing. Use a variable energy hammer to drive concrete piles. Hammers will be rated based on the theoretical energy of the ram at impact. Supply driving equipment which provides the required normal bearing resistance at a blow count ranging from 3 blows per inch (36 blows per foot) to 10 blows per inch (120 blows per foot) at the end of initial drive, and capable of driving the piles to a resistance equal to at least 1.25 times the nominal bearing resistance, without overstressing the piling in compression or tension and without reaching practical refusal, as defined in 455-5.11.3. ~~When the stroke height or bounce chamber pressure readings do not adequately determine the energy of the hammer, provide and maintain a device to measure the velocity of the ram at impact. Determine the actual hammer energy in the field so that it is consistent with the hammer energy used for each bearing capacity determination.~~ When requested, submit to the Engineer all technical specifications and operating instructions related to hammer equipment.





*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

January 25, 2022

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **SP4550000DB**  
Proposed Specification: **Additional Change to SP4550000DB Structures Foundations  
(Design Build).**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Special Provision.

The changes are proposed by Juan Castellanos from the State Construction Office to include language for pile driving system requirements. The proposed changes are an addition to the changes made to include polymer as an APL product and to provide requirements to drilled shaft construction, that has already been sent out for review. Change is made to Subarticle 455-5.3.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer



*Florida Department of Transportation*

RON DESANTIS  
GOVERNOR

605 Suwannee Street  
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.  
SECRETARY

December 13, 2021

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section: **SP4550000DB**  
Proposed Specification: **SP4550000DB Structures Foundations (Design Build).**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Special Provision.

The changes are proposed by Juan Castellanos from the State Construction Office to include polymer as an APL product and to provide requirements to drilled shaft construction. The proposed changes are associated with the changes made to Section 932.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email [daniel.strickland@dot.state.fl.us](mailto:daniel.strickland@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

Use when requested and approved by the District Construction Engineer

**SP455 STRUCTURES FOUNDATIONS (DESIGN BUILD).**

**(REV ~~127-914-21~~) (FA ~~12-14-217-19-21~~) (~~71-22~~)**

SUBARTICLE 455-14.3 is deleted and the following substituted:

**C. DRILLED SHAFTS**

**455-13 Description.**

Construct drilled shaft foundations consisting of reinforced concrete drilled shafts.

**455-14 Materials.**

**455-14.1 Concrete:** Use concrete meeting the requirements of Section 346, unless otherwise shown in the Plans.

**455-14.2 Reinforcing Steel:** Meet the reinforcing steel requirements of Section 415.

**455-14.3 Polymer Slurry:** Use a product listed on the Department's Approved Product List (APL) meeting the requirements of 932-5.

SUBARTICLE 455-12.1.2 is deleted and the following substituted:

**455-15 Construction Methods and Equipment.**

**455-15.1 General Requirements:**

**455-15.1.1 Templates:** When drilling from a barge, provide a fixed template, adequate to maintain shaft position and alignment during all excavation and concreting operations. Do not use floating templates (attached to a barge). When the Contractor fails to properly maintain shaft position and alignment without use of a template when drilling on land, provide a fixed template, adequate to maintain shaft position and alignment during all excavation and concreting operations.

**455-15.1.2 Drilled Shaft Installation Plan (DSIP):** At the preconstruction conference or at least 15 days prior to constructing the first drilled shaft, submit a Drilled Shaft Installation Plan (DSIP) for review and acceptance by the Engineer. The DSIP will be used to govern all drilled shaft construction activities. In the event that deviations from the DSIP are observed, the Engineer may perform Independent Verification Testing/Review of the Contractor's equipment, procedures and personnel at any time during production drilled shaft construction. If, as determined by the Engineer, drilled shaft construction equipment, procedures or personnel is deemed inadequate to consistently provide drilled shafts meeting the contract requirements, the Contractor's DSIP may be withdrawn pending corrective actions. All drilled shaft construction activities shall then cease and not restart until corrective actions have been taken and the DSIP has been re-accepted.

Include in the DSIP the following details:

1. Name and experience record of drilled shaft superintendent or foreman in responsible charge of drilled shaft operations. Ensure the drilled shaft superintendent or foreman in responsible charge of the drilled shaft operations has the experience requirements of 105-8.13 installing drilled shafts of the size and depth shown in the Plans using the following methods:

a. Wet Method (mineral and polymer slurry),

- b. Casings up to the length shown in the Plans,
- c. Shaft drilling operations on water under conditions as

shown in the Plans.

2. List and size of proposed equipment, including, but not limited to, cranes, drills, augers, bailing buckets, final cleaning equipment, desanding equipment, slurry pumps, core sampling equipment, tremies or concrete pumps, and casings and equipment to install and remove casing.

3. Details of sequence of construction operations and sequence of shaft construction in bents or shaft groups.

4. Details of shaft excavation methods, including casing installation procedures.

5. Details of slurry, including proposed methods to mix, circulate, desand, test methods, and proposed CTQP certified technicians that will perform and document the fluid tests.

6. Details of proposed methods to clean the shaft excavation.

7. Details of shaft reinforcement, including methods to ensure centering/required cover, cage integrity during placement, placement procedures, cage support, and tie downs.

8. Details of concrete placement, including elapsed concrete placement times and proposed operational procedures for concrete tremie or pump, including initial placement, raising during placement, and overfilling of the shaft concrete. Include provisions to ensure proper final shaft cutoff elevation.

9. Details of casing removal when removal is required, including minimum concrete head in casing during removal.

10. Required submittals, including shop drawing and concrete design mixes.

11. Details of any required load tests, including equipment and procedures, and recent calibrations for any jacks or load cells.

12. Proposed Cross-Hole Sonic Logging (CSL) and Thermal Integrity Testing for Drilled (TITDS) Specialty Engineer to supervise field testing and report the test results.

13. Methods and equipment proposed to prevent displacement of casing and/or shafts during placement and compaction of fill.

14. Provide the make and model of the shaft inspection device, if applicable, and procedures for visual inspection.

15. Details of environmental control procedures used to prevent loss of slurry or concrete into waterways or other protected areas.

16. Proposed schedule for test shaft installation, load tests and production shaft installation.

17. For drilled shafts for constructed using polymer slurry, identify the polymer slurry ~~meeting the requirements of 455-15.8.3~~, the pH and ~~recommended by the manufacturer for the materials to be excavated~~ and a description of the mixing method to be used. ~~Submit the Material Safety Data Sheets (SDS) for the product, and a current certification that the polymer slurry and components meet the requirements of 455-15.8.3. The certification shall be attested to within the past one year by a person having legal authority to bind the manufacturing company.~~ Submit the contact information for the

manufacturer's representative available for immediate contact during shaft construction and the representative's schedule of availability.

18. Methods to identify and remediate drilled shaft deficiencies.

19. Names of the CTQP qualified inspectors assigned to inspect the drilled shaft installation.

20. The name and contact information for the single representative of the Contractor, independent of field operations personnel, to resolve to the Engineer's satisfaction, conflicts in the drilled shaft installation procedures. This person shall be available within two hours notice, and shall have the authority to refer issues to higher levels (corporate, if needed).

21. Procedure for grouting non-destructive testing access tubes.

22. A letter from the GFDEOR certifying concurrence with the

DSIP.

23. Other information shown in the Plans or requested by the Engineer.

SUBARTICLE 455-15.1.2.1 is deleted and the following substituted:

**455-15.1.2.1 Acceptance of the Drilled Shaft Installation Plan (DSIP):**

The Engineer will evaluate the DSIP for conformance with the Contract Documents. Within five working days, excluding weekends and Department observed holidays, after receipt of the plan, the Engineer will notify the Contractor of any comments and additional information required and/or changes that may be necessary ~~in the opinion of the Engineer~~ to meet the above requirements and satisfy the Contract Documents. The Engineer will reject any part of the plan that does not meet specifications, plans or has the potential to affect the integrity of adjacent structures or negatively affect the environmental conditions ~~is unacceptable~~. Submit changes agreed upon for reevaluation. The Engineer will notify the Contractor within two working days, excluding weekends and Department observed holidays, after receipt of proposed changes of their acceptance or rejection. All equipment and procedures are subject to trial and satisfactory performance in the field.

Acceptance by the Engineer does not relieve the Contractor of the responsibility to perform the work in accordance with the Contract Documents. The Engineer's acceptance is not a guarantee that the chosen methods and equipment are capable of obtaining the required results, this responsibility lies with the Contractor.

SUBARTICLE 455-15.8.1 is deleted and the following substituted:

**455-15.8 Slurry and Fluid in Excavation:**

**455-15.8.1 General:** Thoroughly premix the slurry in a mixing tank with clean fresh water prior to introduction into the shaft excavation. Introduce slurry before the excavation advances below the bottom of the casing. Ensure that the percentage of polymer or mineral admixture used to make the suspension is such as to maintain the stability of the shaft excavation. ~~The Engineer will require~~ Provide adequate water or slurry tanks ~~when necessary~~ to perform the work in accordance with these Specifications. The Engineer will not allow excavated pits on projects requiring slurry tanks without the written permission of the Engineer. Take the

steps necessary to prevent the slurry from “setting up” in the shaft, including but not limited to agitation, circulation, and adjusting the composition and properties of the slurry. Provide suitable offsite disposal areas and dispose of all waste slurry in a manner meeting all requirements pertaining to pollution.

For shafts to support sign, signal, lighting and ITS structures, polymer slurry may be mixed in the casing portion, in accordance with the APL approved instructions if the following conditions are met:

1. Contractor tests and verifies the polymer slurry meets the property requirements of 455-15.8.3, before continuing the excavation below the casing.

2. Polymer mix continues to be added as required below the bottom of the casing, to maintain the slurry properties during the excavation within compliance of 455-15.8.3.

3. Slurry sampling and testing is performed at intervals not exceeding one hour, in the middle of the excavation depth at the time of testing to verify the properties are maintained within compliance throughout the excavation.

4. If failing to demonstrate the properties are maintained within compliance of 455-15.8.3, discontinue this mixing method and use a slurry pre-mixed in a tank.

Provide a CTQP qualified drilled shaft inspector to perform control tests using suitable apparatus on the slurry mixture to determine the slurry and fluid properties as specified in sub-articles 455-15.8.2 to 455-15.8.4.

Measure the viscosity of the freshly mixed slurry regularly as a check on the quality of the slurry being formed using an approved measuring device.

Perform tests from the fluid in the excavation to determine density, viscosity, and pH value to establish a consistent working pattern, taking into account the mixing process and blending of freshly mixed slurry and previously used slurry. Repeat tests to determine density, viscosity, and pH value at intervals not exceeding 2 hours during the first 8 hours slurry is in use and every 4 hours thereafter, including overnight, until concrete placement. Perform density, viscosity and pH tests again when the excavation reaches the midpoint. When the contractor operations require the shaft excavation to be interrupted and performed in multiple shifts, the continuous testing may be waived if the excavation at the time of suspension of the operations is not deeper than the bottom of the casing provided.

For shafts to support sign, signal, lighting, and ITS structures up to 5 ft diameter and up to 40 ft in depth, when the contractor operations require the shaft to be constructed in multiple shifts, the continuous testing may be waived if the excavation at the time of operations suspension is not deeper than the bottom of the casing provided, or if all the conditions below are met:

1. The shaft location does not pose a safety risk to the public, adjacent lane, utility pole, or any structure, if the excavation fails.

2. Slurry testing is performed at the time of suspending operations and at a time not exceeding 12 hours after that or at the time the operations resume whichever comes first. Testing shall be performed at intervals not exceeding 2 hours for the first 8 hours after resuming operations and every 4 hours thereafter.

3. Slurry testing shall be performed on at least two samples each time, one sample approximately three feet from the bottom and one sample from the middle of the excavation depth at the time the operations were suspended. The results must indicate the polymer slurry meets the viscosity requirements of 455-15.8.3. If this requirement is not met, do not continue without testing for more than 4 hours including the time periods between shifts.

4. The contractor performs soundings of the fluid level, at intervals of 15 minutes or longer, that demonstrate the fluid level is stable over two consecutive soundings.

5. If when resuming operations, slurry does not meet density, pH, or both, adjust the slurry to meet all property requirements of 455-15.8.3. Re-test slurry to verify properties meet the requirements, before resuming operations. Continue testing the slurry every 4 hours after resuming operations until completion of the excavation.

The Department may perform comparison tests as determined necessary during the mineral and polymer slurry operations.

If, at any time in the opinion of the Engineer, the wet construction method fails to stabilize the excavation discontinue this method of construction, backfill the excavation and submit modifications in procedure or alternate means of construction for approval.

SUBSRTICLE 455-15.8.2 is deleted and the following substituted:

**455-15.8.2 Mineral Slurry:** When mineral slurry is used in an excavation, use only processed attapulgit or bentonite clays with up to 2% (by dry weight) of added polymer. Use mineral slurry having a mineral grain size such that it will remain in suspension and having sufficient viscosity and gel characteristics to transport excavated material to a suitable screening system. Use a percentage and specific gravity of the material to make the a suspension sufficient able to maintain the stability of the excavation and to allow proper placement of concrete. Ensure that the material used to make the slurry is not detrimental to concrete or surrounding ground strata. During construction, maintain the level of the slurry at a height sufficient to prevent caving of the hole. In the event of a sudden significant loss of slurry such that the slurry level cannot practically be maintained by adding slurry to the hole, backfill the excavation and delay the construction of that foundation until an alternate construction procedure has been approved.

Perform the following tests on the mineral slurry supplied to and in the shaft excavation and ensure that the results are within the ranges stated in the table below:

Item to be measured	Range of Results at 68°F <u>fluid temperature</u>	Test Method
Density	64 to 73 lb/ft <sup>3</sup> (in fresh water environment) 66 to 75 lb/ft <sup>3</sup> (in salt water environment)	Mud density balance: FM 8-RP13B-1
Viscosity	30 to 40 seconds	Marsh Cone Method: FM 8-RP13B-2
pH	8 to 11	Electric pH meter or pH indicator paper strips: FM 8-RP13B-4
Sand Content	4% or less	FM 8-RP13B-3

The Contractor may adjust the limits in the above table when field conditions warrant as successfully demonstrated in a test hole or with other methods approved by

the Engineer. The Engineer must approve all changes in writing before the Contractor can continue to use them.

During construction, maintain the level of mineral slurry in the shaft excavation within the excavation and at a level not less than 4 feet above the highest expected piezometric water elevation along the depth of a shaft.

SUBARTICLE 455-15.8.3 is deleted and the following substituted:

**455-15.8.3 Polymer Slurry:** ~~Materials manufactured expressly for use as polymer slurry for drilled shafts that meet the requirements of this subarticle may be used as slurry for drilled shaft excavations.~~ A representative of the manufacturer must be on-site or available for immediate contact to assist and guide the construction of the first three drilled shafts at no additional cost to the Department. This representative must also be available for on-site assistance or immediate contact if problems are encountered during the construction of the remaining drilled shafts. Use polymer slurry only if the soils below the casing are not classified as organic, and the pH of the fluid in the hole can be maintained in accordance with the manufacturer's ~~published~~ recommendations. ~~Submit the SDS for the product, the manufacturer's published mixing procedures, and the manufacturer's published range of values for pH and viscosity of the mixed slurry. Submit a report in accordance with Section 2.4, Volume II of the Department's Material Manual, which may be viewed at the following URL: <http://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section24V2.shtm>.~~ The report must include test results, certification and documentation that demonstrate the polymer slurry and additives meet the following requirements:

- ~~1. The polymer slurries to be used on the project and their waste products are classified as non-hazardous as defined by Resource Conservation and Recovery Act (RCRA) Subpart C rules, Table 1 of 40 CFR 261.24 Toxicity Characteristic.~~
- ~~2. Pull-out tests demonstrate the bond between the bar reinforcement and the concrete is not materially affected by exposure to the slurry under typical construction conditions, over the typical range of slurry viscosities to be used.~~
- ~~3. Load tests demonstrate the bond between the concrete and the soil is not materially affected by exposure to the polymer slurry under typical construction conditions, over the typical range of polymer slurry viscosities to be used.~~
- ~~4. The method of disposal meets the approval of all federal, state and local regulatory authorities.~~

Perform the following tests on the polymer slurry supplied to and in the shaft excavation and ensure that the results are maintained within the ranges stated in the table below:



Table 455-3 Mixed Polymer Slurry Properties		
Item to be measured	Range of Results at 68°F <u>fluid temperature</u>	Test Method
Density	62 to 65 lb/ft <sup>3</sup> (fresh water) 64 to 67 lb/ft <sup>3</sup> (salt water)	Mud density balance: FM 8-RP13B-1
<u>Viscosity: for bridges and main structure foundations</u>	50 seconds to upper limit <u>published defined by the APL manufacturer, limited by 455-15.8.3 (2) and (3) above, for materials excavated</u>	Marsh Cone Method: FM 8-RP13B-2
<u>Viscosity: for miscellaneous structure foundations</u>	<u>50 seconds to upper limit recommended by the manufacturer based on soil type</u>	<u>March Cone Method: FM 8-RP13B-2</u>
pH	Range published by the manufacturer for materials excavated	Electric pH meter or pH indicator paper strips: FM 8-RP13B-4
Sand Content	0.5% or less	FM 8-RP13B-3

Premix polymer slurry in accordance with the manufacturer's published procedures. Do not mix in the excavation as a means to prepare slurry. When approved by the GFDEOR, adjustments to slurry properties can be made in the excavation.

During construction, maintain the level of the slurry at a height sufficient to prevent caving of the hole and which should not be lower than 4 feet above the highest expected piezometric water elevation along the depth of the shaft.

Ensure the method of disposal meets the requirements of local authorities.

SUBARTICLE 455-15.8.4 is deleted and the following substituted:

**455-15.8.4 Fluid in Excavation At Time Of Concrete Placement:** When any fluid is present in any drilled shaft excavation, including shafts to support sign, signal, lighting and ITS structures, the applicable test methods and reporting requirements described in 455-15.8.1, 455-15.8.2 and 455-15.8.3 apply to tests of fluid in the shaft prior to placing the concrete.

When mineral slurries are used, ensure the properties at the time of concrete placement are within the acceptable ranges indicated in 455-15.8.2. When polymer slurries are used ensure the properties of the polymer slurry are within the following acceptable ranges at the time of concrete placement:

Table 455-4 <u>Polymer Slurry Properties at Time of Concrete Placement</u>		
<u>Item to be measured</u>	<u>Range of Results at 68°F fluid temperature</u>	<u>Test Method</u>
<u>Density</u>	<u>62 to 65 lb/ft<sup>3</sup></u>	<u>Mud density balance:</u>

<u>Table 455-4</u> <u>Polymer Slurry Properties at Time of Concrete Placement</u>		
<u>Item to be measured</u>	<u>Range of Results at 68°F fluid temperature</u>	<u>Test Method</u>
	<u>(fresh water)</u> <u>64 to 67 lb/ft<sup>3</sup></u> <u>(salt water)</u>	<u>FM 8-RP13B-1</u>
<u>Viscosity</u>	<u>50 seconds to upper limit defined by the APL</u>	<u>Marsh Cone Method:</u> <u>FM 8-RP13B-2</u>
<u>pH</u>	<u>Range published by the manufacturer for materials excavated</u>	<u>Electric pH meter or pH indicator paper strips:</u> <u>FM 8-RP13B-4</u>
<u>Sand Content</u>	<u>0.5% or less</u>	<u>FM 8-RP13B-3</u>

Test samples of the fluid in the shaft from within 1 inch of the base of the shaft and from the middle of the shaft height for shafts up to 60 feet in depth. Test samples of the fluid in the shaft from within 1 inch of the base of the shaft and at intervals not exceeding 30 feet up the shaft for shafts deeper than 60 feet. Use a sampling tool, ~~approved by the Engineer,~~ designed to sample over a depth range of 12 inches or less. Take whatever action is necessary prior to placing the concrete to bring the fluid within the specification and reporting requirements, outlined in the tables in 455-15.8.2 and 455-15.8.3, except as follows:

The Engineer will not require tests for pH or viscosity, nor require the fluid to meet the minimum density specified in 455-15.8.2 and 455-15.8.3 when neither polymer nor mineral slurry has been introduced into the shaft excavation.

SUBARTICLE 455-16.3 is deleted and the following substituted:

**455-16.3 Support, Alignment, and Tolerance:** Tie and support the reinforcing steel in the shaft so that the reinforcing steel will remain within allowable tolerances as specified in 455-20 and Section 415.

Ensure concentric spacing for the entire length of the cage. As a minimum, use centering devices consisting of wheels or other approved noncorrosive spacing devices within 3 feet of the bottom, within 6 feet of the top, and intervals not exceeding 10 feet along the cage length. ~~When a casing with an inside diameter (I.D.) larger than the required shaft diameter is used, provide, within the portion of the oversized casing, centering devices specially dimensioned, or other means to ensure the casing and the cage are concentric.~~ Do not use block or wire type spacers. Ensure no permanent metallic elements will be within the concrete cover space. Use a minimum of one spacer per 30 inches of circumference of cage with a minimum of four at each level. Provide spacers at the bottom of the drilled shaft reinforcing cage as required to maintain the proper position of the cage.

For shafts to support sign, signal, lighting and ITS structures, when a casing with an inside diameter (I.D.) larger than the required shaft diameter is used, provide, within the portion of the oversized casing, centering devices specially dimensioned or other means to ensure the shaft, the cage and the upright are concentric. Provide spacers within 3 feet of the

bottom and at intervals not exceeding 10 feet along the reinforcement, with a minimum of two levels of spacers below the bottom of the casing.

Check the elevation of the top of the steel cage before and after placing the concrete. If the cage is not within the specified tolerances, correct, and submit a revised DSIP to the Engineer for approval. Do not construct additional shafts until receiving approval from the Engineer.