ORIGINATION FORM
Proposed Revisions to the Specifications
(Please provide all information - incomplete forms will be returned)

Date: 6/22/22

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Office: State Materials Office

Specification Section: Specifications 346

Article/Subarticle: 346-4.2 Mass Concrete

Associated Section(s) Revisions: Materials Manual 9.4 (New)

Will the proposed revision require changes to:

Publication	Yes	No	Office Staff Contacted
Standard Plans Index	○	◉	(Select)
Traffic Engineering Manual	○	◉	(Select)
FDOT Design Manual	○	◉	(Select)
Construction Project Administration Manual	○	◉	(Select)
Basis of Estimate/Pay Items	○	◉	(Select)
Structures Design Guidelines	○	◉	(Select)
Approved Product List	○	◉	(Select)
Materials Manual	○	◉	(Select)
Maintenance Specs	○	◉	(Select)

Will this revision necessitate any of the following:

Design Bulletin ☐ **Construction Bulletin** ☐ **Estimates Bulletin** ☐ **Materials Bulletin** ☐

Have all references to internal and external publications in this Section been verified for accuracy? YES

Synopsis: Summarize the changes:

Information regarding preparation of a Mass Concrete Control Plan (MCCP) that is relevant to the Specialty Engineer was removed from 346-4.2 and placed in a new Materials Manual Section 9.4 in Vol. 2. Editorial changes were made to the rest of the document to improve comprehension and readability. No material or technical changes were made to the specification subarticle.

Justification: Why does the existing language need to be changed?

Guidance for preparing an MCCP existed in the Standard Specifications Section 346.4.2; however, the Specialty Engineer prepares the MCCP for the Contractor. For this reason, the guidance for preparing an MCCP should be in the Materials Manual. Information was removed from the Standard Specifications, expanded to include guidance on all relevant MCCP topics, and placed in the new MM Vol. 2 Section 9.4. Editorial changes were made to improve comprehension and readability.

Do the changes affect either of the following types of specifications (Hover over type to go to site.):

Special Provisions ☐ **Developmental Specifications** ☐

List Specifications Affected: (ex. SP3270301, Dev330TL, Dev334TL etc.)

Contact the State Specifications Office for assistance in completing this form.

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STRUCTURAL PORTLAND CEMENT CONCRETE
(REV 6-22-22)

SUBARTICLE 346-4.2 is deleted and the following substituted:

346-4.2 Mass Concrete: When the Contract Documents designate any structure as mass concrete, use a Specialty Engineer to develop and administer a Mass Concrete Control Plan (MCCP). Develop the MCCP in accordance with Section 9.4 Volume II of the Materials Manual. Provide the Specialty Engineer a list of all concrete elements identified. Use a sequential identification code for each element indicating the bridge or structure number, location and type of element, least dimension size, and environmental exposure. ~~ACI Publications 207.1R Guide to Mass Concrete, 207.2R Report on Thermal and Volume Change Effects on Cracking of Mass Concrete, and 224R Control of Cracking in Concrete Structures.~~

Record core and differential temperatures for all structures included in the MCCP and monitor only the elements specified therein. Ensure that the concrete core temperatures ~~for any mass concrete element~~ do not exceed the maximum allowable temperature of 180°F and that the differential temperatures between the element core and surface do not exceed the maximum allowable temperature differential of 35°F. Submit the MCCP to the Engineer for approval at least ~~14~~21 calendar days prior to the first anticipated mass concrete placement. ~~Ensure the MCCP includes and fully describes the following:~~

~~1. The Financial Project Identification Number (FPID).~~
~~2. Contact names and numbers.~~
~~3. Names and qualifications of all designees who will inspect the installation of and record the output of temperature measuring devices, and who will implement temperature control measures.~~
~~4. The number, type, and dimensions of each mass concrete element to be constructed.~~
~~5. A sequential ID number assigned to each element indicating bridge number, element type, element size, and element location.~~
~~6. The mix design number of the concrete used to construct each element.~~
~~7. Indicate which mass concrete elements will be monitored.~~
~~8. Casting procedures,~~
~~9. Insulating systems,~~
~~10. Type and placement of temperature measuring and recording devices, as well as any remote monitoring devices and software.~~
~~11. For each concrete mix design and concrete element, provide information included in Table 346-6, listing the maximum allowable concrete placement temperature for each ambient temperature range at time of placement, in 10°F increments from 40°F and 99°F.~~

Table 346-6 Maximum Allowable Concrete Placement Temperature Data Sheet		
Mix Design No.	Maximum Allowable Concrete Placement Temperature (°F)	
Ambient Temperature at Time of Placement	Footer Dimensions(1) W by L by H (ft)	Column Dimensions(1) D by H(ft)
40° - 49°F		
50° - 59°F		
60° - 69°F		
70° - 79°F		
80° - 89°F		
90° - 99°F		
Notes: (1) W = Width, L = Length, H = Height and D = Diameter		

12. Measures to prevent thermal shock.
13. Active cooling measures, if used.

Do not place concrete until the proposed MCCP has beenis approved, and fully complies with its requirements. Any modifications must be submitted as addenda to the original MCCP and must be approved in writing by the Engineer.

Install temperature measuring sensors and recording devices for all mass concrete elements in accordance with the MCCP. Do not add local additional insulation or external sources of heat around the surface sensors that affect the temperature readings.

Ensure that, prior to the first concrete placement of each concrete element the Specialty Engineer or approved designee personally inspects the installation of the temperature measuring devices and verifies that the temperature data acquisition equipment is properly functioning. The Specialty Engineer shall be available for immediate consultation during the monitoring period of any mass concrete element.

Use The temperature data acquisition equipment to must record temperature readings in accordance with the MCCP. at least once per hour, beginning at the completion of concrete placement and continuing until the core temperature is within 50°F of the ambient temperature. The Specialty Engineer shall be available for immediate consultation during the monitoring period of any mass concrete element. Monitor temperature readings at least once every six hours.

Within three workings days of the completion of temperature recording for each concrete element, submit the Mass Concrete Field Report in accordance with Section 9.4, Volume II of the Materials Manual. an electronic spreadsheet file, editable report to the Engineer that includes the element identification, date and time of any changes to the temperature control measures, all original temperature readings and curing notes. Also submit data logger summaries and graphs, and results of the visual inspection of each element.

For a group of elements, the Engineer may approve a monitoring reduction ifIf the first element of a group of elements with the same dimensions is placed does not exceed in accordance with the approved MCCP, without exceeding either the maximum temperature or maximum temperature differential. of the concrete, reduced monitoring of the remaining elements may be allowed with written approval from the Engineer. Request written approval from the Engineer at least 14 calendar days prior to the anticipated date of the intended reduced monitoring. If approved, temperature monitoring of the recorded temperatures is not required

~~only~~ for the remaining~~initial element of a group of concrete~~ elements meeting all of the following requirements:

1. All elements have the same dimensions.
2. All elements have the same concrete mix design.
3. All elements have the same insulation R value and active cooling measures (if used).
4. Ambient temperatures during concrete placement for all elements are within minus 10°F of the ambient temperature during placement of the initial element.
5. Use the same temperature control measures used for the initial monitored element and keep them in place for at least the same length of time as for the initial element~~. The Contractor and Engineer each have the option to have the temperature monitored to ensure the core temperature is within 50°F of ambient temperature prior to termination of temperature control measures~~.

~~Install temperature measuring and recording devices for all mass concrete elements. Position the temperature sensors 2.00± 0.25 inches inside the concrete surface for surface temperature measurements and at the expected location of the maximum temperature for core temperature measurements. Place the ambient temperature sensor in a location that protects it from direct exposure to rain, sun, or sources of radiated heat, such as concrete or asphalt pavement surfaces. Temperatures shall be continuously recorded starting at the end of concrete placement and continuing until the core has cooled to within 50°F of the ambient temperature.~~ Resume monitoring of the temperatures for all elements if directed by the Engineer.

Instrumentation and temperature monitoring are not required for miscellaneous drilled shafts supporting sign, signal, lighting or I~~i~~ntelligent T~~t~~ransportation System (ITS) structures when the as built~~that meet all of the following requirements:~~

~~1. The~~ diameter is six feet or less, and the ~~2. The~~ total cementitious materials content of the concrete mix design is less than or equal to 752 ~~0~~pounds per cubic yard.

M~~Temperature m~~onitoring of the recorded temperatures is not required~~may be omitted at the Contractor's option,~~ for any mass concrete substructure element meeting all of the following requirements:

1. The minimum cross-sectional as-built dimension of the element is six feet or less.
2. Insulation with an R-value of at least 2.5 must be provided for at least 72 hours following the completion of concrete placement.
3. The environmental classification of the concrete element is slightly aggressive or moderately aggressive.
4. The concrete mix design meets the mass concrete proportioning requirements of 346-2.3.
5. The total cementitious material content of the concrete mix design is less than or equal to 752~~0~~ pounds per cubic yard.
6. Temperature of the concrete is 95°F or less at placement.

Implement immediate corrective action as directed by the Specialty Engineer when either the core temperature or the temperature differential of any mass concrete element exceeds its maximum allowable value. The approval of the MCCP shall be revoked. ~~Do not place any mass concrete elements until a revised MCCP has been approved in writing by the Engineer.~~

Submit an Engineering Analysis Scope in accordance with 6-4 for approval, which addresses the structural integrity and durability of any mass concrete element that is not cast in compliance with the approved MCCP, or which exceeds the allowable core temperature or temperature differential.

Submit all analyses and test results requested by the Engineer for any noncompliant mass concrete element ~~to the satisfaction of the Engineer~~. Submit a revised MCCP and do not place any mass concrete elements until a revised MCCP has been approved in writing by the Engineer.

The Department will ~~make~~ not provide compensation for additional costs or loss of time due to additional analyses, tests, or other impacts on production caused by not monitoring the recorded temperatures~~the use of reduced monitoring or the Contractor's option~~.