Florida Department of Transportation

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SECRETARY

January 19, 2011

Monica Gourdine
Program Operations Engineer
Federal Highway Administration
545 John Knox Road, Suite 200
Tallahassee, Florida 32303

Re: Office of Design, Specifications
Section **452**
Proposed Specification: **4520400 Precast Segmental Bridge Construction.**

Dear Ms. Gourdine:

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

These changes were proposed by Charles Boyd of the State Structures Design Office to move the Shop Drawing Submittal requirements and other various requirements from the Plans Preparation Manual to the Specification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to SP965RP or rudy.powell@dot.state.fl.us.

If you have any questions relating to this specification change, please call Rudy Powell, State Specifications Engineer at 414-4280.

Sincerely,

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

RP/dt
Attachment
cc: Gregory Jones, Chief Civil Litigation
Florida Transportation Builders' Assoc.
State Construction Engineer

PRECAST SEGMENTAL BRIDGE CONSTRUCTION.
(REV 1~~1~~-~~*15892419*~~-1~~0~~*1*)

ARTICLE 452-4 (of the Supplemental Specifications) is deleted and the following substituted:

452-4 Shop Drawings, Calculations And Manuals.

452-4.1 General: Use methods and procedures providing adequate safety to the general public from construction/erection activities and/or falsework placed over or adjacent to traveled roadways, navigational or recreational waterways or any existing commercial, industrial or other facility.

452-4.2 Information Required: Submit detailed shop drawings, calculations~~, and~~ manuals *and other information,* ~~which~~ include*ing*, but ~~are~~ not ~~necessarily~~ 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, grout, 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, anchorages positions, and other similar items.

(4) Post-tensioning 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, ~~etc.~~and other similar items;~~,~~ and any localized required strengthening and the materials and methods to fill and finish the holes.

452-4.2.2 Casting Yard:

(1) Procedures for segment fabrication including layout of the casting yard, set up and operation of the casting cells, movable rain and sun shades, geometry control stations, the storage and handling of rebar cages. the preparation of as built geometry data, placing and finishing concrete, curing of concrete, form stripping, bond breaking, and other similar items.

(2) Calculations and details for lifting, storage and stacking of segments. Additional strengthening of the segments to accommodate stacking will be at no expense to the Department.

(3) Equipment for segments fabrication, including details of the forms and casting cells for the manufacture of the segments, surveying the segment, lifting and transportation of the segment in the yard, and other similar items.

(4) Segment storage including layout of the storage area, method of supporting the segments, single or double stacking, placing erection marks and segment identification, and other similar items.

(5) Segment transportation from the casting yard to the site.

452-4.2.3 Erection Manual: *Meet the requirements in 452-8.*

452-4.2.4 Manual for Geometry Control and Casting Curves: *Meet the requirements in 452-6.3.*

~~(1) A schedule of the timing and sequence of segment casting and erection including the sequence of making cast-in-place closures and continuity between spans.~~

~~(2) Details of the disposition and use of special erection equipment, falsework, temporary supports and the like, including all loads or reactions from such equipment applied to the structure during erection and the sequences and timings of these effects in accordance with the erection schedule.~~

~~(3) Details of the forms and casting cells for the manufacture of the segments.~~

~~(4) Layout of the casting yard showing operational features, casting cells, rebar fabrication and material storage areas, movable rain and sun sheds, geometry control stations, segment handling and storage facilities and the like.~~

~~(5) Calculations and details for lifting, storage or stacking of the segments. (Note: any additional strengthening of the segments to accommodate stacking will be at no expense to the Department.)~~

~~(6) Details of inserts or lifting holes including any necessary localized strengthening and the materials and methods to fill and finish such holes.~~

~~(7) Details and calculations for any localized strengthening for concentrated supports, loads or reactions from any special erection equipment placed in locations not already allowed for in the plans.~~

~~(8) Details and complete description of post-tensioning hardware components and any other embedments to be cast into the segments.~~

~~(9) In order to accommodate variations from the views and dimensions shown on the plans, fully and accurately dimensioned views showing the revised geometry of the segment including projections, recesses, notches, opening, blockouts, and the like with clear and concise cross-reference to the appropriate Contract plans to which the variations apply.~~

~~(10) Where variations are made to segment geometry and dimensions, appropriate details of changes to reinforcing clearly showing the size, spacing and location, including any special reinforcing required but not shown on the Contract plans, with clear and concise cross-reference to the appropriate Contract plans to which the variations apply.~~

~~(11) The size, type, and components of the post-tensioning system to be used. The duct type, size and support spacing. Locate all relevant details and grout inlets/outlets. The method of maintaining the position and alignment of duct couplers at the segment joints. Ensure all post-tensioning alignments are in accordance with the plans, unless the Contractor's proposed variations require changes in which case horizontal and vertical profiles will be fully detailed.~~

~~(12) Details of and supporting calculations for any modifications to reinforcement at anchorages, deviation saddles, diaphragms and the like, made necessary for accommodating the elected post-tensioning system hardware.~~

~~(13) Casting curves and erection elevations, prepared in accordance with chosen construction methods, sequence and schedule.~~

~~In this respect, the construction methods, sequence and schedule include, but are not limited to, Contractor adopted general construction techniques, the erection equipment, its deployment and effect upon the structure, the introduction or removal of temporary supports, falsework, closure devices and the like, their deployment and effect upon the structure, the order (sequence) in which all casting, construction methods and step-by-step erection operations are executed, including post-tensioning, and the timing (schedule) of all such operations, with respect to the maturity of the concrete and affect thereon.~~

~~(14) A manual for the casting and geometry control of the segments in accordance with the information provided in the Contract Documents or as required by this Specification. (This is referred to as the "Casting Manual" see also 452-5.3 below.)~~

~~(15) A manual for the detailed step by step erection of the segments including all intermediate procedures relating to any erection equipment, falsework, movement of equipment, support jacking, stressing of temporary post-tensioning bars, closure operations including any partial stressing across the closure during concrete curing, main post-tensioning tendon sequences, stressing loads and elongations, erection elevations, a method for the field survey and alignment control for setting initial and subsequent segments and any other relevant operations. (This is referred to as the "Erection Manual".)~~

~~(16) Method of mixing and placing grout; equipment capacity; mix design.~~

~~(17) The volume of concrete, the weight of reinforcement and weight of post-tensioning in each precast segment and the totals of these for both the superstructure and substructure summarized and tabulated on the shop drawings.~~

~~In general, any revision to materials, components, erection methods or erection sequencing indicated on the plans and/or to previously approved shop drawings requires submittals prepared and sealed by the Contractor's Engineer of Record for the Engineer's approval.~~

SUBARTICLE 452-5.2 (of the Supplemental Specifications) is deleted and the following substituted:

452-5.2 Concrete: Use concrete as specified in Section 346 except as specifically modified herein. *Use No. 67 coarse aggregate in the concrete for segments.*~~Gradation for coarse aggregate utilized in the concrete for segments will be such that 100% passes a 1 inch sieve. Use No.67 course aggregate in lieu of the grade specified in Section 346 to meet this gradation requirement.~~

Screenings are not allowed as a substitute for silica sand for use in concrete for Precast Superstructure Segments.

SUBARTICLE 452-8.1 (of the Supplemental Specifications) is deleted and the following substituted:

452-8.1 Erection Manual: Before commencing erection operations, submit proposals for all segment erection operations to the Engineer for approval. This submittal must be in the form of an "Erection Manual" and include but not necessarily be limited to:

(1) A detailed step-by-step sequence for the erection of each segment including all intermediate procedures relating to erection equipment, temporary and permanent post-tensioning and making of closures between spans and/or cantilevers ~~etc~~*and other required sequencing*.

(2) Positioning, use and sequencing of falsework, jacking and/or releasing of falsework, temporary towers, *supports, tie-downs, counterweights,* closure devices and the like.

(3) Positioning, use and sequencing of erection equipment such as cranes, beam and winch devices, gantries, trusses and the like, including the movement, introduction and/or removal of any supports onto or connections with the structure. *Include drawings and calculations for the structural effects of erection equipment on the structure.*

(4) Detailed scheduling of all temporary and permanent post-tensioning operations and sequences in accordance with the segment erection and closure operations ~~etc~~*and other required scheduling*.

(5) Stressing forces and elongations for post-tensioning.

(6) Sequencing of grouting operations.

(7) A method for the field survey control for establishing and checking the erected geometry (elevations and alignments) with particular attention to the setting of critical segments such as, for example, pier segments for balanced cantilever erection.

(8) Any other relevant operations as required and applicable to the structure type and construction method.

Do not start erection without the Engineer’s approval of the erection manual.

PRECAST SEGMENTAL BRIDGE CONSTRUCTION.
(REV 1-19-11)

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(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.

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(2) Positioning, use and sequencing of falsework, jacking and/or releasing of falsework, temporary towers, supports, tie-downs, counterweights, closure devices and the like.

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(6) Sequencing of grouting operations.

(7) A method for the field survey control for establishing and checking the erected geometry (elevations and alignments) with particular attention to the setting of critical segments such as, for example, pier segments for balanced cantilever erection.

(8) Any other relevant operations as required and applicable to the structure type and construction method.

Do not start erection without the Engineer’s approval of the erection manual.