Florida Department of Transportation

CHARLIE CRIST
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

STEPHANIE KOPELOUSOS
SECRETARY

July 20, 2010

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

Re: Office of Design, Specifications
Section 534
Proposed Specification: **5340000 Sound Barriers.**

Dear Ms. Gourdine:

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

These changes were proposed by Gevin McDaniel of the State Structures Design Office to include an additional material requirement, reference all applicable Design Standards, and general editing of the existing language.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via Email to ST986RP 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

SOUND BARRIERS.
(REV *7*~~643~~-*19*~~220140~~-10)

Section 534 (Pages 669 – 672) is deleted and the following substituted:

SECTION 534
SOUND BARRIERS

534-1 Description.

Furnish and install sound barriers with pile, posts and panels constructed in accordance with Design Standards~~,~~ Index Nos. 5200 thru 520*7*~~4~~ or with pre-approved alternatives listed on the Department's Qualified Products List (QPL), unless the *P*~~p~~lans otherwise indicate limitations based on specific design or aesthetic criteria unique to the project.

Obtain Precast Concrete Sound Barrier *c*~~C~~omponents from a manufacturing plant that is currently on the list of Producers with Accepted Quality Control Programs. Producers seeking inclusion on the list shall meet the requirements of 105-3.

534-2 Materials.

Meet the following requirements:

Portland Cement Concrete .....Section 346
Reinforcing Steel.....*Section 415*

534-3 ~~Concrete Sound Barrier~~ Component Construction.

Construct concrete components in accordance with Section 400. Precast wall components are produced using certification acceptance; therefore, assume responsibility for performance of all quality control testing and inspections required by Sections 346 and 400 for the precast component construction. Perform all Quality Control Testing using *Construction Training and Qualification Program (*CTQP*)* qualified testing personnel. Perform compressive strength testing in a laboratory inspected by *the Cement and Concrete Reference Laboratory (*CCRL*)* or *Construction Materials Engineering Council (*CMEC*)*, with all deficiencies corrected.

Ensure that each ~~Precast Concrete Sound Barrier~~ *p*~~P~~anel and *p*~~P~~ost is permanently and clearly marked by ink stamping the tongue and groove portion of the panel and post. Mark the panel with the panel type, date cast, project number, manufacturer's name or symbol and the post with the date cast, project number and manufacturer's name or symbol.

534-4 Approved Proprietary Sound Barrier Panels and Systems.

~~Use only approved~~ *P*~~p~~roprietary panels or systems *listed on the QPL*~~shown in Design Standards, Index Nos. 5200 thru 5204~~ that have been pre-determined by the Engineer to be in compliance with the project design and aesthetic criteria ~~and are listed on the QPL~~ *shown in the Plans may be used*.

Manufacturers seeking evaluation of products for inclusion on the QPL must submit an application in accordance with Section 6, independently certified test reports, and written certification that the product meets the requirements of this Section, Design

Standards~~,~~ Index Nos. 5200 thru 520*7*~~4~~*,* and the Sound Barrier Evaluation Criteria contained in the State Structures Design Office's Structures Manual~~, which may be viewed at the following URL: www.dot.state.fl.us/structures/StructuresManual/CurrentRelease/QualifiedProductsList/QPLChapter2SoundBarriers.htm~~ .

Provide written certification from the manufacturer of the panels that the product meets the requirements of this Section and is the same product listed on the QPL.

~~**534-5 Product Certification.**~~

~~Provide written certification from the manufacturer of the panels that the product meets the requirements of this Section and is the same product listed on the QPL.~~

534-*5*~~6~~ Shop Drawing Submittal.

Do not include shop drawings of the basic panel details, submit only the information requested. Submit shop drawings in accordance with Section 5, showing a plan and elevation of the sound walls with the following project specific information provided:

1. Begin and end wall stations with offsets
2. Horizontal and vertical alignments of the wall
3. Fire hose access hole locations
4. Drainage panel locations and type
5. Graphic details and graphic panel location
6. Panel locations
7. Post locations
8. Elevations of top of panel, bottom of panel, and panel joints
9. Existing and proposed ground elevations
10. Utility locations
11. Special post and panel details
12. Post and pile connection details
13. *Post Cap Details*
14. Lifting devices

534-*6*~~7~~ Construction Methods.

A. Prior to beginning earthwork on the project, stake the wall location in the field, and establish the final ground line elevations at the ba*se of the*~~rrier~~ walls. Use these elevations to develop the shop *drawings*~~plans~~, including a complete elevation view of each wall indicating top and bottom elevations as well as the roadway grade. Protect the final ground elevations established in the field for the duration of the project, and do not adjust without prior approval of the Engineer. Keep to a minimum the clearing and grubbing, and trimming of trees as necessary to construct the walls.

B. Do not mix wall types or colors at any one site. Install the walls in accordance with the *P*~~p~~lans, and in accordance with shop drawings submitted to and approved by the Engineer. Secure joints and connections in such a manner as to be structurally sound *and* with*out* ~~no~~ visible openings *in the system allowing*~~for~~ sound transmission. Ensure metal walls do not produce a secondary source of noise transmission due to vibration.

C. Repair marred, chipped, scratched, or spalled areas of walls at no expense to the Department in accordance with the manufacturer's recommendations or at the Engineer's direction.

D. The Contractor may substitute welded for fixed bolt connections or vice versa on metal walls, where applicable, provided load calculations are submitted for the specific modified connection and uses a minimum safety factor of 3.0.

E. Place trench backfill for wall construction in accordance with 125-8. Use select materials for the trench backfill.

If, in the opinion of the Engineer, the trench is too narrow to compact, backfill the trench excavation with *flowable fill meeting the requirements of Section 121 or* concrete *meeting the requirements of Section 346 or 347*~~grout~~ to the satisfaction of the Engineer at no expense to the Department.

F. Dispose of all excess excavation in a manner satisfactory to the Engineer.

G. Keep right-of-way fence that is scheduled to be salvaged in place until completing the wall or, in the opinion of the Engineer, as long as possible.

~~H. Stain concrete walls the color shown in the plans.~~

H~~I~~. After erecting the wall, leave the disturbed area in a finished condition at the direction of the Engineer, and grass or sod the area as indicated in the *P*~~p~~lans.

I~~J~~. Erection Tolerances:

1. Variation from plumb: *plus or minus*~~±~~1/4 inch*/ post height*
2. Panel alignment: *plus or minus*~~±~~1/4 inch
3. Top of panel elevation: *plus or minus*~~±~~3/4 inch
4. Elevation difference of adjacent panels: *plus or minus*~~±~~1/2 inch
5. Joint taper over panel length: *plus or minus*~~±~~1/2 inch
6. Top of collar elevation: *plus or minus*~~±~~3/4 inch

~~7. Post alignment: *plus or minus*±1 inch~~

7~~8~~. Post placement:

a. Variation from specified location *plus or minus*~~±~~1/2 inch
b. variation from specified elevation *plus or minus*~~±~~1/4 inch

~~9~~*8*. Continuity of graphics, fracture fins, etc across joints: 1/4 inch

J~~K~~. When building sound barriers on top of earth berms, construct the berms of fill material compacted to 95% of the maximum density as determined by AASHTO T 99.

K~~L~~. Provide the concrete wall (Precast or Cast-in-Place) with a uniform color, pattern, and texture.

534-*7*~~8~~ Test Wall.

Erect a test wall section not less than 50 feet in length before starting general wall construction at the project site. The Engineer will use the erection of the test wall to determine if the Contractor's methods and equipment are sufficient to produce a sound barrier that meets the requirements of the Contract Documents. The Contractor may revise his methods and equipment as necessary, at any time during the positioning of the test wall, in order to satisfactorily meet all Contract requirements. Build the test wall at a permanent wall location, as directed by the Engineer. If the test wall does not meet the construction tolerances, remove and dispose of it at no expense to the Department. Include the cost of the test wall in the cost of the sound barrier.

534-*8*~~9~~ Repairs or Rejection.

For precast concrete sound barrier components that have not been installed, evaluate cracks, spalls and other deficiencies in accordance with 450-12. Repair deficiencies in accordance with 450-13 or the plant's approved repair methods that are included as part of the QCP. Ensure that the original performance and durability of repaired sound barrier components are maintained. Use materials for concrete repair that will meet or exceed the strength requirement for the class of concrete used. Materials meeting the requirements of Section 930 may be substituted for non-shrink grout when required by 450-13. Precast concrete sound barrier components are subject to rejection if they fail to conform to any of the requirements after repair. For precast concrete sound barrier components that have been installed, the disposition of concrete cracks shall be in accordance with 400-21.

534-*9*~~10~~ Method of Measurement.

The quantity to be paid for will be the plan quantity, in square feet, measured in place, completed and accepted, of the area bounded by the top of the top panel and the bottom of the bottom panel without deductions for openings in the panels, and the beginning to end limits shown in the control drawings. ~~The pay area for anti-graffiti coating will be the plan quantity, in square feet, measured in place, completed and accepted, of the wall without allowances for striations or openings.~~

534-1*0*~~1~~ Basis of Payment.

Price and payment will be full compensation for all work specified in this Section, including but not limited to: furnishing all materials, labor, panels, special panels, posts, *post caps,* collars, reinforcing steel, foundations, drain holes, fire hose access holes, grating, neoprene pads, equipment, alignment pins, etc. necessary to construct the sound barriers. Include in this price, the cost of any charges for power stoppages, sound barrier wall realignments, special erection methods, etc. required to construct the wall.

Payment will be made under:

Item No. 534- 72- Sound Barrier - per square foot.

SOUND BARRIERS.
(REV 7-19-10)

Section 534 (Pages 669 – 672) is deleted and the following substituted:

SECTION 534
SOUND BARRIERS

534-1 Description.

Furnish and install sound barriers with pile, posts and panels constructed in accordance with Design Standards Index Nos. 5200 thru 5207 or with pre-approved alternatives listed on the Department's Qualified Products List (QPL), unless the Plans otherwise indicate limitations based on specific design or aesthetic criteria unique to the project.

Obtain Precast Concrete Sound Barrier components from a manufacturing plant that is currently on the list of Producers with Accepted Quality Control Programs. Producers seeking inclusion on the list shall meet the requirements of 105-3.

534-2 Materials.

Meet the following requirements:

Portland Cement Concrete .....Section 346
Reinforcing Steel .....Section 415

534-3 Component Construction.

Construct concrete components in accordance with Section 400. Precast wall components are produced using certification acceptance; therefore, assume responsibility for performance of all quality control testing and inspections required by Sections 346 and 400 for the precast component construction. Perform all Quality Control Testing using Construction Training and Qualification Program (CTQP) qualified testing personnel. Perform compressive strength testing in a laboratory inspected by the Cement and Concrete Reference Laboratory (CCRL) or Construction Materials Engineering Council (CMEC), with all deficiencies corrected.

Ensure that each panel and post is permanently and clearly marked by ink stamping the tongue and groove portion of the panel and post. Mark the panel with the panel type, date cast, project number, manufacturer's name or symbol and the post with the date cast, project number and manufacturer's name or symbol.

534-4 Approved Proprietary Sound Barrier Panels and Systems.

Proprietary panels or systems listed on the QPL that have been pre-determined by the Engineer to be in compliance with the project design and aesthetic criteria shown in the Plans may be used.

Manufacturers seeking evaluation of products for inclusion on the QPL must submit an application in accordance with Section 6, independently certified test reports, and written certification that the product meets the requirements of this Section, Design Standards Index Nos. 5200 thru 5207, and the Sound Barrier Evaluation Criteria contained in the State Structures Design Office's Structures Manual.

Provide written certification from the manufacturer of the panels that the product meets the requirements of this Section and is the same product listed on the QPL.

534-5 Shop Drawing Submittal.

Do not include shop drawings of the basic panel details, submit only the information requested. Submit shop drawings in accordance with Section 5, showing a plan and elevation of the sound walls with the following project specific information provided:

1. Begin and end wall stations with offsets
2. Horizontal and vertical alignments of the wall
3. Fire hose access hole locations
4. Drainage panel locations and type
5. Graphic details and graphic panel location
6. Panel locations
7. Post locations
8. Elevations of top of panel, bottom of panel, and panel joints
9. Existing and proposed ground elevations
10. Utility locations
11. Special post and panel details
12. Post and pile connection details
13. Post Cap Details
14. Lifting devices

534-6 Construction Methods.

A. Prior to beginning earthwork on the project, stake the wall location in the field, and establish the final ground line elevations at the base of the walls. Use these elevations to develop the shop drawings, including a complete elevation view of each wall indicating top and bottom elevations as well as the roadway grade. Protect the final ground elevations established in the field for the duration of the project, and do not adjust without prior approval of the Engineer. Keep to a minimum the clearing and grubbing, and trimming of trees as necessary to construct the walls.

B. Do not mix wall types or colors at any one site. Install the walls in accordance with the Plans, and in accordance with shop drawings submitted to and approved by the Engineer. Secure joints and connections in such a manner as to be structurally sound and without visible openings in the system allowing sound transmission. Ensure metal walls do not produce a secondary source of noise transmission due to vibration.

C. Repair marred, chipped, scratched, or spalled areas of walls at no expense to the Department in accordance with the manufacturer’s recommendations or at the Engineer’s direction.

D. The Contractor may substitute welded for fixed bolt connections or vice versa on metal walls, where applicable, provided load calculations are submitted for the specific modified connection and uses a minimum safety factor of 3.0.

E. Place trench backfill for wall construction in accordance with 125-8. Use select materials for the trench backfill.

If, in the opinion of the Engineer, the trench is too narrow to compact, backfill the trench excavation with flowable fill meeting the requirements of Section 121

or concrete meeting the requirements of Section 346 or 347 to the satisfaction of the Engineer at no expense to the Department.

F. Dispose of all excess excavation in a manner satisfactory to the Engineer.

G. Keep right-of-way fence that is scheduled to be salvaged in place until completing the wall or, in the opinion of the Engineer, as long as possible.

H. After erecting the wall, leave the disturbed area in a finished condition at the direction of the Engineer, and grass or sod the area as indicated in the Plans.

I. Erection Tolerances:

1. Variation from plumb: plus or minus1/4 inch/ post height
2. Panel alignment: plus or minus1/4 inch
3. Top of panel elevation: plus or minus3/4 inch
4. Elevation difference of adjacent panels: plus or minus1/2 inch
5. Joint taper over panel length: plus or minus1/2 inch
6. Top of collar elevation: plus or minus3/4 inch

7. Post placement:
    a. Variation from specified location plus or minus1/2 inch
    b. variation from specified elevation plus or minus1/4 inch
8. Continuity of graphics, fracture fins, etc across joints: 1/4 inch

J. When building sound barriers on top of earth berms, construct the berms of fill material compacted to 95% of the maximum density as determined by AASHTO T 99.

K. Provide the concrete wall (Precast or Cast-in-Place) with a uniform color, pattern, and texture.

534-7 Test Wall.

Erect a test wall section not less than 50 feet in length before starting general wall construction at the project site. The Engineer will use the erection of the test wall to determine if the Contractor's methods and equipment are sufficient to produce a sound barrier that meets the requirements of the Contract Documents. The Contractor may revise his methods and equipment as necessary, at any time during the positioning of the test wall, in order to satisfactorily meet all Contract requirements. Build the test wall at a permanent wall location, as directed by the Engineer. If the test wall does not meet the construction tolerances, remove and dispose of it at no expense to the Department. Include the cost of the test wall in the cost of the sound barrier.

534-8 Repairs or Rejection.

For precast concrete sound barrier components that have not been installed, evaluate cracks, spalls and other deficiencies in accordance with 450-12. Repair deficiencies in accordance with 450-13 or the plant's approved repair methods that are included as part of the QCP. Ensure that the original performance and durability of repaired sound barrier components are maintained. Use materials for concrete repair that will meet or exceed the strength requirement for the class of concrete used. Materials meeting the requirements of Section 930 may be substituted for non-shrink grout when required by 450-13. Precast concrete sound barrier components are subject to rejection if they fail to conform to any of the requirements after repair. For precast concrete sound barrier components that have been installed, the disposition of concrete cracks shall be in accordance with 400-21.

534-9 Method of Measurement.

The quantity to be paid for will be the plan quantity, in square feet, measured in place, completed and accepted, of the area bounded by the top of the top panel and the bottom of the bottom panel without deductions for openings in the panels, and the beginning to end limits shown in the control drawings.

534-10 Basis of Payment.

Price and payment will be full compensation for all work specified in this Section, including but not limited to: furnishing all materials, labor, panels, special panels, posts, post caps, collars, reinforcing steel, foundations, drain holes, fire hose access holes, grating, neoprene pads, equipment, alignment pins, etc. necessary to construct the sound barriers. Include in this price, the cost of any charges for power stoppages, sound barrier wall realignments, special erection methods, etc. required to construct the wall.

Payment will be made under:

Item No. 534- 72- Sound Barrier - per square foot.