



Shelby County Government

MARK H. LUTTRELL, JR.
MAYOR

January 31, 2014

TO ALL BIDDERS:

RE: **Addendum No. 6 to Sealed Bid # I-000222B**
Fite Road and Bridge Improvements Project

IMPORTANT: Please note that the acknowledgement of receipt of addendum form must be completed and included with your proposal. It is located in Addendum No. 1.

Please note: *Tennessee Department of Transportation (TDOT) General Conditions and Special Provisions prevail over Shelby County General Conditions and Special Provisions.*

The following changes to the specifications for Sealed Bid # I-000222B, Fite Road and Bridge Improvements Project:

We are extending the due date for SBI-000222B, Fite Road and Bridge Improvements Project from, 2:30 p.m. Tuesday February 4, 2014 to **2:30 p.m. Thursday February 13, 2014.** The deadline for questions has been extended to Thursday February 6, 2014 at 12:00 p.m.

The Locally Owned Small Business (LOSB) goal has been deleted for this project and is not a requirement. The Disadvantaged Business Enterprise goal of ten percent (10%) is still required.

The following additions/corrections shall be made a part of the plans and contract documents for the above referenced project:

Clarifications:

1. Please replace the "Retaining Wall Notes" that were submitted via Addendum No. 3 (dated January 17, 2014) with the attached revised "Retaining Wall Notes" dated January 29, 2014.

Retaining Wall Design Notes – January 29, 2014

Unless specifically stated otherwise in the contract plans and these notes, the bidding for the design of and the construction of retaining walls shown in the plans shall be governed by the *Tennessee Department of Transportation Special Provision 624*

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Regarding Retaining Walls. This Special Provision shall be considered as one of those documents which the Bidder/Contractor has examined and made himself familiar with as described in *Section 102.04 – Examination of the Site, the Work, the Plans, and the Specifications in the TDOT Standard Specifications for Road and Bridge Construction.*

Excavation for the wall and/or its footing shall not be accomplished until the Contractor has submitted wall designs and calculations and has been issued an approved set of wall plans and has labor and material resources available to begin and continue wall construction immediately after excavation.

The walls shall be designed in accordance with AASHTO 1998 Edition With Addenda Including The Standard Specifications For Seismic Design Of Highway Bridges (Seismic performance category C with a peak ground acceleration of 0.25g.)

For proprietary wall systems that have been approved as shown in TDOT's Special Provision 624, the Wall Designer shall be responsible for providing wall designs incorporating materials and components (i.e. reinforcement connection devices, specific manufacturer and properties of reinforcing materials) as was submitted and approved. If a material and/or component of the wall system have been modified from the originally approved system, a wall design and set of plans and calculations for this wall system cannot be submitted for review and approval until the Wall System Designer who originally submitted the wall system for approval submits a request for re-approval utilizing the modified elements of the wall. This submittal does not guarantee approval of the modified system. If this re-approval process does not meet the Contractor's schedule or if the modified system is not approved, the Contractor/Wall Designer shall provide a wall design for one of the approved systems at no change in contract price for the retaining wall and no change in project schedule requirements will be allowed.

The Wall Designer shall provide retaining wall plans, details and calculations as required by Special Provision 624 and as required herein.

- Calculations for both internal and external stability (sliding, eccentricity, bearing capacity- global stability and settlement) shall be provided for each critical wall section which demonstrates adequate factors of safety are met utilizing the design parameters provided. For MSE walls, the Wall Designer must adjust the reinforcement lengths beyond those minimum required lengths, if required, to meet both internal and external requirements, including global stability. The Wall Designer/Contractor plans must include any foundation improvements as required herein on the Wall Designer/Contractor's wall elevation views and any cross-sectional detail drawings.
- While the Wall Designer's design must demonstrate compliance with external stability requirements as discussed above, the Wall Designer may provide certification (by signing and stamping by Professional Engineer registered in State of Tennessee) of the wall plans and calculations.

- Soil slopes above the top of retaining walls should be independently checked for stability. Slopes not meeting the minimum required factor of safety against stability failure (1.30 for short and long-term static conditions, and 1.10 for seismic conditions) should be reinforced using geogrid or similar materials.

Note Regarding Construction Slopes

The Contractor shall be responsible for making the excavation in accordance with OSHA and other applicable state and local regulations regarding construction slopes and trenches. In addition to following applicable regulatory requirements, as a minimum requirement, all temporary construction slopes shall be placed at a maximum of a 1:1 slope in soil and shall not be left open without shoring for any longer than absolutely necessary. The Contractor building the wall shall ensure that these temporary back slopes are not and do not become unstable. If slope is unstable, becomes unstable, is cut steeper than a 1:1 slope or is unacceptable for another reason, then temporary shoring shall be used. Any unusual soil conditions other than those assumed should be reported to the Project Engineer.

Acceptable Wall Types

The retaining wall shall be one of the wall types listed below. For retaining wall systems listed as Bin Wall, Crib Wall, MSE (either segmental panel or Modular Block) and Ground Anchor Wall, the specific Wall System Supplier/Installer shall be one of those listed as Pre-approved in the TDOT Special Provision 624.

- **Pile-supported, Cast-in-Place, L-Shaped Cantilever Walls**
- **Soil Nail/Anchor Wall**
- **Soldier Pile and Lagging Wall**
- **Anchored Sheet Pile wall**
- **Mechanically Stabilized Earth (MSE) Wall - Segmental Precast**
- **Mechanically Stabilized Earth (MSE) Wall – Modular Block**

Note: All non-pile-supported wall types will require ground improvement by means of installing aggregate piers, stone columns or similar methods. The cost for ground improvement should be included in the wall unit cost per square foot.

TABLE 1-DESIGN REQUIREMENTS AND PARAMETERS

| Description | Value-MSE Walls | Value-Other Walls | Note * |
|--|--|---------------------------------|--------|
| Design Life | 75 Years | | |
| Design Ground Acceleration (A_g) | 0.25 | | |
| Effective (Drained) Friction Angle | | | |
| Retained Backfill-Unclassified site or borrow soil | 28° | 28° | |
| Retained Backfill-Select Backfill | 34° to max 40° | 34° to max 40° | 1 |
| Reinforced Backfill | 34° to max 40° | NOT APPLICABLE | |
| Unit Weight- | | | |
| Unclassified site or borrow soil | 120 pounds per cubic foot | 120 pounds per cubic foot | |
| Select Backfill Material | Varies | Varies | 1A |
| Minimum Length of soil reinforcement, B | Greater of 0.7H min or as required by Global Stability | As required by Global Stability | 2,2A |
| Limiting eccentricity | B/6 | B/6 | |
| Coefficient of Sliding Friction | See Table 2 or 3 | See Table 2 or 3 | 3 |
| Allowable Bearing Capacity | See Table 2 or 3 | See Table 2 or 3 | 3 |

TABLE 1.1

NOTES FOR TABLE 1

| # | Note |
|----|---|
| 1 | A minimum friction angle of 34 degrees can be assumed for material meeting specifications in Section F, Part 1, and Item e of <i>Tennessee Department of Transportation Special Provision 624 Regarding Retaining Walls</i> . A higher friction angle can be utilized if the Contractor submits independent testing and it is verified by TDOT. However, in no case shall the friction angle for analysis exceed 40-degrees. |
| 1A | Select Backfill unit weight to be determined by Contractor/Designer depending on actual backfill material used. Select backfill is defined as material meeting specifications in Section F, Part 1, and Item e of <i>Tennessee Department of Transportation Special Provision 624 Regarding Retaining Walls</i> . In order to utilize ϕ for select backfill design, select backfill must be placed for a minimum zone formed by a 1:1 slope from 2 feet behind the bottom of back of wall footing or reinforced soil zone for MSE walls up to finished grade. |
| 2 | H is the design height of the wall and is defined as the difference in elevation between from the finished grade at the top of the wall and the top of leveling pad. The top of the leveling pad shall always be below the minimum embedment reference line as indicated on the plans for that location. The length of the soil reinforcement, B, is measured from the backface of the wall facing unit. In case of grid type reinforcements the length of the soil reinforcement is measured from the backface of the wall facing unit to the last full transverse member. For modular block facing units, the total length of the reinforcement, Br as measured from the front face of the wall is the length B as defined above plus the width of the modular block unit (the horizontal dimension of the block unit measured perpendicular to the wall face). |
| 2A | Wall Designer must adjust the reinforcement lengths beyond those minimum required lengths, if required, to meet both internal and external (global stability included) stability requirements. |
| 3 | These values will be provided in Tables 2 and/or 3 |

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Passive resistance shall **NOT** be considered in evaluation of sliding resistance.

**TABLE 2-FOUNDATION PARAMETERS AND REQUIREMENTS FOR MSE WALLS,
GRAVITY OR SEMI-GRAVITY WALLS**

| FOUNDATION DESIGN PARAMETERS FOR GRAVITY / SEMI GRAVITY WALLS / MSE WALLS | | | |
|--|--|----------------------------------|---------------------------------|
| Wall No. | Foundation (Reinforced Zone) Bearing Condition Requirement | Allowable Bearing Capacity (psf) | Coefficient of sliding Friction |
| 1 | On In-Place Soil | 1,250 | 0.35 |
| 2 | On In-Place Soil | 1,350 | 0.35 |
| 3 | On In-Place Soil | 1,350* | 0.35* |

*: Values are based on a subsurface exploration done by others. Subsurface conditions for this wall should be verified prior to wall construction. The design values above may be accordingly modified.

Note Regarding Global Stability

Pile-supported or soil nail wall designer/contractor must account for global stability of wall. Pile lengths should be of sufficient depth to obtain adequate factors of safety against global stability failure for static and seismic conditions.

The minimum required factor of safety for global stability, short and long-term static: 1.30

The minimum required factor of safety for global stability, seismic: 1.10

For MSE or grade-support CIP walls, ground improvement is required to meet the minimum required factors of safety for global stability mentioned above.

TABLE 3- SOIL DESIGN PARAMETERS FOR PILE SUPPORTED WALL

| Depth (ft.) | Elevation (ft.) | Soil Type | Total Unit Weight (pcf) | Effective Unit Weight (pcf) | Undrained Shear Strength (psf) | Effective Angle of Internal Friction (deg.) | Soil Strain, E50 | Soil Modulus (pci) |
|-------------|-----------------|---------------------------|-------------------------|-----------------------------|--------------------------------|---|------------------|--------------------|
| 0-35 | Surface to 200 | Soft to Medium Stiff Clay | 118 | 56 | 750 | 27 | 0.02 | 30 |
| 35-45 | 200 to 190 | Medium Dense Silty Sand | 120 | 58 | -- | 32 | -- | 60 |
| 45-60 | 190 to 175 | Dense Sand with Silt | 125 | 63 | -- | 35 | -- | 90 |

Factors of Safety

The following safety factors shown in Table 4 should be incorporated in the wall design.

TABLE 4–FACTORS OF SAFETY

| Mode of Failure | Minimum Safety Factors | |
|------------------|-------------------------|-------------------|
| | Non-Seismic Condition | Seismic Condition |
| Sliding | 1.5 | 1.2 |
| Overturning | 2.0 | 1.5 |
| Bearing Capacity | 2.5 For MSE Walls | 1.9 |
| | 3.0 For All Other Types | 2.3 |
| Global Stability | 1.3 | 1.1 |

Other Design Requirements

The wall shall have a drainage gutter at the top designed to carry surface runoff to either or both ends of walls. Details of this drainage feature shall be provided in Wall Designer/Contractor's wall design plans. If a Concrete Cantilever Wall is used, the wall designer must provide for a drainage layer behind the wall stem with adequate drainage provided via weep holes.

Questions:

1. Question: **“How will the pay area for the geogrid be measured for payment? If the design of the geogrid in the slopes calls for more geogrid than what is listed in the bid estimate, with the overage be paid for at the unit rate?”**

Response: Geogrid will be measured by the square yard complete in place, excluding overlap. If the design is approved by the Engineer and calls for more geogrid than what is listed in bid estimate, then the overage will be paid for at the bid unit price.

2. Question: **“The seismic acceleration required for the design of the walls is 0.524g. This is much higher than anything we have ever seen in Memphis. Is it the intent of the Owner to pay millions of dollars extra for such an extreme loading condition that even the major interstate projects in the Memphis area are not required to design for? It may be beneficial for the Owner's Engineer to review the conditions for this site and the Memphis area and provide an acceleration value consistent with other local projects. This would also provide a value to be used by all of the**

contractors bidding which would help ensure that each contractor uses the same.”

Response: Please see the revised "Retaining Wall Notes" dated January 29, 2014. The seismic acceleration coefficient to be utilized is 0.25. In seismic slope stability, you only use ½ of this value in the design (0.125g).

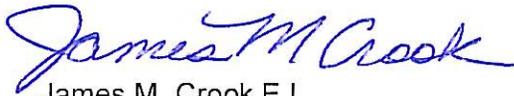
3. **Question: "Can the design parameters provided in Table 3 of the retaining wall design notes included in Addendum #3 be used to develop a foundation soil profile for use in the global stability design of the 3 walls if they will not be pile supported? If so, what is the estimated depth to the groundwater table?"**

Response: Yes. One addition would be the effective angle of internal friction for the upper clayey soil. That can be taken as 26-28 degrees. This angle will be required to evaluate the long-term non-seismic conditions. The groundwater was encountered at depths of 10 to 18 feet in some of the borings (See Soils and Geology Survey Report and Retaining Wall Reports that were included with the Bid Book).

4. **Question: "Will any geogrid reinforcing required in the 2:1 slopes above the retaining walls be paid for under the geogrid pay item or will it be included in the unit rate for the walls?"**

Response: If building the slopes on top of the retaining walls is part of the retaining wall construction, then the geogrid shall be included in the unit rate of the retaining walls. If the Engineer directs additional geogrid for slope stabilization above the wall, the additional geogrid will be paid for under the geogrid pay item. .

Sincerely,



James M. Crook E.I.

Shelby County Roads, Bridges & Engineering Department

Cc: Darren Sanders, P.E.

Nelson Fowler

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