Earth Retaining Systems – Alternative Earth Retaining Systems

Revision and Approval

Revision	Date	Nature of Changes	Approved By
0	12-20-2018	Original issue.	Steve Altman

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Background

This process establishes Structure Construction (SC) responsibilities and procedures to administer Alternative Earth Retaining Systems (AERS), including:

1. Review and authorization of submittals.
2. Acceptance of materials.
3. Quality assurance during construction.

Alternative earth retaining systems (AERS) are listed on the Authorized Material List (AML), and may be used when specified in the contract documents. Shop drawings for alternative earth retaining systems are reviewed and authorized by the Designer. SC staff and the Earth Retaining Systems technical specialist in Structure Policy and Innovation (SP&I) assist with the review as described in MTD 5-16, *Review of Working Drawings for Proprietary Earth Retaining Systems*.

The AERS shall comply with contract documents specific to the type of AERS submitted:

1. *Contract Specifications,* Section 19-6.02B, *Earthwork – Embankment Construction – Materials – Geosynthetic Reinforced Embankment*.
2. *Contract Specifications*, 47-2, *Earth Retaining Systems – Mechanically Stabilized Embankment*.
3. *Contract Specifications,* Section 47-3, *Earth Retaining Systems – Reinforced Concrete Crib Walls*.
4. *Contract Specifications,* Section 72-16, *Slope Protection – Gabions*.

Process Inputs

1. AERS submittals and shop drawings.

2. Foundation Report.
3. Structures RE Pending File.
4. Excavation plans, if needed.

Procedure

1. All work associated with this process is charged as Project Direct – Construction.
2. Inspection of field work for this process is:
   a. Intermittent.
3. Before construction begins:
   a. Verify that the Contractor submits the alternative earth retaining systems (AERS) shop drawings to Bridge Design (BD) Document Unit.
      i. Only one type of wall shall be used at each wall location.
      ii. Shop drawings shall include the manufacturer's installation manual, system specific information such as design parameters, materials notes, construction procedures, erection sequencing, tensioning or spacing details, etc.
      iii. When the submitted shop drawings are authorized with minor corrections, ensure that the Contractor incorporates the minor corrections into the final construction.
   b. For technical assistance during AERS shop drawing review and construction may be provided by:
      i. Structure Designer.
      ii. METS Rep.
      iii. DES Structure Policy & Innovation – MSE Senior Technical Specialist.
      iv. Geotechnical Services.
      v. Manufacturer Representative.
   c. Coordinate with RE:
      i. Notify RE Documents Unit may mail authorized Shop Drawings to RE.
      ii. Request RE review shop drawings for conflicts with roadway plans, utilities, drainage, etc.
      iii. Request RE forward all AERS related District Quality Assurance (QA) testing to SR.
   d. SR will review the AERS shop drawings:
      i. Verify proposed system is authorized for use.
      ii. Review the following Sections of the *Contract Specifications:*

1. Section 19-6.02B, *Earthwork – Embankment Construction – Materials – Geosynthetic Reinforced Embankment.*
2. Section 47-3, *Earth Retaining Systems - Reinforced Concrete Crib Walls.*
3. Section 72-16, *Slope Protection – Gabions*.

iii. Review MTD 5-16, *Review of Working Drawings for Proprietary Earth Retaining Systems*.

iv. Review the Construction Considerations Section of the Foundation Report and contact report's author if there are any questions or unusual geotechnical requirements, such as settlement monitoring, surcharge, etc.

v. Review BCM 19-6.03D, *Earthwork – Embankment Construction – Settlement Periods and Surcharges*, for Surcharge Loading and monitoring requirements.

vi. Verify top of wall elevations versus the district grid grades, drainage plans, and underground utility plans. Coordinate review of district related items with RE.

vii. Verify the locations of structural elements for any potential conflict with utilities. Coordinate review of district related items with RE.

viii. Verify the bottom of facing elevations are at or below the project plans.

ix. Provide shop drawing review comments to Structure Designer. The Structure Designer authorizes shop drawings.

e. Receive rejection or authorization of the AERS shop drawings from the Documents Unit. Document Unit forwards authorization/rejection to the Contractor. Verify Contractor was notified.

f. Set up a pre-construction meeting with the Contractor to discuss Alternative ERS construction. Invite representatives from METS, BD, Geotechnical Services, ERS specialist, District Construction, and Materials Lab. Remind Contractor of requirement for onsite Qualified Manufacturers Representative during first 10 vertical feet of erection and backfill and submittal of Form 3101, *Notice of Materials to be Used.*

g. Remind the Contractor to submit the construction staking request for the authorized system, including: wall layout line, beginning of wall, end of wall, and respective elevations.

h. Confirm with the Contractor the schedule of material procurement and sampling.

i. Review and authorize the final texture of the sample facing panel and concrete mix design. The sample panel must be stored for later comparison to the finished product.

j. Review and authorize the erection procedures. Confirm with the Contractor on adequate equipment to lift and set panels.

4. During construction:
    a. Meet and work with the qualified representative of the alternative system manufacturer
    b. Upon delivery of materials onsite:
        i. Check for inspection release tags (Form TL-0624, *Inspection Release Tag*) and match with Form TL-0029, *Report of Inspection of Material*.
        ii. Take photos of source inspection release information that are applied directly onto the system elements such as stenciled on panels or etched into concrete block.
        iii. Document quantities
        iv. Check for certificates of compliance and Buy America Certification.
        v. Verify proper material storage and handling.
        vi. Check for damage incurred during the delivery and if request a repair plan from the contractor as needed.
    c. Verify sloping or shoring installation specific to the authorized AERS.
    d. Verify the Contractor installs drainage system, if required, per authorized plans before backfilling. Coordinate with RE.
    e. Coordinate QA backfill and compaction testing with District Materials Staff.
    f. Verify that backfilling is done with proper equipment to avoid damage to the structural elements.
    g. Verify the Contractor grades the backfill to slope away from the wall face at the end of each shift to keep surface run off away from the facing if a significant rain event is anticipated. Surface water, if not controlled, will migrate the fines from the structure backfill into the pervious material, possibly causing excessive backfill settlement.
    h. Verify wall cap profile elevations to match the cross section and super elevations of the roadway section.
5. Document all inspection, construction, and quality assurance activities in the daily reports per BCM C-7*, Daily and Weekly Reports.*
6. Following Construction:
    a. File all submittals in the project records as specified in the *Construction Manual,* Section 5-1.02, *Contract Administration – Project Records and Reports – Organization of Project Documents*.
    b. Record information necessary for required documents including:
        i. Any as-built changes.
        ii. Report of Completion for Structures.

Process Outputs

1. Complete project records for each wall that is an alternative ERS (including materials certifications and test results).
2. As-built plans and shop drawings.
3. Daily reports.

Attachments

None