SEGMENTAL BLOCK RETAINING WALLS

PART 1 - GENERAL

1.01 SECTION INCLUDES

Segmental Block Retaining Walls

1.02 DESCRIPTION OF WORK

Constructing segmental block retaining walls in accordance with the most recent edition of Iowa Statewide Urban Design and Specifications (SUDAS), unless otherwise specified.

1.03 SUBMITTALS

A. Submit certification that products supplied comply with identified specifications.

B. Delegated design. Provide detailed design calculations (including assumed soil bearing pressure), construction drawings, and shop drawings for all segmental block retaining walls, prepared by a licensed Professional Engineer in the State of Iowa.

C. A detailed explanation of the design properties of geogrid reinforcement and quality control tests limits.

D. Submit catalog cuts of segmental retaining wall blocks and cap stones indicating the size, type, and standard color options for selection by Owner. Provide sample wall block to Facility upon request to confirm block style and color.

1.04 SUBSTITUTIONS

Submit formal substitution requests during bidding/quoting for review by Owner.

1.05 DELIVERY, STORAGE, AND HANDLING

Comply with Manufacturer recommendations.

1.06 SCHEDULING AND CONFLICTS

Coordinate with facility on scheduling and phasing of work and to rectify any on-site conflicts. Coordinate construction access and material layout down areas with the Facility.

1.07 SPECIAL REQUIREMENTS

A. A licensed Professional Engineer in the State of Iowa must prepare, sign, and seal detailed design calculations, construction drawings, and shop drawings for all segmental block retaining walls.

B. Ensure design complies with the National Concrete Masonry Association (NCMA) “Design Manual for Segmental Retaining Walls.”

PART 2 - PRODUCTS

2.01 MATERIALS

A. Segmental Block Walls:

1. Dry-cast Concrete Wall Units:

a. Comply with ASTM C 1372 and Iowa DOT Section 2431. Test and provide samples according to ASTM C 140.

b. Provide certification that the blocks comply with the freeze-thaw durability requirements of ASTM C 1262 and the additional requirements for concrete units of Iowa DOT Materials I.M. 445.04.

c. Furnish from an approved supplier.

1) Iowa DOT Materials I.M. 445.04, Appendix A (MAPLE) lists approved suppliers.

2) Provide written certification that blocks comply with ASTM C 1372 and the additional materials requirements of Iowa DOT Materials I.M. 445.04, Appendix A (MAPLE).

d. In lieu of furnishing blocks from an approved supplier, provide blocks from an approved system.

1) Iowa DOT Materials I.M. 445.04, Appendix B (MAPLE) lists approved systems.

2) Submit alternative supplier information and block specifications as a Substitution request for review and approval.

2. Wet-cast Concrete Wall Units: Comply with the materials and compressive strength requirements of Iowa DOT Section 2431 and Materials I.M. 445.05.

a. Furnish from an approved supplier.

1) Iowa DOT Materials I.M. 445.05, Appendix A (MAPLE) lists approved suppliers.

2) Provide written certification that blocks comply with Iowa DOT Materials I.M. 445.05.

b. In lieu of furnishing blocks from an approved supplier, provide blocks from an approved system.

1) Iowa DOT Materials I.M. 445.05, Appendix B (MAPLE) lists approved systems.

2) Submit alternative supplier information and block specifications as a Substitution request for review and approval.

3. Geogrid: Provide geogrid as specified in the retaining wall design.

B. Leveling Pad: Provide material recommended by the wall manufacturer or supplier.

1. Granular Material: Comply with Iowa DOT Section 4132.

2. Concrete: Comply with Section 6010. Use Class C Concrete.

C. Subdrain: Comply with Section 4040, 2.02. Minimum 4 inch diameter pipe.

D. Porous Backfill Material (for Subdrain): Comply with Section 4040, 2.04.

E. Engineering Fabric: Provide fabric complying with Iowa DOT Article 4196.01 for subsurface drainage.

F. Unit Fill Material: Comply with Iowa DOT Section 4131.

G. Backfill Material:

1. Granular Backfill Material: Comply with Iowa DOT Section 4133 within the reinforced earth zone of segmental block retaining walls. Crushed stone meeting the requirements of Iowa DOT Section 4131 may be substituted for granular backfill.

2. Suitable Backfill Material: Comply with Section 2010.

PART 3 - EXECUTION

3.01 DEMOLITION, EXCAVATION AND EMBANKMENT

A. Remove and dispose of the existing retaining wall and all associated geogrid and backfill materials required to prepare the site for the proposed wall according to manufacturer recommendations. Excess clean soil and granular material may be disposed of onsite at an Owner approved location.

B. Prior to beginning wall construction, compact proposed embankment behind the wall according to the manufacturer's recommendations.

C. Excavate to the line and grade specified in the contract documents and manufacturer construction/shop drawings. Minimize overexcavation.

3.02 INSTALLATION

A. Foundation Soil Preparation: Excavate and compact 12 inches of native soil beneath the leveling pad to 95% of maximum Standard Proctor Density.

B. Leveling Pad:

1. Construct a minimum 6 inch thick, or as recommended by the manufacturer, leveling pad of granular material, at a depth such that the entire first course will be completely below the finished grade at the base of the wall.

2. Compact granular material with a minimum of three passes of a vibratory plate compactor.

C. Unit Installation:

1. Ensure units are in full contact with the leveling pad. Check alignment, level and stability.

2. Place units side by side for the full length of wall alignment. Establish alignment by means of a string line or offset from the base line.

3. Do not leave gaps between units. Lay out corners and curves in accordance with manufacturer's instructions.

4. Cut blocks with saw. Do not split units.

5. Install all connecting pins as recommended by Manufacturer.

6. Sweep all excess material from top of units and install the next course. Ensure each course is completely filled prior to proceeding to the successive course.

7. Place each course so that pins protrude into adjoining courses a minimum of 1 inch or to tolerances recommended by the manufacturer. Repeat the above procedure for each course to the top of wall height.

8. At the end of each course, where the wall changes elevation, turn the units into the backfill material. Place units to create the minimum radius possible. Install a minimum of three units into the grade. Ensure only the front face of the units is visible from the side of the wall.

D. Backfill Material Placement:

1. Place the backfill material in maximum 8 inch lifts, spread, and compact in such a manner that eliminates the development of wrinkles and/or movement of the geogrid reinforcement.

2. Compact granular backfill material according to the manufacturer recommendations.

3. Use only hand-operated compaction equipment within 3 feet of the front of the wall face.

4. Do not operate tracked construction equipment directly on the geogrid reinforcement. A minimum thickness of 6 inches of backfill material is required over the geogrid reinforcement prior to operation of tracked vehicles. Minimize turning of tracked vehicles to prevent tracks from displacing the fill and damaging the geogrid reinforcement.

5. Rubber-tired equipment may pass over the geogrid reinforcement, if done according to the manufacturer's recommendations. Avoid sudden braking and sharp turning.

E. Geogrid Installation:

1. Do not overlap the geogrid in the design strength direction; use one continuous piece of material. The design strength direction is perpendicular to the wall face. Butt adjacent sections of geogrid in a manner to ensure 100% coverage after placement.

2. Install the geogrid reinforcement under tension. Apply a nominal tension to the reinforcement and maintain it by staples, stakes, or hand tensioning. The tension applied may be released after the geogrid reinforcement has been covered and held in place with soil fill.

F. Subdrain:

1. Install subdrain behind the first course of retaining wall or as required to achieve positive drainage. Place porous backfill material around the subdrain to a minimum cover of 6 inches.

2. Ensure positive drainage on subdrain, and outlet subdrains through the wall at an elevation lower than the lowest point in the pipe behind the wall. Pipe penetration through wall should follow manufacturer recommendations. Coordinate exact subdrain outlet locations with the Facility.

END OF SECTION