1. General

1.1. The Contractor shall furnish all labor, materials, equipment, and incidentals required and perform all operations in connection with the installation of the ArmorFlex® units in accordance with the lines, grades, design and dimensions shown in the Contract Drawings and as specified herein.

1.2. ArmorFlex® is recommended to control erosion problems, improve the aesthetics of the location, or to envelop an existing deteriorated area. The gross area of each individual block shall be no less than one square foot and maintain direct contact with the geotextile, which is placed directly onto the subgrade.

2. Scope

2.1. This specification addresses the installation procedures for correct placement of the ArmorFlex® articulating concrete block (ACB) revetment system. The correct placement of an ACB revetment system is crucial in order to achieve the desired hydraulic performance and the stability required to withstand the erosive forces generated by hydraulic forces.

2.2. This specification should only be utilized as a reference for the installation of the ArmorFlex® articulating concrete block (ACB) revetment system, and meant to supplement any knowledge based on experience and professional judgment for onsite installation. The contractor should abide by the regulations mandated by OSHA (Occupational Safety and Health Administration) as well as any other relevant codes/regulations pertinent to the specific project.

2.3. This specification is intended to increase the understanding and to reiterate the importance of correct installation procedures required to maintain proper function of the revetment system. Throughout the installation process the concrete units shall be installed in a manner so that the concrete units will maintain intimate contact with the site-specific geotextile, and so that the geotextile shall remain in intimate contact with the prepared subgrade.

2.4. This specification addresses the Foundation Preparation, Placement of Geotextile Filter Fabric, Placement of ArmorFlex® Units, and Project Completion issues in the following sections.

3. Foundation Preparation

3.1. Areas on which filter fabric and ArmorFlex® units are to be placed shall be constructed to the lines and grades shown on the Contract Drawings as well as to the tolerances specified in the Contract Documents, and approved by the Engineer. The transitions between the lands contours shall be compacted and graded to facilitate the installation of the articulated concrete block system to insure that intimate contact is maintained throughout the system.

3.2. The slope shall be graded to a smooth plane surface to ensure that intimate contact is achieved between the slope face and the geotextile (filter fabric), and the geotextile and the entire bottom surface of the ArmorFlex® units. The sub-grade preparation is a crucial aspect of installation; therefore it is recommended that a flat rigid bar or beam of nine (9) feet minimum be attached to the bucket of an excavator then dragged along to slope to assist in a smooth grade preparation, or method similar thereof. All slope deformities such as roots, grade stakes, and stones that impair the local slope face must be
removed. Holes, "pockmarks", slope board teeth marks, footprints, or other voids greater than 1.0 inch in depth normal to the local slope face shall not be permitted. No grooves or depressions greater than 0.5 inches in depth normal to the local slope face with a dimension exceeding 1.0 foot in any direction shall be permitted. Where such areas are evident, they shall be brought to grade by placing compacted homogeneous material. The slope and slope face shall be uniformly compacted, and the Engineer shall determine the depth of layers, homogeneity of soil, and amount of compaction.

3.3. Immediately prior to placing the filter fabric and ArmorFlex® units, the prepared area shall be inspected by the Engineer, the owner's representative, and by the manufacturer's representative. No fabric or units shall be placed thereon until that area has been approved by each of these parties. Any area that becomes unacceptable prior to the ACB installation shall be regraded, recompacted, or replaced at the discretion of the engineer.

4. Placement of Geotextile Filter Fabric

4.1. Filter Fabric, or filtration geotextile, as specified elsewhere, shall be placed within the limits shown on the Contract Drawings.

4.2. The filtration geotextile shall be placed directly on the prepared sub-grade, in intimate contact with the sub-grade, and free of folds or wrinkles. The geotextile shall not be walked on or disturbed in a manner resulting in the loss of intimate contact between the ArmorFlex® block and sub-grade. The placement is initiated at the toe of the slope and proceeds to the top of slope. The geotextile filter fabric shall be placed so that the upstream strip of fabric overlaps the downstream strip, when applicable. The longitudinal and transverse joints shall be overlapped at least two (2) feet. The geotextile shall extend at least two (2) foot beyond the top and bottom revetment termination points. If necessary to expedite construction and to maintain the recommended overlaps, 18 inch anchoring pins or 11 gauge 6”x1” U-Staples are recommended.

5. Placement of ArmorFlex® Units

5.1. ArmorFlex® units shall be constructed within the specified lines and grades shown on the Contract Drawings. Care shall be taken while installing the system in order to avoid damage to the geotextile or the underlying subgrade.

5.2. The ArmorFlex® units shall be placed on the filter fabric in such a manner as to produce a smooth plane surface in intimate contact with the filter fabric. This placement pattern will produce a densely interlocked matrix. No individual unit within the plane of the system shall protrude more than one-half inch or as otherwise specified by the Engineer. The units shall be placed side by side so that the blocks abut each other; therefore distinct changes in grade will result in a discontinuous surface. To insure that the ArmorFlex® units remain flush and develop a close connection with the sub-grade; the units shall be "seated" by a method that is approved by the Engineer. Care shall be taken during installation so as to avoid damage to the geotextile or concrete units during the installation process. The system placement shall begin at the toe of slope and then proceed to the top of slope.

5.3. When installation begins downstream and proceeds upstream, a toe trench is located at the finished upstream edge to protect against erosive forces. These erosive forces potentially could undermine the system if proper installation procedures are not followed. Projections throughout the system shall not exceed 0.5 inch.
6. Project Completion

6.1. The exposed edges shall be backfilled and compacted until flush. The integrity of a soil backfill must be maintained so as to insure a flush surface with the top of the ArmorFlex® units for its entire service life. Toe trenches shall be backfilled as shown on the Contract Drawings. Backfilling and compaction shall be completed in a timely manner such that no more than 500 feet of exposed units exist at any time. Backfilling is required at the top of slope on both sides of the ditch to protect from eroding under the edge of the concrete unit system.

6.2. When required, the system shall be backfilled and compacted immediately with suitable materials. This will insure that there are no voids and the compacted material will extend from the filter fabric to one-inch above the surface of the cellular concrete block.

6.3. When required, the manufacturer of the concrete units shall provide design and construction advice during the design and initial installation phases of the project. The subgrade preparation, placement of geotextile filter fabric, placement of the ArmorFlex® concrete units, and the final completed project shall be inspected and approved by a qualified individual.

7. Repair of Damaged Units

7.1. In the scenario that a damaged concrete unit exist prior to the placement or after the mat as been installed, it is feasible to repair the area. The concrete unit is to be completely removed and then backfilled with 4000 psi grout. The grade of the grout is to be the same elevation as the surrounding units so that no projections will be created into revetment system.