

## SECTION 07 17 00

### BENTONITE WATERPROOFING

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. This Section describes the requirements for furnishing and installing bentonite waterproofing on the following surfaces:
  - 1. Foundation support system at below grade tie-back walls at Parking Structure and adjacent retaining wall at west side of Parking Structure.
- B. Related Sections:
  - 1. Modified bituminous sheet waterproofing is specified in Section 07 13 52.
  - 2. Elastomeric liquid waterproofing is specified in Section 07 14 16.
  - 3. Crystalline waterproofing is specified in Section 07 16 16.

##### 1.02 SUBMITTALS

- A. Product Data:
  - 1. Materials list of items proposed to be provided under this Section;
  - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
  - 3. Product data sheets or catalog illustrations in sufficient detail to show installation and interface of the work of this Section with adjacent work;
  - 4. Manufacturer's current recommended installation procedures which, when reviewed by the County's Representative, will become the basis for accepting or rejecting actual installation procedures used on the work.
  - 5. Written documentation of applicator's qualifications, including reference projects of similar scope and complexity, with current phone contacts of architects and owners for verification.
  - 6. Where work of this Section may potentially contact groundwater, include manufacturer's report confirming laboratory testing of membrane system with project groundwater samples and confirming suitability for installation in Project conditions.
- B. Warranty.

##### 1.03 QUALITY ASSURANCE

- A. Install by applicator specializing in installation of specified products with documented experience and approved by manufacturer.
- B. Convene a pre-installation job-site conference prior to commencing work of this Section. Attending shall be the County's Representative, Developer Design/Builder, applicator, representatives of the waterproofing manufacturer and related trades. Examine drawings, specifications and site conditions affecting the work of this Section, verify site conditions, review installation procedures, and coordinate scheduling with interfacing portions of the work.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials as factory packaged, sealed, and labeled, and handle and protect as necessary to prevent damage and deterioration during shipment, handling, and storage.
- B. Follow special instructions by manufacturer.

1.05 PROJECT CONDITIONS

- A. Substrates shall be free of standing water, dirt and debris, loose material, voids and protrusions or deformations which may inhibit application or performance of waterproofing.
  - 1. Where work of this Section will be installed on earth, provide subgrades that are stable, smoothed and compacted to minimum 85 percent modified proctor density.
  - 2. Where work of this Section will be installed on earth retaining system, fill gaps and voids in earth retaining system to conform with waterproofing manufacturer's requirements; fill voids and cavities exterior of wood-lagged shoring with sand or cement slurry; remove nails in wood lagging.
  - 3. Where work of this Section will be installed on concrete or masonry, provide substrates that are free of voids deeper than 3/8-inch and free of surface protrusions more than ¼-inch above the surface.
  - 4. Where work of this Section will be installed on concrete footings, provide wood float or better finish to surfaces scheduled to receive the membrane.
  - 5. Where work of this Section will include bentonite waterstop strips, provide concrete surfaces as required for that installation.
  - 6. Rigidly install penetrations of membrane for detailing procedures.
- B. Groundwater:
  - 1. Where work of this Section will encounter groundwater, provide waterproofing manufacturer with sufficient groundwater samples taken from Project at logged locations for manufacturer's laboratory analysis.
  - 2. Manufacturer shall provide written report confirming laboratory testing with regard to suitability of waterproofing system for installation in Project conditions.

1.06 WARRANTY

- A. Waterproofing materials shall be free from defects in materials and workmanship and installation shall be warranted to be waterproof for a period of 10-years from Date of Substantial Completion. This warranty shall be in addition to and not a limitation of other rights the County may have against the Developer Design/Builder under the Contract Documents.

PART 2 - PRODUCTS

2.01 APPROVED MANUFACTURER

- A. Tremco "Vulkem Paraseal LG" or approved equal.

## 2.02 BENTONITE MATERIALS

- A. Bentonite Sheet Membrane: Three component waterproofing membrane consisting of high-density polyethylene (HDPE), self-sealing layer of sodium montmorillonite (bentonite) modified to delay expansion, and protective layer of spun polypropylene. Membrane shall be designed for blindside installation over lagging system, meeting or exceeding the following physical properties:
1. Puncture Resistance: 169-pounds, ASTM E154.
  2. Tensile Strength: 4,000-psi, ASTM D412.
  3. Water Vapor Permeance: 0.03-perms, ASTM E96.
  4. Percent Elongation: 700-percent, ASTM D638, Type 4 Dumbbell.
  5. Resistance to Hydrostatic Head: 150-feet, ASTM D751.
  6. Warranted Crack-Bridging Capability: 1/8-inch.
- B. Bentonite Caulk: "Paramastic" bentonite expandable caulk, non hydrated expandable caulk containing not less than 55-percent high swelling, Wyoming bentonite. Bentonite caulk shall be resistant to rain damage, and may be installed at temperatures of -15-deg. F. to 110-deg. F. and shall retain 200-percent residual swell.
- C. Granular Bentonite: "Paragranular" granular bentonite shall swell to occupy a minimum volume of 17-mil when 2-grams are dispersed into deionized water. Granular bentonite shall be dust free, and packaged in waterproof bags.
- D. Termination Bar: "Paraterm" molded termination bar for use at reglets, parapet walls and grade terminations.
- E. Polyethylene Sheet: 6-mil polyethylene.
- F. Waterstop and Penetration Sealing Tape: Sealing tape with bentonite on both sides of polyethylene plastic strip, for use at penetrations through slabs or walls and at construction joints.
- G. Expandable Waterstop: Tremco "Superstop" or approved equal.
- H. Permanent Seam Tape: Self adhesive polyethylene backed tape for use on all seams.
- I. Fluid Applied Flashing Mastic: Vulkem 450/351 or approved equal, UV resistant and compatible with sheet membrane system.
- J. Perimeter Drain at Shoring: Tremco, Inc. "TREMDrain Total-Drain" or approved equal, including fittings, transitions and closures.
- K. Drainage Board: Tremco, Inc. "TREMDrain, TREMDrain 1000 or TREMDrain 2000 or approved equal, as recommended by membrane system manufacturer.

## PART 3 - EXECUTION

### 3.01 INSPECTION

- A. Verify that surfaces are free of standing water, debris, loose materials, and voids or interruptions which would affect installation.
- B. Prior to commencing installation, an authorized manufacturer's representative shall inspect jobsite conditions and report findings to County's Representative.

## 3.02 INSTALLATION

- A. Install waterproofing in accordance with manufacturer's instructions, recommendations, and specific project application instructions.
1. Coves: Form 2-inch coves with granular bentonite at horizontal-to-vertical junctures such as footings and horizontal shelves. Form 1-inch coves with sealant, elastomeric flashing or expandable mastic at vertical inside corners and under ledges.
  2. Place membrane in manner that assures minimum handling. Fit closely to and seal around inlets, outlets and other penetrations. Press membrane tight to corner surfaces and securely fasten.
  3. Prime concrete, masonry and metal surfaces with substrate primer immediately prior to application of tapes and pressure-sensitive waterproofing accessories.
  4. Terminate membrane system with termination bar finished off with bead of sealant or terminate to elastomeric flashing using reinforced waterproofing tape.
  5. Protect static construction joints in concrete with flexible, reinforced, bentonite-laminate waterstop strips. Install to suitable hardened concrete surface prior to subsequent concrete placement.
- B. Excavation Support System:
1. Ensure that vertical surfaces to receive waterproofing conform to manufacturer's requirements.
  2. Install waterproofing membrane starter-strip to vertical surfaces of earth retaining system with bentonite-side facing applicator prior to placement of concrete footings or foundation mat slab.
  3. Prepare vertical inside corners that occur along the earth retaining system by fastening a minimum 12-inch wide strip of membrane pressed tight into corner with bentonite-side facing applicator. Fasten along vertical edges 24-inches on center.
  4. Install membrane sheets oriented vertically with bentonite-side facing applicator. Overlap membrane sheets 3-inches minimum for poured-in-place walls and 4-inches minimum for shotcrete/gunite walls. Securely fasten membrane through both sheets at overlap areas with nails every 24-inches on center and staples every 3-inches on center.
  5. Verify which penetrations must be accessed after concrete placement for completion of waterproofing detail treatment and ensure that sufficient access to membrane is provided within a formed boxout. Verify which penetrations will not be accessed after concrete placement for completion of waterproofing detail treatment and ensure that final detailing procedures are completed prior to erection of concrete formwork or shotcreting/guniting. Waterproof penetrations in accordance with manufacturer's procedures.
  6. Protect membrane system from excessive rain.
  7. Inspect and repair damages to membrane system immediately prior to installation of concrete formwork or shotcreting/guniting. Ensure that concrete directly contacts membrane.
  8. Complete waterproofing details and terminations at grade with other work.
- C. Drainage Mat Installation: Install drainage mat units according to manufacturer's installation instructions.

END OF SECTION