PART 1 - GENERAL

1.1 SUMMARY

A. Furnish and install bentonite waterproofing system where shown on the drawings, as specified herein, and as needed for a complete and proper installation.
   1. Waterproofing system installation shall provide leak free below-grade walls.

B. Prior to ordering materials, contractor shall submit water samples to manufacturer for review, allow time for manufacturer review of samples, and distribute water sample test results to Owner and Consultant.
   1. If, based on water samples, manufacturer submits in writing that contaminate resistance is not required for waterproofing, provide Voltex DS in lieu of Voltex DSCR and provide credit to the Owner for change in material.

1.2 RELATED REQUIREMENTS

A. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Scheduling: Schedule work such that membrane will not be left exposed to weather for longer than that recommended by the manufacturer but in no case left unprotected for more than 30 days.

B. Preinstallation Meetings: Coordinate preinstallation meeting prior to commencement of field installation to establish procedures to maintain required working conditions and to coordinate this Work with related and adjacent Work. Verify that final waterproofing and waterstop details comply with waterproofing manufacturer's current installation requirements and recommendations. Preinstallation meeting attendees shall include representatives for Stanford University and the Architect, inspection firm, Contractor, waterproofing contractor, concrete contractor, excavating/backfill contractor, and mechanical and electrical contractors if Work penetrates the waterproofing.

1.4 SUBMITTALS

A. Within 15 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
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. Shop Drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades;

B. Manufacturer’s recommended installation procedures which, when approved by the Architect and Stanford University, will become the basis for accepting or rejecting actual installation procedures used on the Work. Product Data: For each product indicated.

C. Shop Drawings: Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

D. Samples: Submit representative samples of the following for approval:
   1. 12 inch x 12 inch minimum size sheet membrane

E. Certificates: Submit certificate(s) signed by manufacturer certifying materials comply with specified performance characteristics and physical requirements. Submit certification that waterproofing system and components, drainage and protection materials are supplied by a single-source manufacturer.

F. Certificate: Submit written certification that installer has current Approved Applicator status with waterproofing material manufacturer

G. Sample Warranty: Submit project specific sample warranty by manufacturer.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer shall meet or exceed the qualifications listed below and indicated elsewhere in the Contract Documents.
   1. Bentonite waterproofing system shall be manufactured and marketed by a firm with a minimum of 20 years experience in the production and sales of bentonite waterproofing.
2. Manufacturer shall be capable of providing field service representation during construction, approving an acceptable installer, recommending appropriate installation methods, and conducting a final inspection of the bentonite waterproofing and drainage system applied.

3. Manufacturers proposed for use but not named in these specifications shall submit evidence of ability to meet all requirements specified, and include a list of 20 projects of similar design and complexity completed within the past 5 years.

B. Installer Qualifications: Installer shall meet or exceed the qualifications listed below and indicated elsewhere in the Contract Documents.
   1. A firm which has at least (10) years experience in work of the type required by this Section, who can comply with manufacturer's warranty requirements.
   2. Installer must have been an authorized applicator of the specified materials for a minimum of 5 years.
   3. Installer shall adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.

C. Materials: For each type of material required for the Work of this Section, provide materials which are the products of one manufacturer. For products indicated that are not manufactured by the bentonite waterproofing manufacturer, provide products approved by the bentonite waterproofing manufacturer.

D. Water Sample Test: Project site water sample supplied to manufacturer by waterproofing contractor to verify type of bentonite system (standard sodium bentonite or contaminate resistant (CR) sodium bentonite) to be utilized on the project.
   1. Manufacturer shall conduct test free of charge. Contractor is responsible for collection and shipment of one liter of actual site water. Water should be shipped in uncontaminated, sealed plastic container to: CETCO Technical Center, Attn: BMG Water sample Technician, 2870 Forbs Avenue, Hoffman Estates, IL 60192. Also provide project name, city and state along with return address to forward test results.

E. Mockups: Before beginning installation, install waterproofing to 100 square feet of wall to demonstrate surface preparation, crack and joint treatment, corner treatment, and execution quality.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver the materials to the job site in the manufacturer’s unopened containers with all labels intact and legible at time of use.
B. Store and handle in strict compliance with manufacturer’s instructions, recommendations and material safety data sheets.

C. Maintain the products in a dry condition during delivery, storage, handling, installation, and concealment.

D. Protect from damage from sunlight, weather, excessive temperatures and construction operations.

E. Remove damaged material from the site and dispose of in accordance with applicable regulations.

F. Sequence deliveries to avoid delays, but minimize on-site storage.

1.7 PROJECT CONDITIONS

A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials and products used.

B. Proceed with installation only when substrate construction and preparation work is complete and in condition to receive waterproofing.

1.8 WARRANTY

A. Manufacturer's standard or customized form in which manufacturer agrees to repair or replace components of membrane roofing system including components that fail in materials or workmanship within specified warranty period.
   1. Provide written 10 year material, labor, and leak repair HydroShield warranty issued by the membrane manufacturer upon completion of work.
      a. Warranty shall provide for crack injection repairs for leakage that occurs during the warranty period at no additional cost to the Owner.
      b. Warranty shall state that the waterproofing system shall remain watertight for the entire warranty period and that the manufacturer will make timely leak repairs upon notification.

B. Installer's Warranty: Installer's warranty against all leaks in the waterproofing system in which Installer agrees to repair or replace waterproofing system that does not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period: Five years from date of Substantial Completion.
      a. Warranty shall provide for crack injection repairs for leakage that occurs during the warranty period at no additional cost to the Owner.
b. Warranty includes removing and reinstalling protection board, drainage panels, and other overburden at no additional cost to the Owner.

c. Warranty shall state that the waterproofing system shall remain watertight for the entire warranty period and that the contractor will make timely leak repairs upon notification.

**PART 2 - PRODUCTS**

2.1 MATERIALS

A. Basis-of-Design: Subject to compliance with requirements, provide Voltex DSCR by Cetco or one of the products listed below.
   1. Tremco Paraseal
   2. CCW MiraClay

B. Bentonite Waterproofing: 4’-0” x 14’-6” roll of interlocked geotextiles encapsulating a minimum of 1.10 lbs. per square foot of granular sodium bentonite. Composite shall consist of one woven and one non-woven polypropylene geotextile, interlocked using a needle-punching process that produces several interlocks per square inch over the entire surface area of product with an integrated polyethylene liner on one side.

2.2 ACCESSORY WATERPROOFING PRODUCTS

A. Furnish and install accessory waterproofing products by the bentonite waterproofing manufacturer. If products are not available from the bentonite manufacturer, provide products approved by the bentonite manufacturer.

B. Trowel Grade Bentonite: Manufacturer’s trowel grade sodium bentonite compound used as detailing mastic around penetrations, corner transitions and grade terminations.

C. Seam Tape: Manufacturer’s 2 inch wide butyl rubber sealant tape.

D. Waterstop: sodium bentonite based waterstop designed to stop water infiltration through cast-in-place concrete construction joints by expanding upon contact with water to form a positive seal against the concrete
   1. Product: Subject to compliance with requirements, provide Waterstop-RX 101 or approved equal.

E. Termination Bar: Minimum 1 inch wide by 1/8 inch thick stainless steel bar with pre-punched holes for fastening.

F. Accessory Products: Provide accessory products indicated in the Contract Documents and as required by the manufacturer for a complete and watertight installation.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the areas and conditions under which Work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION OF SUBSTRATES

A. Refer to manufacturer’s literature for requirements for preparation of substrates. Surfaces shall be structurally sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove loose stone and debris. Use repair materials and methods which are acceptable to manufacturer of sheet membrane waterproofing.

B. Treat joints and install flashing as recommended by waterproofing manufacturer.

3.3 INSTALLATION

A. Comply with Contract Documents and manufacturer's written instructions and recommendations.

B. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this section.

C. Install the bentonite waterproofing where shown on the Drawings, and in strict accordance with the manufacturer’s recommendations as approved by the Architect and Stanford University.

D. WATERSTOP INSTALLATION

1. Install waterstop in strict accordance with manufacturer's recommendations and written instructions.

2. Install continuous waterstop a minimum of 3 inches away from exterior face of concrete.

3. Install waterstop in a continuous bead of below grade sealant/adhesive.

4. Tightly butt ends in below grade sealant/adhesive to form a continuous waterstop.

5. Install two strips of waterstop in all horizontal and vertical shotcrete construction stop joints.

6. Install one strip of waterstop in all shotcrete lift joints after the joint surface has been cleaned of rebound, poorly bonded material, or any other defect. Secure by pushing waterstop halfway down into fresh shotcrete. 1-1/2 inch wide strip of flat surface shall be tooled or formed into the shotcrete surface at rough surfaces to facilitate proper installation of the waterstop.

7. Install one strip of waterstop around all mechanical penetrations extending through the shotcrete foundation.
8. Install one strip of waterstop around all steel reinforcement anchorage.
9. Waterstop shall not be prehydrated. Prehydrated waterstop shall be removed and replaced at no additional cost to the Owner.

E. Cast-in-Place Walls:
1. Attach bentonite sheet waterproofing using washer-headed mechanical fasteners maximum 24 inches on center and tape overlap with seam tape. Overlap all adjacent sheet edges a minimum 4 inches. Stagger all vertical overlap seams a minimum of 12 inches. Tape all membrane overlap seams with seam tape.
2. After the bottom horizontal course, sheets can be installed either vertically or horizontally oriented. Continue installation up wall to finished grade elevation detail, staggering all sheet roll ends of adjacent courses a minimum 12 inches. Do not allow horizontal overlap joints to run at same elevation as the concrete pour lift joints. Overlap all adjacent sheet edges a minimum 4 inches and secure with washer-head fastener maximum 24 inches. Tape all membrane overlap seams with seam tape.
3. Terminate bentonite sheet waterproofing as indicated in Contract Drawings. Termination of top of bentonite sheet waterproofing shall occur prior to backfill.
4. Inspect finished bentonite sheet waterproofing installation and repair any damaged material prior to backfill placement. Ensure that bentonite sheet waterproofing is not displaced during backfill placement or soil compaction.

F. Protection:
1. Protect panels from moisture with temporary plastic sheets.
2. Install the specified protection board against vertical surfaces prior to backfilling.
3. Backfill as soon as possible after installation has been approved, working in strict accordance with the pertinent provisions of other sections of these Specifications.

G. Ensure the termination bar is sealed and fastened per the manufacturer requirements. This detail is very critical; especially during the back fill operation to prevent soil from lodging between the waterproofing membrane and the structure.

H. Protect the material from moisture / rain at all times. Replace any damaged material prior to backfill after being re-inspected by the Architect and Stanford project manager.

I. Follow manufacturer’s requirements for proper overlaps and pin attachment based upon type of substrate.
J. Follow manufacturer’s requirements and details for horizontal to vertical conditions where walls meet horizontal conditions and any other field conditions. The use of Bentonite granular is sometimes required at the toe of the footing to wall transition.

3.4 CLEANING AND PROTECTION

A. Protect completed membrane waterproofing and accessory products from subsequent construction activities as recommended by manufacturer.

B. Provide third party observation and documentation of backfill operations to confirm the waterproofing system is not damaged during concealment.

END OF SECTION