1. **Design Criteria**:
    a. Dampproofing shall be allowed to be used where the geotechnical engineer has established no hydrostatic pressure exits in the groundwater. Waterproofing shall be used in all other cases.
        i. Waterproofing not only protects interior spaces from moisture intrusion but alleviates problems with water-borne minerals and chemical caused deterioration of permeable concrete substrates.
        ii. Elevator pits shall receive waterproofing
    b. The term “waterproofing” in this document shall refer to both dampproofing and waterproofing.
    c. Waterproofing product selection depends heavily on the specific project context and substrate materials. The design consultant shall carefully specify materials and systems that apply to the project's specific needs.
    d. Selection of the most appropriate product shall consider the following:
        i. How are penetrations, corners, and joints handled?
        ii. How is the product detailed where it meets the bottom of the wall/footing?
        iii. How is the product terminated at the top of the wall to ensure water does not get behind it?
        iv. How well does the product span cracks or expansion joints and what details does the manufacturer require to maintain a warranty?
    e. Drainage board shall be used to protect sheet and fluid membranes installed below grade from backfill.
    f. Proper flashing materials shall be used based on the waterproofing materials specified to connect field areas to penetrations.
    g. Negative-side waterproofing is not preferred over exterior moisture protection in new construction. It may be used as a last resort in existing conditions where the application will not adversely affect interior space or the protected wall construction.
    h. Below-grade vertically applied moisture protection membranes shall be installed with protective drainage panels to provide an airgap to reduce hydrostatic pressure from surrounding grade. These may be used in conjunction with insulation boards.
    i. Low-VOC products are preferred.
        i. Drainage panels be drained into the foundation drainage system where it exists as part of the project design.

j. The design consultant shall pay special attention to detailing corners, cracks, cold joints, spalls, voids, transitions, and penetrations of substrates to receive waterproofing and what details does the manufacturer require to maintain a warranty?
k. Consider tying the under-slab vapor barrier to the below-grade waterproofing where possible.
l. Coordinate the waterproofing specification section with other division 3 (Concrete) and 31 (Earthwork) sections as well as 22 (Plumbing) and 26 (Electrical) that can have an impact on this work.
    i. Coordinate footing waterstop materials and details with waterproofing materials
m. Require a preconstruction meeting to discuss detail requirements, installation procedures, and warranty requirements as well as coordination of trades that are penetrating or installing the substrates waterproofing is being applied to. The waterproofing manufacturer's technical representative shall be invited to attend the meeting.

2. **References**
    a. ASTM Standards apply according to type of materials selected

3. **Required Submittals**:
    a. Product Data: Manufacturer's data including instructions, recommendations, and restrictions.
    b. Details: Provide manufacturer's standard published details for terminations, corners, penetrations, and other details.

4. **Products, Materials & Equipment**:
    a. Trowel or spray applied, fully adhered, and fluid applied membranes are allowed.
        i. Acceptable materials include:
            1. Bituminous Dampproofing
            2. Fully Adhered Sheet Waterproofing
            3. Fluid-Applied Waterproofing
    b. Mechanically attached membranes shall be explicitly reviewed with the UVM Project Manager for approval on a case-by-case basis.

5. **Installation, Fabrication, and Construction**:
    a. Repair holes, holes from removed fasteners, pin holes, tears, damage, bubbles, blisters, wrinkles, fish mouths, slump, sag, and all other detections.
    b. Detail repairs as recommended and warranted by system manufacturer.
    c. Preparation of substrate imperfections according to manufacturer instructions shall be specified.
    d. The waterproofing installer shall review all substrates for correct preparation prior to installing damp/waterproofing materials and prepare a written report of all nonconformances. Installation of waterproofing shall not be started until all the reported issues have been resolved.
        i. This report is not part of commissioning or assembly testing requirements. Its purpose is to document acceptable substrate conditions prior to installation of the membrane barrier.
    e. The detailing guidance given below must be compared to specific manufacturer details for each type of waterproofing product. These guidelines are given as a baseline to communicate the complexity of detailing that must be addressed to avoid future problems caused by lack of attention by the designer or installer
    f. General Detailing
        i. Require adhesion testing for waterproofing materials according to the related ASTM standard test methods to confirm adequate adhesion
            1. Include remediation plans for failing tests in the specifications
        ii. Protect adjacent surfaces not to receive waterproofing
        iii. Where below-grade waterproofing materials are not UV resistant, provide durable protection from UV where the below-grade materials would otherwise be exposed to UV light after construction is complete.
            1. Terminate UV sensitive materials 6 inches below-grade and use a UV stable material from that transition to the top of the wall substrate that requires protection.
    g. Sheet Membrane Detailing
        i. Provide a ¾ inch minimum non-sag flexible sealant joint at the cold joint between below grade walls and footers to avoid 90 degree turns in any sheet membrane waterproofing product as it transitions between vertical and horizontal surfaces. The sealant also provides a secondary line of defense at the cold joint. Follow the sealant joint with a detail strip of the same material

as the sheet membrane to create a double layer of protection at this critical joint.

1. Confirm the sealant material is appropriate and compatible with the membrane and substrate.

ii. Apply mastic or an appropriate non-sag sealant over the membrane termination onto the substrate at the bottom of vertical below grade walls to prohibit pressurized water from rising under the membrane at the termination.

iii. Provide sealant joint at pipe penetrations through walls to eliminate any 90-degree turnouts. Follow this with a membrane detail strip and a pipe clamp and mastic/sealant on the penetrating pipe if necessary.

h. Protection/drainage board
   i. Protect installed waterproofing system from all damage during and after installation.
   ii. Protect installed work from soil backfilling with 100 percent coverage of protection board.
   iii. Scribe protection board around projections, penetrations, and interruptions
   iv. Prohibit mechanical attachment of drainage boards through moisture protection coatings. Adhesives are preferred to limit penetration of the newly applied protective coating.

i. Comply with manufacturer's published limits for exposure to sunlight and weather.

j. Negative-side waterproofing detailing
   i. Shall not be applied over cracks larger than 1/16 inch. Larger cracks must be prepared according to manufacturer instructions.
   ii. Shall be applied over substrates only after all existing coatings, dirt, efflorescence, oils, etc. have been removed.
   iii. The correct surface profile shall be achieved as required by the material manufacturer prior to application. This may require etching or abrasion.

k. Fluid and Trowel Applied Detailing
   i. Installer shall use a wet film gauge to measure the application depth of fluid applied coatings.

6. **Warranties**:
   a. Provide manufacturer's minimum five-year warranty on product for material AND labor costs related to replacement due to failure.
   b. Provide installer's standard five-year warranty on installation and workmanship