



MANUFACTURER'S GUIDE SPECIFICATION

SECTION 07 17 00 Bentonite Waterproofing – Geosynthetic Clay Liner (GCL)

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. All Contract Documents, including General and Supplementary Conditions, and Division 1 General requirements, apply to this section.

1.2 SUMMARY

- A. Section includes complete waterproofing system, preparation of substrate, and prefabricated drainage composite system to prevent passage of liquid water into building structure. Compatible with construction materials such as concrete, shotcrete, and metal. Includes protection.

1.3 SYSTEM DESCRIPTION

- A. Waterproofing system includes:

1. Verification of Waterstop in construction joints.
2. Substrate preparation repair mortars, cants/fillet, crack filler and joint treatment.

Waterproofing shall be composed of granular sodium bentonite clay at a rate of 1.13 lbs. per sq. ft. (5,5 kg per m²) sandwiched between two polypropylene geotextile fabrics – a nonwoven and a woven fabric. The nonwoven fabric is needle-punched through to the woven fabric, with thousands of fibers mechanically locking the sodium bentonite clay in place.

3. Waterproofing for contaminated sites shall be composed of contaminant resistant granular sodium bentonite clay and polymers at a rate of 1.1 lbs. per sq. ft. (5,3 kg per m²) sandwiched between two polypropylene geotextile fabrics – a nonwoven and a woven fabric. The nonwoven fabric is needle-punched through to the woven fabric, with thousands of fibers mechanically locking the sodium bentonite clay in place.
4. Accessory components fasteners and washers, granules, mastics, termination bars, waterstop, tie-back covers, expansion joint materials.
5. Prefabricated protection and drainage composite sheet
6. Prefabricated drainage base

7. Drainage accessories
8. Rigid Insulation Board
9. Testing and Inspection

1.4 RELATED SECTIONS

- A. Section 01 82 00 - Facility Substructure Performance Requirements
- B. Section 02 30 00 - Subsurface Investigation
- C. Section 02 32 00 - Geotechnical Investigations
- D. Section 03 15 00 – Concrete Accessories
- E. Section 03 30 00 – Cast-In-Place Concrete
- F. Section 07 06 00 - Schedules for Thermal and Moisture Protection
- G. Section 07 17 13 – Bentonite Panel Waterproofing
- H. Section 07 21 13 - Board Insulation
- I. Section 07 26 16 - Below-Grade Vapor Retarders
- J. Section 07 60 00 – Flashing and Sheet Metal
- K. Section 07 92 00 – Joint Sealants
- L. Section 07 95 00 – Expansion Control
- M. Section 22 13 00 - Facility Sanitary Sewerage (Penetrations)
- N. Section 22 14 00 - Facility Storm Drainage (Penetrations)
- O. Section 26 05 33.13 - Conduit for Electrical Systems (Penetrations)
- P. Section 26 05 43 - Underground Ducts and Raceways for Electrical Systems (Penetrations)
- Q. Section 31 23 00 - Excavation and Fill
- R. Section 31 41 00 – Shoring
- S. Section 33 46 00 - Subdrainage
 1. Section 33 46 13 - Foundation Drainage
 2. Section 33 46 16 - Subdrainage Piping
 3. Section 33 46 19 - Underslab Drainage
 4. Section 33 46 23 - Drainage Layers

5. Section 33 46 26 - Geotextile Subsurface Drainage Filtration

1.5 REFERENCES

- A. American Society for Testing and Materials International (ASTM)
- B. ASTM D5261 Standard Test Method for Measuring Mass per Unit Area of Geotextile
- C. ASTM D5993 Standard Test Method for Measuring Mass Per Unit of Geosynthetic Clay Liners
- D. ASTM D5887 Standard Test Methods for Measurement of Index Flux Through Saturated Geosynthetic Clay Liner Specimens Using a Flexible Wall Permeameter
- E. ASTM D5890 Standard Test Method for Swell Index of Clay Mineral Component of Geosynthetic Clay Liners
- F. ASTM D6768 Standard Test Method for Tensile Strength of Geosynthetic Clay Liners
- G. ASTM D4632 Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
- H. ASTM D6241 Standard Test Method for Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe
- I. ASTM D6496 Standard Test Method for Determining Average Bonding Peel Strength Between Top and Bottom Layers of Needle-Punched Geosynthetic Clay Liners
- J. ASTM D903 Standard Test Method for Peel Adhesion of Waterproofing to Concrete
- K. ASTM D4491 Test Methods for Water Permeability of Geotextiles by Permittivity
- L. ASTM D4716 Test Method for Determining the (In-Plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head
- M. ASTM D4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
- N. ASTM D5385 Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes

1.6 ACTION SUBMITTALS

- A. Product Data: Manufacturer's product data, installation instructions and details.
- B. Samples: Representative samples of the following:
 - 1. Geosynthetic Clay Liner: 2" x 3" (5 x 7,6 cm)
 - 2. Waterstop for Concrete Joints: 3" (7,6 cm)
 - 3. Drainage Composite Sheet: 4" x 4" (10 x 10 cm)
 - 4. Drainage Composite Base Drain: 6" (15,2 cm)

1.7 INFORMATION SUBMITTALS

- A. Waterproofing Manufacturer's Sample Warranty
- B. Sustainability Submittals:
 - 1. Provide VOC content of all components.
- C. Material Certificates: Certification that waterproofing system and components, drainage and protection materials comply with specified performance characteristics and physical requirements and are supplied by single-source manufacturer.
- D. Contractor Certificate: Approved Applicator status with waterproofing material Manufacturer.
- E. Site Condition Reports: Indicate ambient and substrate surface temperatures, relative humidity and dew point, wind velocity and precipitation during application.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications to:
 - 1. Have minimum three (3) years of experience in type of work required by this section.
 - 2. Comply with manufacturer's warranty requirements.
 - 3. Be approved applicator as determined by waterproofing/drainage system manufacturer.
 - 4. Attend necessary job meetings. Provide competent and full-time supervision, experienced mechanics, all materials, tools, and equipment necessary to complete, in acceptable manner, the membrane installation.
- B. Manufacturer Qualifications:
 - 1. Capable to supply all components of complete waterproofing system.
 - 2. Minimum of five (5) years of experience in manufacturing of waterproofing systems.
 - 3. Capable of providing product and technical support representation during construction, approving an acceptable applicator, and suggesting appropriate installation methods.
 - 4. ISO 9001-2000 Certified Organization.
 - 5. ISO 14001-2004 Certified Environmental Management Organization.
- C. Pre-Installation Conference:
 - 1. Establish procedures to maintain required working conditions.
 - 2. Coordinate this work with related and adjacent work and trades.

3. Verify dewatering plan for projects in the water table.
 4. Review special project details.
 5. Verify with Architect and Contractor that waterproofing and waterstop details comply with waterproofing manufacturer's current installation requirements and recommendations.
 6. Attendees should include representatives for Owner, Architect, Quality Assurance, General Contractor, Waterproofing Contractor, Waterproofing Manufacturer, Concrete Contractor, Excavating/backfill Contractor and MEP contractors if MEP work penetrates waterproofing.
 7. Give minimum five (5) day notice to Owner, General Contractor and Manufacturer prior to commencing work. Immediately notify parties of changes in work schedule.
- D. Independent Inspection: Owner provided independent inspection service to monitor waterproofing material installation. Inspection to include:
1. Compliance with project contract documents.
 2. Compliance with manufacturer's published literature and site-specific details.
 3. Produce reports and digital photographs documenting each inspection. Make reports available in timely manner to Contractor, Waterproofing Installer, Waterproofing Material Manufacturer and Architect.
 4. Substrate examination at beginning of waterproofing installation, at periodic intervals during waterproofing installation and at final inspection.
 5. Authorization to proceed prior to concrete or backfill placement against the waterproofing.
- E. Mock-up:
1. Area designated by Architect will be considered Mock-up.
 2. Prepare and clean a minimum 4' x 4' (1,2 x 1,2 m) area of each substrate material type and project condition.
 3. Demonstrate methods, products and tools to prepare acceptable substrate meeting membrane manufacturer's installation instructions
 4. Install waterproofing system with drainage composite and accessories.
- F. Water Sample Test: Ground water analysis is required on projects that have ground water present to test for contamination and compatibility with waterproofing membrane.
1. Waterproofing contractor is responsible for collection and shipment of 64-fluid ounces (2-liters) of actual site ground water to manufacturer. Water should be shipped in uncontaminated, sealed plastic container to: Polyglass, 1111 West Newport Center Drive, Deerfield Beach, FL 33442, Attn: Technical Services – Water Sample Test.

2. Water sample must be taken from the lowest part of the site in the water table or from dewatering wells and not surface water from rain.
3. Waterproofing contractor must provide project name, city and state along with their company information (contact person, address, phone number and email) so that results can be forwarded.
4. Manufacturer shall test submitted ground water sample for contamination and compatibility with waterproofing membrane and provide waterproofing contractor written results and formulation recommendation.
5. Waterproofing contractor shall submit to architect a letter of compatibility recommending which formulation to use.

1.9 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery: Deliver materials in factory sealed and labeled packaging. Sequence material deliveries to avoid work delays and minimize on-site storage. Follow manufacturer's instructions, recommendations and material safety data sheets for material handling and storage.
- B. Storage: Do not double-stack pallets during shipping or storage. Protect waterproofing materials from moisture, excessive temperatures and sources of ignition. Cover material top and all sides while stored on-site, allowing for adequate ventilation. Protect material from construction operation, weather, excessive temperatures and prolonged sunlight.
- C. Store and manage hazardous materials in accordance with Section 01 35 29.06 - Health and Safety Requirements and Section 01 35 43 - Environmental Procedures. Remove damaged material from site and dispose of in accordance with applicable regulations.

1.10 PROJECT CONDITIONS

- A. Substrate Condition: Proceed with work only when substrate construction and preparation work is complete and is acceptable for waterproofing application. All structural, plumbing, electrical, and mechanical work to be under or penetrating through the waterproofing to be completely secured in proper position prior to waterproofing system installation. Substrate preparation to comply with waterproofing manufacturer's guidelines.
- B. Submit written report to General Contractor of substrate surface defects and work prepared by other Trades which adversely affect quality or dimensions of waterproofing work.
- C. Weather Conditions: Perform work only when existing and forecasted weather conditions are within Manufacturer's guidelines including but not limited to:
 1. Do not apply waterproofing materials in areas of standing or active water, or over snow, ice or frost.
 2. In a timely manner, remove standing water caused by precipitation or ground water seepage to maintain acceptable site conditions.
- D. Schedule work so membrane will not be exposed for longer than recommended by Manufacturer.

1.11 WARRANTY

- A. Waterproofing System Warranty: Waterproofing Manufacturer to provide sample of [five (5)], [ten (10)], [fifteen (15)] year warranty, including waterproofing system requirements. Issuance of Manufacturer's Waterproofing Warranty requires the following:
1. Waterproofing System products and drainage composite products provided by single manufacturer.
 2. Installation of waterproofing products, prefabricated drainage composite and all appropriate system accessories are installed by a Manufacturer's Approved Applicator in full accordance with manufacturer's recommendations, installation instructions, specifications and details.
 3. Concrete Accessories Waterstop installed in concrete cold construction joints, formed construction joints, isolation joints and penetrations are required by Sheet Membrane Waterstop Warranty

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Materials: Obtain waterproofing system including all components and accessories from single manufacturer to assure material compatibility.
- B. Polyglass, 1111 West Newport Center Drive, Deerfield Beach, FL 33442, USA. Phone: Toll Free (888) 410-1375; Website: www.polyglass.us

2.2 GEOSYNTHETIC CLAY LINER BENTONITE WATERPROOFING MEMBRANE

- A. Polyglass Mapeproof HW membrane: 3'-7" x 16'-5" (1,09 x 5,0 m) roll is a 1/4" (6 mm) thick GCL Bentonite Waterproofing consisting of granular sodium bentonite clay at a rate of 1.13 lbs. per sq. ft. (5,5 kg per m²) encapsulated between two polypropylene geotextile fabrics – a nonwoven and a woven fabric. The nonwoven fabric is needle-punched through to the woven fabric, with thousands of fibers mechanically locking the sodium bentonite clay in place.
- B. Polyglass Mapeproof SW membrane: 3'-7" x 16'-5" (1,09 x 5,0 m) roll is a 1/4" (6 mm) thick GCL Bentonite Waterproofing consisting of contaminant resistant granular sodium bentonite clay and polymers at a rate of 1.1 lbs. per sq. ft. (5,3 kg per m²) encapsulated between two polypropylene geotextile fabrics – a nonwoven and a woven fabric. The nonwoven fabric is needle-punched through to the woven fabric, with thousands of fibers mechanically locking the sodium bentonite clay in place.

2.3 BENTONITE CLAY – GCL PERFORMANCE PROPERTIES:

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|----|-----------------------------------------|------------------------------------------------------|
| A. | Thickness – ASTM D5199 | 1/4" (6 mm) |
| B. | Mass per unit area, nonwoven ASTM D5261 | 5.9 U.S. oz. per sq. yd. (200 g per m ²) |
| C. | Mass per unit area, woven ASTM D5261 | 3.2 U.S. oz. per sq. yd. (110 g per m ²) |
| D. | Bentonite at 12% moisture – ASTM 5993 | 1.13 lbs. per sq. ft. (5,5 kg per m ²) |
| E. | Bentonite at 0% moisture – ASTM 5993 | 1.00 lbs. per sq. ft. (4,9 kg per m ²) |
| F. | Swell Index – ASTM D5890 | >27 ml/2g |

G.	Hydraulic conductivity – ASTM D5887	1 x 10 ⁻⁹ cm/sec.
H.	Index flux – ASTM D5887	2 x 10 ⁻⁹ m ³ /m ² /s max
I.	Tensile strength (MD/CMD) – ASTM D6768	63/63 lbf/ft. (11,0/11,0 kN/m)
J.	Grab tensile strength – ASTM D4632	135 lbf (600 N)
K.	Static puncture strength – ASTM D6241	450 lbf (2 kN)
L.	Peel strength (MD ²) – ASTM D6496	3.6 lbf/in. (625 N/m)
M.	Peel adhesion to concrete – ASTM D903	17.7 lbf/in. (3,1 kN/m)
N.	Hydrostatic head – ASTM D5385	231 ft. (70,4 m) of water

2.4 WATERPROOFING ACCESSORIES:

- A. Granules: Polyglass Mapeproof Granules. Bag of loose granular sodium bentonite clay.
- B. Mastics/Sealants: Polyglass Mapeproof Sealant. Trowel grade of bentonite detailing mastic.
- C. Termination Bar: Min. 1/8" (3 mm) thick by 1" (2,5 cm) wide stainless steel or aluminum termination bar with pre-punched holes punched 6" (15,24 cm) on center for fastening.
- D. Fasteners: Provide fasteners and 1" washers for membrane and termination bar which is compatible with the substrate
- E. Waterstop: Polyglass Mapestrip 25 hydrophilic expandable, pre-formed, flexible rubber strip for watertight construction.
- F. Tie-Back Covers: Fabricated metal tie-back cover in accordance with manufacturer's detail for specific project condition(s).

2.5 PROTECTION AND DRAINAGE COMPOSITE SHEET- PREFABRICATED

- A. General: Polyglass Mapedrain prefabricated drainage composite sheet to promote positive drainage. High-Strength, High-Flow, Prefabricated Drainage Composite with Filter Fabric. Three-dimensional polypropylene drainage core with geotextile adhered to one side to allow water passage while restricting soil particles.
- B. Polyglass Mapedrain HS for vertical applications with high compressive strength and flow rates. Has backer film to prevent potential "die cutting" of a waterproofing membrane installed behind drainage composite.
 - 1. Geotextile fabric non-woven
 - 2. Compressive strength 11,000 psf (526 kN/m²)
 - 3. Flow Rate per ASTM D4491: 140 gal/min/ft² (5 704 L/min/m²)
 - 4. Flow (hydraulic gradient = 1) per ASTM D4716: 18 g/min/ft (223 L/min/m)
 - 5. Core Thickness 0.40" (10,16 mm)
- C. Polyglass Mapedrain HS PLUS for vertical or horizontal applications, with high compressive strength and flow rates. Has backer film to prevent potential "die cutting" of

a waterproofing membrane installed behind drainage composite.

1. Geotextile fabric: 4 oz. non-woven
2. Compressive strength: 15,000 psf (718 kN/m²)
3. Flow rate per ASTM D4491: 140 gal/min/ft² (5 704 L/min/m²)
4. Flow (hydraulic gradient = 1) per ASTM D4716: 21 g/min/ft (260 L/min/m)
5. Core thickness: 0.40" (10.16 mm)

2.6 BOARD INSULATION: Extruded-polystyrene board insulation complying with ASTM C 578.

- A. Type IV, 25 psi (173 kPa) minimum compressive strength.

PART 3 – EXECUTION

3.1 SUBSTRATE INSPECTION AND CONDITIONS

- A. Examine conditions of substrates and other conditions affecting work of this section with waterproofing Installer, General Contractor and Owner's Independent Inspector present. Notify General Contractor, in writing, of defects in substrate preventing installation of waterproofing. Do not proceed with work until defects in substrate are corrected and acceptable for waterproofing installation and comply with manufacturer's recommendations.
- B. Substrates to receive waterproofing must be clean, dry and free of voids, protrusions and surface irregularities.
- C. Related work: Verify Waterstop is installed in vertical and horizontal concrete construction cold pour joints and around penetrations, structural members, and tie-rod form holes that extend through the wall.
- D. Prepare substrate surfaces to accept waterproofing system per requirements of membrane Manufacturer and as directed by Architect.
- E. Apply waterproof membrane only in dry weather.

3.2 PREPARATION

- A. Remove contaminants such as dirt, debris, oil, grease, wax, cement laitance or other foreign matter which will impair or negatively affect performance of waterproofing and drainage system.
- B. Protect adjacent work areas and finish surfaces not receiving waterproofing from damage or contamination from waterproofing products spillage and overspray during installation operations.
- C. Form fins, ridges, ponding ridges and other protrusions should be level and smooth with concrete surface.
- D. Honeycombing, aggregate pockets, tie-rod holes and other voids shall be completely filled with non-shrink cementitious grout and level with adjacent concrete surface.
- E. Working Mud Slab: Working concrete mud slabs should have a float finish providing a flat surface; without sharp angular depressions, voids or raised features.

- F. Compacted Soil: Sub-grade shall be compacted to a minimum Modified Proctor compaction of 85% or greater as specified by civil/geotechnical engineer. The finished sub-grade surface shall be well-leveled, uniform, and free of debris, standing water, ice or snow.
- G. Compacted Gravel Base: Aggregate sub-grades shall consist of 3/4" (19 mm) stone or smaller and be mechanically compacted flat, free from any protruding sharp edges, standing water, ice or snow.
- H. Wood Lagging Shoring: Wood lagging shoring should extend to the lowest level of the waterproofing installation with any voids or cavities on the exterior side of the lagging timbers filled with compacted soil, gravel or cementitious grout. Interior building side surface of lagging boards should be flat, smooth and tight together with gaps less than 1" (2,5 cm). Gaps in excess of 1" (2,5 cm) should be filled with cementitious grout, wood, extruded polystyrene (20 psi min.) or polyurethane spray foam. Do not use plywood or other surface treatment over large lagging gaps that leave the cavity void. In areas where lagging gaps are 2-1/2" (6,35 cm) or less, Mapedrain drainage composite should be installed over lagging to provide uniform surface to mount the waterproofing without the requirement of filling gaps. All lagging board nails and other mechanical projections shall be removed or pounded flush. Install a protection material over all soldier piles with raised lagging hanger bolts, form tie rods, or other irregular surface; protection material should extend a minimum 6" (15 cm) to both sides of the steel piling.
- I. Secant Piles or Cut Rock Face Shoring: Interior secant piles and cut rock shall be flat and smooth without irregular surface conditions, voids and sharp transitions that would leave a void space to the outside of the drainage and waterproofing installation. Irregular rock, void pockets, cracks and sharp concave transitions should be completely filled or smoothed with cementitious grout, shotcrete or other approved solid material.
- J. Structural Concrete Substrate: Structural concrete to be waterproofed shall be properly placed and consolidated. Cast-in-place concrete to receive waterproofing shall be of sound structural grade with a smooth finish, free of debris, oil, grease, laitance, dirt, dust or other foreign matter which will impair the performance of the waterproofing and drainage system and which do not comply with manufacturer's warranty requirements. Mapeproof can be installed on green structural concrete as soon as the forms are removed provided the contractor has written approval. Do not apply Mapeproof waterproofing directly over CMU, lightweight insulating concrete or insulating concrete forms.
- K. Under Concrete Slab on Grade: Reinforced concrete slab(s) on compacted grade shall be a minimum of 4" (10 cm) thick. Reinforced structural slabs should be a minimum of 6" (15 cm) thick when placed on a working mud slab. When hydrostatic conditions exist, install Mapeproof under all footings, grade beams and elevator pits.

3.3 GENERAL INSTALLATION GUIDELINES

- A. Comply with contract documents and manufacturer's product data, including product application and installation instructions.
- B. Always install membrane with the white non-woven geotextile side facing the installer, with the black woven geotextile side against the substrate.
- C. Overlap membrane edges a minimum 4" (10 cm) for side and end laps.
- D. Fasten membrane to substrate with fasteners compatible with the substrate and 1" (2,5 cm) washers.

- E. For tunnels and structures with earth covered roofs, install a 1/8" (3 mm) thick layer of granules to the top of tunnels and earth-covered roofs prior to the main waterproofing material course. Install membrane with the white non-woven geotextile side outward, away from the concrete and facing the installer with the black geotextile against the concrete substrate.
- F. Expansion Joints: Sodium Bentonite Clay waterproofing membranes are not expansion joint filler or sealant but may be used as an expansion joint cover over a properly installed expansion joint material placed during substrate preparation. To use membrane as an expansion joint cover, trowel 1/8" (3 mm) thick, 6" (15 cm) wide layer of bentonite mastic or sealant centered over installed mechanical expansion joint by others. Install a 24" (60 cm) wide strip of membrane centered over the expansion joint. Then install the main waterproofing membrane course.
- G. Related work to be completed under Division 3. Mapestrip 25 Waterstop shall be installed in all concrete joints, around applicable slab penetrations and structural members. Refer to Mapestrip 25 Waterstop Technical Data Sheet for further installation procedures and guidelines.
- H. Always apply waterproofing membrane directly to properly prepared structural concrete substrates.
- I. Insulation, if used, should be installed to the exterior of the waterproofing and to the inside of Mapedrain.
- J. Do not apply Mapeproof HW/SW waterproofing over lightweight insulating concrete or CMU.
- K. Terminate membrane 4" to 6" (10 cm – 15 cm) below finished grade with metal termination bar and Mapeproof Sealant.
- L. Always inspect finished Mapeproof installation and repair any damaged material prior to backfill or concrete placement.
- M. Mapedrain drainage composite installation:
 - 1. Blindsight waterproofing applications: Use drainage composite in blindsight applications to provide a suitable substrate for waterproofing membranes. Apply Drainage Composite and other related materials in accordance with manufacturer's recommendations.
 - 2. Positive side waterproofing applications: Use drainage composite in positive side applications to protect the waterproofing membrane. Apply Drainage Composite and other related materials in accordance with manufacturer's recommendations.

3.4 BLINDSIDE APPLICATIONS:

- A. Under Slab Installation
 - 1. Reinforced structural foundation slabs should be a minimum of 6" (15 cm) thick when placed on a working mud slab. Reinforced concrete slab(s) on compacted grade shall be a minimum of 4" (10 cm) thick. For Hydrostatic conditions, slab thickness must be designed by project engineer. Install Mapeproof under all footings, grade beams and elevator pits when hydrostatic conditions exist or are anticipated per the historical high ground water elevation reported in the project's geotechnical documents.
 - 2. Install under slab Mapeproof membrane extending to base of shoring wall (white

non-woven geotextile side facing side up) fully overlapping the corner transition sheet. Secure corner edge of membrane with washer-head fasteners or pneumatic staples 12" (30 cm) on center.

3. Place Mapeproof directly on properly prepared substrate (white non-woven geotextile side up facing installer; black woven geotextile side down) with adjoining edges overlapped a minimum of 4" (10 cm). Stagger sheet end seams a minimum of 12" (30 cm). Mechanically fasten or staple Mapeproof membrane as required to prevent movement from construction operations or concrete placement. When the slab is poured in sections, extend Mapeproof a minimum 12" (30 cm) beyond the slab edge and rebar to enable proper overlapping.
4. Install waterproofing system at all grade beams, pile caps and other detail areas in accordance with manufacturer's details for specific project conditions.
5. Slab Penetrations: For all pipe, rebar, structural or other penetrations install waterproofing system in accordance with manufacturer's standard details for specific project conditions.
6. Inspect finished Mapeproof installation and repair any damaged material prior to concrete slab placement.

NOTE: Mapestrip 25 shall be installed in all slab joints, around applicable slab penetrations and structural members. Refer to manufacturer's details and Mapestrip 25 Technical Data Sheet for further installation procedures and guidelines.

B. Blindsided Underslab to Shoring Wall Transition

1. At base of shoring wall, install full sheet of Mapeproof oriented horizontally centered on corner with white non-woven geotextile side up facing installer, black woven geotextile side down against shoring wall and horizontal substrate. Secure Mapeproof sheet to shoring wall through the Mapedrain with fasteners compatible with the substrate and 1" (2,5 cm) washers as required to secure the sheet. Overlap edges of Mapeproof sheets a minimum of 4" (10 cm).
2. Install Mapeproof under slab membrane overlapping transition corner sheet extending over to the corner.
3. Install Mapeproof wall membrane overlapping transition corner sheet extending down to the corner.
4. Detail the membrane that is cut, to follow contour of vertical/horizontal intersection, with Mapeproof Sealant and/or Mapeproof Granules.

C. Wood Lagging Wall Installation

1. Install Mapedrain:
 - a. Install the bottom course of Mapedrain drainage composite (geotextile side against the lagging wall) with the bottom edge fabric wrapped to the back side of the drainage composite and secured.
 - b. Install subsequent courses of Mapedrain to within 4" to 6" (10 cm – 15 cm) of finished grade or as shown on the construction documents. Tightly abut adjoining sheet drain core edges and tuck the extra fabric flaps behind the adjacent roll edge to prevent soil from entering the sheet drain. Secure sheet drain to lagging wall with fasteners compatible with

the substrate and 1" (2,5 cm) washers. Where drainage sheet panels are installed overlapped, bottom edge of higher course shall be installed to the outside of the lower course, to shed water like a roof shingle.

- c. Prior to installing drainage composite near grade, install ½" (12 mm) thick cementitious wall board centered over metal soldier pile from finished grade elevation to specified depth of soldier pile removal. Cementitious wall board will protect the Mapedrain drainage composite and Mapeproof waterproofing membrane when the top of the soldier piles is excavated and removed. Remove cementitious board with removal of soldier pile top and lagging boards.
- d. Around penetrations and tie-back heads, cut Mapedrain drainage composite to fit and wrap extra filter fabric around open core edge to prevent soil from entering core.
- e. At the top of the sheet drain installation, wrap the filter fabric flap behind the exposed top core edge to prevent intrusion of soil into the core and secure sheet drain to wall with termination bar fastened 12" (30 cm) on center with the fabric wrapped.

2. Install Mapeproof:

- a. Starting at the base corner, install base course of Mapeproof (horizontally oriented) to lagging wall over the previously installed drainage composite and corner transition Mapeproof course. Secure sheet edges to shoring wall with fasteners compatible with the substrate and 1" washers placed a maximum of 18" (46 cm) on center around sheet edge and provide enough fasteners in the field to secure the sheet. Overlap adjacent Mapeproof sheet edges a minimum of 4" (10 cm)
- b. After installing the horizontal base course, Mapeproof sheets can be installed either vertically or horizontally oriented. Continue Mapeproof installation up the wall to finished grade elevation detail, staggering all sheet roll ends of adjacent courses a minimum of 12" (30 cm). Do not allow horizontal Mapeproof overlap joints to run at the same elevation as the concrete pour lift joints; extend membrane past pour joint or rebar a minimum of 12" (30 cm). Overlap adjacent Mapeproof sheet edges a minimum of 4" (10 cm).
- c. Tie-Back Heads: For all tie-back heads and soil nails, install waterproofing system with field-fabricated or prefabricated tie-back cover in accordance with manufacturer's detail. Fill tie-back cover with a 50/50 mix of Mapeproof Sealant and Mapeproof Granules.
- d. Penetrations: For all pipe, rebar, structural and other penetrations install waterproofing system in accordance with manufacturer's detail for specific project conditions.

3. Lagging Wall Termination:

- a. Coordinate with excavation and backfill operations conducted under Division 31 Earthwork to remove the required wood lagging timbers and top end of the metal soldier piles per local building code or project requirements. Identify and repair any waterproofing and drainage sheet damaged by excavation and removal of soldier pile heads and lagging.

Where excavated, fasten all exposed Mapeproof overlap seams a maximum of 18" (46 cm) on center.

- b. Terminate Mapeproof membrane 4" to 6" (10 cm – 15 cm) below finished grade elevation and secure with fasteners compatible with the substrate and 1" washers to exterior surface of concrete wall.
- c. Inspect finished Mapeproof installation and repair any damaged material prior to concrete placement.

D. Steel Sheet Piling Installation:

1. Trowel a 1/2" (12 mm) thick layer of Mapeproof Sealant over all steel sheet piling interlocks. Any areas of water seepage at the interlocks should be welded prior to Mapeproof installation to prevent pre-hydration of the Mapeproof and Mapeproof Sealant.
2. Starting at the base corner of the shoring, install the first course of Mapeproof (horizontally oriented) to metal sheet piling wall over the previously installed sheet drainage (if used) and corner transition Mapeproof course. Secure sheet edges to shoring wall with washer-head fasteners placed a maximum of 18" (46 cm) on center around sheet edge and provide enough fasteners in the field to secure the sheet.
3. After installing the horizontal base course, Mapeproof sheets can be installed either vertically or horizontally oriented. Continue Mapeproof installation up the wall to finished grade elevation detail, staggering all sheet roll ends of adjacent courses a minimum of 12" (30 cm). Do not allow horizontal Mapeproof overlap joints to run at the same elevation as the concrete pour lift joints; extend membrane past pour joint or rebar a minimum of 12" (30 cm). Overlap adjacent Mapeproof sheet edges a minimum of 4" (10 cm).
4. Tie-Back Heads: For all tie-back heads and soil nails, install waterproofing system with field-fabricated or prefabricated tie-back cover in accordance with manufacturer's detail. Fill tie-back cover with a 50/50 mix of Mapeproof Sealant and Mapeproof Granules.
5. Penetrations: For all pipe, rebar, structural and other penetrations install waterproofing system in accordance with manufacturer's detail for specific project conditions.
6. Terminate the Mapeproof membrane 4" to 6" (10 cm – 15 cm) below the finished grade elevation and secure with fasteners compatible with the substrate and 1" (2,5 cm) washers to exterior surface of concrete wall.
7. Inspect finished Mapeproof installation and repair any damaged material prior to concrete placement.

E. CUT ROCK FACE OR SECANT PILES

1. Cut rock face or secant pile (auger cast caisson) wall should be sufficiently flat and smooth to provide an adequate surface to apply Mapeproof. Mapeproof will conform to large gradual change in planes (e.g., around secant/caisson column) but should not be installed over sharp surface deflections or voids. Deflections/voids and inside corners between secant/caisson piles should be filled with cementitious material to create a suitable substrate for waterproofing installation

2. Starting at the base corner of the shoring wall, install the first course of Mapeproof (horizontally oriented) to rock face or secant pile wall over the previously installed sheet drainage (if used) and corner transition Mapeproof course. Secure sheet edges to shoring wall with fasteners compatible with the substrate and 1" (2,5 cm) washers placed a maximum of 18" (46 cm) on center around sheet edge and provide enough fasteners in the field to secure the sheet.
3. After installing the horizontal base course, Mapeproof sheets can be installed either vertically or horizontally oriented. Continue Mapeproof installation up the wall to finished grade elevation detail, staggering all sheet roll ends of adjacent courses a minimum of 12" (30 cm). Do not allow horizontal Mapeproof overlap joints to run at the same elevation as the concrete pour lift joints; extend membrane past pour joint or rebar a minimum of 12" (30 cm). Overlap adjacent Mapeproof sheet edges a minimum of 4" (10 cm).
4. Tie-Back Heads: For all tie-back heads and soil nails, install waterproofing system with field-fabricated or prefabricated tie-back cover in accordance with manufacturer's detail. Fill tie-back cover with a 50/50 mix of Mapeproof Sealant and Mapeproof Granules.
5. Penetrations: For all pipe, rebar, structural and other penetrations install waterproofing system in accordance with manufacturer's detail for specific project conditions.
6. Terminate Mapeproof membrane 4" to 6" (10 cm – 15 cm) below the finished grade elevation and secure with fasteners compatible with the substrate and 1" (2,5 cm) washers to exterior surface of concrete wall.
7. Inspect finished Mapeproof installation and repair any damaged material prior to concrete placement.

3.5 BACKFILLED POURED-IN-PLACE CONCRETE WALLS

A. Install Mapeproof:

1. Place 1-1/2" (3,8 cm) fillet of Mapeproof Granules along the wall/footing intersection. Mapeproof Granules may be substituted with a 3/4" (19 mm) fillet of Mapeproof Sealant.
2. Install a 3/4" (19 mm) thick fillet application of Mapeproof Sealant at all inside wall corner transitions. Use Mapeproof Sealant to detail form-tie pockets/patches and any slightly irregular concrete surface and/or honeycomb areas.
3. Starting at the base of the wall, install Mapeproof sheet oriented horizontally (black woven geotextile side against the wall; white non-woven geotextile side facing installer) covering the Mapeproof Granules and extending onto the footing a minimum of 6" (15 cm). For hydrostatic conditions, cover the entire footing and overlap waterproofing membrane from under slab work a minimum of 6" (15 cm). Attach Mapeproof using fasteners compatible with the substrate and 1" (2,5 cm) washers a maximum of 18" (46 cm) on center. Overlap all adjacent sheet edges a minimum of 4" (10 cm). Stagger all vertical overlap seams a minimum of 12" (30 cm).
4. After installing the horizontal base course, Mapeproof sheets can be installed either vertically or horizontally oriented. Continue Mapeproof installation up wall to the finished grade elevation detail, staggering all sheet roll ends of adjacent courses a minimum of 12" (30 cm). Do not allow horizontal Mapeproof overlap

joints to run at the same elevation as the concrete pour lift joints; extend the membrane past the pour joint or rebar a minimum of 12" (30 cm). Overlap adjacent Mapeproof sheet edges a minimum of 4" (10 cm) and fasten at 18" (46 cm) on center using fasteners compatible with the substrate and 1" (2,5 cm) washers.

5. Penetrations: For all pipe, rebar, structural and other penetrations install the waterproofing system in accordance with manufacturer's details for specific project conditions.
6. Terminate Mapeproof membrane 4" to 6" (10 cm – 15 cm) below finished grade elevation and secured with fasteners compatible with the substrate and 1" (2,5 cm) washers to exterior surface of concrete wall.
7. Inspect finished Mapeproof installation and repair any damaged material prior to backfill placement.

B. Install Mapedrain:

1. Install the bottom course of Mapedrain drainage composite (flat plastic core side against the wall/waterproofing). Secure Mapedrain drainage composite to wall using fasteners compatible with the substrate and 1" (2,5 cm) washers approximately 24" (60 cm) on center. Secure extra fabric flap of Mapedrain extending down the top front edge of Mapedrain TD to prevent the passage of soil into the core at the connection.
2. Install subsequent courses of Mapedrain drainage composite to the top termination edge of Mapeproof. Tightly abut adjoining drainage composite core edges together and secure the extra fabric flaps over the front of adjacent roll edges, to prevent soil from entering the drainage composite. Secure Mapedrain drainage composite to wall using fasteners compatible with the substrate and 1" (2,5 cm) washers approximately 24" (60 cm) on center. Where drainage composite panels are installed overlapped, the bottom edge of higher course shall be installed to the outside of the lower course; shingle style to shed water.
3. Around penetrations and tie-back heads, cut Mapedrain drainage composite to fit and wrap extra filter fabric around open core edge to prevent soil from entering core.
4. At the top of the Mapedrain drainage composite installation, wrap the filter fabric flap behind the exposed top core edge to prevent intrusion of soil into the core.

3.6 BACKFILL EXCAVATED CAST-IN-PLACE CONCRETE WALLS:

- A. Backfill shall be placed in lifts up to 2' (0,6 m) deep. Each lift shall be compacted to a minimum 85% Modified Proctor density promptly after waterproofing system and drainage composite system has been installed.
- B. Coordinate with contractor responsible for backfill work by informing them each time a waterproofed area is ready for backfill.
- C. Backfill shall consist of compactable clean soil or angular aggregate (3/4" (18 mm) or less) free of debris, sharp objects, and stones larger than 3/4" (18 mm).
- D. Care should be used during backfill operation to avoid damage to the waterproofing system. If damage occurs, cease backfilling and report damage. Damaged waterproofing must be repaired per manufacturer's guidelines.

3.7 CLEAN UP:

- A. In areas where adjacent finished surfaces or work are contaminated by waterproofing material, immediately notify General Contractor and trade responsible for area. Consult manufacturer of surfaces for cleaning advice and conform to their recommendations and instructions. Remove all tools, equipment and remaining product on-site. Dispose of debris and damaged product in accordance with applicable regulations.
- B. Maintain work area in a neat and workmanlike condition. Remove empty cartons and rubbish from site daily.
- C. Repair or replace defaced or disfigured finishes caused by the work of this section.

END OF SECTION 07 17 00