

GUIDE SPECIFICATIONS

**SECTION 07-55-56
BLACK PEARL
COLD RUBBERIZED ASPHALT WATERPROOFING
BP-2-PMR WITH VEGETATED ROOFING AND PAVERS**

PART 1 - GENERAL

1.01 RELATED SECTIONS

- Section 02 41 19 Demolition
- Section 04 01 00 Masonry Repair
- Section 06 10 00 Carpentry
- Section 07 22 00 Roof Insulation
- Section 07 60 00 Sheet Metal
- Section 07 72 00 Roofing Accessories
- Section 07 92 00 Caulking and Sealants
- Section 32 90 00 Landscaping

Edit to project
conditions

1.02 SCOPE

The work includes supplying all materials, labor, and equipment to complete the installation of the Fluid Applied Waterproofing and Greenroof-Roofscapes®/EcoCline® assembly, including water retention mat, drainage/water retention component, filter fabric, lightweight engineered growing media and vegetation

1.03 QUALIFICATIONS

Only a contractor approved and licensed by the manufacturer shall install the waterproofing system. Waterproofing, related rubberized flashings and all other major Greenroof components shall be supplied through the same firm to insure single-source responsibility. An independent laboratory may test materials for compliance with published physical properties and these specifications.

1.04 SUBMITTALS

- A. Submit Manufacturer's written approval or license of Applicator for installation of the herein specified roofing system.
- B. Submit Manufacturer's sample Labor and Material System Warranty and Manufacturer's Intent to Warranty Certification for this project.
- C. Submit most recent copy of Manufacturer's literature applicable to products and specifications to be used, as specified herein, including applicable flashing details.
- D. Submit three sheet samples approximately 8 x 10 inches or alternately 3 units that are representative of the following products:

Select Components Utilized

- | | |
|--|---|
| <ul style="list-style-type: none">• Membrane Reinforcement• Membrane Flashing• Root Barrier• Drain Boxes• Vent Pipe Flashing• Filter Fabric | <ul style="list-style-type: none">• Protection Course• Drainage Mat• Metal Curbing• Paver Pedestals• Insulation |
|--|---|
- E. Submit, in duplicate, certification from the primary Manufacturer, properly attested by a corporate officer, stating that all materials being supplied comply with the specifications and requirements of the contract documents, including conformance to all federal, state and local building codes including United States Code, Section 41:10, Subsections a-d, popularly known as the "Buy American Act".
 - F. Submit evidence of Manufacturers history of production for the system specified herein. A minimum of fifteen (15) years' experience is required in conjunction with the 20 year warranty. Documentation shall include job lists with project size, Architect of record, installing Applicator, telephone numbers and contact names.

1.05 QUALITY ASSURANCE

- A. All the materials specified herein are cited as a minimum standard of quality and shall not preclude consideration of equal or superior materials. All suggested "equivalent materials" or other substitutions are to be submitted to the Architect for consideration a minimum of ten (10) days prior to bid date. Submittal shall include all evidence of compliance or superiority of material from the proposed substitute Manufacturer. If accepted by the Architect, an addendum will be issued to all bidders for their consideration of the proposed substitute Manufacturer. Determination of equivalency of all substitutions shall rest exclusively with the Architect and such decision shall be final.

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- B. Contractor shall have ten (10) years documented experience in the application of similar waterproof systems. Lack of proficiency as shown by past work under other contracts which, in the judgment of the Owner, which might hinder or prevent the prompt completion of additional work, if so awarded, or involvement in any legal actions which relate to past or present performances shall be sufficient cause to reject any bid offer.
- C. The contractor shall submit information on the entire assembly in the form of published literature, detailed specifications, and details.
- D. All component products incorporated into the Greenroof-Roofscapes®/EcoCline® system shall be supplied by or approved by the waterproofing membrane manufacturer.
- E. The contractor shall employ a qualified Electric Field Vector Mapping Service (EFVM) to survey the completed membrane application. The system supplier and Architect shall approve the surveyor.
- F. Pre-Construction Conference – A minimum of two weeks prior to the start of the work, the manufacturer, general contractor, waterproofing contractor, horticultural contractor, plumbing contractor, and any other contractor with work on the roof, along with the Architect and Owner’s Representative, shall meet at the jobsite to review and discuss project conditions as it relates to the installation and the integrity of the roofing assembly, including post installation care by the general contractor.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to jobsite on pallets. Package labels shall indicate material name, production date and product code.
- B. Store materials in dry, protected areas in an upright position. Control temperature of storage areas in accordance with Manufacturer's instructions. Protect moisture sensitive materials with breathable tarps on sides and top surfaces.

1.07 PROJECT CONDITIONS

- A. Follow local, state and federal regulations, safety standards and codes. When a conflict exists use the stricter requirements.
- B. Do not apply waterproofing materials when visible water in any form (i.e. rain, dew, ice, frost, snow, etc.) is present on the deck.
- C. Ensure deck is structurally sound to support the live and dead load requirements of the waterproof system and sufficiently rigid to support construction traffic.

- D. Membrane application can be made to 0°F, however workmanship standards tend to diminish below freezing temperatures and require extra supervision. Vegetation plantings must conform with recommendations of the horticultural consultant and the plant nursery supplier.
- E. Sequencing and Scheduling: The work shall be scheduled in the construction sequence so that designated complete contiguous areas can be installed and completed, including overlay elements and wear courses, before other construction trades are allowed in the area. Prior to starting the work, all drains shall be operative and all deck projections, sleeves and all other penetrations shall be installed in place and operative.

1.08 REGULATIONS COMPLIANCE

It shall be the Contractor's responsibility to ensure that the work on this project shall be in compliance with applicable code requirements, including obtaining any required permits prior to the start of the Work.

1.09 WARRANTY

Prior to project close out, the Contractor shall submit the Manufacturer's pre-approved 20 Year Labor and Material Warranty including insulation, pavers, pedestals with pavers and overburden considerations.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

The Barrett Company is set forth as the referenced standard of quality. Other manufacturers of equal or better quality may request approval in conformance with specification requirements. Architect approved equals remain subject to all specification requirements.

2.02 WATERPROOFING MATERIALS

A. Waterproofing Membrane System:

Project Specification minimum standard of quality as set forth in Barrett Company Black Pearl BP-PMR specification or approved equal as noted above, in strict compliance with the following minimum specifications.

Materials required per 100 sq. ft. of roof area:

Black Pearl Waterproofing Membrane (BP•WM)	2 plies
Black Pearl Primer and Adhesive (BP•PA)	5 gals. (approx.)
Protection Course	1 ply

1. Black Pearl Waterproofing Membrane (BP-WM) shall comply with requirements set forth in ASTM D-6769 in addition to the following minimum specifications. The reinforcement fabric shall be heat set, resin stabilized, spunbond polyester fortified with fiberglass scrim set in the machine direction on 3/8 inch centers.

<u>TEST</u>	<u>METHOD</u>	<u>TYPICAL TEST RESULTS</u>
Reinforcement Basis Weight	ASTM D-3776	140 gm/m ²
Sheet Thickness	ASTM D-1777	55 mils
Tensile Strength, lbf	ASTM D-4830	75 lbf/in.
Elongation, %	ASTM D-4830	26 MD, 28 XD
Tear Strength, lbf	ASTM D-4830	31 MD, 27 XD
Fatigue Life	ASTM D-8B	>10,000 cycles

2. Elastomeric Primer-Adhesive: Black Pearl P-A shall comply with the requirements set forth in ASTM D-6769 and the following minimum specifications:

<u>TEST</u>	<u>METHOD</u>	<u>TYPICAL TEST RESULT</u>
Softening Point of bitumen Component	ASTM D-36	220°F
Solids content	ASTM D-1250	70% min.
Penetration (dmm)	ASTM D-5	162 dmm
Elongation @ 77°F min	ASTM D-412	>100%
Breaking Strength	ASTM D-146	89 lbf/in, MD
Wind Uplift Resistance	FM 4474/TAS 114D	200 psf
Low Temp Crack Bridging	ASTM D-1305	-15°F min.
Resistance to Decay	ASTM E-154/AC29	Pass
Extensibility after Heat Aging	ASTM C-1522	Pass

3. Insulation: Plaza insulation board shall be a dense, rigid, extruded polystyrene insulation, ___ inches thick, designed for plaza applications, Dow "Plazamate" or Owens Corning "Foamular" or approved equal, and approved by the membrane Manufacturer for system warranty. Plaza insulation shall meet the following values:

<u>TEST</u>	<u>TYPICAL METHOD</u>	<u>TEST RESULTS</u>
Thermal Conductivity @ 75°F	ASTM C-518	0.20 K
Compressive Strength, min.	ASTM D-1621	60 lbs.
Flexural Strength, min.	ASTM C-203	75 lb/in.
Water Absorption	ASTM C-272	0.1%
Water Vapor Permeance	ASTM E-96	0.3-.8 perm
Dimensional Stability	ASTM D-2126	2% max

4. Paver Units: Exposed aggregate precast concrete units, lightly sandblasted in production, in standard colors as selected by the Architect. Paver unit size shall be 2 inches thick, 24 inches x 24 inches square. Paver unit Manufacturer shall be approved by the membrane Manufacturer for total system warranty. Paver units shall comply with the following minimum specifications:

<u>TEST</u>	<u>METHOD</u>	<u>TYPICAL TEST RESULTS</u>
Compressive Strength	ASTM C-140	7000 psi, min.
Water Absorption	ASTM C-140	5% max
Freeze/Thaw Resistance	ASTM C-67:8	1% loss, max
Flexural Strength	ASTM C-293	600 PSI

5. Paver Pedestal Units and Leveling Plates: Barrett "Roofscape" Pedestal Units fabricated from high density polyethylene with integral 1/8 inch joint spacer ribs. Pedestal units shall have thorough drainage. Pedestal units shall meet the following values:

<u>TEST</u>	<u>TYPICAL METHOD</u>	<u>TEST RESULTS</u>
Low Temperature Brittleness	ASTM D-746	-90°F
Shore Hardness	ASTM D-1706D	65
Softening point	ASTM D-15252	164°F

B. Related Materials:

1. Flashing Sheet: **RAM** 306 granular surface SBS sheet shall comply with ASTM D-6164, Grade G, Type I, minimum specifications.
2. Primer: **RAM** Primer/Surface Conditioner shall comply with ASTM D-41 requirements and only used when directed by manufacturer.
3. Protection Course: RAM 203 SBS polymer-modified Protection Course or approved equal.
4. Pipe and Stack Flashings shall be 16 oz./SF copper, .015 thick stainless steel or 4 lbs./SF lead sheet, installed in accordance with standard SMACNA and NRCA details.
5. Drainage and water retention Mat: Ram-Drain 2451, composite polyethylene drainage medium consisting of a 3 dimensional water-retaining core with polypropylene geo-textile fabric bonded to both sides of the core. Ram-Drain 2451 shall comply with the following minimum specifications:

<u>TEST</u>	<u>METHOD</u>	<u>TYPICAL TEST RESULTS</u>
Thickness	ASTM D-1777	1.0 inches
Compressive Load Test	ASTM D-1621 mod.	9500 lbs. /sq. ft.
Flow	ASTM D-4716	100 gals./min/ft. wide
Fabric Flow	ASTM D-4491	.70 gpm / sq ft
Grab Tensile	ASTM D-4632	130 lbs.
U.V. Resistance	ASTM D-4355	Stabilized passed
Puncture Resistance	ASTM D-4833	35 lbs.
Water Retention		14 cu. in./sf

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6. Primary Root Barrier: Ram-30H, 30 mil High Density Polyethylene Sheet and RB25 seaming tape for all seams.
7. Filter Fabric: PolyFelt 3.5 Filter Fabric or approved equal.
8. Growing medium shall be "Rooflite Intensive" as blended by Skylands USA, Avondale, PA or approved equal.
9. Vegetation shall be a minimum of six species of sedum supplied by Emory Knoll Farm Nursery and approved by Architect and the Owner (regional plant lists are available).
10. Roof Drain Inspection Boxes – Roofscapes Drain Access Boxes, stainless steel or aluminum or approved equal specifier choice and with mill finish or Kynar finish specifier choice as selected by Architect.
11. Metal Curbing – Roofscapes stainless steel or aluminum edging or approved equal specifier choice and with mill finish or Kynar finish specifier choice as selected by Architect.
12. Vent Pipe Inspection Boxes – Roofscapes stainless steel or aluminum Access Boxes or approved equal specifier choice and with mill finish or Kynar finish specifier choice as selected by Architect.
13. Geotextile Erosion Control Mat shall be GR Erosion Control Mat or approved equal. Control Mesh shall be a photodegradable open weave mesh designed to hold vegetation and soil in place until vegetation is established. Erosion control mat typically lasts through one or two growing seasons under normal conditions. Use in conjunction with Greenroof·Roofscapes® pins and plates set on 4 foot centers in all directions.
14. Flashing Mastic: **RAM** Mastic trowel grade SBS modified cold process cement or approved equal shall comply with ASTM D-4586, Type 1.
15. Nails and Mechanical Fasteners: As specified by the fastener Manufacturer for specific application and approved by membrane Manufacturer.
16. Sheet Metal - See Section 07600.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Remove trash, debris, grease, oil, water, moisture and other contaminants from the concrete deck which may affect bond of membrane to deck surface.

Optional:

Sand-blasting and/or shot-blasting procedures may be required on certain applications to provide the best possible surface. If required, provide unit price per square foot in bid documents.

- B. Condition of Surface: Any new concrete surfaces shall be wood float finish ACI 301-11.7.3 or better. Deck surface shall comply with ASTM D-5295 standard guide. All concrete shall have cured for a minimum of 72 hrs. or, alternatively, pass a surface dryness test. All surfaces shall be free from laitance and unapproved curing compounds or other foreign matter detrimental to performance of the waterproofing membrane. The General Contractor shall certify no wax base or stearate based or other type curing compounds have been used.

Before commencing work, examine all areas and report in writing to Architect and manufacturer any conditions that will adversely affect successful installation. Do not begin work until the conditions have been addressed and corrected. Voids, cracks, holes and other damaged surfaces shall be repaired with materials compatible with **Black Pearl** such as Sika epoxy concrete or approved equal.

- C. Expansion Joints: Expansion joints shall be sharply formed and free of broken edges, loose aggregate and completely free of preformed joint fillers, sealants or back-up materials to a depth that is at least twice the width of the joint. Curb expansion joints at each side of the joint, either by integrally forming with the slab or securely fastening sulfate treated wood strips to deck. Chamfer edges of the curbs.

3.02 APPLICATION

- A. Waterproofing Membrane:

1. Installation of Black Pearl Membrane is required at all flashing conditions such as changes of plane, all joints and cracks and all penetrations such as curbs, pipes, rebar and conduits. All flashings are installed in a 2 layer redundant configuration prior to starting the horizontal field of the deck membrane.
2. Start detailing installation with a full coating of BP Primer Adhesive applied at the standard rate of 1.75 gallons per 100 square feet at flashing conditions and allow to set to a tacky condition. Install the first ply of BP

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Membrane a minimum of 9 inches beyond the corner or penetration in one direction and 4 inches in the other direction. Each succeeding ply shall extend at least 3 inches beyond the underlying ply in one direction and shall be adhered to the previous reinforcement layer with additional adhesive applied at approximately 1.25 gallons per 100 square feet. At vertical pipe penetrations the flat section is installed first, followed by the vertical “wrap” where the base “fingers” shall extend a minimum of 2 inches out onto the horizontal deck surfaces.

3. All drains shall be flashed with BP Membrane, 36 inches square and set in BP Primer-Adhesive before the new 2 layer-5 course waterproofing is installed over the field of the deck.
4. Follow standard details of ASTM D-5898 as modified by Barrett standard details unless otherwise required by the designer. All laps are to be inspected and completely sealed with BP Primer-Adhesive and all flashing reinforcement shall be rubbed or rolled into place with a steel hand roller or a weighted roller.
5. For expansion joints up to 3 inches in width, with a designed total movement of 50% or less, Ram Flash 327 HDR neoprene flashing shall be placed over the joint as shown on the drawings creating a “hammock”. The “hammock” shall be looped into the joint 1-1/2 times the joint width at maximum opening and extend 8 inches onto the deck on each side of the joint. Embed the horizontal flashings into a thick coating of Black Pearl-PA. Install customized Black Pearl foam joint in a width ¼ inch smaller than the opening and the bridge centered as shown. Install a sheet of Black Pearl-WM looped over the foam extending 12 inches onto the deck on each side of the joint and set in Black Pearl-WM. Overcoat the flange on each side.
6. At cracks over 1/16 inch width and all construction joints, apply Black Pearl-PA, then center a 6 inch wide strip of Black Pearl-WM flashing over the joint or crack and embed into the Black Pearl-PA. Avoid air pockets. Flashing should be installed before the continuous, unbroken thick Black Pearl System is applied over the entire deck surface.
7. After completing all flashings and detail work for a contiguous work area, start the Black Pearl Primer-Adhesive application over the field of the deck. Begin installation of BP Waterproofing Membrane at the low points and drains unless otherwise approved by the manufacturer.

8. Apply Black Pearl Primer-Adhesive (BP·PA) at a rate of 1.5 gals. per 100 square feet and allow to set to a tacky condition before installing the first layer of Black Pearl Waterproofing Membrane (BP·WM). Apply only as much adhesive as can be covered with membrane before the adhesive loses its tack.
9. Lap all edge seams a minimum of 4 inches and stagger all end laps a minimum of 6 inches. Continue the membrane 4 inches up any vertical surfaces already flashed with the flashing assembly.
10. Install membrane and rub the membrane into place with stiff brooms or a squeegee. Total contact with all substrates is required. No “bridging” is acceptable and is adequate cause for rejection.
11. Install second layer of BP Membrane in a BP·PA coating applied at the rate of approximately 1.25 gal. per 100 square feet, after allowing the BP·PA to reach a tacky state. Broom or squeegee sheet in place. Offset the side laps from the first ply by half a sheet width and end laps by 6 inches.
12. Do not install the granular surface base flashing cap at exposed conditions until the flat field of the roof is completed. Precut Ram 306 sheet across the roll to install in 36 inch wide sheets. Embed Ram 306 SBS granular cap sheet membrane into Black Pearl·PA extending flashings out onto the field of the roof 3 inches minimum and up vertical surfaces 8 inches minimum and 24 inches maximum. Side overlaps shall be 3 inches minimum. Mechanically fasten top of the flashings to the substrate with 1/8 inch thick flat bar stock termination bar and mechanically fasten 8 inches on centers. Seal the top edge of the flashings installed each day with Ram Mastic. Counter-flashing is required.

B. Deck Equipment and Penetrations:

All air conditioners and mechanical units set on the deck shall be lifted to allow new waterproofing and flashing under unit as required. Minimum height for all curbs and other flashings is 8 inches above the highest expected waterline. Raise as shown or required. New equipment dunnage, flashing and metal coping shall be installed as shown or required. Install new neoprene wearpads between the unit supports and dunnage.

- C.** The electric field vector mapping survey shall occur at this time. Once the tests are completed and the application approved by the manufacturer, uniformly top coat the membrane with BP Primer-Adhesive as a top finish coat the rate of 1.5 to 1.75 gal. per 100 square feet and install the specified protection course.

D. Protection Course:

After quality control tests and the Manufacturer approval of the membrane installation, install specified protection course in top coat of BP Primer-Adhesive installed at 1.5 to 1.75 gal. per 100 square feet. Provide 3 inch side lap overlaps in each direction of drainage gradient with protection course.

E. Root Barrier:

The primary root barrier, RB 30H shall be installed in accordance with manufacturer's recommendations over the protection course. Install primary root barrier sealing all seams with Ram RB25 root barrier tape. Provide a minimum of 12-inch side and end laps of root barrier. Run root barrier past full height at all base flashings, drain access boxes, vent pipe access boxes and perimeters and temporarily seal with RB25 tape.

F. Insulation:

Insure that membrane, flashing and other associated work is completed, tested and approved by Manufacturer. Upon acceptance of the waterproofing application, install extruded polystyrene insulation directly over the protection course and root barrier. Stagger all joints by half a board. Tightly abut all boards. The maximum acceptable opening between boards is 1/4 inch. Install filter fabric over the insulation and turn up 6 inches at all projections and obstructions. Fabric and root barrier can be trimmed after installation of the overburden. Provide temporary ballast required to prevent wind damage.

G. Aeration Mat: **Optional**

The Aeration Mat 600 shall be placed directly over insulation in lieu of the filter fabric. Provide 3-inch side laps.

H. Drainage/Water Retention Mat:

Clean surface of any loose debris. Install RAM Drain material with heavier, black mat down and open cups facing up over the filter fabric or Aeration Mat. Start panels so that the edge with the fabric lap is facing the perimeter condition. Seal the lap to the perimeter. Cut panels to fit tightly around the penetrations. Place adjacent panels so that the cores are butted-together. Lay the 4 inch fabric lap onto the adjacent panel. Secure the flaps at 3 inch intervals with adhesive or duct tape. Join roll ends by peeling back the fabric and cutting off 4 inches of the core. Place panel ends so that the cores are butted together. Glue or tape overlap in place at 12 inch intervals.

I. Drain and Vent Pipe Access Boxes:

Sheet metal inspection boxes shall be fabricated from aluminum alloy 3003 – H14 in compliance with ASTM B-209 specifications, with H14 temper or minimum 0.015 thick stainless steel with a 2-D finish unless otherwise specified by the Architect. Thickness gauge shall be as recommended by SMACNA reference tables for the span and load requirements encountered or place access boxes and border elements in locations noted on the drawings and at all drains and vent pipe protrusions.

J. Metal Border Edging:

Set metal border edging as specified over the drainage/retention mat as shown on the drawings using edge clips at all joints.

K. Pavers and Pedestals:

Specified paver units shall be set on specified pedestals to line and grade as shown, with uniform joint width. Adjust pedestal elements so that precast paver has bearing on all four corners. Where cutting is required it shall be done with a high speed masonry saw producing clean sharp edges. Precast paver units shall fit to within 1/4 inch of all projections and walls or as shown on drawings. Provide shims as required to align paver surface with existing elements and other pavers.

Following pre-determined layout, locate first row of paver units at the longest exterior edge of deck. Use 1/2 unit pedestals at the edgeline and 1/4 unit pedestals at corners. Place paver stones by lowering horizontally rather than nosing into position to eliminate possible indentation of the substrate. Run subsequent rows of pavers parallel to first row. Finished installation shall be set to line and grade shown with uniform joint width. Replace any units that exhibit damage to surface finish, corners or edges which will be exposed to view in the finished work. General Contractor shall protect units in place from soiling or damage. Install 0.18 thick stainless steel banding 3 inches wide centered over each of the outer two perimeter rows of pavers, mechanically fastened with approved fasteners, and elsewhere as required and approved by the insulation manufacturer.

3.03 GROWING MEDIA AND EROSION CONTROL MAT

The landscape installation shall commence with application of the growing medium followed by the vegetation and other specified components in strict compliance with weather requirements as set forth by the approved media and vegetation suppliers, including weather, humidity, waterings, fertilization and other protocols. Install specified soil over the drainage/water retention mat as prescribed by the media supplier including required compaction. Install geo-textile erosion control mat over the soil with side and end laps of 12 inches. Ballast all edges of the geotextile with specified pavers or stone ballast in a minimum 2 foot width. Install biodegradable erosion control pins and plates on 4 foot centers in all directions over the field of the roof.

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- A. Fill vegetation free zones with extruded polystyrene insulation and cover with filter fabric, washed river rock, or paver ballast as shown on the drawings.
- B. Thoroughly soak the growth media with water using a sprinkler or hand sprayer. For a 4-inch growth media layer, expect to use approximately 30 gallons per 100 sq. ft.

3.04 PLANTING

- A. Low profile vegetation mixture shall include a minimum of 6 sedum species that will generate a continuous ground cover. Maximum mature plant height is generally less than 24 inches.
- B. All high profile planting schemes should also incorporate a variegated Sedum design. The plant mixture must include a minimum of 6 species of Sedum in approximately equal quantities. Sedum planting season generally runs from April until October. The installing contractor shall consult with plant supplier to verify planting times. Do not plant vegetation out of season or in adverse weather conditions as recommended by nursery supplier.
- C. Cut an 8 inch X through the Erosion Control Mat and set plugs into the media to their full depth with the media pressed firmly around the installed plugs. Install plugs at the rate of 2 per square foot. At the end of each day, soak newly planted areas.
- D. Provide plant maintenance for the first two years, maintaining a minimum of 80% plant survivability. Replace plantings that fail to meet survivability requirements.
- E. When using a sedum mat, install as prescribed by the approved mat supplier. Water the finished installation with a heavy soaking and re-water as required by weather conditions.

Optional: Installer shall maintain all vegetation for a [two-year] [five-year] specifier choice period commencing from the date of the installation.

- F. If the horticulture is an EcoCline project, provide complete maintenance without charge for five years from the date of installation.

3.05 FIELD QUALITY CONTROL

- A. Adhesion Tests and Thickness Tests shall be monitored by applicator every hour throughout the application process.
- B. Upon completion of the membrane and prior to installing insulation or overburden, retain the services of an approved surveyor and conduct an Electric

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Field Vector Mapping (EFVM) survey of all waterproofed deck areas to verify entire waterproofing membrane is free of holes, open seams, and capillary defects that allow water to pass. Administer EFVM test by a qualified testing agency as follows:

- a.
 - 1) Place conductor wire on bare membrane. Secure wire with small strips of waterproofing or other compatible membrane or tape.
 - 2) Thoroughly wet waterproofing membrane with potable water in area of test. Wetting can be accomplished by hand or mechanical spray devices. Membrane shall be wet during testing procedures.
 - 3) Technician shall mark on waterproofing membrane or surface exact location of defect and assign an identification number to each location.
 - 4) Visually inspect entire waterproofing membrane area and repair breaches found. An EFVM retest shall be performed to confirm integrity of repair(s).
 - b. Technician shall prepare a report of each day's test results containing a written description and photograph of defect(s) located and a schematic CAD drawing indicating location of conductor wire and of defect(s) located in testing field to within 1 in (25 mm) of accuracy. This report shall be made available in hard copy.
 - c. Report results of tests, both successful and unsuccessful. In addition to results, report shall include date of test, project name, list of products being applied and tested, name of applicator, name of Contractor, and conditions causing failure of waterproofing membrane in event of an unsuccessful test.
 - d. Materials and installations failing to meet specified requirements shall be replaced at Contractor's expense. Retesting of materials and installations failing to meet specified requirements shall be done at Contractor's expense."
- C. Should the quality of the membrane application be questioned by the architect or manufacturer supplying the warranty, test cuts may be required. If test cuts are required, it will be the contractor's responsibility to take the required samples and submit them to a qualified laboratory, approved by the materials manufacturer. If the test cuts are found to be deficient, the cost of the test cuts and laboratory testing shall be the responsibility of the contractor.

Any areas found deficient must be replaced or repaired in accordance with the materials manufacturer's recommendations and approved by the architect. The cost of such repairs or replacement shall be the contractor's responsibility.

- D. Correct deficiencies in roof, if any, as prescribed by material Manufacturers and approved by the Architect.

3.06 CLEANING

- A. Remove equipment, trash, debris and any excess material from the jobsite.
- B. Repair any damage and remove any stains caused by work of this Section.

3.07 PROTECTION

General Contractor and the Owner shall protect finished waterproofed and/or vegetated areas from damage during subsequent construction not related to the deck areas.

MAINTENANCE:

Semi-annual inspections for waterproofing and regular maintenance programs for the vegetation is required. Consult your Barrett Representative or Barrett Approved Applicator for further information.

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