



Green Roof Roofscaapes

The roof is a forgotten element on most buildings. Unnecessarily. Designed and built as a multi-functional element, roofs can be environmentally friendly and aesthetically pleasing.

The Barrett Company has over 70 years of successful experience in the roofing and waterproofing industry. Combining our expertise with that of qualified Landscape Professionals, Barrett is able to offer building owners the **Green Roof—Roofscape**.

This state-of-the-art roofing-landscape assembly provides an Owner with many new benefits:

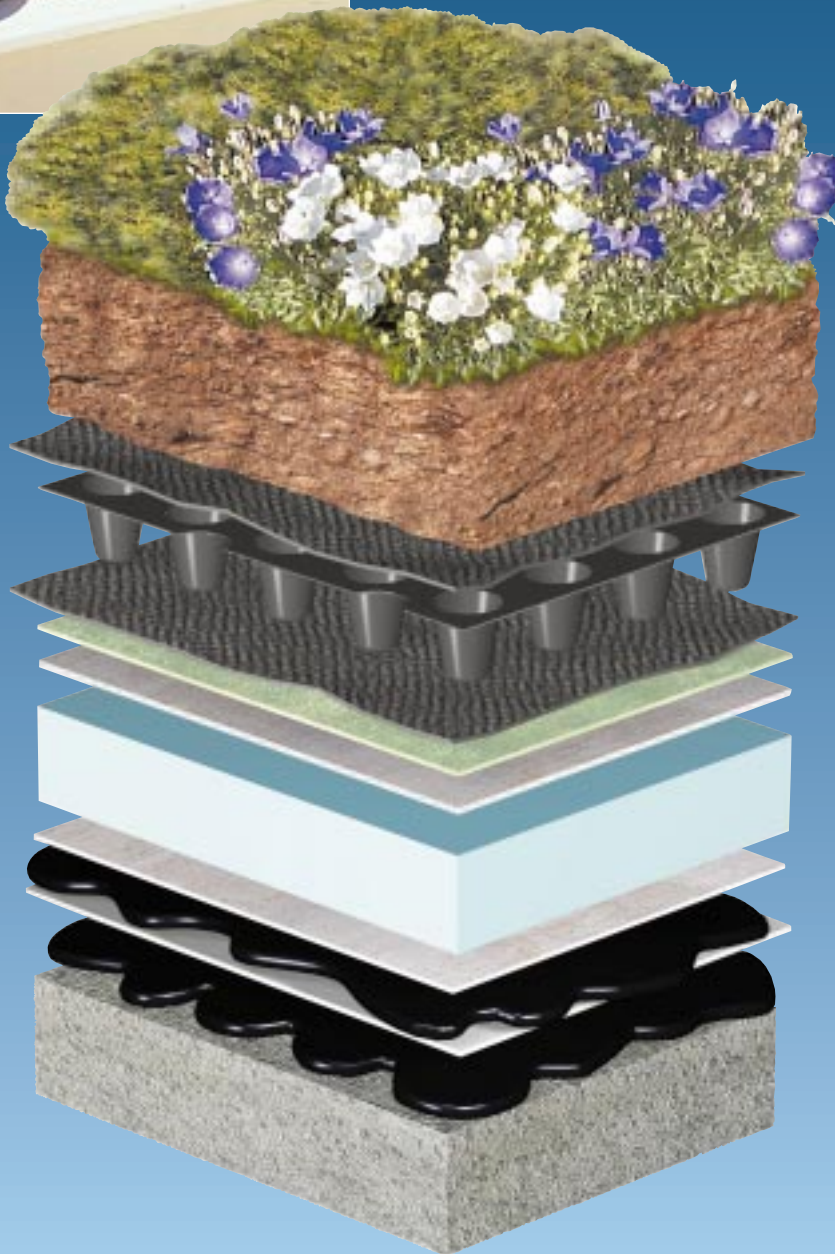
- *Create Aesthetic Appeal of The Roof Space*
- *Increased Property Values*
- *Increased Usable Space*
- *Reduced Energy Costs*
- *Controlled Storm Water Runoff*
- *Tax Benefits In Some Areas*

Ecological Benefits Include:

- *Conversion of Carbon Dioxide to Oxygen, Improving Air Quality*
- *Processing Airborne Toxins Through Photosynthesis*
- *Reduced Noise Pollution*
- *Reduced Heat Island Effect*
- *Prolonged Roof Life*
- *Reduced Debris Sent To Landfills*
- *Recycled and Recyclable Materials In Most Components*

Conceptually, the **Green Roof—Roofscape** can turn unused roof space into a park-like garden setting with a keen sensitivity to environmental enhancement.

The **Green Roof—Roofscape** is designed around inter-dependent components which function as a natural planting habitat. The otherwise "lost" roof space can be used to create a public or private open space, offering serenity, balance and harmony.





Between the World and The Weather Since 1928

Green Roof - Roofscape Components

Membrane

The membrane is the most critical element of the assembly. Without a tough, long-life, watertight membrane the entire concept is undermined. The time-proven Barrett RAM Tough 250 membrane offers:

- A fluid-applied SBS Modified bitumen, reinforced with spunbond polyester fabric for extra toughness and redundancy.
- Aggressive full adhesion to the structural substrate preventing water migration between the membrane and the deck in the event the membrane is damaged.
- A monolithic waterproofing membrane, without seams or joints, which can withstand constant water immersion and hydrostatic pressure.
- Longterm physical stability in an environment of water, fertilizers, chlorides, and mild acids.
- Reliable and redundant detailing at all penetrations and perimeters.
- High abuse resistance of the membrane as measured by the membrane's toughness and tenacity.
- Exceptional self-healing properties in warm temperatures.
- Quality control program from design through project completion.
- Over two decades of proven performance.

Protection

Green Roof—Roofscape designs incorporate long-term protection from root growth penetrating the membrane. The thickness and the construction of the root barrier and protection layer will vary depending on the vegetation plan and other design considerations. Several types of root barriers are available.

Drainage, Water Retention & Aeration

The alternating balance between drainage, retention of a supplementary water supply for plantings, and aeration, can be provided with RAM drain mats. RAM drain mats are manufactured with small integral reservoirs providing for improved plant hydration while simultaneously allowing drainage and air flow. Ram Roofscape Drainage mediums have a heavy polyester mat on the bottom for additional protection of the membrane. The top polyester geotextile fabric acts as a filter to prevent soil migration into the drainage channels.

Ram-Drain Roofscape 1241

For plants less than 24 inches tall.
Water flow—12 gallons/min./12 in.
Water Retention —10 cu. in./SF

Ram-Drain Roofscape 2451

For plants over 24 in. tall
Water Flow —100 gal/min./ 12 in.
Water Retention—14 cu. in. /SF

Ram-Aeration 600

For drying insulation and protection.

To help maintain a sustainable environment for vegetation, water is controlled through a combination of aeration, drainage and retention mediums. Soil depth and vegetation design will dictate the appropriate control materials.

Insulation

Insulation is typically a high density extruded polystyrene. It is installed over the membrane and root barrier. The weight of the soil overburden will dictate compressive strength-requirements of the insulation.

Soil Overburden

Soil specifications are determined by the Landscape Architect. Many variables affect the choice of the proper soil mix and these variables are evaluated for the specifics of each project.

Soils are classified as mineral, organic, synthetic and fertile topsoil. They are usually blended together in different ratios. Soil considerations include:

- **Vegetation Requirements**
- **Moisture and Nutrient Retention**
- **Drainage Design**
- **PH Level**
- **Porosity and Compaction**
- **Weight Restrictions on Structure**
- **Resistance to Fire Propagation**
- **Structure for Plant Anchorage**



General Design Considerations

Plant Specifications

Plant specifications are determined by the landscape architect or a horticulturist. Designs are classified as **High Profile** and **Low Profile**.

Low Profile planting systems are generally composed of plants less than 24 inches tall. A single layer of root protection is usually required. Low profile designs typically include grasses, herbs, wild flowers and sedums. Low profile systems are considered low maintenance.

High Profile plantings, in excess of 24 inches high, or with aggressive root systems utilize multiple layers of root protection. High profile systems include shrubbery, decorative trees, and sod. High profile systems are generally high maintenance designs.

Vegetation considerations include:

- **Root System Anchorage**
- **Reactivity to Direct Sunlight**
- **Drought and Wind Resistance**
- **Maintenance Requirements**
- **Local Climatic Conditions**
- **Wildlife Habitat**

Maintenance

It is a standard roofing industry recommendation that all roofs have an ongoing maintenance program. **Green Roof—Roofscapes** also require a programmed cycle of care and maintenance appropriate for the planting design.

Wind Resistance

All Barrett membranes are UL Class A and many are FM Class I-90 approved, however, UL and FM do not yet address **Green Roof—Roofscape** designs. Ballast weights are easily adjusted to comply with industry standards. Wind erosion of the soil can be addressed with a number of design features including geotextile erosion control mats. Newly planted shrubbery and ornamental trees should be anchored to prevent uprooting from wind.

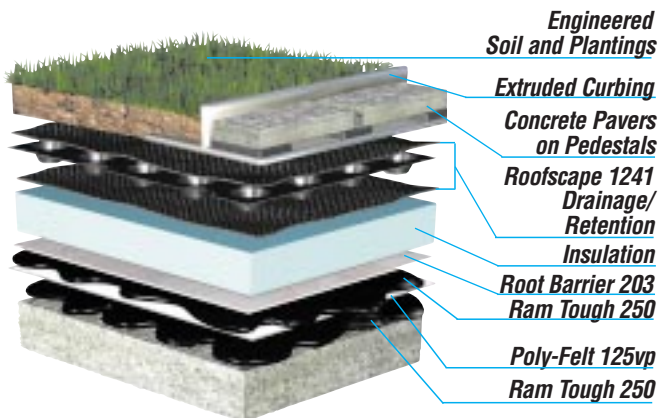
Fire Resistance

Green Roof—Roofscapes that are properly maintained are generally considered to be acceptably fire resistant. Consult local code officials. **Green Roof—Roofscapes** are almost always installed over concrete decks which produces a high degree of interior fire protection.

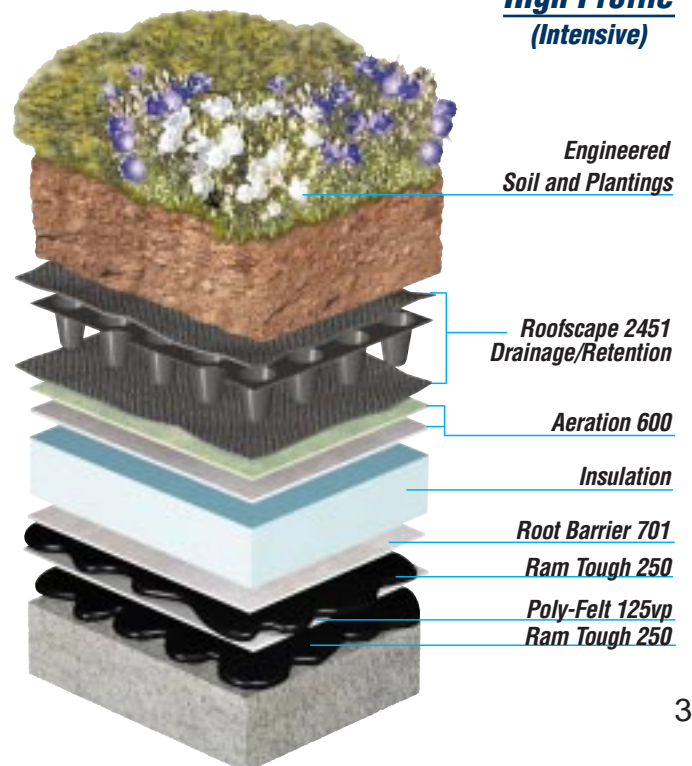
Most **Green Roof—Roofscape** systems are irrigated with sprinklers, providing additional fire protection. Nonirrigated systems require firebreaks or firebarriers every one hundred feet, in each direction. Additional vegetation-free zones are required at all roof top openings for additional fire safety.

Nonirrigated systems should be manually watered in periods of drought to reduce fire risks. High organic content soil is not recommended for fire-safety reasons.

Low Profile (Extensive)



High Profile (Intensive)



Design Alerts

Flashing conditions and perimeters are designed without soil cover or plantings in a 24 to 36 inch wide border path which is typically filled with gravel ballast or precast concrete pavers set on pedestals. Flashing heights must rise above the highest possible expected waterline, in no event less than 8 inches above the membrane.



Drains are kept free of plantings and designed with inspection and clean-out boxes. When soil depths exceed six inches, planter drains are utilized and installed in accordance with manufacturer's design criteria.

- If irrigation systems are not installed as part of the system, access to a water source must be provided.

- Plantings and soil mix are chosen and designed by the Landscape Architect.
- Roof loads must be carefully evaluated by a structural Engineer early in the design phase. Deadloads can range from 21psf to over 100psf. For slopes in excess of 3:12 consult Barrett Tech Services.

Minimum GreenRoof Roofscape Deadload Design Weights Are:

Membrane, root barrier, protection and insulation	4.5 lbs
Drainage - water retention	1.5 lbs
Soil, 2.5 inches of 1/3 organic, 2/3 mineral	14 lbs
Sedum plantings	1 lb
Roofscape total	21 lbs/ft²
Concrete pavers on pedestals	21 lbs/ft ²
Gravel ballast	15-20 lbs/ft ²

The Barrett Green Roof - Roofscape Design Group will assist in making the right selections to meet your program.

Certified Feng Shui consultations are also available through Barrett.

OTHER QUALITY PRODUCTS & SERVICES AVAILABLE FROM THE BARRETT COMPANY

- RAM-TOUGH Elastomeric BUR Systems
- Barrett Specification Reroof Systems
- Highway Membrane For Bridge & Parking Decks
- Thermography Services
- Construction Management and Direct Contract Services For Reroofing Projects



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