



Between the World
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Since 1928

Greenroof - Roofscapes® **General Design Considerations**

Structural Requirements

Greenroofs weigh more than conventional roofs. Dead loads can range from 18psf to over 100 psf when fully saturated. Barrett requires each retrofit project be reviewed by a licensed Structural Engineer in early design phase.

New construction structural requirements are easily computed and incorporated during early design phase. Barrett or a landscape architect can supply information concerning Greenroof design load weights.

Wind Resistance

Wind uplift pressures imposed on a roof are affected by geographic location, surrounding terrain, building height and parapet height. There are numerous resources dealing with wind resistance of roofs including:

- **American National Standards Institute (ANSI)**
- **American Society of Civil Engineering (ASCE)**
- **Underwriters Laboratories, Inc. (UL)**
- **Single Ply Roofing Institute (SPRI)**
- **Factory Mutual Research Corp (FMRC)**
- **National Roofing Contractors Association (NCRA)**
- **American Society for Testing and Materials (ASTM)**
- **Forshungsgesellschaft Landschaftsentwicklung Landschaftsbau e.V. (FLL)**

These organizations and others have developed information and formulas to classify a building's wind load design parameters. Most prominent among these for vegetated roofs is the ANSI/SPRI RP-14 standard which has found its way into national building codes.

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 and soil tactifiers.

Newly planted shrubbery and ornamental trees should be anchored to prevent uprooting. Plant resistance to wind damage can also be affected by the variables of root conditions, soil conditions, wind erosion and water erosion.



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Fire Resistance

Greenroofs that are properly designed and maintained are generally considered by the industry to be acceptably fire resistant. ANSI/SPRI VF-1 sets forth general greenroof system requirements and design guidelines for fire resistance which have been adopted by national building codes. Consult local codes for updates and requirements.

Greenroofs are almost always installed over concrete decks which produce a high degree of interior fire protection.

High Profile Greenroofs systems are usually irrigated with sprinklers, providing additional fire protection. Non-irrigated systems require firebreaks or fire barriers every one hundred feet, in each direction. Additional vegetation-free zones at all perimeters, roof top openings, drains and wall openings are required, which add to fire safety features.

Non-irrigated systems are generally not recommended, they will still require manual watering in periods of extended drought to reduce fire risks. High organic content soil is not recommended for fire-safety and other reasons.

Maintenance

It is a standard roofing industry recommendation that all roofs have an ongoing maintenance program. **Greenroof-Roofscapes®** also require a programmed cycle of care and maintenance. The scope of the maintenance program will vary considerably with the planting design, from occasional inspections and light maintenance to daily gardening activity. Maintenance service is readily available from a network of approved landscape contractors.

Each project has its own specific details and conditions which will require unique solutions. Barrett has a variety of accessory products including water retention fabrics, reservoir mats, drainage mats, root barriers, soil substitutes, aeration and planting mediums, curbing and protection courses that address unique needs with specific components.

Consultation with the Barrett **Greenroof-Roofscapes®** representatives and partners can assist you in making the right selections to meet your program.



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Design Alerts

Flashing conditions and perimeters are designed without soil cover or plantings in a minimum 24 inch to 48 inch wide 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 and melting snow drifts, in no event less than 8 inches above the membrane.

Drains are kept free of plantings and designed with boxes for inspection and maintenance clean-out. When soil depths exceed of eight inches, planter drains may be utilized and installed in accordance with manufacturer’s design criteria.

- **If an irrigation system is not installed as part of the system, suitable access to a water source must be provided by the designer.**
- **Plantings and soil mix may be chosen and designed by the Landscape Architect.**
- **Roof loads must be carefully evaluated by a structural Engineer early in the design phase. All calculations must be based upon full saturation conditions, mature vegetation and full live loads appropriate to the project location and code requirements.**

<u>Minimum Greenroof-Roofscapes® dead load design weights are:</u>	
Membrane, root barrier, protection and insulation	4.5 lbs
Drainage – water retention	1.5 lbs
Soil, 2.5 inches of 10% organic, 90% mineral	14 lbs
<u>Sedum plantings</u>	<u>1 lb</u>
<i>Greenroof-Roofscapes®</i> total	21 lbs/ft²
Concrete pavers on pedestals	21 lbs/ft ²