

Green Roof Maintenance ...the Spring Clean





Basic Research | Planning . Design . Permits . Construction Oversight | Policy + Program Management



Living Roof

Vegetated Roof

WHAT IS A GREEN ROOF?

Eco Roof

Planted Roof



Courtesy of Oehme Van Sweden



Courtesy of DC Govt



Courtesy of USDA



Courtesy of ASLA







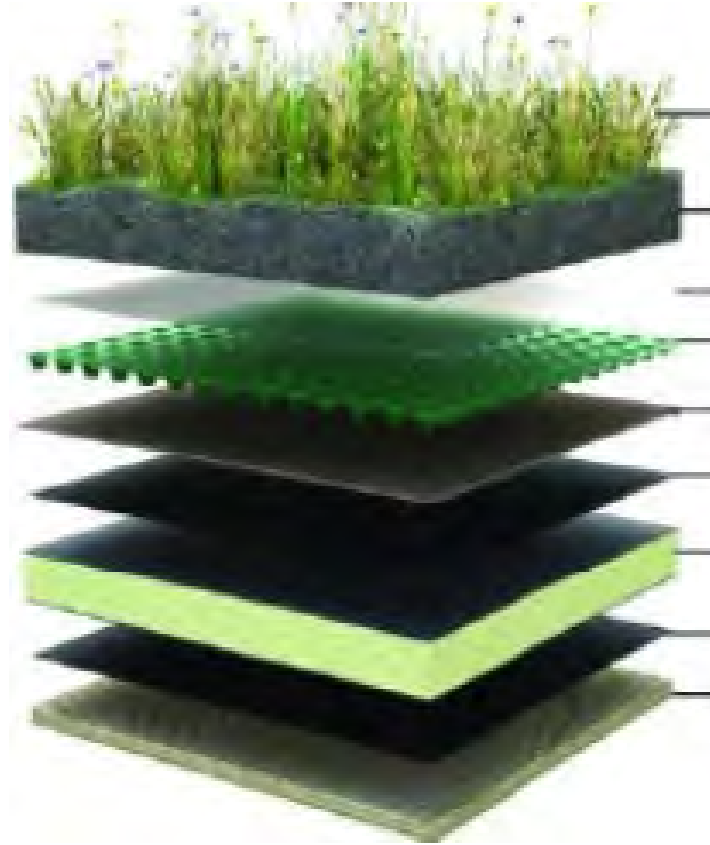
Pre-grown Mats



Trays



Plugs



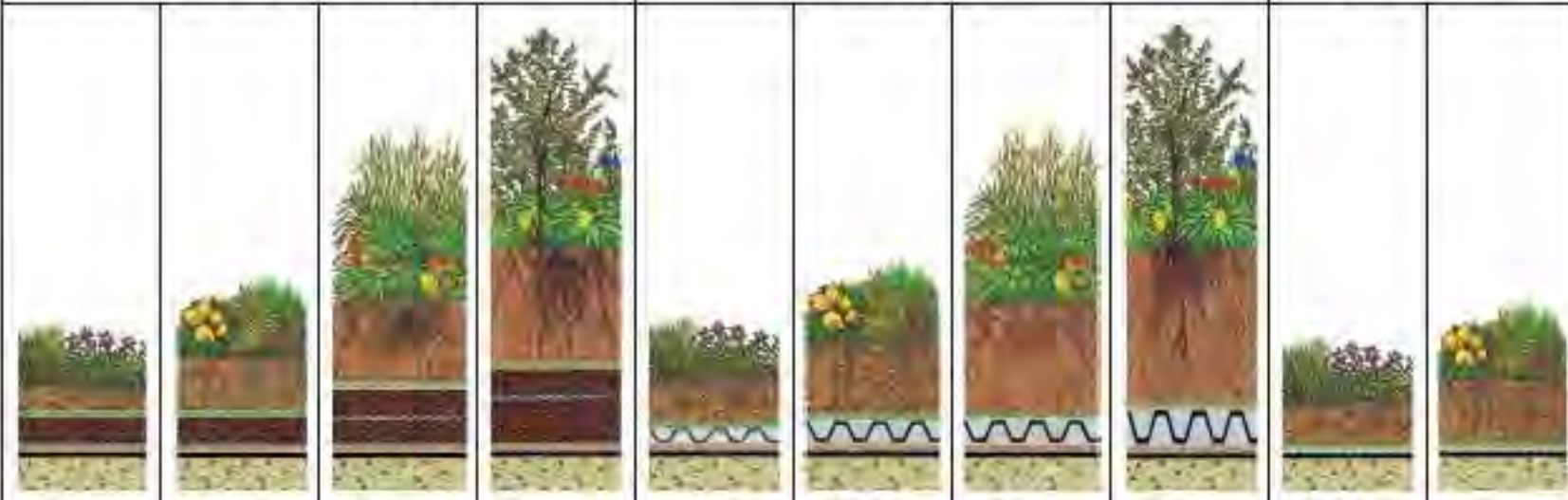
- Vegetation
- Growing Media
- Filter Layer
- Drainage Layer
- Protection Fabric
- Root Barrier
- Insulation
- Waterproofing
- Roof Deck

GREEN ROOF SYSTEMS

SYSTEMS WITH GRANULAR DRAINAGE

SYSTEMS WITH DRAINAGE PLATES

SYSTEMS WITH DRAINAGE MATS



system designation	G1	G2	G3	G4	P1	P2	P3	P4	M1	M2
typical plants	sedum herbs	sedum herbs perennials	perennials grasses shrubs	grasses shrubs trees	sedum herbs	sedum herbs perennials	perennials grasses shrubs	grasses shrubs trees	sedum herbs	sedum herbs perennials
extensive soil mix	2"	4"	-	-	3"	5"	-	-	3"	5"
intensive soil mix	-	-	6"	9"	-	-	8"	12"	-	-
separation fabric	1/8"	1/8"	1/8"	1/8"	1/8"	1/8"	1/8"	1/8"	-	-
granular drainage	2"	2"	4"	6"	-	-	-	-	-	-
drainage plate	-	-	-	-	1"	1-1/2"	1-1/2"	2-1/2"	-	-
drainage mat	-	-	-	-	-	-	-	-	3/8"	3/8"
protection mat	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	-	-
nominal thickness	4"	6"	10"	15"	4"	7"	10"	15"	3"	5"
dry weight	19 lbs/ft ²	28 lbs/ft ²	45 lbs/ft ²	69 lbs/ft ²	14 lbs/ft ²	23 lbs/ft ²	34 lbs/ft ²	52 lbs/ft ²	14 lbs/ft ²	22 lbs/ft ²
saturated weight	26 lbs/ft ²	41 lbs/ft ²	70 lbs/ft ²	105 lbs/ft ²	23 lbs/ft ²	37 lbs/ft ²	57 lbs/ft ²	85 lbs/ft ²	23 lbs/ft ²	37 lbs/ft ²
minimum slope	0:12	0:12	0:12	0:12	1/4:12	1/4:12	1/4:12	1/4:12	1:12	1:12
maximum slope	1:12	1:12	1:12	1:12	1:12	1:12	1:12	1:12	3:12	3:12
water retention	50%	60%	70%	80%	50%	60%	70%	80%	50%	60%
irrigation system	-	-	subsurface	subsurface	-	-	surface	surface	-	-

FUNCTION

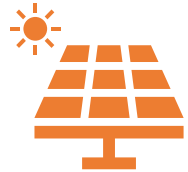
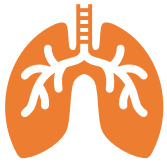


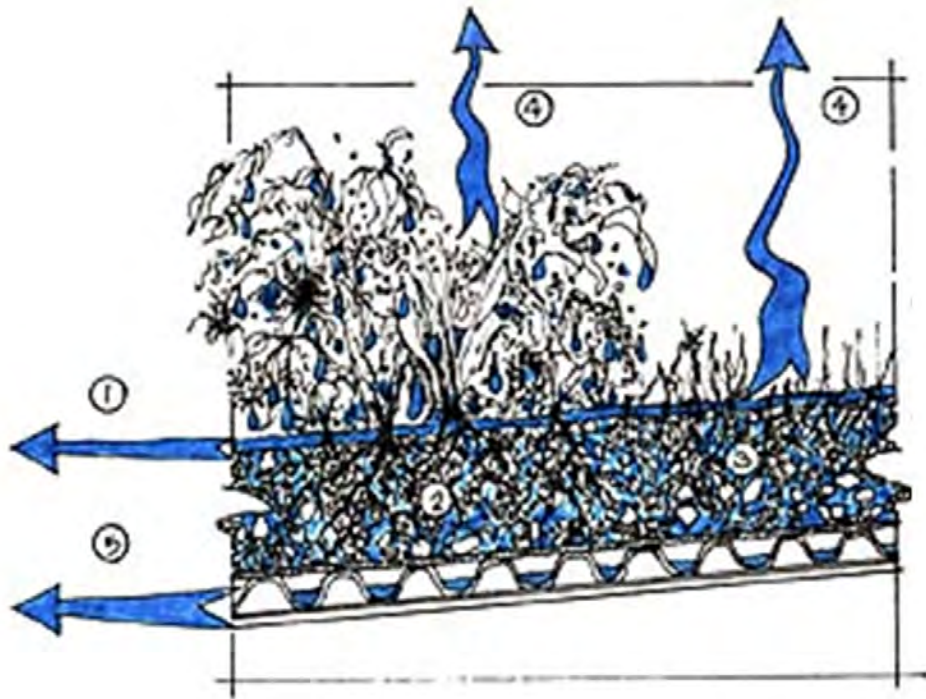
“

A roof functions to protect what is
inside...



... a green roof functions to protect
inside and out ”





1 Green Roofs Reduce Runoff

During heavy rain, runoff can overwhelm stormwater drains which can lead to damaged waterways and fish habitats.



2 They Are Energy Efficient

Green roofs reduce the amount of heat entering a building, so there is less of a need for heating and cooling thus reducing energy costs.



3 Improved Air Quality

Less ground level ozone and less heat means less smog. Plant leaves also trap dust particles in the air and cool ambient temperatures.



4 They Can Serve As a Habitat

If undisturbed, green roofs can serve as refuge for many types of birds to nest and raise their young.



5 Green Roofs Last Longer

Green roofs are protected from UV rays and temperature fluctuations, reducing the cost of maintenance and the need for re-roofing.





PERFORMANCE

“

How do you define success...

...Stormwater Compliance, Energy Conservation, Habitat Creation, Aesthetics, Clean Air,
Carbon Sequestration, Roof Membrane Life, Local Food Production?

MAINTENANCE
GUIDELINES FOR
AUSTRALIAN
GREEN ROOFS

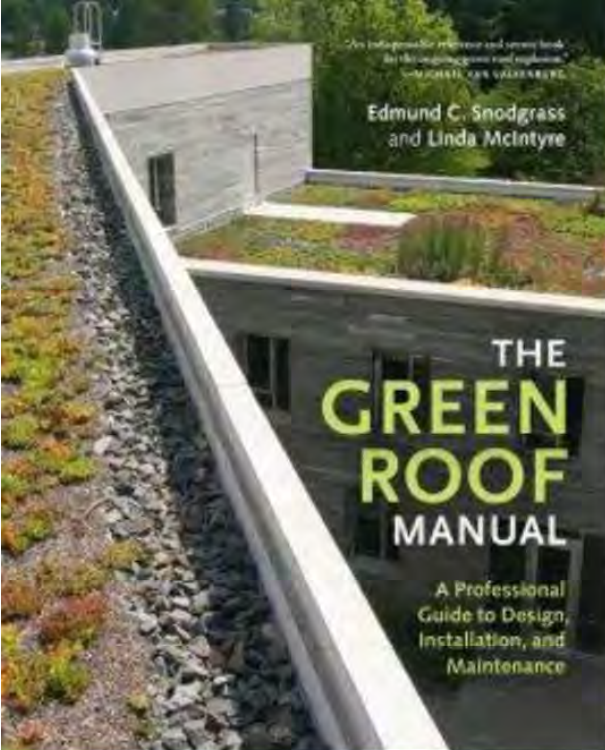


GROWING GREEN GUIDE



City of Toronto
GUIDELINES
for Biodiverse
Green Roofs



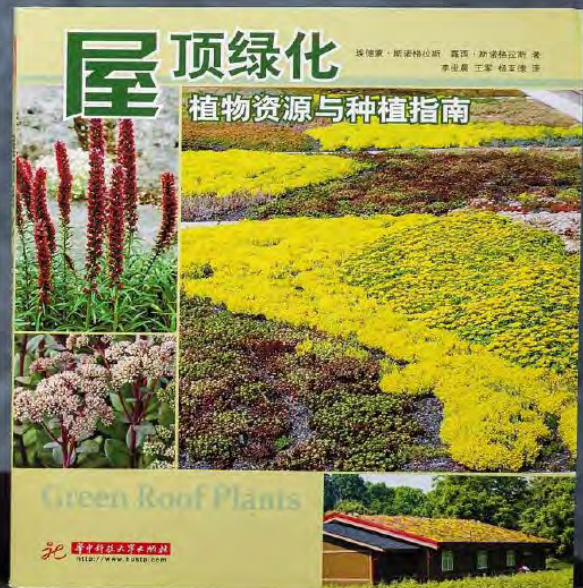
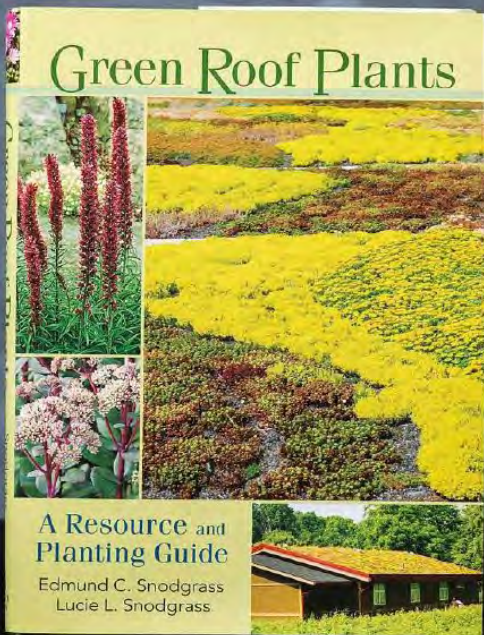
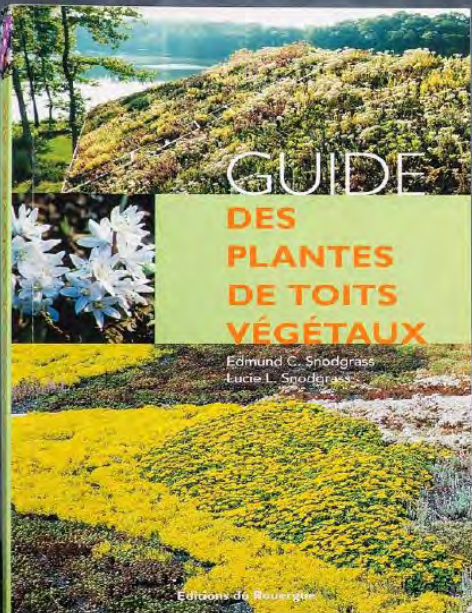
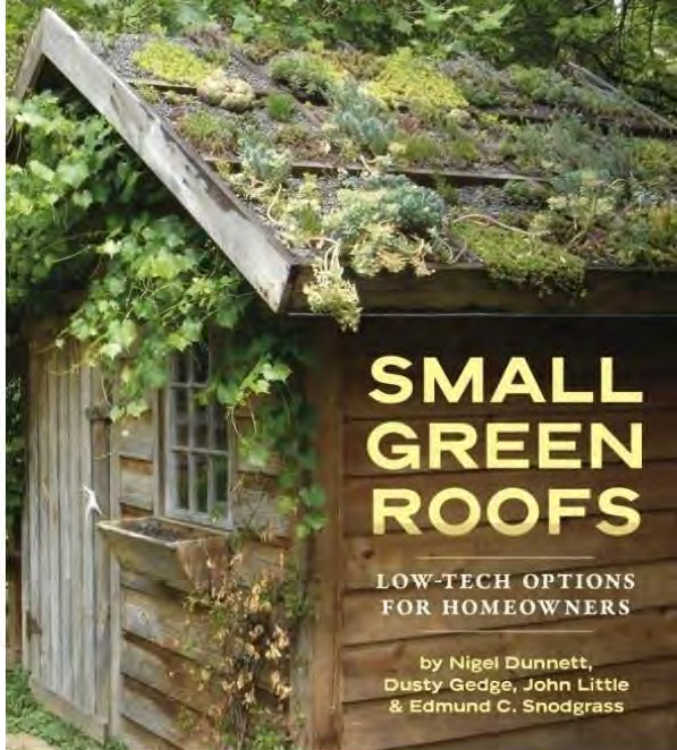


**GREEN ROOF
PLANTS**

EMORY KNOLL FARMS, INC.

greenroofplants.com

410 452 5880





LiveRoof Maintenance Protocol

The LiveRoof Maintenance Protocol is simple and takes you through each year season-by-season. It is based upon sound horticulture and lean processes, and is designed to protect owner investment with minimal time and.

Documentation

Always record each maintenance event. By keeping records (in spreadsheet format), you will learn the particular nuances of caring for your LiveRoof®.

Name of Person	Date	Activity	Observations
		If soil test, which lab, what test, and what were the results?	
		If fertilizer, record type and amount applied per 1000 sf	
		Time needed for bi-weekly weed walk and drain inspection.	
		If irrigation, duration and weather conditions?	

PLEASE NOTE: The following recommendations are for LiveRoof® systems planted with low-growing, drought tolerant succulents. Deep & Maxx systems planted with traditional landscape perennials & ornamental grasses typically have different maintenance requirements and increased irrigation needs. Consult your LiveRoof® Grower for maintenance recommendations for these types of plants.



RainScapes

Environmentally-Friendly Landscapes for Healthy Watersheds

Green Roofs

Why should I install a green roof?



Typical rooftops are hard surfaces that cannot absorb rainwater, so they contribute to stormwater runoff and increased pollution to streams. A green roof on a house or building allows rainwater to be absorbed by the plants and soil that are incorporated on the roof. This plant-based living roof reduces the amount of water leaving the property. This RainScapes technique reduces the environmental impact of a building roof, and usually provides energy savings and maintenance benefits.

Each green roof is unique and the type of benefits it provides will vary depending on the type of system installed. Studies have shown that 50 to 60 percent of annual rainfall at a site can be captured by green roofs, which significantly reduces runoff and harmful downstream ecological and environmental effects.



Green roof tray system - UMD Shady Grove campus

What is a green roof?

A green roof is a rooftop partially or completely covered with a specifically designed soil and vegetation system. Green roofs create living green spaces on top of buildings and structures that help to capture rainfall and reduce stormwater runoff. This captured water may be used by plants on the roof, released back to the atmosphere through evaporation, or it can be reused in other locations on the property.

Green roofs are a roof system that includes a waterproof membrane, filter fabric, drainage layer, root barrier, growing medium (soil), and plants. Green roofs may be constructed using modular units that contain all components listed above, or the components may be installed stop-by-stop directly on the building's roof deck.

The two main types of green roofs are extensive or intensive green roofs.

Extensive green roofs are typically lighter and thinner, which makes them more suitable to residential properties, while intensive roofs are thicker, heavier, and are designed to support trees and larger shrubs.



Green roof tray system

Extensive green roofs are designed to be lightweight and to maximize the performance and environmental benefits that a green roof can bring to a building. Extensive green roofs feature a layer of growing media that is 6-inches deep or less and are planted with drought-tolerant plants. Extensive systems require less maintenance and have simpler irrigation and drainage systems, if they have any at all. Existing roofs on porches, garages, sheds, and sunrooms are excellent candidates for extensive green roof retrofits.

(continued on page 2)



Green roof tray system



OWNER'S MAINTENANCE MANUAL

MAINTENANCE SCHEDULE FOR GREEN ROOFS

	Spring			Summer			Fall			Winter		
Irrigation (until established)		Required	Required	Required	Required	Required	Required	Required	Required			
Irrigation (during drought)		Required as Necessary	Required as Necessary	Required as Necessary	Required as Necessary	Required as Necessary	Required as Necessary	Required as Necessary	Required as Necessary			
Weeding		Required at Low Frequency	Required at Low Frequency	Required at Low Frequency	Required at Low Frequency	Required at Low Frequency	Required at Low Frequency	Required at Low Frequency	Required at Low Frequency			
Plant replacement	Required as Necessary	Required as Necessary	Required as Necessary				Required as Necessary	Required as Necessary	Required as Necessary			
Fertilizing	Required at Low Frequency	Required at Low Frequency	Required at Low Frequency				Required at Low Frequency	Required at Low Frequency	Required at Low Frequency			



Required



Required at Low Frequency



Required as Necessary



GREEN ROOF MAINTENANCE

Watch

Inspect drains
1x month

Look for standing water
1x month

Inspect flashing and caulk
1x month

Water

Alert! YEAR ONE

Water weekly for the first 3 months

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SEDUMS
2x per month

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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LARGER PLANTS
2x per month

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Weed

Weed
1x to 2x per month

Remove dead or diseased plants
1x to 2x per month

	SPRING		
	M	A	M
Inspect drains 1x month	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Look for standing water 1x month	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inspect flashing and caulk 1x month	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alert! YEAR ONE <i>Water weekly for the first 3 months</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SEDUMS 2x per month	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LARGER PLANTS 2x per month	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Weed 1x to 2x per month	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Remove dead or diseased plants 1x to 2x per month	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





Weeds



Standing Water



Missing Plants



Horseweed



Prickly Lettuce



Crabgrass



Tree Shoots



Courtesy of Furbish Co.



Courtesy of Furbish Co.



Courtesy of Emory Knolls



Courtesy of Furbish Co.





Courtesy of Furbish Co.





Courtesy of Furbish Co



Courtesy of Furbish Co.



-
- **DON'T USE SHARP TOOLS TO REMOVE WEEDS**
-
- **DON'T STAKE DEEPER THAN THE DEPTH OF THE SOIL**
-
- **DON'T FAIL TO USE THE ORIGINAL GREEN ROOF SOILS**
-
- **DON'T USE CHEMICALS TO KILL WEEDS**
-
- **DON'T USE FLAME OR TOUCH WEED KILLER**
-
- **DON'T COVER PLANTS WITH TARP FOR MORE THAN 3 HOURS**









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