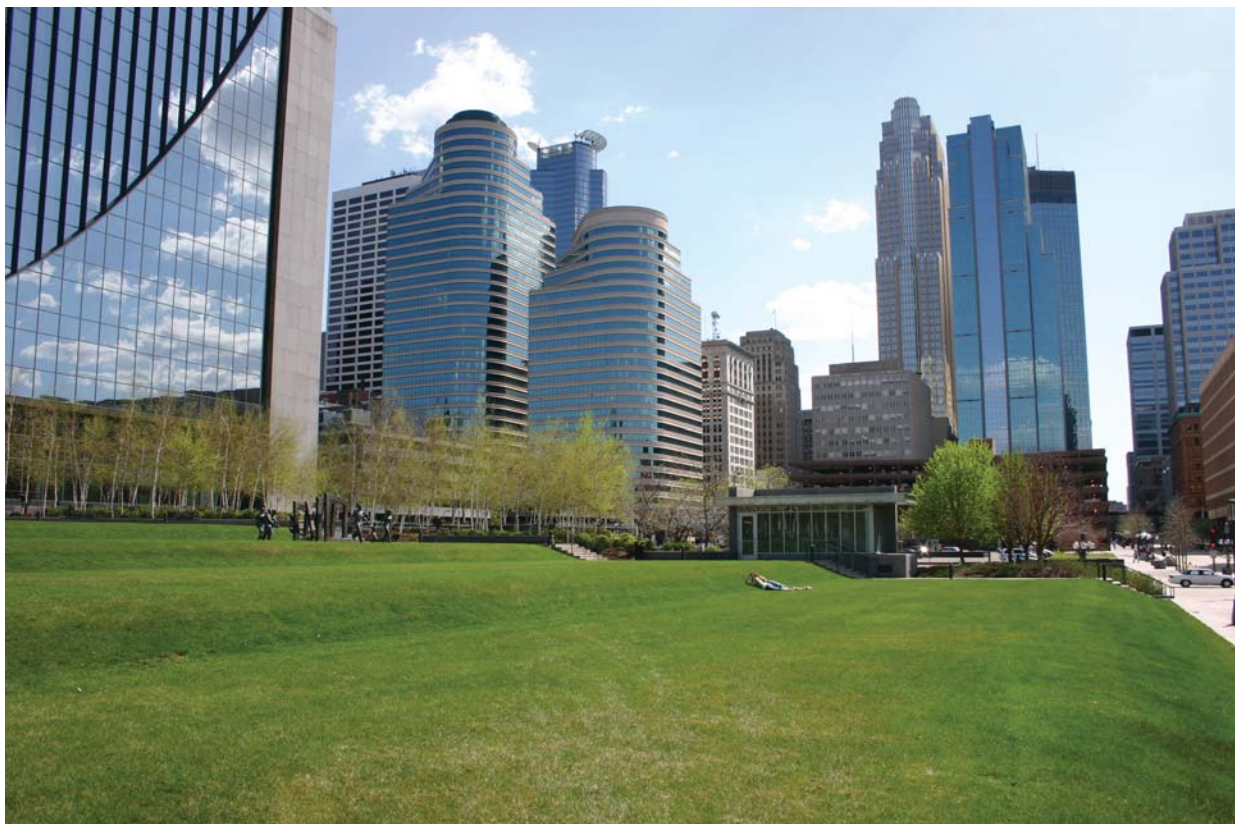
What is a Green Roof?

The term Green Roof is used to describe a variety of vegetated roofs that include roof gardens as well as the new high tech, thin profile roofs. These roofs can be outdoor spaces for people or inaccessible roofs built purely for their environmental benefits.

photo by 416style - flickr



PRIMARILY USED IN URBAN AREAS BENEFITS OF GREEN ROOFS CAN BE ENJOYED ON COMMERCIAL AND RESIDENTIAL BUILDINGS.

Improves Visual Quality

Consider overlooking a traditional roof with condensers, vents and other typical utilitarian roof accessories with the ocean view beyond. Now consider a green open space as your foreground view towards the ocean. Which is better? For which would you pay more? Economist Linda Cox, PhD at University of Hawaii is working on research that documents a willingness to pay more for views that overlook green spaces and green roofs.

Increases Roof Life

Due to the protection and insulation of the waterproofing membrane a green roof can last two to three times longer than a traditional roof. The layers of plants, growing media and drainage along with protection board or insulation keeps the waterproofing more protected from UV degradation, wind, and rain.

Improves Water Quality

Due to the filtration and the absorbtion of pollutants by the plants and growing media green roofs actually improve water quality. This is particularly important to Hawaii since so much of our stormwater flows to the ocean.

Reduces Urban Heat Island Effect

Most of us understand that urban areas are 10 to 15 degrees warmer than rural areas due to the concentration of concrete, glass and other impervious and reflective surfaces. Green roofs offer a natural cooling effect that has a cumulative effect as more and more green roofs are built in urban areas.

Decreases Air Conditioning Need

Research shows energy savings in both heating and cooling, but more so in cooling costs. So due to our climate in Hawaii we stand to see more benefit than other cities where research was conducted.

Components from Top To Bottom

Plants - typically groundcover or native plants found in dry, rocky conditions with some ornamental characteristics

Growing Media - usually rocky, lightweight, low organic content and well drained

Filter Fabric - non woven fabric keeps the smaller particles from clogging up the drainage layer

Drainage - a layer of rock or formed plastic cells that allow excess water to drain away from the media layer

Insulation or Protection Board - protects the membrane or waterproofing layer from damage during and after assembly

Root Barrier - a chemical or physical barrier to root intrusion on the waterproofing layers

Waterproofing - without a doubt the most important layer; the roof has to be water tight to protect the structure and everything inside

photo by thingermejig -flickr

Decreases Peak Stormwater Rates

Green roofs absorb rainfall and only release excess after saturation. This time delay reduces the demand on stormwater systems by reducing the flow rates in the "First Flush". In Hawaii, much of our infrastructure was designed decades ago for a smaller population size with less impervious surfaces, therefore it has a difficult time handling peak flows today.

How much does it cost?

Due to the shipping and the lack of a competitive market here in Hawaii we estimate that extensive green roofs cost between $20-$25/SF. Costs range depending on location and the number of qualified contractors and suppliers. In Germany where extensive green roofs have been constructed since 1986 the price per sf is as low as $2.50/sf while in New York it is closer to $10/sf.

Dawn Easterday is a Landscape Architect with Belt Collins Hawaii

Among other projects, Dawn has been working with roof gardens for over 13 years and is currently conducting Extensive green roof research in conjunction with University of Hawaii for Optimal Growing Media and Depths.

Research Partners Include
Andrew Kaufman, PhD
Linda Cox, PhD
Tomoaki Miura, PhD

Parallel Research on Native Plants
Graduate Student - Leyla Cabugos