## THE URBAN HEAT ISLAND EFFECT

The Urban Heat Island Effect is a phenomenon that occurs when areas of vegetation are replaced with non-reflective, heat collecting, impervious surfaces that absorb a high degree of incoming solar radiation. The development of heat islands has a city-wide impact on energy demands, air quality and public health.
By installing a planted roof, the outdoor air temperature and the urban heat island effect is reduced through plant transpiration, shading, and radiation reflectivity of roof surfaces.
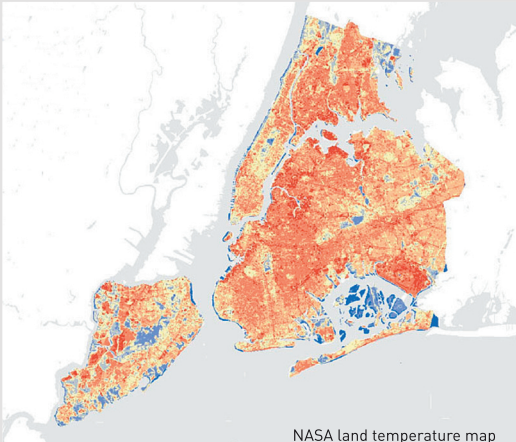
NASA land temperature map

COMBINED SEWAGE OVERFLOW

When rainwater flows off impervious surfaces such as rooftops, parking lots and streets, it picks up many contaminants including dangerous heavy metals. New York City invests millions of dollars upgrading and operating sewage treatment plants to address these pollutants. However, during heavy rainfall, excessive volumes of water overwhelm these treatment plants and cause untreated sewage to overflow into the city's rivers and waterways. Green roofs retain 50–75% of the rainwater that falls on them, easing the pressure on the combined sewage system.

THE COOPER UNION
Institute for Sustainable Design

A NEW YORK CITY GUIDE TO
GREEN ROOFS

HOW ARCHITECTS, BUILDERS, DEVELOPERS, AND BUILDING OWNERS CAN ADVANCE THE FUTURE SUSTAINABILITY OF OUR CITY

**THE COOPER UNION
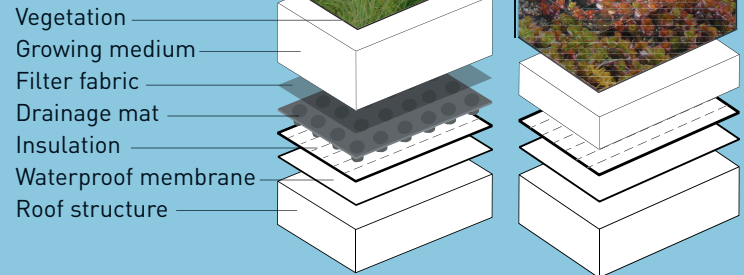INSTITUTE FOR SUSTAINABLE DESIGN**

GREEN ROOFS

There has been a growing concern about the amount of energy that buildings consume and the environmental problems to which they contribute.   According to the New York City Department of City Planning, approximately 60% of the city's total land area is occupied by buildings. That constitutes over 90,000 acres, or an area more than 100 times that of Central Park. Large areas of roof surfaces contribute significantly to the Urban Heat Island Effect, and rapid stormwater run-off that can overwhelm the sewer systems. Green roofs work to mitigate these adverse effects, by keeping heat-absorbing surfaces cool and filtering stormwater run-off.

TYPICAL GREEN-ROOF ASSEMBLY

There are two main categories of green roof systems: Intensive and Extensive.

The selection and use of each system is dependent on the plant type, occupant usage, and structural capacity of the the roof. Within each category, there are two basic types: modular tray systems and direct applied systems. A typical green-roof assembly consists of:

Vegetation
Growing medium
Filter fabric
Drainage mat
Insulation
Waterproof membrane
Roof structure

PROPERTIES	INTENSIVE	EXTENSIVE
System	Deep growing medium	Shallow growing medium
Structure	Additional structure, relative to load	Typically, existing structure is sufficient
Cost	$12-40 / sf*	$12-25 / sf*
Maintenance	General landscape care	Minimal
Irrigation	Yes	Typically not required
Vegetation	Perennials, trees, bushes, grasses, vegetables	Moss, sedum, herbs, grasses

*Pricing varies based on conditions.

GOODE GREEN

COLUMBIA GREEN ROOF

BENEFITS:

- REDUCED maintenance costs
- REDUCED energy usage
- INCREASED life expectancy of roofing
- INCREASED property value
- INCREASED marketing value
- INCREASED air quality
- Possible LEED credit
- Attenuated city noise
- Mitigation of the urban HEAT ISLAND EFFECT
- NATURAL habitat for plants & animals
- STORMWATER retention

REBATES!

NEW YORK CITY GREEN-ROOF TAX ABATEMENT PROGRAM:
Eligible installations receive a one-time property tax abatement of $4.50/SF, up to $100,000, for green roofs that cover at least 50% of the roof area.
For more details, go to:

www.nyc.gov/buildings
click on: Forms, Tax Abatement

Abatement ends on MARCH 15, 2013

USEFUL LINKS:

NYC TAX ABATEMENT GUIDE:
www.nyc.gov/buildings
click on: Sustainability, Tax Abatement
see: Green Roofs, A guide for filing…

NYC DEPARTMENT OF PARKS AND RECREATION NATIVE ROOF SPECIES:
www.nycgovparks.org/sub_about/go_greener/green_roofs.html

FOR MORE INFORMATION ON GREEN-ROOF SYSTEMS CONTACT:
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