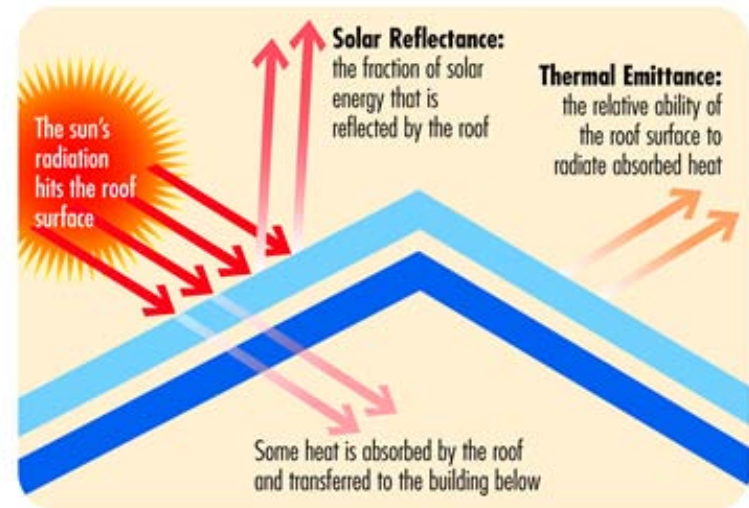


# Cool Roofs: A practical solution to the Urban Heat Island

2010 Urban Heat  
Island Summit

# Cool Roofs and UHI Reduction

- A “cool roof” is a roof that reflects the sun’s heat and emits absorbed radiation back into the atmosphere
- Solar Reflectance (Albedo)
- Thermal Emittance (Emissivity)
- Increasing average albedo from 0.25 to 0.40 can lower summer air temperature by up to 4 degrees



# Case Study- Polaris Realty Partners in Project Green

- Tremco TRA-LRM cold-applied roofing system
- White calcite
- Reduced temperature on roof by 20 degrees in April



# Implementation Strategies

- Public and Private Building Standards
  - LEED (CaGBC)
  - Toronto Green Standard
- Incentives for voluntary actions
  - Bonuses for developers
  - Grants
- Changes to Provincial Building and Energy Codes

# Toronto GREEN STANDARD



**AIR QUALITY**  
For New Mid to High Rise

Development Feature
<b>Urban Heat Island Reduction: Roof</b> Reduce ambient surface temperatures on/from rooftops

AQ 5.1 For buildings included in the City of Toronto Green Roof By-law, install a green roof to meet the requirements of the By-law. <sup>1</sup>
For buildings not covered by the Green Roof By-law do one of the following for available roof space: <sup>2</sup>
Install green roof with 50% minimum coverage <sup>3</sup>
OR
Use cool roofing materials for 100% of the roof <sup>4</sup>
OR
Use a combination of both for a minimum of 75% of the roof.
For all City owned buildings and all Agencies, Boards, Commissions, Corporations and Divisions, new buildings will provide a green roof with total area coverage equal to at least 50% of the building footprint. Cover the remaining available roof space with cool roofing materials.

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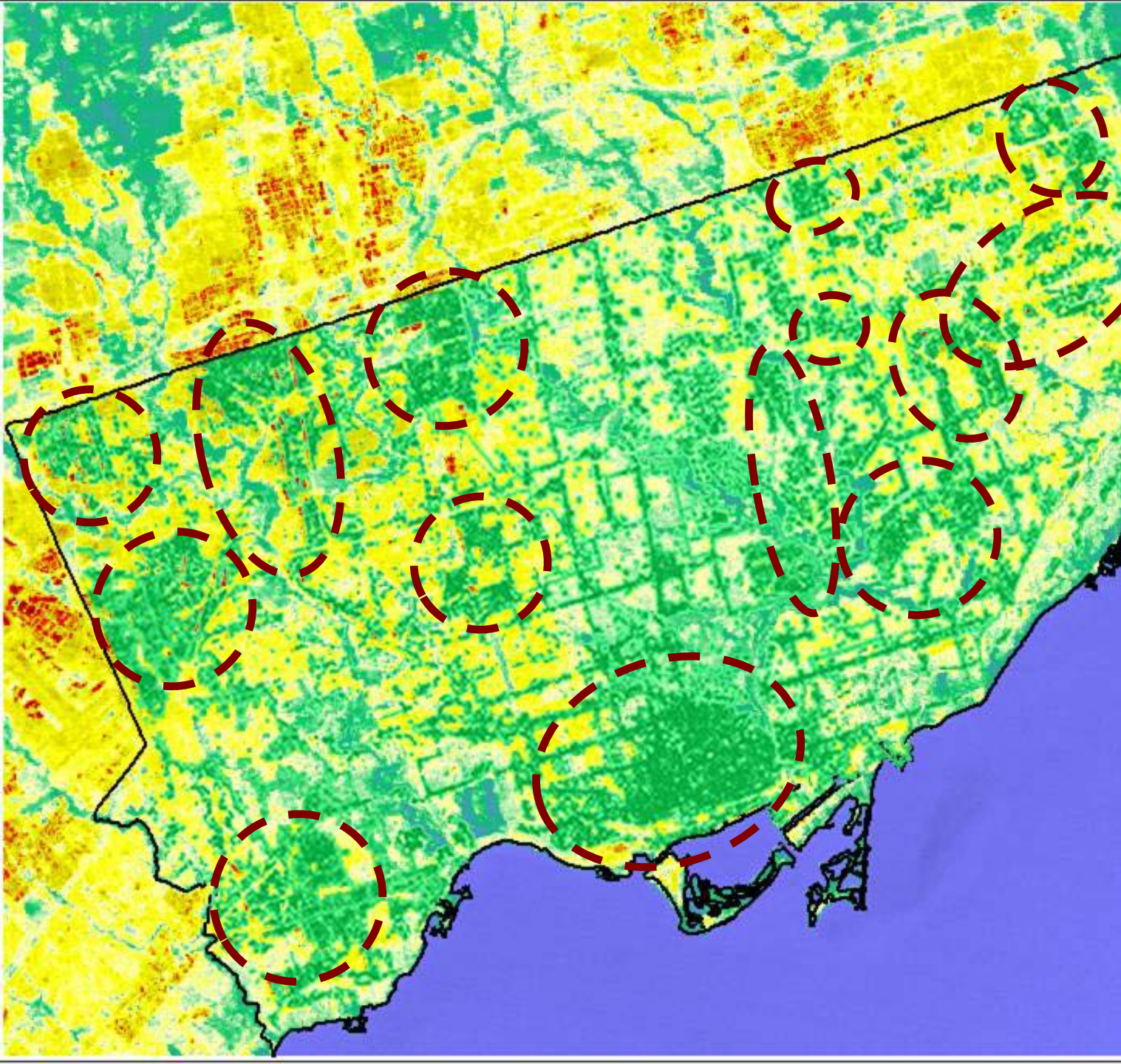
**Use cool roofing materials for 100% of the roof<sup>4</sup>**

**OR**

**Use a combination of both for a minimum of 75% of the roof.**

**For all City owned buildings and all Agencies, Boards, Commissions, Corporations and Divisions, new buildings will provide a green roof with total area coverage equal to at least 50% of the building footprint. Cover the remaining available roof space with cool roofing materials.**

Notes	Potential Strategies
Green Roof on see:	Specify Energy Star or Cool Roof Rating Council (CRRC) rated cool roof coatings and single ply membranes for low-sloped applications
building private sum of 2m <sup>2</sup>	Green roof types include: complete and modular systems and pre-cultivated vegetation blankets.
of vegetation later in typically age layer,	al emittance ls must have a tance of 0.90; a steep-sloped 16.7% (9.5 reater than s). Ballasted b/ft <sup>2</sup> or 117
For a list of logical <a href="#">df</a>	s adjacent to ight of at least entially fatal bird



# City of Toronto Eco-Roof Incentive Program



## green roof

\$50 / m<sup>2</sup> up to \$100,000

A green roof supports the growth of vegetation for the purpose of water or energy conservation, and is comprised of a waterproofing membrane, drainage layer, organic growing medium and vegetation.

## cool roof

\$2 / m<sup>2</sup> coating over existing roof

\$5 / m<sup>2</sup> new roof membrane up to \$50,000

A cool roof reflects the sun's thermal energy, using either a coating applied over an existing roof or a new roof membrane.

## Eco-Roof Incentive Program



Designed to help Toronto's business community take action on climate change, the Eco-Roof Incentive Program provides grants to promote the use of green or cool roofs on Toronto's industrial, commercial and institutional buildings.

## Benefits of Eco-Roofs

### Energy Efficiency

Green and cool roofs can reduce energy demand and energy costs. They may also attract environmentally-conscious tenants, businesses and consumers.

### Cooling Effect

Widespread installation of eco-roofs will help cool our city and reduce the impacts of climate change. Conventional roofs absorb and radiate the sun's energy which contributes to urban heat, making cities an estimated 2-3°C warmer than rural areas.

### Stormwater Management

Green roofs retain rain where it falls, which reduces pressure on water infrastructure and helps improve water quality. In older areas of Toronto where storm sewers and sanitary sewers are combined, overflows during large rainfalls can contaminate our beaches.

### Biodiversity

Green roofs help beautify buildings, and provide habitat for birds and pollinators, as well as new space for urban food production.



# Questions?

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