

Green Roofs in the GI and ES Story

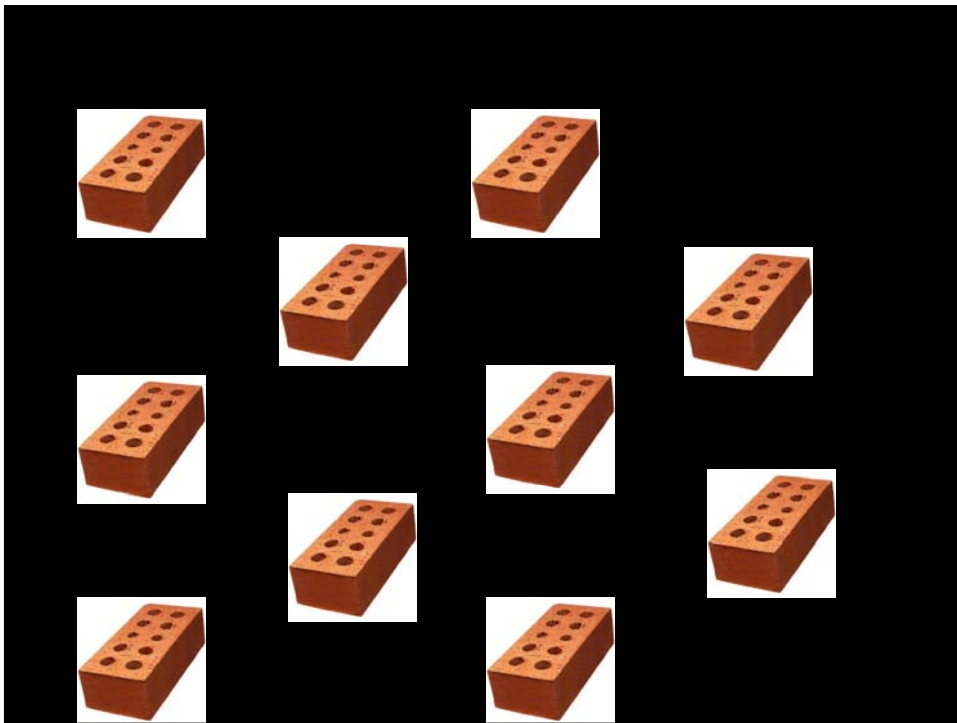








Inherent Tension between the built environment and nature





- Green Roofs in GI and ES agenda
- If we design well and buy later will get the best benefit
- Policy and Planning and Clients are the answer
- They will make the built environment professionals deliver

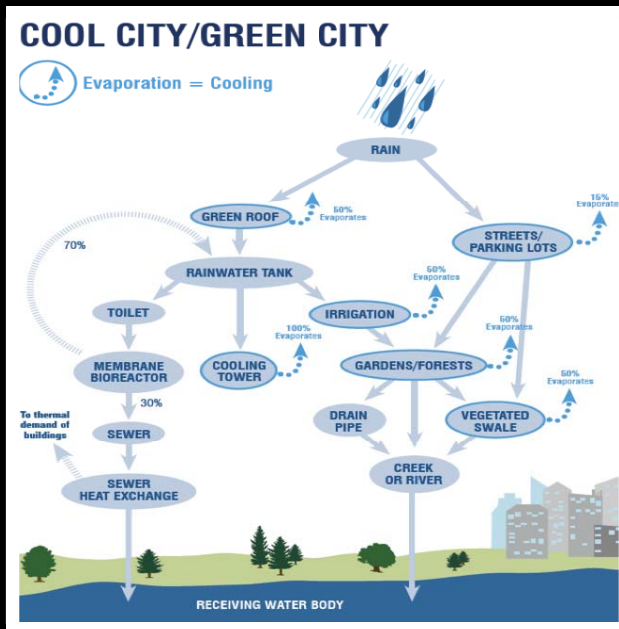
Energy and Water

Energy

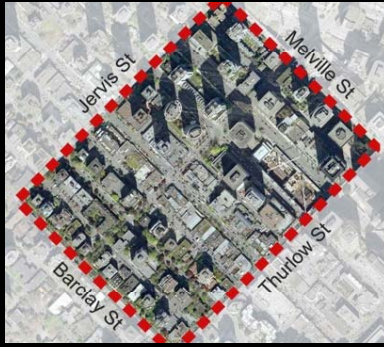
- Macro and the Micro
- City Scale and Building Scale
- Central London can be 5 degrees warmer than the country side

Energy and water

- Vegetated landscapes need water
- Plants - 'sweat' - evapotranspire
- Evapotranspiration = cooling

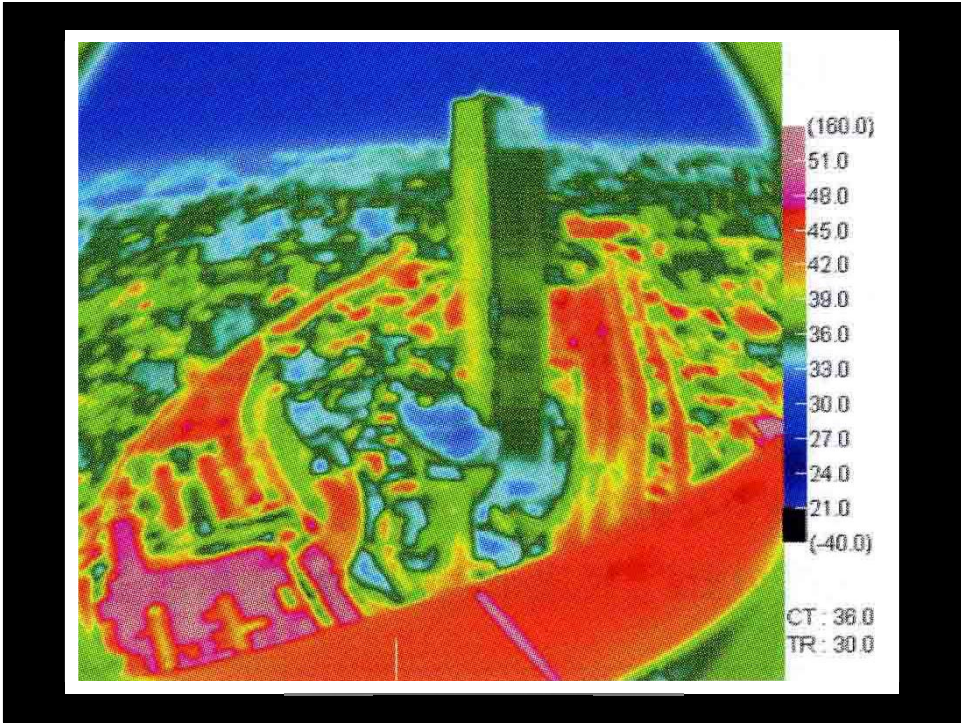


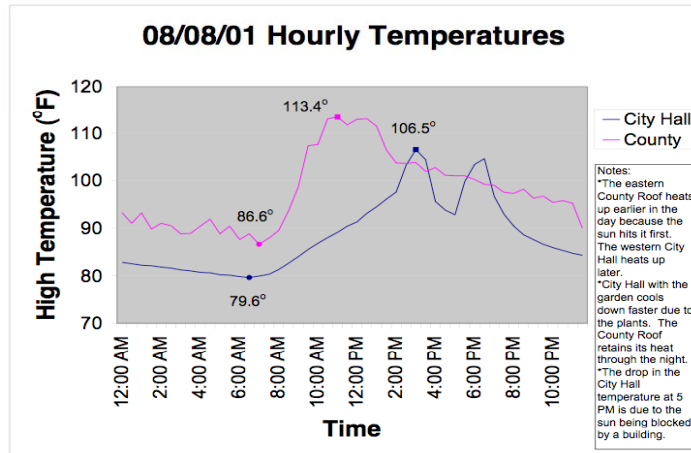
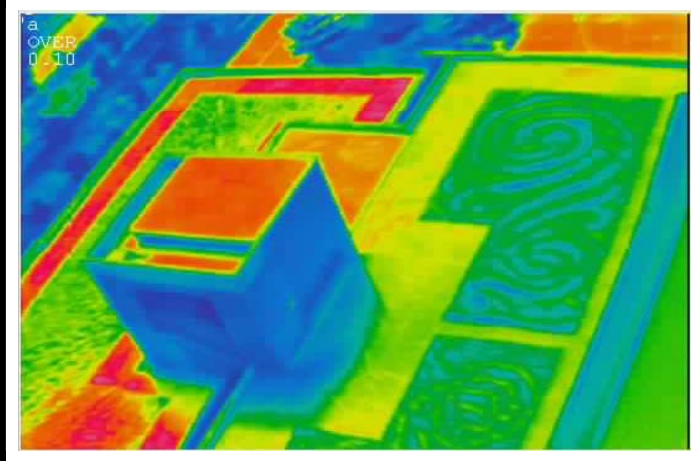
Energy and water



Roehr: reduce energy use 10%
Reduce runoff 14%





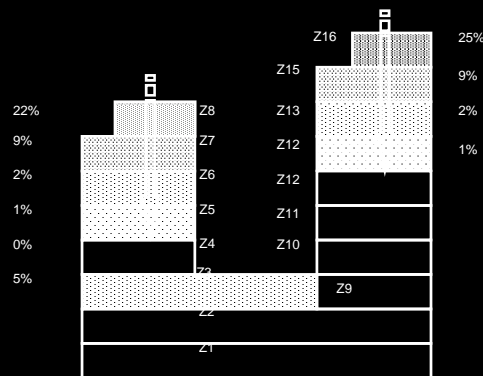


Paradise Park

- *Brown roof is approximately 150mm*
- *Slows heat transfer by 6 hours*
- *Between noon and 1800 no heat transfer*
- *28kW heat gain*
- *9.2kW per hour would normally be used*
- *Needs no air conditioning*
- *Saving 3,800kWhrs/year*



Summer Reductions with Green Roof 4.15Kwh/msq/yr



Winter Reductions with Green Roof
Between 2 - 6 Kwh/msq/yr



Power and Plants

Evapotranspiration
maintains ambient
temp. close to 25
degrees C



Water

Water Retention

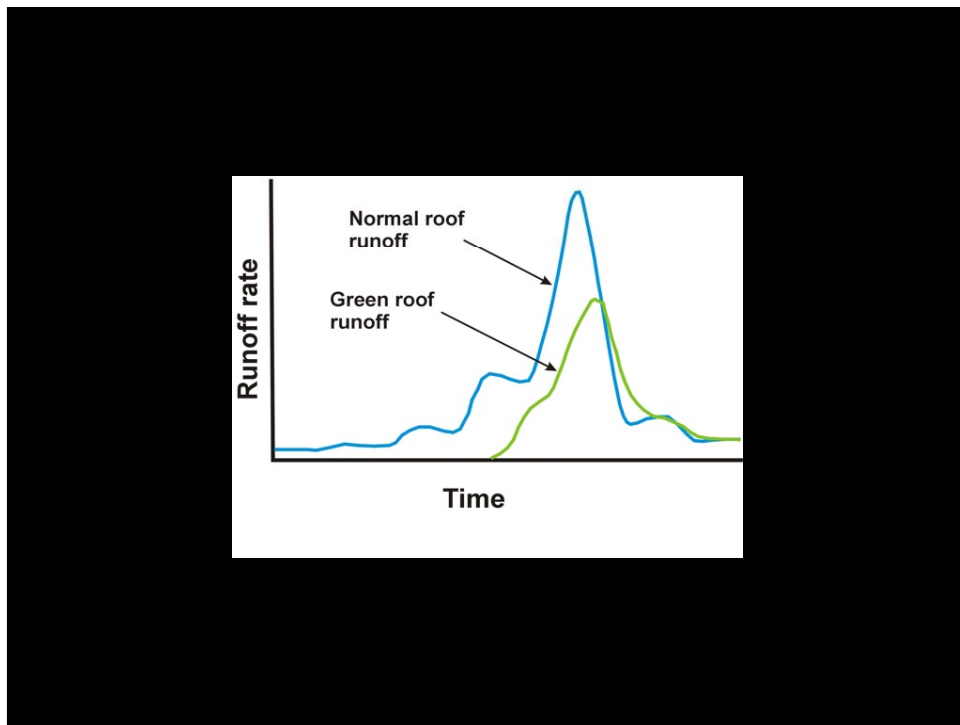
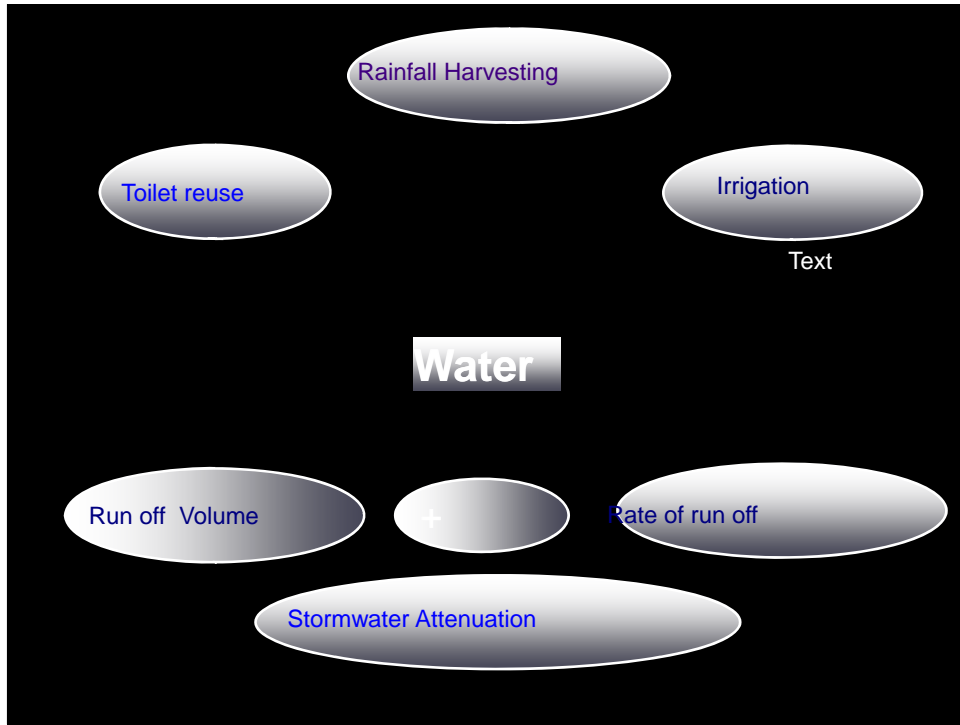
| TYPE OF GREEN ROOF | DEPTH [MM] | VEGETATION | WATER RETENTION |
|--------------------|------------|--------------------|------------------|
| | | | ANNUAL AVERAGE % |
| Extensive | 20-40 | MOSS/SEDUM | 40 |
| | 40-60 | SEDUM/MOSS | 45 |
| | 60-100 | SEDUM/MOSS/HERBS | 50 |
| | 100-150 | SEDUM/HERBS/GRASS | 55 |
| | 150-200 | GRASS/HERBS | 60 |
| Intensive | 200 - 250 | LAWNS/SHRUBS | 60 |
| | 250 - 500 | LAWNS/SHRUBS | 70 |
| | <500 | LAWNS/SHRUBS/TREES | <90 |

Rainfall Attenuation

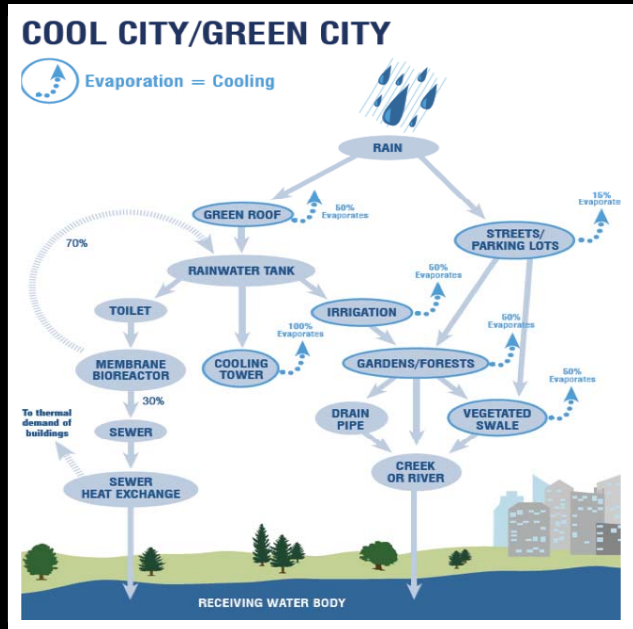
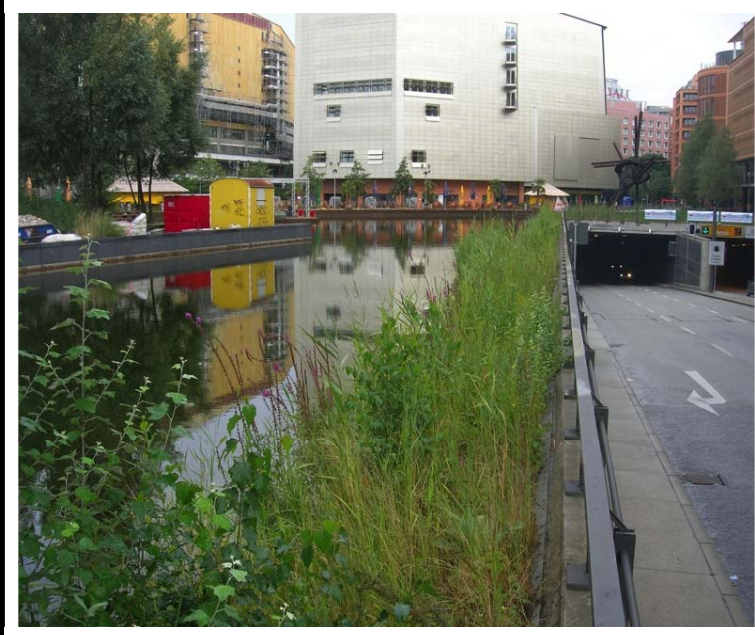
- Roofs are source -green roofs a source control mechanism
- In practice there is very little runoff for many rainfall events
- A lot of the water that falls on the roof is removed by evaporation and transpiration from plants
- Runoff volumes and rates are reduced
- In Germany green roofs are important part of [zero discharge](#) sites

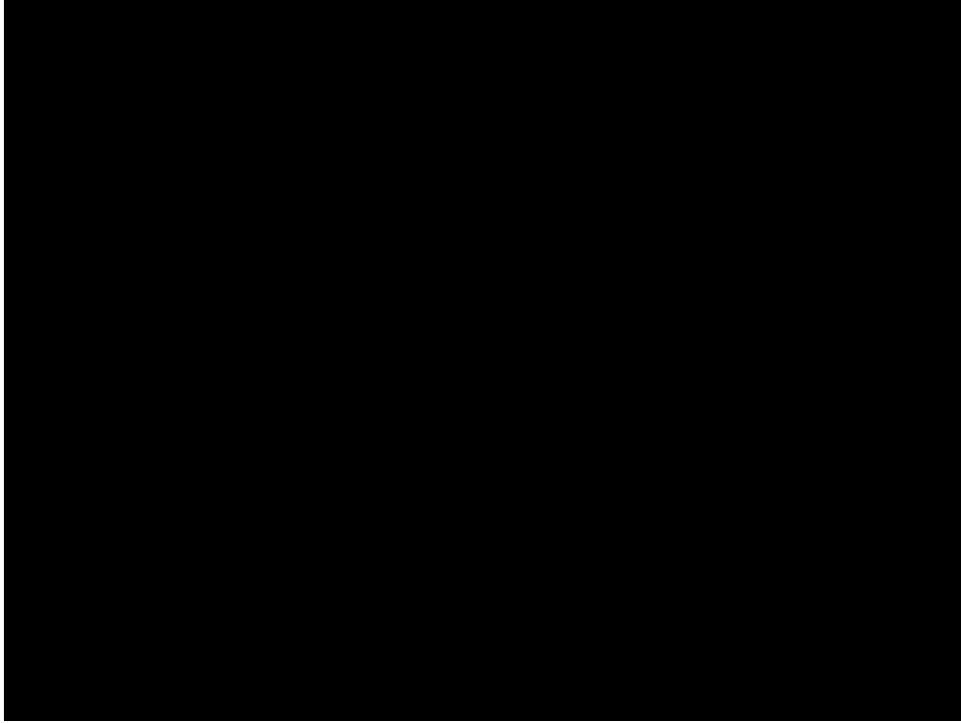
Rainfall Harvesting

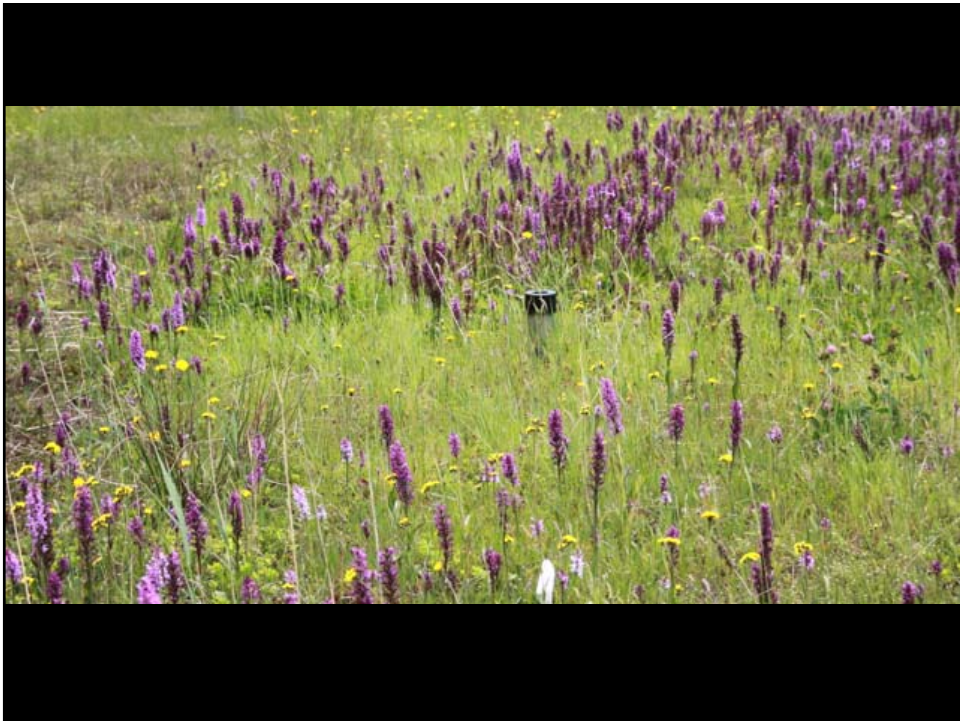
- Can use water from roofs as grey water
- Some commercial substrates have nutrients which leads to discolouration of water
- Discoloration disappears after few years once vegetation established
- If are going harvest 'no' nutrient substrate can be used
- POTSDAMMER PLATZ

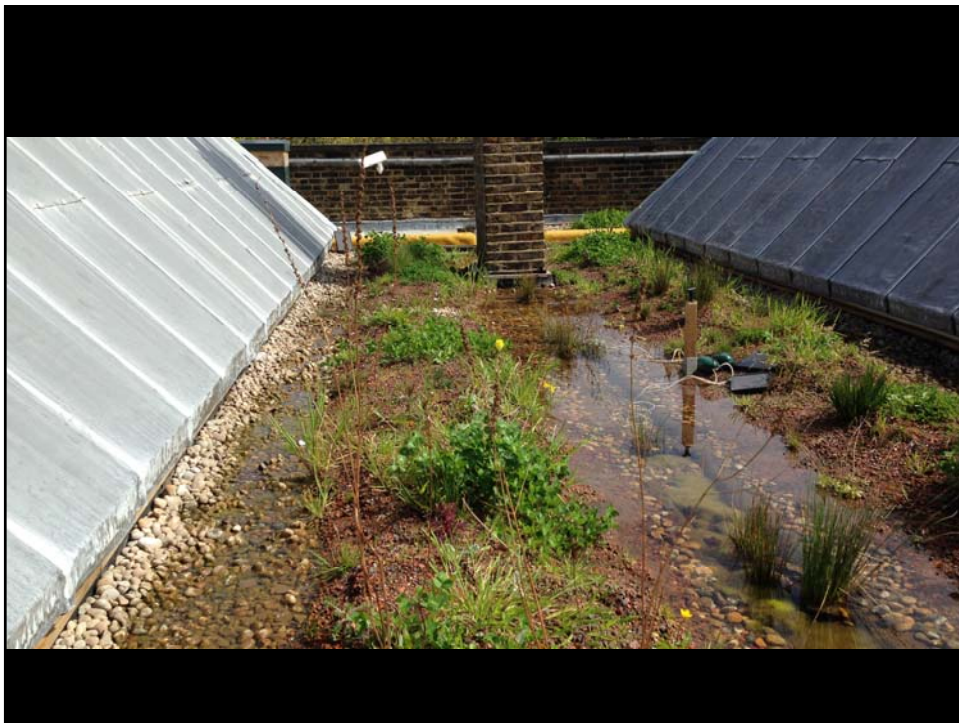
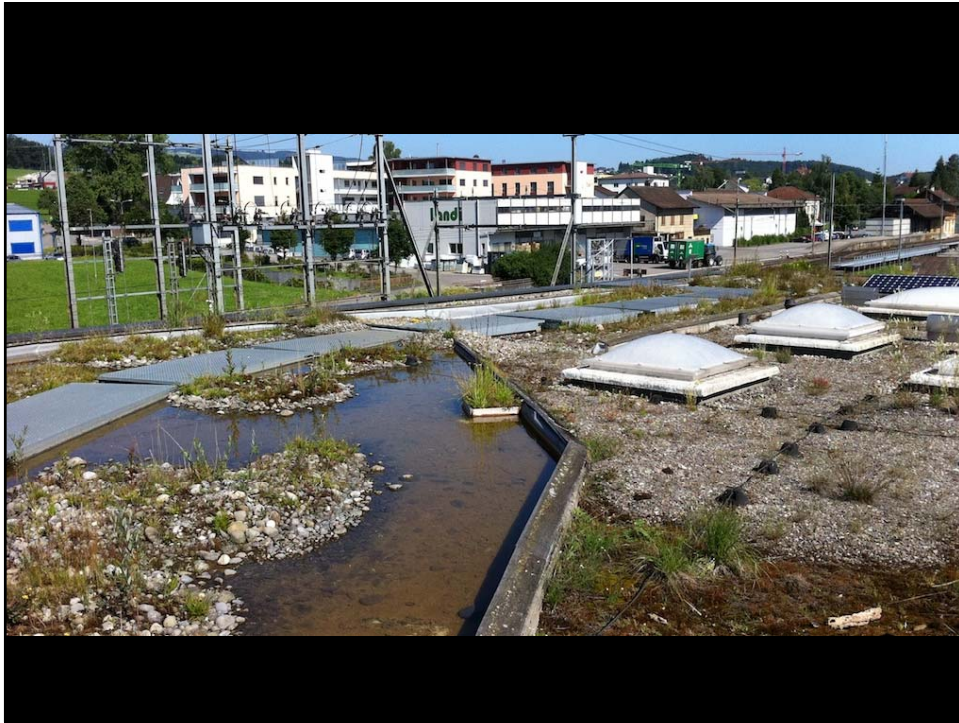


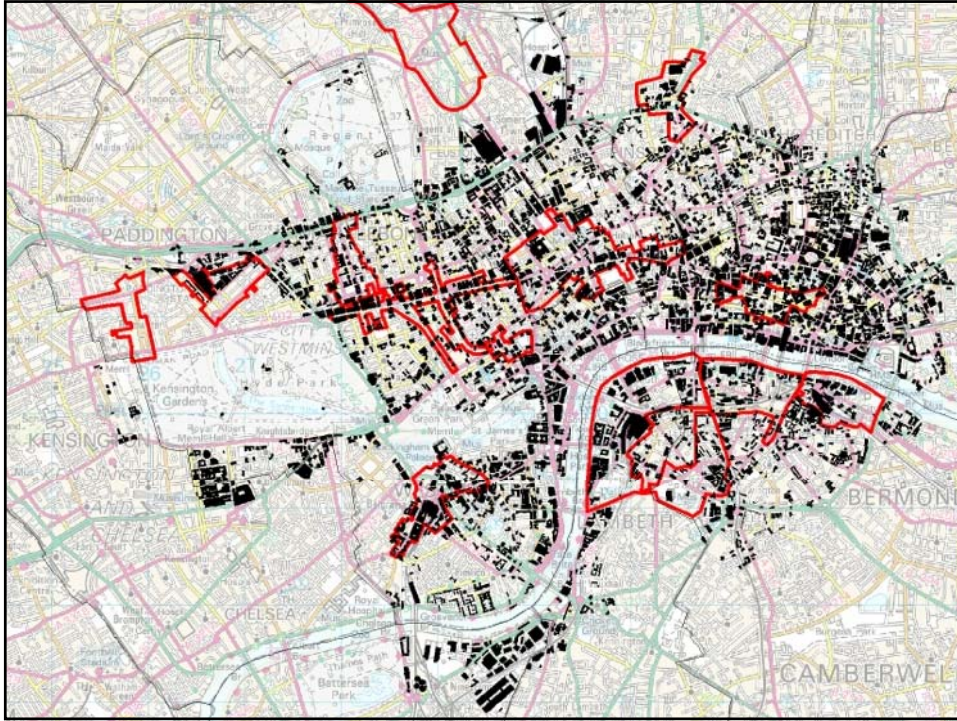












Living Roofs and Walls
Technical Report: Supporting London Plan Policy

An aerial photograph of London, showing the city's skyline and the River Thames winding through it. The image captures a wide view of the city, including the River Thames, several bridges, and the dense urban landscape. The sky is clear, and the overall scene is a panoramic view of the city from an elevated perspective.

A Green Infrastructure Audit of the Victoria Business Improvement District

Prepared for Victoria BID Partnership
by
Land Use Consultants and Green Roof Consultancy



Why? 2009 Late June the flooding of Victoria Station and subsequent loss of business

