

## Living roofs in London, UK

<i>City</i> London	<i>Region</i> South East		<i>Country</i> UK
River flooding <b>Drought</b> Fire events	<b>Urban flooding</b> <b>Heat waves</b> <b>Poor air quality</b>	Sea level rise Water quality <b>Biodiversity change</b>	Ground instability <b>Storm events</b>
<i>Scale</i> Town or city	<i>Stage</i> Ongoing	<i>Source of funding</i> Regional government; local authorities; private sector	
<b>Physical infrastructure change</b> <b>Organisational change</b>  <b>Educational action</b>	<i>Activities involved</i> <b>Change in spatial planning policy</b> <b>Change in legislation or regulation</b>  Financial action		<b>Stakeholder engagement</b> <b>Research into the need for adaptation</b>
<b>Adaptation to climate change</b> <b>Biodiversity conservation</b> Private sector development	Mitigation of climate change Transport	Recreation  Urban regeneration	Water management  Housing
<i>Leading agent</i> Non-governmental organisation: Livingroofs.org		<i>Key stakeholders</i> Regional government; local authorities; NGOs; research institutions; community/citizens	

### Project description

The original idea of the work, which started in 1997, was to promote installation of green roofs for biodiversity enhancement and conservation. In 2004, livingroofs.org was officially established as a driver to get policy changes into the London Plan. Since then, over 500,000m<sup>2</sup> of green roofs has been installed in London, mainly as a result of retrofitting action. As a result of the championing actions, the 2008 London Plan includes a policy on Living roofs and walls (Policy 4A.11).

Also, two PhD projects were initiated and collaborated on, addressing green roofs and biodiversity and green roofs and recycled aggregates. The NGO is now working closely with the Institute for Sustainability to establish a research station to measure the impact of green roofs on the urban heat island, water quality, and stormwater management. Monitoring of biodiversity on green roofs has been carried out since 2001 and a comprehensive data set has been compiled.

In addition, Livingroofs.org also provide training on green roof installation and maintenance to both the public and the private sectors, in addition to community groups.

### Good practice includes:

- Prioritising adaptation
- Sound evidence base
- Leadership / championship

### Resources

<http://www.livingroofs.org/>  
[www.dustygedge.co.uk](http://www.dustygedge.co.uk)  
[www.greenrooftraining.co.uk](http://www.greenrooftraining.co.uk)  
[www.greenroofconsultancy.com](http://www.greenroofconsultancy.com)

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## WaterProof Northwest, UK

<i>City</i> Manchester		<i>Region</i> North West		<i>Country</i> UK
<i>Adaptation to climate change impacts</i>				
<b>River flooding</b>	<b>Urban flooding</b>	<b>Sea level rise</b>	Ground instability	
<b>Drought</b>	<b>Heat waves</b>	<b>Water quality</b>	<b>Storm events</b>	
Fire events	Poor air quality	Biodiversity change		
<i>Scale</i> Region		<i>Stage</i> Completed (March 2010)	<i>Source of funding</i> Regional branch of a national body (Environment Agency); and private sector (United Utilities)	
Physical infrastructure change Organisational change		<i>Activities involved</i> Change in spatial planning policy Change in legislation or regulation		<b>Stakeholder engagement</b> Research into the need for adaptation
Educational action		Financial action		
<i>Themes driving the initiative</i>				
<b>Adaptation to climate change</b>	Mitigation of climate change	Recreation	<b>Water management</b>	
Biodiversity conservation Private sector development	Transport <b>Planning</b>	Urban regeneration	Housing	
<i>Leading agent</i> Non-governmental organisation: Mersey Basin Campaign; research institution: University of Manchester		<i>Key stakeholders</i> Local authorities; NGOs; research institutions; community/citizens		

### Project description

The Mersey Basin Campaign (MBC) carried out a project engaging local authorities in the delivery of the EU's Water Framework Directive (WFD) in partnership with the University of Manchester. The project used the method of scenario planning to identify the challenges and opportunities that could impact on delivery of the WFD in the Northwest of England. The overall aim of the project was to produce four contrasting scenarios for the year 2030 that could be used to facilitate better planning and decision-making in relation to the future management of the region's water environment.

Drivers of change that could impact on society and the environment over the next 20 years were identified through roundtable meetings and interviews with key stakeholders. These drivers helped to inform the scenario prototypes, together with a large amount of desktop research. Further consultation was then undertaken to assess the prototype scenarios and their accompanying images. An interactive display was produced which featured a brief summary of each scenario and their accompanying images. The display board was taken to various events and people were asked to cast a vote as to which scenario they felt was the most likely vision for the Northwest region in 2030. This display board was also a valuable tool for raising awareness of the issues and promoting the project to a wider audience. The University of Manchester then produced the final scenarios and the results were disseminated via a half-day event and a final report.

### Good practice includes:

- Sound evidence base
- Positively influencing decision making

### Resources

[www.waterproofnorthwest.org.uk](http://www.waterproofnorthwest.org.uk)

[http://www.merseybasin.org.uk/archive/assets/239/original/WaterProof\\_Northwest.pdf](http://www.merseybasin.org.uk/archive/assets/239/original/WaterProof_Northwest.pdf)

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## Supermarket Adaptation to Future Environments, UK

<i>City</i> Greater Manchester conurbation		<i>Region</i> North West		<i>Country</i> UK
<i>Adaptation to climate change impacts</i>				
<b>River flooding</b>	<b>Urban flooding</b>	Sea level rise	Ground instability	
<b>Drought</b>	<b>Heat waves</b>	Water quality	<b>Storm events</b>	
Fire events	<b>Poor air quality</b>	Biodiversity change		
<i>Scale</i> Building		<i>Stage</i> Completed	<i>Source of funding</i> Private sector (Tesco)	
<i>Activities involved</i>				
Physical infrastructure change Organisational change		Change in spatial planning policy Change in legislation or regulation		<b>Stakeholder engagement</b> <b>Research into the need for adaptation</b>
Educational action		Financial action		
<i>Themes driving the initiative</i>				
<b>Adaptation to climate change</b>	Mitigation of climate change	Recreation	Water management	
Biodiversity conservation	Transport Planning	Urban regeneration	Housing	
<b>Private sector development</b>				
<i>Leading agent</i> Research institution: University of Manchester			<i>Key stakeholders</i> Local authorities; private sector; NGOs; research institutions; community/citizens	

### Project description

The Supermarket Adaptation to Future Environments (SAFE) project was funded by Tesco through the Sustainable Consumption Institute (SCI) at the University of Manchester. This project aimed to inform the development of the next generation of supermarkets by developing and analysing future environmental scenarios so that supermarkets and their associated infrastructure can adapt to climate change and be better integrated into the local environment. The study focussed on the external environment of stores and assessed measures to adapt the external environment to climate change. The project involved:

- Investigating examples of good practise in adaptation to climate change already implemented in supermarkets and within the retail sector more widely; and holding two workshops with representation from a number of stakeholders, including the private sector, NGOs, local authorities and research institutions.
- Environmental monitoring of case study stores to investigate the current state of stores and their environments (neighbourhoods). This also included a public survey on human comfort. Environmental modelling was then carried out to investigate different potential adaptation measures to reduce surface temperatures at the site and in the wider neighbourhood, including adding green roofs, greening car parks, and ponds.

The project illustrates engagement of the private sector through funding the initiative and involvement at workshops. In addition, full access to the sites for environmental monitoring was given. The research was undertaken to influence the design of future Tesco supermarkets as well as identifying measures that could be retro-fitted to existing stores.

### Good practice includes:

- Sound evidence base
- Prioritising adaptation
- Positively influencing decision making

### Resources

Full report: [http://www.sci.manchester.ac.uk/medialibrary/SAFE\\_Final\\_Jan09\\_reduced.pdf](http://www.sci.manchester.ac.uk/medialibrary/SAFE_Final_Jan09_reduced.pdf)

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## Guiding models for water storage, The Netherlands

<i>City</i>	<i>Region</i>	<i>Country</i>
Arnhem, Nimwegen, Tiel	Area between rivers Rhine and Meuse	The Netherlands
<i>Adaptation to climate change impacts</i>		
River flooding Drought Fire events	<b>Urban flooding</b> Heat waves Poor air quality	Sea level rise Water quality Biodiversity change Ground instability Storm events
<i>Scale</i> Town or city	<i>Stage</i> Completed	<i>Source of funding</i> European Union and local Water Board
<i>Activities involved</i>		
Physical infrastructure change Organisational change Educational action	<b>Change in spatial planning policy</b> Change in legislation or regulation Financial action	<b>Stakeholder engagement</b> <b>Research into the need for adaptation</b>
<i>Themes driving the initiative</i>		
<b>Adaptation to climate change</b> Biodiversity conservation Private sector development	Mitigation of climate change Transport Planning	Recreation <b>Urban regeneration</b> Housing <b>Water management</b>
<i>Leading agent</i>		<i>Key stakeholders</i> Regional government; Local authorities; community/citizens

### Project description

The Guiding Models for Water Storage were developed to assist water managers and spatial developers in weaving together water storage with other functions. Water storage is defined as the retention and salvaging of water by modifying the spatial plan of an area to create more room for water. Strategies such as intensification, combining space use, different dimensions of land use, switching in time and transformation can improve land use. The importance of water storage can be relevant in many occasions throughout the planning process. The following phases can be distinguished: initiative, design and development, decision making, testing, executing, and monitoring and evaluation. The water manager can exert influence on the outcome within every phase of the policy cycle. To have an impact, the water manager has to be able to transfer the sense of urgency to the relevant institutions and the residents in an area. Another important instrument for the water manager within spatial planning is force field analysis. To have influence in the process, it is important to maintain the right perspective on the roles and positions of different actors. An understanding of the underlying interests of the actors and a discussion on what one is trying to achieve tends to create more room for new solutions, coalitions and compromise.

The Norm Study is implemented once the theoretical Guiding Models are put into practice. A specific area was selected to influence spatial planning with stakeholders. Firstly, the exact water amount was calculated using a hydrological model, and keeping safety levels in mind, the exact water storage levels required was determined. This was carried out with the stakeholders and therefore they also felt a sense of urgency to solve the problem. A Communication Tool ensured that everyone was discussing the same issue and a shared mindset was created. Within the project, several adaptation measures were suggested and planned. Although the actual measures may still be difficult to implement, there has been a sound discussion on the issue.

### Good practice includes:

- Prioritising adaptation
- Sound evidence base
- Cohesive delivery of multiple benefits

### Resources

[www.espace-project.org/part1/publications/pdf8.pdf](http://www.espace-project.org/part1/publications/pdf8.pdf)

## I-trees research project, Manchester, UK

<i>City</i> Manchester	<i>Region</i> North West	<i>Country</i> UK	
River flooding Drought Fire events	<b>Urban flooding</b> <b>Heat waves</b> <b>Poor air quality</b>	Sea level rise Water quality Biodiversity change	Ground instability Storm events
<i>Scale</i> Town or city	<i>Stage</i> Ongoing	<i>Source of funding</i> European Union; Local authorities	
Physical infrastructure change Organisational change  Educational action	<i>Activities involved</i> Change in spatial planning policy Change in legislation or regulation  Financial action		Stakeholder engagement <b>Research into the need for adaptation</b>
<b>Adaptation to climate change</b> Biodiversity conservation Private sector development	<i>Themes driving the initiative</i> Mitigation of climate change Transport Planning		Recreation Urban regeneration Water management Housing
<i>Leading agent</i> Non-governmental organisation (Red Rose Community Forest) and research institution (University of Manchester and Manchester Metropolitan University)		<i>Key stakeholders</i> Local authorities; NGOs; Research institutions; community/citizens	

### Project description

The I-trees project explores the impact of different land surface types on surface water run-off and surface temperature. Nine Experimental Monitoring Plots have been set up in a highly urbanised area close to Manchester city centre. The plots include a 3x3m<sup>2</sup> grass plot; a 3x3m<sup>2</sup> tarmac plot; and a 3x3m<sup>2</sup> plot with a tree. The plots contain monitoring devices which capture temperature and surface water run-off data that will be analysed to determine the effectiveness of green infrastructure over sealed surfaces to assist in adaptation to high temperatures and pluvial flooding. It is hoped that the research from this project will demonstrate the importance of green infrastructure over sealed surfaces and will help to quantify the amount of green infrastructure needed to assist in climate proofing cities.

I-trees is being co-ordinated by Community Forests North West and the University of Manchester. The project is supported by a steering group of academic staff from the fields of Planning and Landscape, Life Sciences, Earth Atmospheric and Environmental Sciences, Architecture and Geography, as well as representatives from Manchester City Council, Manchester City South Partnership, Red Rose Forest and Mersey Forest. With further funding, it is envisaged that the project will grow into its second and third phases which will include street level climate monitoring stations and observatories for members of the public. In addition, a considerable investment will go into providing additional trees and greenery to enhance the quality of the local environment and image of the area. At the end of the project, the published research will be used to influence policy and resource allocation, by demonstrating the need for tree planting schemes along major transport corridors.

### Good practice includes:

- Prioritising adaptation
- Sound evidence base
- Positively influencing decision making

### Resources

[http://www.sed.manchester.ac.uk/architecture/research/ecocities/projects/associatedprojects/associated\\_projects\\_%20itree.pdf](http://www.sed.manchester.ac.uk/architecture/research/ecocities/projects/associatedprojects/associated_projects_%20itree.pdf)

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# Community Climate Change Action Plan, Salford, UK

<i>City</i> Salford		<i>Region</i> North West		<i>Country</i> UK
<i>Adaptation to climate change impacts</i>				
<b>River flooding</b> Drought Fire events	<b>Urban flooding</b> <b>Heat waves</b> Poor air quality	Sea level rise Water quality Biodiversity change	Ground instability <b>Storm events</b>	
<i>Scale</i> Neighbourhood		<i>Stage</i> Inception	<i>Source of funding</i> Central government; Local authorities; private sector	
<i>Activities involved</i>				
<b>Physical infrastructure change</b> Organisational change Educational action	Change in spatial planning policy Change in legislation or regulation Financial action		<b>Stakeholder engagement</b> <b>Research into the need for adaptation</b>	
<i>Themes driving the initiative</i>				
<b>Adaptation to climate change</b> Biodiversity conservation Private sector development	<b>Mitigation of climate change</b> Transport Planning	Recreation Urban regeneration	Water management Housing	
<i>Leading agent</i> Local authorities – Salford City Council			<i>Key stakeholders</i> Central government (represented by the Environment Agency); politicians; private sector; NGOs; research institutions; community/citizens	

## Project description

The aim of the project is to make communities in the floodplain of the River Irwell resilient to impacts of climate change. The initiative was originally conceived as a project to encourage take-up of flood resilience measures in households in the floodplain. The intention is to test the propensity to take up such measures within an overall strategy of adaptation and mitigation. In other words, will greater awareness of climate change and its consequences lead to a greater take up of flood resilience measures?

The project is funded by the Environment Agency. Phase 1 of the initiative, which identifies the key partners and the most effective means of community participation, is already complete. Phase 2 will focus on delivery which includes the installation of flood resistance measures in both private and social housing. It will also include an analysis of green infrastructure and a programme delivered by Red Rose Community Forest and Groundwork, who will also examine the possibility of replacing impermeable driveways with green infrastructure. Partnerships between housing providers and energy companies will address mitigation issues. In addition, Salford University has been carrying out research into behavioural change and Salford City Council's environmental education service has been working with primary schools in the area to promote awareness.

## Good practice includes:

- Prioritising adaptation
- Cohesive delivery of multiple benefits
- Positively influencing decision making

## Resources

<http://www.salixhomes.org/2318.htm>

<http://www.environment-agency.gov.uk/news/108962.aspx>

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## Green roofs on all new developments, Sheffield, UK

<i>City</i> Sheffield	<i>Region</i> Yorkshire and the Humber		<i>Country</i> UK
River flooding Drought <b>Fire events</b>	<b>Urban flooding</b> Heat waves <b>Poor air quality</b>	<i>Adaptation to climate change impacts</i> Sea level rise <b>Water quality</b> <b>Biodiversity change</b>	Ground instability <b>Storm events</b>
<i>Scale</i> City	<i>Stage</i> Ongoing	<i>Source of funding</i> Private sector	
<b>Physical infrastructure change</b> Organisational change <b>Educational action</b>	<i>Activities involved</i> Change in spatial planning policy <b>Change in legislation or regulation</b> Financial action		<b>Stakeholder engagement</b> Research into the need for adaptation
<b>Adaptation to climate change</b> <b>Biodiversity conservation</b> Private sector development	<b>Mitigation of climate change</b> Transport Planning	<i>Themes driving the initiative</i> Recreation Urban regeneration	<b>Water management</b> Housing
<i>Leading agent</i> Local authorities – Sheffield City Council		<i>Key stakeholders</i> Research institution (University of Sheffield)	

### Project description

The implementation of green and vegetated roofs through local authority planning requirements on all new medium to large developments. Green roofs are supported by Sheffield City Council for all of their many benefits but primarily for wildlife and rainwater attenuation.

The Green Roof Centre at the University of Sheffield has helped Sheffield City Council to establish its minimum desirable standards and planning condition strategy.

### Good practice includes:

- Prioritising adaptation
- Leadership / championship
- Positively influencing decision making

### Resources

[www.thegreenroofcentre.co.uk](http://www.thegreenroofcentre.co.uk)

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## Stamford Brook: naturalised river in Altrincham, UK

<i>City</i> Altrincham, Greater Manchester		<i>Region</i> North West		<i>Country</i> UK
<i>Adaptation to climate change impacts</i>				
<b>River flooding</b> Drought Fire events	<b>Urban flooding</b> Heat waves Poor air quality	Sea level rise Water quality Biodiversity change	Ground instability Storm events	
<i>Scale</i> Neighbourhood		<i>Stage</i> Completed	<i>Source of funding</i> Regional government; private sector; NGO	
<i>Activities involved</i>				
<b>Physical infrastructure change</b> <b>Organisational change</b>  Educational action	<b>Change in spatial planning policy</b>  <b>Change in legislation or regulation</b>  Financial action	<b>Stakeholder engagement</b>  Research into the need for adaptation		
<i>Themes driving the initiative</i>				
<b>Adaptation to climate change</b> <b>Biodiversity conservation</b> Private sector development	<b>Mitigation of climate change</b> Transport Planning	Recreation  Urban regeneration	<b>Water management</b>  <b>Housing</b>	
<i>Leading agent</i> Non-governmental organisation – National Trust		<i>Key stakeholders</i> Local authorities; private sector; research institutions; community/citizens		

### Project description

Stamford Brook in Altrincham, Greater Manchester is a new-build estate of over 700 houses on National Trust land. For the first phase of construction, the Trust worked with volume housebuilders and Leeds Metropolitan University to design, build and test mainstream homes which are as energy efficient as possible. The lessons learnt have influenced the normal practice of the housebuilders as well as national Building Regulations. As the houses were to be built within a flood risk zone, the canalised river running through the estate was naturalised and a SUDs system was included in the landscaping. This has reduced the flood risk to the new properties as well as homes on the neighbouring estates.

The work on energy efficiency has influenced the development of national building regulations. Working with the local authority and Environment Agency has led them to recommend the approach used at Stamford Brook as good practice for other estates built in a flood risk area. A significant amount of public engagement took place before the development to reassure local communities about the effects of river naturalisation and to prove that it would reduce flood risk to their homes.

### Good practice includes:

- Prioritising adaptation
- Leadership / championship

### Resources

[http://www.nationaltrust.org.uk/main/w-global/w-news/w-news-further\\_news/w-news-delivering-sustainable\\_housing.htm](http://www.nationaltrust.org.uk/main/w-global/w-news/w-news-further_news/w-news-delivering-sustainable_housing.htm)

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## Engaging community in urban forest planting, Telford, UK

<i>City</i> Telford and Wrekin		<i>Region</i> East Midlands		<i>Country</i> UK
<i>Adaptation to climate change impacts</i>				
River flooding	<b>Urban flooding</b>	Sea level rise	<b>Ground instability</b>	
Drought	<b>Heat waves</b>	Water quality	Storm events	
Fire events	<b>Poor air quality</b>	Biodiversity change		
<i>Scale</i> Neighbourhood		<i>Stage</i> Ongoing	<i>Source of funding</i> Local authorities; Seeking Community Grants	
<i>Activities involved</i>				
<b>Physical infrastructure change</b>	<b>Change in spatial planning policy</b>		<b>Stakeholder engagement</b>	
<b>Organisational change</b>	Change in legislation or regulation		<b>Research into the need for adaptation</b>	
Educational action	<b>Financial action</b>			
<i>Themes driving the initiative</i>				
Adaptation to climate change	<b>Mitigation of climate change</b>	<b>Recreation</b>	Water management	
<b>Biodiversity conservation</b>	Transport Planning	<b>Urban regeneration</b>	Housing	
Private sector development		<b>Crime reduction</b>		
<i>Leading agent</i> Local authorities		<i>Key stakeholders</i> Politicians; NGOs; Research institutions; community/citizens		

### Project description

The aim of the initiative was to firstly establish areas within the Borough which have limited urban forestry, as well as poor community health and high crime, and then, to engage the communities in these areas in designing and planting urban trees to ameliorate their area from these aspects but also to encourage wildlife, meet carbon offsetting targets, improve shade, aesthetics and reduce noise.

Shropshire Wildlife Trust developed a proposal to engage communities in urban forestry. A local Borough Council became interested in the proposed approach, and support from key politicians and officers was secured. Partner organisations were then engaged through a series of meetings to establish interest in and relevance of the proposal, followed by potential areas for implementation, a suitable methodology, and resources. This has led to the mutual recognition of potential improvements for a variety of organisations towards social biodiversity and climatic benefits.

### Good practice includes:

- Sound evidence base
- Leadership / championship
- Setting up an efficient organisational structure to deliver adaptation responses
- Positively influencing decision making
- Cohesive delivery of multiple benefits

### Contact

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## 2BG: Black, Blue and Green research project in Denmark

<i>City</i> Copenhagen		<i>Region</i> Zealand		<i>Country</i> Denmark
<i>Adaptation to climate change impacts</i>				
River flooding Drought Fire events	<b>Urban flooding</b> Heat waves Poor air quality	<b>Sea level rise</b> <b>Water quality</b> Biodiversity change	Ground instability Storm events	
<i>Scale</i> Neighbourhood		<i>Stage</i> Ongoing	<i>Source of funding</i> Local authorities	
<i>Activities involved</i>				
<b>Physical infrastructure change</b> Organisational change Educational action	<b>Change in spatial planning policy</b> Change in legislation or regulation Financial action		<b>Stakeholder engagement</b> <b>Research into the need for adaptation</b>	
<i>Themes driving the initiative</i>				
<b>Adaptation to climate change</b> <b>Biodiversity conservation</b> Private sector development	Mitigation of climate change Transport Planning	<b>Recreation</b> Urban regeneration	<b>Water management</b> Housing	
<i>Leading agent</i> Local authorities and research institutions			<i>Key stakeholders</i> Local authorities and research institutions	

### Project description

The City of Copenhagen is developing a plan for adaptation to climate change. In parallel, the research project 2BG – Black, Blue and Green, is being carried out by the Danish Centre for Forest, Landscape and Planning at the University of Copenhagen, which is exploring the role of green infrastructure for stormwater retention and infiltration. The project is being carried out in close cooperation with the city with a view towards implementing the research findings. The project is funded by national research councils and co-funded by local authorities and private consultancies. The climate change adaptation plan, which emphasises the need for adaptation to sea level rise, is fully funded by the Copenhagen municipality.

The 2BG project explores the possibility for a paradigm shift within urban water systems, a shift that focuses on citizens' life quality and long-term functionality of applied management concepts. The 2BG key-challenges for stormwater are to analyse the potential for massive infiltration to avoid sewer overflow and to recharge local streams and aquifers; the methods for water quality control to avoid pollution of receiving environments and improve re-use opportunities, and the options for inclusion of technical water systems as assets in urban life.

2BG outputs will include: a model for simulating urban water flows in response to increased infiltration, IT-tools for city-level dimensioning of stormwater infiltration, evaluation of catchment policies and end-of-pipe options for control of water quality, and support-tools for integrating urban water systems within green infrastructure. Events to enhance the transfer of knowledge between urban planners, engineers and landscape architects will be organised.

### Good practice includes:

- Prioritising adaptation
- Sound evidence base

### Resources

[www.2BG.dk](http://www.2BG.dk)

<http://www.kk.dk/sitecore/content/Subsites/CityOfCopenhagen/SubsiteFrontpage/InformationAndServices/ClimateAndEnvironment.aspx>

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## Dry Feet for Tiel East project, the Netherlands

<i>City</i> Tiel	<i>Region</i> Provincie Gelderland		<i>Country</i> The Netherlands
<b>River flooding</b> Drought Fire events	<b>Urban flooding</b> Heat waves Poor air quality	<i>Adaptation to climate change impacts</i> Sea level rise Water quality Biodiversity change	Ground instability <b>Storm events</b>
<i>Scale</i> Neighbourhood	<i>Stage</i> Inception	<i>Source of funding</i> European Union	
<b>Physical infrastructure change</b> <b>Organisational change</b> <b>Educational action</b>	<i>Activities involved</i> <b>Change in spatial planning policy</b> Change in legislation or regulation Financial action		<b>Stakeholder engagement</b> <b>Research into the need for adaptation</b>
<b>Adaptation to climate change</b> Biodiversity conservation <b>Private sector development</b>	Mitigation of climate change Transport Planning	Recreation <b>Urban regeneration</b>	<b>Water management</b> <b>Housing</b>
<i>Leading agent</i> Local authorities		<i>Key stakeholders</i> Regional government; local authorities; private sector; research institutions; community/citizens	

### Project description

Tiel East is a business site between Waal and Amsterdam-Rhine canal, which has to cope with water related problems such as runoff management, groundwater table fluctuations and water seepage from the river and the canal. Development of 1100 new houses is underway at Tiel East. However, at present, all building activities have been stopped because new development would create even more problems for the surrounding area.

“Dry feet for Tiel East” is a pilot project within the Future Cities Interreg IVB project. The key components of the project include development of an integral scenario for water for Tiel East, combining innovative design principles and technical measures to solve several water related problems; transforming industrial roofs into green roofs on a large scale; and, education on adapting to climate change.

The project is being carried out in a participatory manner with the Tiel East residents. As part of the project, a Watergame has been developed in which the roles of stakeholders (municipality, water boards, project developers, housing associations, and inhabitants) can be played. The game has proven useful as it lets stakeholders play each others role: this enhances the insights into the different aims that each stakeholder has and therefore, results in a better understanding of decisions that have to be made.

### Good practice includes:

- Prioritising adaptation
- Sound evidence base
- Setting up an efficient organisational structure to deliver adaptation responses
- Achieving integrated adaptation responses across the organisation
- Positively influencing decision making

### Resources

<http://www.future-cities.eu/index.php>

<http://www.future-cities.eu/project/pilot-projects-locations/tiel-nl/1.html>

<http://www.watergame.nl/Welkom.html>

### Contact

Municipality of Tiel

Ms A. De Kort – Spit: [adkort@tiel.nl](mailto:adkort@tiel.nl)

# Newlands: greening the brownfield land in Northwest England

<i>City</i> Manchester, Liverpool, Preston		<i>Region</i> North West		<i>Country</i> UK
<i>Adaptation to climate change impacts</i>				
<b>River flooding</b> Drought Fire events	<b>Urban flooding</b> <b>Heat waves</b> <b>Poor air quality</b>	Sea level rise Water quality Biodiversity change	<b>Ground instability</b> <b>Storm events</b>	
<i>Scale</i> Region		<i>Stage</i> Ongoing	<i>Source of funding</i> Regional government	
<i>Activities involved</i>				
<b>Physical infrastructure change</b> Organisational change	Change in spatial planning policy Change in legislation or regulation		<b>Stakeholder engagement</b> Research into the need for adaptation	
<b>Educational action</b>	<b>Financial action</b>			
<i>Themes driving the initiative</i>				
<b>Adaptation to climate change</b> <b>Biodiversity conservation</b> Private sector development	<b>Mitigation of climate change</b> Transport Planning	Recreation <b>Urban regeneration</b> <b>Economic/social regeneration</b>	Water management Housing	
<i>Leading agent</i> Regional government (North West Development Agency)		<i>Key stakeholders</i> Regional government; local authorities; private sector; NGOs; community/citizens		

## Project description

Launched in the summer of 2003, Newlands is a unique regional £59 million scheme that responds to local and regional socio-economic needs by transforming derelict sites - often former landfill or industrial sites that exist in the centre of urban areas (many of which are socially deprived) - into thriving, multifunctional community woodlands. Newlands is helping to combat the effects of climate change such as flooding and the urban heat island effect, by planting trees and shrubs both on site and also in surrounding areas, carefully planning hard landscaping, and selecting the most appropriate (often porous) surfaces.

Newlands works through partnerships; most notably partnerships between the Northwest Regional Development Agency (NWDA) and the Forestry Commission. The project uses The Public Benefit Recording System – a tool to identify land where regeneration will deliver maximum environmental economic and social benefits. Each Newlands site has 15 years of management funding and a 99 year lease to ensure that they remain in good condition over the long term. During the first phase of the project (2003-10) seven brownfield sites (345ha) have been transformed in the Mersey Belt area. The second phase of investment, which applies the programme across the whole of the Northwest Region, will be delivered in 2010-15.

## Good practice includes:

- Prioritising adaptation
- Leadership / championship
- Setting up an efficient organisational structure to deliver adaptation responses
- Achieving integrated adaptation responses across the organisation
- Positively influencing decision making

## Resources

[www.newlandsproject.co.uk](http://www.newlandsproject.co.uk); [www.forestry.gov.uk/newlands](http://www.forestry.gov.uk/newlands)

Public Benefit Recording System: <http://www.pbrs.org.uk/>

## Contact

Faith Ashworth, Creative Concern, Manchester: [faith@creativeconcern.com](mailto:faith@creativeconcern.com)

## Green-blue corridor in the city of Kamen, Germany

<i>City</i> Kamen	<i>Region</i> Northrhine-Westphalia		<i>Country</i> Germany
<b>River flooding</b> <b>Drought</b> Fire events	<b>Urban flooding</b> <b>Heat waves</b> <b>Poor air quality</b>	<i>Adaptation to climate change impacts</i> Sea level rise Water quality Biodiversity change	Ground instability Storm events
<i>Scale</i> Neighbourhood	<i>Stage</i> Ongoing	<i>Source of funding</i> European Union; Water Board	
<b>Physical infrastructure change</b> Organisational change	<i>Activities involved</i> Change in spatial planning policy Change in legislation or regulation		<b>Stakeholder engagement</b> Research into the need for adaptation
<b>Educational action</b>	Financial action		
<b>Adaptation to climate change</b> Biodiversity conservation Private sector development	<i>Themes driving the initiative</i> Mitigation of climate change Transport Planning	Recreation Urban regeneration	<b>Water management</b> Housing
<i>Leading agent</i> Lippeverband		<i>Key stakeholders</i> Community/citizens	
		<b>Visual attractiveness</b>	

### Project description

Lippeverband is a Water Board founded in 1926 in order to solve the problems caused by increasing industrialization and volumes of sewage, hygiene problems including epidemics, and underground coal mining in the Lippe catchment in North-Rhine-Westphalia. Lippeverband is a partner in the INTERREG IV B Project Future Cities, and it aims to develop a green-blue corridor through the city of Kamen, Germany.

Lippeverband in Kamen operates an open water course, the Heerener Mühlbach (length 2.14 km, total catchment area 1,470 ha), for the collection of waste water to the next biological waste water treatment plant. One of the main tasks of the Lippeverband is to restructure the whole area and to improve water quality inside the receiving water. The water body of the Heerener Mühlbach will be ecologically improved, the concrete bed will be removed and the hard banks will be modified into natural banks. In addition, the paved areas nearby (about 80 houses and properties with a total paved area of 1.1 ha), which feed the combined sewer system will be disconnected and the stormwater will be drained into a new, water body of more natural character. The majority of the cost for disconnection (10-25 €/m<sup>2</sup> for infiltration facility and open water drain) will be paid by the residents. The citizens will be made aware of what they can do personally to face climate change and to improve the city climate - such as disconnecting their private property.

A green-blue corridor will be created to contribute to adaptation to climate change by reducing the risk of flooding, improving water cycling and providing cooling through evaporation and evapotranspiration.

### Good practice includes:

- Prioritising adaptation
- Achieving integrated adaptation responses across the organisation
- Positively influencing decision making

### Resources

[www.future-cities.eu](http://www.future-cities.eu)

### Contact

Anke Althoff  
Lippeverband  
[althoff.anke@eglv.de](mailto:althoff.anke@eglv.de)

# EcoCities: developing an adaptation blueprint for Greater Manchester, UK

<i>City</i> Greater Manchester		<i>Region</i> North West		<i>Country</i> UK
<i>Adaptation to climate change impacts</i>				
<b>River flooding</b> Drought Fire events	<b>Urban flooding</b> <b>Heat waves</b> Poor air quality	Sea level rise Water quality Biodiversity change	Ground instability <b>Storm events</b>	
<i>Scale</i> City-region		<i>Stage</i> Ongoing	<i>Source of funding</i> Charitable donation from private sector	
<i>Activities involved</i>				
Physical infrastructure change Organisational change  Educational action	Change in spatial planning policy Change in legislation or regulation  Financial action		<b>Stakeholder engagement</b> <b>Research into the need for adaptation</b>	
<i>Themes driving the initiative</i>				
<b>Adaptation to climate change</b> Biodiversity conservation Private sector development	<b>Mitigation of climate change</b> Transport Planning	Recreation  Urban regeneration	Water management  Housing	
<i>Leading agent</i> Research institution – University of Manchester			<i>Key stakeholders</i> Local authorities; private sector	

## Project description

EcoCities is an initiative led by the University of Manchester and funded by Bruntwood, drawing on the expertise of the Manchester Architecture Research Centre (MARC), Centre for Urban Regional Ecology and Brooks World Poverty Institute. The project will focus on the response of urban areas to the impacts of climate change, looking particularly at how we can adapt our cities to the challenges and opportunities that a changing climate presents. In particular, EcoCities focuses on the use of green and blue infrastructure to reduce the vulnerability of cities to flooding and high temperatures.

EcoCities seeks to provide Manchester, by the end of 2011, with its first blueprint for an integrated climate change adaptation strategy. This will be based on leading scientific research, extensive stakeholder engagement, and best practice examples of new programmes successfully piloted during a three-year period.

### Good practice includes:

- Positively influencing decision making
- Sound evidence base

### Resources

[www.manchester.ac.uk/ecocities](http://www.manchester.ac.uk/ecocities)

### Contact

[ecocities@manchester.ac.uk](mailto:ecocities@manchester.ac.uk)

# Creating coherent green infrastructure in Budapest, Hungary

<i>City</i>	<i>Region</i>		<i>Country</i>
Budapest			Hungary
River flooding <b>Drought</b> Fire events	<i>Adaptation to climate change impacts</i> Urban flooding <b>Heat waves</b> Poor air quality		Sea level rise Water quality Biodiversity change Ground instability Storm events
<i>Scale</i> Neighbourhood	<i>Stage</i> Ongoing	<i>Source of funding</i> Local authorities; private sector	
<b>Physical infrastructure change</b> Organisational change	<i>Activities involved</i> <b>Change in spatial planning policy</b> Change in legislation or regulation		<b>Stakeholder engagement</b> <b>Research into the need for adaptation</b>
<b>Educational action</b>	<i>Themes driving the initiative</i> <b>Financial action</b>		
Adaptation to climate change Biodiversity conservation Private sector development	Mitigation of climate change Transport Planning	<b>Recreation</b> <b>Urban regeneration</b>	Water management Housing
<i>Leading agent</i> Local authorities		<i>Key stakeholders</i> Private sector; NGOs; community/citizens	

## Project description

The main goal of AngelGREEN (AngyalZÖLD) Green Network Development Strategy of the 13th district of Budapest is to integrate the various elements of public and semi-public urban spaces into a coherent network of patches and linear elements. The patches include large and small urban parks, amenity areas associated with housing estates, school grounds, and sports and play areas. The linear elements include the corridors along rivers and streams (Danube or Rákos), greenways, and tree alleys. The main aim is to increase the number and improve the condition and connectivity of these elements. The secondary aim is to improve the communication between the Local Authority and the residents, involve them in the decision making process, and in the creation and maintenance of urban greenery. Therefore, the project aims to develop a partnership approach towards green network development.

The Strategy includes the following programmes:

- Urban park and public green space (improvement of their safety and aesthetics)
- Green corridor, greenway and alley (improving the connectivity of the network)
- Institutional gardens (improvement of school and nursery grounds)
- Environment management (improvement of the maintenance of urban green spaces, including adaptation measures)
- Communication and partnership
- Changing the regulations on the maintenance and management of green networks

## Good practice includes:

- Sound evidence base
- Positively influencing decision-making
- Public engagement

## Resources

<http://www.angyalzold.hu/web/index.php> (in Hungarian only)

## Contact

Peter Gabor, Greentree Studio Ltd: [office@greentree.hu](mailto:office@greentree.hu)

## SUDS in Upton One development, Northampton, UK

<i>City</i> Northampton		<i>Region</i> East Midlands		<i>Country</i> UK
<i>Adaptation to climate change impacts</i>				
<b>River flooding</b> Drought Fire events	<b>Urban flooding</b> Heat waves Poor air quality	Sea level rise Water quality Biodiversity change	Ground instability Storm events	
<i>Scale</i> Neighbourhood		<i>Stage</i> Completed	<i>Source of funding</i> Regional government; Local authorities; private sector	
<i>Activities involved</i>				
Physical infrastructure change Organisational change  Educational action		Change in spatial planning policy Change in legislation or regulation  Financial action		<b>Stakeholder engagement</b> <b>Research into the need for adaptation</b>
<i>Themes driving the initiative</i>				
<b>Adaptation to climate change</b> Biodiversity conservation Private sector development	<b>Mitigation of climate change</b> Transport Planning	Recreation  Urban regeneration	<b>Water management</b>  <b>Housing</b>	
<i>Leading agent</i> Local authorities		<i>Key stakeholders</i> Central government; regional government; community/citizens		

### Project description

The need for new housing in Northampton led to the development of high density housing on a large site on the edge of the flood plain. Northampton had experienced severe flooding in 1998, and it was crucial that there should be no future risk of flooding, even in the face of climate change. The project also presented an opportunity to test green technologies for the future delivery of national housing targets. A design code agreed and adopted by the Local Authority set standards for developers to ensure that proposals were of high quality, environmentally sound, and recognisably of Northampton. Development bids were endorsed by a steering group of political and community representatives. Advance infrastructure was provided by English Partnerships, fast tracking the development whilst also maintaining a high quality public realm. This included an innovative sustainable urban drainage system (SUDS), open space playing fields, and a road network.

On-site SUDS have worked successfully and are very popular with residents as play spaces. In addition, the reed beds that form part of the system provide a valuable habitat for wildlife. The Upton project promotes best practice well ahead of government standards. A strong partnership approach to design and development guarantees support from all the key agencies, including the local residents.

### Good practice includes:

- Prioritising adaptation
- Leadership / championship
- Internal collaboration

### Resources

<http://showcase.hcaacademy.co.uk/case-study/upton-sustainable-urban-extension.html#background> <http://www.cabe.org.uk/case-studies/upton-phase-one/design>

### Contact

Northampton Borough Council  
[www.northampton.gov.uk](http://www.northampton.gov.uk)

## A park above an underground carpark: Liverpool, UK

<i>City</i> Northampton		<i>Region</i> East Midlands		<i>Country</i> UK	
<i>Adaptation to climate change impacts</i>					
River flooding <b>Drought</b> Fire events		<b>Urban flooding</b> <b>Heat waves</b> Poor air quality		Sea level rise Water quality Biodiversity change	
<i>Scale</i> Building		<i>Stage</i> Completed		<i>Source of funding</i> Private sector	
<i>Activities involved</i>					
<b>Physical infrastructure change</b>		Change in spatial planning policy		Stakeholder engagement	
Organisational change		Change in legislation or regulation		Research into the need for adaptation	
Educational action		Financial action			
<i>Themes driving the initiative</i>					
Adaptation to climate change		Mitigation of climate change		Recreation	
Biodiversity conservation		Transport Planning		<b>Urban regeneration</b>	
Private sector development				Water management Housing	
<i>Leading agent</i> Private sector				<i>Key stakeholders</i> Local authorities	

### Project description

Chavasse Park was the largest green space in Liverpool City Centre. The Paradise Project resulted in extensive redevelopment of the area, with the park replaced by an extensive underground car park and retail centre. However, the park was then reinstated on top of the new development, ensuring the continued provision of greenery in the area. It is a 2.2 hectare park attached to the Liverpool One development. The park undulates, and rises up from 6.5m to 18m above sea level. The park is privately managed, and is part funded by the car park on which it sits. The new-look Chavasse Park has won awards including the British Association of Landscape Industries Grand Prize at the National Landscape Awards in 2008 and was highly commended by the Landscape Institute Awards in 2009.

To prevent flooding of the car park below the park, slow percolation is encouraged. Laser-cut polystyrene blocks occupy the space between the car park and the substrate. Above this, a light expanded clay capable of retaining and slowly discharging water is overtopped with a sand-based subsoil and manufactured topsoil. Since evapotranspiration reduces in drought conditions, the park has been designed to attenuate rainwater onsite. Specially constructed cells and a water harvesting tank retain water onsite to irrigate the park in periods of drought so it can continue to cool the city air.

### Good practice includes:

- Prioritising adaptation

### Resources

<http://www.hortweek.com/news/search/863002/Waterfront-reinvention---Liverpool-ONE/>  
[www.liverpoolpsda.co.uk/NR/exeres/EADA5068-F340-4053-A810-C15BAF22E0D7.htm](http://www.liverpoolpsda.co.uk/NR/exeres/EADA5068-F340-4053-A810-C15BAF22E0D7.htm)  
<http://bdp.com/News/2008/BALI-Grand-Prize-for-Chavasse-Park/>  
<http://www.guardian.co.uk/society/2001/jan/16/urbandesign.communities>  
<http://www.cabe.org.uk/design-review/chavasse-park>

### Contact

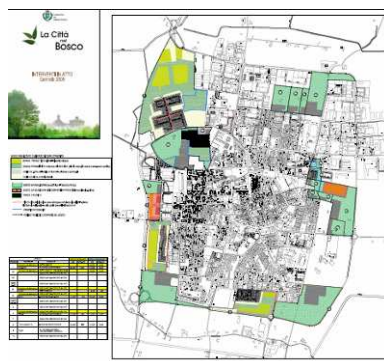
Karen Howell  
 Building Design Partnership  
[karen.howell@bdp.com](mailto:karen.howell@bdp.com)

## Development of urban green belt: Mirandola, Italy

<i>City</i> Mirandola	<i>Region</i> Emilia Romagna	<i>Country</i> Italy
River flooding Drought Fire events	<b>Urban flooding</b> <b>Heat waves</b> Poor air quality	Sea level rise Water quality Biodiversity change
<i>Scale</i> Building	<i>Stage</i> Completed	<i>Source of funding</i> Private sector
Physical infrastructure change Organisational change	<i>Activities involved</i> <b>Change in spatial planning policy</b> Change in legislation or regulation	<b>Stakeholder engagement</b> Research into the need for adaptation
Educational action	Financial action	
<b>Adaptation to climate change</b> Biodiversity conservation Private sector development	<b>Mitigation of climate change</b> Transport Planning	Recreation Urban regeneration Water management Housing
<i>Leading agent</i> Local authorities	<i>Key stakeholders</i> Local authorities; Regional authorities; Citizens	

### Project description

The Local Energy Plan of the municipality of Mirandola aims to achieve 20% energy reduction by 2020. One of the measures to achieve this aim is the creation of a green belt around the city to provide cooling and shading in summer. The green belt of 200ha in size is achieved using the instrument of "transfer of development rights", where the developers receive permission to increase the size of their buildings if they commit a significant part of their land to green space (see images below). The individual green spaces form a continuous green belt. The green belt has additional benefits of reducing the risk of urban flooding, and improving the quality of life of Mirandola's residents. The use of flexible and negotiable standards for developments promotes engagement of developers in town planning and shortens the wait for planning permission.



### Good practice includes:

- External collaboration
- Innovative approach

### Resources

[http://www.bioecolab.it/comuni\\_MO/Mirandola.pdf](http://www.bioecolab.it/comuni_MO/Mirandola.pdf)

<http://www.territorio.provincia.modena.it>

<http://www.provincia.modena.it/allegato.asp?ID=41749>

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