CITY OF YORK CLIMATE CHANGE RISK ASSESSMENT

REPORT JANUARY 2011

CONTENTS

1. EXECUTIVE SUMMARY

2. METHODOLOGY

The risk assessment was conducted by meeting with individuals or groups of staff in City of York Council and following the method outlined below.

1. Key activities at risk:

Please consider the key activities that your service/work area currently have responsibility for and consider the major impacts that a changing climate might have on your work. A matrix has already been partly completed by pulling out actions from a similar exercise in West Yorkshire and based on the work CYC did at the Tackling Climate event in 2009 and through the local impact assessment for York 2010.

2. Future climatic conditions affecting activities:

Please use the menu below to select the individual climatic condition relevant to the chosen activity. The table below outlines these future climatic conditions:

Future Climatic condition	2020	2050	2080
Increased summer temperature	+ 1.3°C	+ 2.3°C	+ 3.3°C
Decreased summer rainfall	- 8%	- 19%	- 23%
Increased winter temperature	+ 1.3°C	+ 1.9°C	+ 2.9°C
Increased winter rainfall	+ 4%	+ 11%	+ 15%
Increased storminess	Increase overtime		
Increased rainfall intensity	Increase overtime		

Source: **Weathering the storm: Yorkshire and Humber regional adaptation study, 2009**

3. Impact:

Please list the key impacts that the different climatic conditions (above) would have on the activities e.g. flooding or heatwave.

4. Consequence:

What are the results of the impacts? Who or what is impacted? Please list positive & negative consequences e.g.: Increased tourism (+) or road closed (-). If the consequence is positive, then highlight in blue.

5. How severe is the impact:

Please rank using the following scores:

1 = Insignificant
2 = Minor
3 = Moderate
4 = Major
5 = Catastophic

6. How likely is the risk:

Please rank using the following scores:

1 = Low
2 = Fairly low
3 = Medium
4 = Fairly high
5 = High

7. **Level of risk:**

This is an automatic calculation (severity x likelihood = risk).

8. **Action:**

We have followed normal risks assessment protocol by selected scores of:

1-9 to be green
10-15 to be amber
16+ to be red

Taking each red risk - Please list any actions that are currently in place or will soon be out in place to address the risk. If there are none, please propose what would be necessary to deal with the risk. Each action should be colour-coded to represent whether the action is needed, planned or done.

Red = needed
Amber = planned
Green = done

8. Cost of action

Score low, medium or high. Monetary values were not used as the cost will be relative to each service or sector and should not be used as a comparable measure.

3. KEY RISKS TO YORK FROM A CHANGING CLIMATE

The major risks from York are often those that are already being seen from current weather conditions but which will be exacerbated by the changing climate.

The methodology used sought to quantify these risks to key service delivery areas of the Council and identify where further collaborative work is needed with the local authority and with partners. It also sought to identify where opportunities might arise that the City and Council could seize to ensure that they work in their favour – these opportunities can raise further risks – such as the potential for increased tourism to York.

The risks will be described from changing climatic conditions as these often affect a range of services and the response may be similar. In many cases now that the risk has been identified further work is needed to provide a more geographical examination of the areas of the City at risk. The key risks identified are outlined below.

RECEPTOR	FUTURE CLIMATIC CONDITION	IMPACT	CONSEQUENCE	level of risk = severity x likelihood				ACTIONS
				Now	2020	2040	2080	
Built Infrastructure - all types of property	Increased winter rainfall	Flooding	buildings on low-lying areas at risk of flooding, increased property damage	8	12	20	25	**Across all building types need specific studies to examine changing flood risk patterns in York with a changing climate. Used to predict areas and useage of buildings at risk. Increased use of planning gain to build improved local flood defences.** Joint work across the Ouse and Foss catchments to reduce water flow and improved management in the catchments to increase water storage and reduce flows before floods reach York. Longer term may require major reconstruction of York's flood defences
Transport	Increased winter rainfall	Flooding	Serious flooding of highway network adjacent to major rivers and consequential impact on other rivers and becks	8	12	20	25	Mapping of flood risk as described above and examination of when key thresholds will be overcome bringing increasing risk to transport infrastructure. Engineering work will be required either to prevent flooding or protect key at risk points in the network

Natural Environment	Hotter/Drier summers and increased rainfall intensity	Summer flash Flooding	Unable to carry out key maintenance work and key breeding species disrupted	4	9	12	20	**Review of protection of flood defences for York to protect vulnerable habitats in the summer, key flood water storage areas are also key habitats. Creation of other flood storage areas for summer flooding.**
Built Infrastructure - all types of property	Increased summer temperatures	Overheating	reduced comfort in buildings for occupants - increased need for air conditioning - potential fatalities, particularly with an ageing population	6	9	16	20	**Need programme of retrofit for homes to reduce temperature and improve upward ventilation. Link to training and development of workforce and businesses retrofitting buildings to ensure that the work carried out is to the highest sustainability standards. City of York Council to consider developing exemplar buildings in their own estate to demonstrate adaptation in practice.**
Tourism and Economic Development	Increased winter rainfall, Increased rainfall intensity, increased storminess	Winter and summer flooding, storms	Loss of key outdoor events – linked with general perception that York is not safe to visit	4	9	16	25	Need to protect York and key transport routes into the City. Need to use proactive modern media to ensure that true picture of risks from visiting York are relayed to potential visitors in UK and across the World

Tourism	Increased summer temperature, increased winter temperature, decreased summer rainfall	Longer tourist season	Increased number of tourists, greater use of outdoor venues	1	4	9	16	**Promote 'café culture' of outdoor eating and entertainment in York centre**, greater use of outdoor venues, ensure that drinking water and shade are available
Road network	increased summer temperature/ decreased summer rainfall	Heatwaves - increased risk of photochemical pollution episodes & resultant poor air quality	Restrictions to the road network and vehicle usage - due to risk health problems in vulnerable groups	15	15	25	25	Need to model the impacts that a changing climate my have on York to examine the extent of the impact and to test suggested changes. Changes to electric vehicles and cycling may elleviate the problem as well
Cycle and Footpath Network	Increased winter rainfall/increased rainfall intensity	Flooding	Closing of riverside cycle routes and footpaths more frequently	2	4	12	16	Some signage of routes during flood episodes needs to be increased. In future need to ensure there is sufficient planned path/cycle way network on road or on higher ground during longer term flooding events

4. SERVICE LEVEL RISKS AND ACTIONS REQUIRED

4.1 FLOOD DEFENCE

A clearer understanding is needed of likely climate impacts on fluvial flooding that could arise if winter rainfall patterns increase in line with predictions. Some of this work is being carried out by the Environment Agency but this needs to be shared with the planning and transport teams in the City of York so that it can be built into the Local Development Framework and the Local Transport Plan.

ACTION – To set up a meeting with Environment Agency Regional Flood Risk Team to discuss available data to feed into Plans.

A wider view is need of land management in the Ouse and Foss Catchments with a view to managing land in the uplands and the flood plain to better store water and slow down flows. This should build on pilot work carried out in the Vale of Pickering.

ACTION – Joint working needed with other North Yorkshire Councils, Forestry Commission, Environment Agency, Natural England and local land managers.

4.2 TRANSPORT

4.2.1 Roads

The major risk to transport in York is from a major flooding event causing loss of a key part of the road network, particularly access to one of the bridges. The prevention of this lies with flood risk management as outlines at 1 above. Further detailed modelling information was needed to examine the threat to York transport from increased winter rainfall and year round increases in intensity – this would allow Local transport Plans to examine measures to defend the network against pluvial and fluvial flooding.

ACTION: Mapping work was needed to identify when predicted changes would lead to threats to key parts of the transport network.

In discussion with the Engineering Consultancy team they considered that in general that the key structures such as bridges and embankments were resilient to the changes predicted for example as the nature of the river flow would not lead to scour and bridge joints should withstand swelling due to excessive heat.

Due to the topography it was not expected that **storms** and other events were a major risk to York but that street trees and building structures needed to be robust to with stand these conditions – see other service areas.

4.2.3 Rail

Follow up work would be needed with Network Rail? To examine the risks to the rail network in the area. There was a risk to a key part of the national rail network from flood risk in the York area which needed to be defended as part of flood risk management.

4.2.4 Walking and Cycling

There are risks to York's cycle and walking network as the key off road routes were often alongside rivers and across other green spaces at risk from pluvial and fluvial flooding. In the short term improved signage could indicate when key routes are closed, possibly with web-based information on route opening?
If this became more common over time there could be a major reputational risk to York as it is designated as a 'Cycle City'. Therefore is riverside and other routes become increasingly unusable alternative routes through the city would need to be developed.

ACTIONS - Short term – improve signage and information when off road network is un-usable

Longer term – develop a higher level off road walking and cycle network that can be used when river routes are impassable.

4.2.5 Air Quality

This is already a major risk for the Council with a number of designated air quality zones in the City. Hotter, drier summers could potential lead to higher levels of pollutants and failure of compliance with required standards. Further information is required to examine this more fully.

ACTION: - Investigate whether Defra Air Quality Division is looking at predictions of reduced air quality with a changing climate which could quantify likely risks to York.

4.3 BUILT ENVIRONMENT

There seemed little difference to the categories of building types under consideration, housing, commercial or council assets as to the risk from a changing climate and the associated actions to deal with the risk. A specific area for York are the many heritage and listed building where changes have to be dealt with in a specific fashion.

A key risk was flooding - see above

Another key risk which is longer term is an increase in temperature. This was potentially a major risk as the number of deaths increased in heat waves in Europe, which affected particularly elderly people and York has an ageing population.

It was felt that many of the domestic commercial and key public assets such as offices, schools, and care homes would not be well equipped to deal with this. In a previous warm period it there had been problems installing even temporary cooling systems in some of the Council's older buildings.

ACTION – It was considered that the Council as a major owner of buildings social housing should promote exemplar procurement and improved building standards to both reduce emissions and improve resilience to climate change. Improved building standards and green procurement needed to looking at improved summer ventilation, such as the PASSIV system. When buildings were examined using systems such as the energy performance

certificate, then cooling needed to be considered to reduce future large demands for energy in the summer for cooling. Design of new office?

As temperatures increased there could be campaigns to increase use of shaded gardens, with associated tree and shrub planting and consideration of major employers leading the way on changing working patterns.

4.4 PLANNING

York is developing is Local Development Framework which is a long term document needs to consider threats from a changing climate. As raised above a particular spatial threat is from flooding. Mapping of current flood risk is provided by the Environment Agency which is used in development of the LDF.

Policies in planning and building control also need to take account of increasing risk of high temperatures

ACTION – Detailed flood risk maps are required for York which examine the increased risk from climate change to be used in developing the LDF

4.5 HERITAGE AND LISTED BUILDINGS

York's heritage buildings were considered to be particularly at risk from a number of climate impacts, because of the number of buildings and the range of ages that they covered, including archaeological remains and timber clad buildings. Many were in active use including as Council Offices.

One specific parts of York's archeological remains is that they are protected by the wet environment, something highlighted in the recent World Heritage bid. It is important that through future hotter drier summers the water table and the wet status is maintained

Changing risks need greater inspection for added risks and potentially new pests and diseases to timber clad buildings. The status of large masonry blocks and mouldings overhanging roads and paths needs regular assessment due to the risks of storms dislodging them and casing series accidents from falling blocks.

Adapting the range of York's heritage buildings to take account of potential hotter summers will also be an issue. York has provided excellent exemplars of new sustainable buildings, particularly the Eco depot. It was considered that York needed to develop an exemplar existing heritage building, which provided excellent design in reducing emissions and being resilient to climate change. There was a potential for this work as the Council moved to its new offices, both in terms of the new Office itself, being developed from an existing premises and redevelopment of vacated office buildings. (difficult at moment – funding from Defra?).

ACTIONS
Who& what on wet archeaology?

Greater inspection of listed buildings is required over time to examine the potential impact of changing conditions bringing new threats and making risk from storms worse.

Form a plan/group? To take forward developing an exemplar climate resilient exemplar building in York

4.6 TOURISM AND ECONOMIC DEVELOPMENT

A major risk to tourism to York was seen from the predicted increase in flooding of areas of the City, this being more as its reputation as a tourist venue from a perceived rather than real threat. Modern media, including social networking sites often rapidly and other events causing loss of reputation of York as a place to visit. This has happened with minor events in the past or when events have placed no bar on travel by tourists or impact on venues. Section 1.1 describes the work needed to protect York from flooding, which would protect businesses as well as housing.

As a counter to campaigns to report perceived problems occur then there needs to be proactive campaigns from York's tourism industry and businesses to promote around the world that York is still an acceptable place to visit.

Other potential climate impacts may provide opportunities for York and potential risks. These include warmer summers that could support more outdoor activities and a warmer winter allowing an extended season. This could allow increasing range of outdoor events and development further of a 'café culture' in York with outdoor eating in City tourist areas. York would need develop plans to further market itself to visitors in these circumstances.

These developments also come with risks. In much warmer summers there would need to cooling and shade provided at venues and consideration of alternative venues if increased storminess and pluvial rainfall took place at the time events were planned. A particular risk which has already been identified with current weather conditions is York Race Course which where meetings have been cancelled due to increased intensity of rainfall in summer 2008 at the loss of £XX million. Drainage has been improved but this would need to be reconsidered on an on-going basis as conditions change.

The York LCLIP raised the need for businesses generally in York to examine their resilience to a changing climate, needing to consider their premises and also supply chains. This report raised the need to establish a champion. The wider climatic conditions may have a great impact than those in the District itself, it is considered that this action needed to be highlighted again and that there are good mechanisms in York to pass on the lessons learnt through various industry groupings.

4.7 PARKS AND COUNTRYSIDE SERVICES

There were risks to key separate areas of activity, the managed parks, gardens and trees in York and to key semi-natural habitats and related biodiversity.

<u>Parks and Tree Services.</u>

There were a number of threats from a changing climate that taken together created risks. These included greater inundation of riverside parks and other managed areas and hotter

drier summers, together with potentially greater storm damage. There has been a greater increase in the growing season for grasses and other plants, which is already increasing grounds maintenance costs.

ACTIONS –

The species being planted in manages areas needed to take account of the changing climate, particularly for planting which is longer in duration, particularly trees.

The costs of maintenance need to be reviewed as climate change could have a substantial impact on this service. It was considered that at some stage the type of maintenance would need to be reviewed and the possibility of moving to a more semi-natural management would have to be considered for some areas. The timing of maintenance need to be reviewed as in hotter drier summers less grass cutting would be needed, but for longer periods in spring, autumn and potentially winter.

Allotments

York is promoting a campaign to increase provision of locally grown food. 'Edible York – see http://www.edibleyork.org.uk/ . This builds on the increase in numbers and use of allotments by residents. One threat to this initiative could be hotter drier summers if there is not sufficient water supply to these areas to support growing the food. To support the aims of the project the water would need to be supplied in a sustainable manner, preferably by storage of rain water.

Action

Water provision to allotments and other food growing areas needs to be reviewed and developed where necessary.

Trees

York's trees in streets, gardens and parks are both at risk from climate change but could also play a part in helping the City adapt to future higher temperatures when cooling and shade could be vital. Trees are also a long term investment trees being planted now being mature through the 2050s and 2080s. It is important that trees are protected from storms where possible and summer droughts. Where trees are lost or new plantings created it is important that the species selected will be adapted to York's future climate.

ACTION Tree planting and protection plans need to be reviewed to examine future climate. Post planting maintenance needs to be reviewed as drier periods become more common in the summer.

Information on suitable species and their maintenance to be provided by the FC, through the Yorkshire Tree Officer Group.

Countryside.

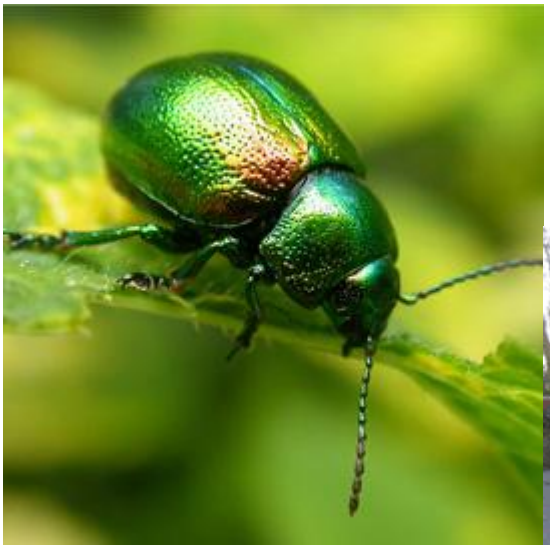
York has key internationally important biodiversity and key habitats alongside rivers and other water courses. There are two main threats from different types of flooding to these

areas. These areas are water meadows with associated plants and invertebrates, including internationally important colonies of Tansy beetle. These areas are also part of York's current flood defences, being used for water storage when the Rivers Ouse and Foss and smaller Becks are high. This occasional inundation in winter is necessary for the continuing role as wet grazing meadow. A large increase in winter/autumnal flooding could damage these areas and see the need for development of more such places in the catchments. There would need help for some less mobile species to move and colonise new habitats as there is a risk of species isolation.

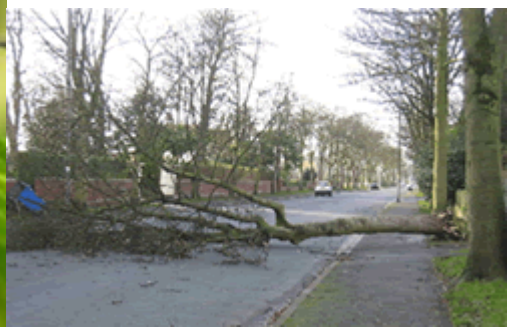
A greater threat has been seen in un-seasonal summer flooding due to intense episodes of rainfall. In these cases there can be loss of breeding species when the areas are flooded. Also heavy rain fall at this time of year can interfere with critical land management to keep the meadows in good condition.

Actions

As part of the review of York Flood defences would need to be examination in the provision of water storage areas. Extra areas need to develop further along the catchments and flooding would need to be managed, particularly in summer, to allow critical management and movement of species to prevent isolation.



Tansy Beetle



Damage to trees with impact on transport network

4.8 EMERGENCY PLANNING

The climate related risks that would affect the emergency planning services have been described in previous sections. The key risks had already been considered and emergency plans are in place for the current level of risk.

Increased levels of flooding as raised at 4.1 would have an impact on the service and they would benefit from the improved mapping of flood risk from a changing climate. Emergency Planning are increasingly involved in providing advice on planning applications on their resilience to flooding and other issues. Improved flood risk mapping would help to give improved advice and greater weight to recommendations. The main action to prvent a greater level of risk lies in the improved defences as outlines above.

Other key issues lie in defending key infrastructure that are required to provide power and water to the City. It is considered that these sights are identified and need to be defended from any increasing flood risk and plans were in place to do this and need to be built in planning documents.

On energy there was an issue to make supply resilient at peak periods and there could be increased demand in hot periods in the summer. This is a wider national issue, although greater local generation of renewable energy would provide benefits, it that itself were not affected by the conditions.

One key asset to be considered in York's general resilience was electricity power supply into the City by pylon. It was considered that this should be resilient to the level of storm predicted as it was a major pylon system.

ACTIONS
Improved flood risk mapping taking into account climate change to be provided to emergency planning team in CYC. Protection of key assets to be built into future plans and greater consideration to be given to flood risk during planning control?

4.9 SOCIAL CARE

There are a number of climatic conditions that could affect the ability of key workers to attend care homes or vulnerable groups in their homes. During recent weather events workers had been flexible enough in transport method and location to provide an adequate service. Protection of key transport routes as highlighted in 4.2 above.

For care home the protection from increased risk of flooding was for the rest of the built environment in York. The Fordlands Care Home was in a location that is prone to flooding and would need to be protected, see 4.1.

A risk raised for elderly and other vulnerable groups was the risk of hot weather from increasing summer temperatures. It was considered that the greatest risk would arise from dehydration rather than hot temperatures on their own. There is a risk of increasing drier summers and any impact this might have on water supply would need to be considered.

ACTION
Tere would need to be measures put in place to increase ventilation of care homes and ensure supplies of water. There would also need to be a campaign to highlight the need to drink water regularly to elderly people and other vulnerable groups being cared for at home.

(4.10 WASTE MANAGEMENT)

Name & Title	Directorate	Area of expertise	Relevant Template
David Warburton - Head of Design, Conservation and SD	City Strategy	Historic Env	Built Env
Jannie Riley - Conservation Architect	City Strategy	Historic Env	Built Env
John Oxley - Archaeologist	City Strategy	Historic Env	Built Env
Dave Caulfield - Head Of City Development, Development & Transport,	City Strategy	LDF and development sites	Built Env
Martin Grainger - Principle LDF officer + LDF officers in Green Infrastructure, flooding, Sustainable Design and Historic	City Strategy	LDF policy	Nat, Built Env
Ruth Stephenson - Head Of Transport Planning Unit, Development & Transport	City Strategy	Transport	Transport
Ian Stokes - Principle transport Planner	City Strategy	Transport - LTP3	Transport
Dave Carter - Head of Network Management	City Strategy	Network Management	Transport
Mike Tavener - Project Manager -structure & drainage, Development & Transport	City Strategy	Flood Enginnering and SWMP	ALL
Tony Clarke - Capital Programme Manager, Development & Transport,	City Strategy	Transport - long term	Transport
Dave Meigh - Head Of Parks & Open Spaces, Ad Lifelong Learning & Leisure	Communities and Neighbourhoods	Nat Environment	Nat Env
Gill Cooper - Head Of Arts & Culture, Ad Lifelong Learning & Leisure		Cultural assets	Built Env
Jeff Derham - Head of Waste and Cleaning Services, Environment and Fleet		Waste and street cleansing	Waste
Shaun Donnelly - Waste and Recycling		Waste and street cleansing	Waste
Andy Binner - Operations Manager - Civils/high, Ad Construction		Winter maintenance / Civils	Transport
Mike Southcombe - Environmental Protection Manager, Environmental Health & Trading Standards - Env Pro Unit		Air Quality / dust/ odours	Nat Env

Phillip Callow - Head Of Asset & Property Man, Property Services,	City Strategy	Buildings	Built Env
Roger Ranson -Asst Dir Economic Development and Assets	City Strategy	Buildings and economy	TBC
Ian Tempest - Visit York / Econ development	City Strategy	Tourism	TBC
Eleanor Cranstoun - Facilities Manager, Property Services,	City Strategy	Buildings and energy	Built Env
Ray Chaplin - Head Of Engineering Consultancy, Development & Transport	City Strategy	Flood Enginnering and SWMP	ALL
Bob Missin - Countryside Officer	City Strategy	Nat Environment	Nat Env
Richard Harlte/ Linda Brooked- Schools Business Support Team	Communities and Neighbourhoods	Schools	Built Env
Ruth Abbott - Housing Standards and Adaptation		Private housing stock	Built Env
Andy Wilcock - Project Manager, Housing Services		Social Housing	Built Env
Jim Breem - Emergency Planning Co-ordinator, City Development & Transport	City Strategy	Business continutity and emergency planning	ALL
Graham Terry, Assistant Director Service Delivery & Transformation Via Melanie Hopewell	ACE	Health and Social - care provisions	Health and Social
Anna Bygrave, Assistant Director Assessment & Personalisation Via Melanie Hopewell	ACE	Health and Social - care provisions	Health and Social