North Yorkshire County Council

Preliminary Flood Risk Assessment

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Executive Summary

This report has been prepared to assist North Yorkshire County Council (NYCC) to meet their duties to manage local flood risk and deliver the requirements of the Flood Risk Regulations (2009).

The Preliminary Flood Risk Assessment (PFRA), comprising this document and the supporting spreadsheet represents the first stage of the requirements of the Regulations.

The PFRA process is aimed at providing a high level overview of flood risk from local flood sources, including surface water, groundwater, Ordinary Watercourses and canals. As a LLFA, NYCC must submit their PFRA to the Environment Agency for review by 22nd June 2011. The methodology for producing this PFRA has been based on the Environment Agency's Final PFRA Guidance and Defra’s Guidance on selecting Flood Risk Areas, both published in March 2010.

The Environment Agency has used a national methodology, which has been set out by Defra, to identify indicative Flood Risk Areas across England. Of the ten indicative Flood Risk Areas that have been identified nationally, none are located within NYCC's administrative area. The Flood Risk Regulations therefore require NYCC to collate and review existing data relating to historic and predicted flood risk. Furthermore, the Environment Agency require NYCC to select the surface water mapping dataset that best represents the risks from surface water flooding within NYCC's administrative area from the available datasets. This is not a requirement of the Flood Risk Regulations.

In order to develop a clear overall understanding of the flood risk across North Yorkshire, flood risk data and records of historic flooding were collected from several different local and national sources. This included the five district and two borough councils, the Environment Agency, water and sewerage companies, emergency services and other risk management authorities.

Information relating to a number of historic flood events, caused by flooding from local sources, was collected and analysed. However, comprehensive details on flood extents and consequences of these events generated by local sources were largely unavailable. It is therefore premature at this stage to make an assessment of past flood events that have had ‘significant harmful consequences’.

As set out in the Environment Agency’s guidance, no records of past flooding have therefore been included in Annex 1 of the Preliminary Assessment Spreadsheet (see Appendix 1 of this document). However, the data collected is recorded in the mapping provided as part of this PFRA document.

An assessment of future flood risk has found that there is a high risk of flooding from local sources across North Yorkshire in some areas, but particularly from surface water. Based on national surface water modelling undertaken by the Environment Agency (for a flood event with a 1 in 200 chance of flooding in any given year), it has been assessed that there are approximately 19,830 properties, including approximately 18,496 dwellings, at risk from surface water flooding.
A further breakdown of the properties at risk from the various sources of local flooding is presented in Table 1.

### Table 1 – Number of Properties and Dwellings at Risk of Flooding

<table>
<thead>
<tr>
<th>District/ Borough</th>
<th>Ordinary Watercourse</th>
<th>Surface Water</th>
<th>Groundwater &amp; Surface Water</th>
<th>Canals</th>
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<tr>
<td></td>
<td>Properties</td>
<td>Dwellings</td>
<td>Properties</td>
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<tr>
<td>Craven</td>
<td>447</td>
<td>374</td>
<td>3,028</td>
<td>2,782</td>
</tr>
<tr>
<td>Hambleton</td>
<td>573</td>
<td>524</td>
<td>2,274</td>
<td>2,119</td>
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<tr>
<td>Harrogate</td>
<td>464</td>
<td>396</td>
<td>4,883</td>
<td>4,606</td>
</tr>
<tr>
<td>Richmondshire</td>
<td>357</td>
<td>324</td>
<td>1,883</td>
<td>1,727</td>
</tr>
<tr>
<td>Ryedale</td>
<td>444</td>
<td>385</td>
<td>2,264</td>
<td>2,050</td>
</tr>
<tr>
<td>Scarborough</td>
<td>184</td>
<td>151</td>
<td>3,828</td>
<td>3,619</td>
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<tr>
<td>Selby</td>
<td>1,501</td>
<td>1,383</td>
<td>1,670</td>
<td>1,593</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>3,970</td>
<td>3,537</td>
<td>19,830</td>
<td>18,496</td>
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Note: Some properties and dwellings may be at risk from more than one source of flooding and could be double counted. The above data tallies with that on Figure 9, but should be treated as approximate only.

In order to progress NYCC’s approach to flood risk management, ongoing work post PRFA submission will include:

- Continue to develop links with the five district councils, two borough councils and all the relevant departments within NYCC;
- Using data collected to produce a manageable GIS database, controlled centrally, for use on future development control queries, investigation, planning etc;
- Assessment to identify flood risk management priorities over the entire NYCC area, and, within the five district and two borough council areas;
- Development of a Local Flood Risk Strategy;
- Development of an Asset Register that will be linked into NYCC’s existing Highways database;
- Setting up arrangements to record and (where appropriate) investigate future floods.

NYCC is in a good position to deliver the requirements of the Flood Risk Regulations and the Flood and Water Management Act over the next few years, provided that appropriate resources are sourced and funded.
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AStSWF: Areas Susceptible to Surface Water Flooding;
CFMP: Catchment Flood Management Plan;
Defra: Department for Environment Food and Rural Affairs;
DG5: OFWAT Directative Guidelines No. 5 (for Water Companies) for annual level of service indicators for properties at risk of sewer flooding;
EA: Environment Agency;
FMfSW: Flood Map for Surface Water;
FWMA: Flood and Water Management Act;
GIS: Geographical Information Systems;
IPCC: Intergovernmental Panel on Climate Change;
LGF: Local Government Forum;
LLFA: Lead Local Flood Authority;
NRD: National Receptor Dataset;
NYCC: North Yorkshire County Council;
NYFRP: North Yorkshire Flood Risk Partnership;
OEFRPG: Operational Emergency Flood Response Plan Groups;
OFWAT: Water Services Regulation Authority;
PFRA: Preliminary Flood Risk Assessment;
PPS25: Planning Policy Statement 25;
RFCC: Regional Flood and Coastal Committee;
SAB: SuDS Approving Body;
SuDS: Sustainable Urban Drainage System;
SFR: Strategic Flood Risk Assessment;
UKCP09: United Kingdom Climate Projections 2009;
WAG: Welsh Assembly Government;
YHLAA: Yorkshire and Humber Learning Action Alliance;
YRFCC: Yorkshire Regional Flood and Coastal Committee.
1 Introduction

1.1 Preliminary Flood Risk Assessment

The key drivers behind the research undertaken to prepare this Preliminary Flood Risk Assessment (PFRA) report are two sets of new legislation, namely:

- The Flood Risk Regulations which came into force on the 10th December 2009;
- The Flood and Water Management Act (FWMA), which gained Royal Assent on the 8th April 2010.

Under this legislation, all Unitary Authorities, and in two-tier systems, all County Councils, are designated a Local Lead Flood Authority (LLFA). North Yorkshire County Council (NYCC) has been designated as a LLFA, and, as such, has been formally allocated a number of key responsibilities with respect to local flood risk management.

The Flood Risk Regulations 2009 implement the requirements of the European Floods Directive. The Directive aims to provide a consistent approach to flood risk management across Europe and requires the completion a four stage process to be undertaken during a six year planning cycle. The four stage process is:

- Preliminary Flood Risk Assessment (PFRA) and reporting;
- Identify Flood Risk Areas (using criteria defined by National Government);
- Prepare Flood Hazard and Flood Risk Maps;
- Prepare Flood Risk Management Plans.

This process must be completed for all sources of flooding. The Flood Risk Regulations define that:-

- The Environment Agency is responsible for assessing flooding in relation to the sea, main rivers and reservoirs;
- The LLFA is responsible for managing local flood risk, which includes flooding from Ordinary Watercourses, surface water runoff, canals and groundwater.

Therefore, NYCC as the LLFA must complete the above four stage process for local flood risk in its administrative area.

The first stage of the four stage process (the PFRA) is a high level screening exercise that involves collecting information on past (historic) and future (potential) floods, and then assembling it into a PFRA Report. Using this information, in addition to other available information, to identify Flood Risk Areas (areas where the risk of flooding is significant) is stage two in the four stage process.

The Environment Agency has the role of reviewing, collating and publishing the PFRA's. The PFRA Report and the identification of Flood Risk Areas must be completed for submission to the Environment Agency (EA) by 22nd June 2011.
NYCC is the Lead Local Flood Authority for the five district councils and two borough councils within its administrative area.

NYCC is required to produce a Preliminary Flood Risk Assessment (PFRA) report which must include an assessment of whether there are any Flood Risk Areas within the NYCC administrative area.

Submission of the PFRA to the Environment Agency is required by 22nd June 2011.

1.2 Study Area

The study area for this PFRA is the administrative boundary of NYCC. This includes:

- Craven, Hambleton, Richmondshire, Ryedale and Selby District Councils;
- Harrogate and Scarborough Borough Councils.

The geographical extent of the study area is illustrated below.

The administrative area of NYCC covers approximately 8,053 km². The county is primarily rural with only a small number of population centres, the largest of which are Harrogate and Scarborough.
National transport links such as the A1 and the East Coast Mainline pass through the county. The local highways network includes a number of A roads and many minor roads.

Agriculture forms a key part of the local economy and the national supply.

The North Yorkshire Moors and the majority of the Yorkshire Dales are located in the county, both of which are designated as National Parks.

The major rivers in the county are the River Derwent, River Aire, River Wharfe, River Rye, River Swale and the River Ure. The Swale and the Ure form the River Ouse which flows through York and into the Humber estuary. The majority of the study area is in the Humber River Basin District.

Main Rivers (including former Critical Ordinary Watercourses) are managed by the Environment Agency North East region.

A small number of canals are located within the county.

Water and sewerage in the majority of the county is serviced by Yorkshire Water. The most northern part of the county is serviced by Northumbrian Water. A small part of the western extremity of the county is serviced by United Utilities.

### 1.3 Aims and Objectives

The PFRA is a high level screening exercise, using readily available data, to locate areas where there is a risk of Ordinary Watercourse flooding, surface water flooding, groundwater flooding and flooding from canals. Where the risk of flooding is significant, it may warrant further examination through the production of maps and management plans.

The aim of this PFRA is to provide an assessment of local flood risk across the study area, including information on past floods and on the potential consequences of future floods.

The PFRA will meet the following objectives:

- Identify relevant partner organisations involved in future assessment of flood risk and summarise means of future and ongoing stakeholder engagement;
- Describe arrangements for partnership and collaboration for ongoing collection, assessment and storage of flood risk data and information;
- Provide a summary of the systems used for data sharing and storing, and provision for quality assurance, security and data licensing arrangements;
- Summarise the methodology adopted for the PFRA with respect to data sources, availability and review procedures;
- Assess historic flood events within the study area from local sources of flooding (including flooding from surface water, groundwater and Ordinary Watercourses), and, where possible, the consequences and impacts of these events;
- Establish an evidence base of historic flood risk information, which will be built upon in the future and used to support and inform the preparation of NYCC’s Local Flood Risk Strategy;
- Assess the potential harmful consequences of future flood events within the study area;
• Review the provisional national assessment of indicative Flood Risk Areas provided by the Environment Agency and provide explanation and justification for any amendments required to the Flood Risk Areas.

The data collected and research undertaken will subsequently be used to inform the development of the Local Flood Risk Strategy. NYCC are undertaking the initial scoping work for this strategy in parallel with the PFRA process. As such, the PFRA notes where further work will be required as part of the development of the Strategy. It is envisaged that this will assist in prioritising the key actions required at County, and, District and Borough level.
2 Lead Local Flood Authority Responsibilities

2.1 Introduction

The preparation of a PFRA is just one of several responsibilities for LLFA’s under the new legislation. This section provides a brief overview of other responsibilities NYCC are obliged to fulfil under their role as a LLFA.

2.2 Coordination of Flood Risk Management

In his Review of the summer 2007 flooding, Sir Michael Pitt stated that “the role of local authorities should be enhanced so that they take on responsibility for leading the coordination of flood risk management in their areas”. As the designated LLFA, NYCC is now responsible for leading local flood risk management across their administrative area.

Much of the local knowledge and technical expertise necessary for NYCC to fulfil their duties as LLFA lies within the district and borough councils, and, within other partner organisations. It is therefore crucial that NYCC work alongside these groups and organisations as they undertake their responsibilities. This will ensure effective and consistent management of local flood risk issues across the county and will contribute to the provision of a coordinated and holistic approach to flood risk management by NYCC.

As LLFA, it is the role of NYCC to forge effective partnerships with the five district councils, two borough councils, water and sewerage companies, British Waterways and the Environment Agency, as well as other key stakeholders and risk management authorities.

Recognising the importance of partnership working, NYCC are actively engaged with the key stakeholders through a variety of formal and informal arrangements, including:

The North Yorkshire Flood Risk Partnership (NYFRP) – the partnership is part of a regional structure which reports to the Yorkshire Regional Flood and Coastal Committee (YRFCC). The partnership comprises the LLFA’s, Water and Sewerage Companies, Internal Drainage Boards (IDB’s) and the Environment Agency.

Operational Emergency Flood Response Plan Groups – a response plan has been developed for each of the five district and two borough councils in North Yorkshire. Regular liaison and joint training events take place involving all of the partners. These include the district, borough and county councils, emergency services, utility providers, health authorities and the military.

Yorkshire and Humber Learning and Action Alliance – NYCC are members of the steering group for the alliance and several key working groups. The alliance is a forum for best practice and support in the region.

Local Government Flood Forum – partnerships at a national level are also of critical importance to making sure that NYCC are best placed to respond to the new duties and responsibilities.
2.3 Stakeholder Engagement

As part of the PFRA, the NYCC has sought to engage stakeholders representing the following organisations and authorities:

Summary of Key Stakeholders

Within the district and borough councils, NYCC have engaged with and collated data from Emergency Planning, Strategic Planning, Highways, Drainage and Environmental Health teams.

2.4 Public Engagement

Members of the public may also have valuable information to contribute to the PFRA, and to local flood risk management more generally. This wider engagement can afford significant benefits to local flood risk management including building trust, gaining access to additional local knowledge and increasing the chances of stakeholder acceptance of options and decisions proposed in future flood risk management plans.

NYCC recognise the importance of public engagement and the contribution it can make to local flood risk management. NYCC have already forged links with community groups and residents and will build on this during the development phase of the Local Flood Risk Strategy. The Environment Agency’s ‘Building Trust with Communities’ document provides useful guidelines on how to communicate risk including the causes, probability and consequences. It is being used in conjunction with the strategic planning expertise and knowledge from within NYCC.

2.5 Further Responsibilities

In addition to forging partnerships and coordinating and leading on local flood risk management, there are a number of other key responsibilities that have arisen for LLFA’s from the Flood and Water Management Act and the Flood Risk Regulations.
These responsibilities include:

**Investigating flood incidents** – LLFA’s have a duty to investigate and record details of significant flood events within their area. This duty includes identifying which authorities have flood risk management functions and what they have done or intend to do with respect to the incident, notifying risk management authorities where necessary and publishing the results of any investigations carried out.

Working closely with colleagues from across the region and nationally, NYCC have developed a detailed policy response to the duty to investigate, highlighting the key characteristics of a flood and helping to identify the most appropriate response in any given circumstance.

**Asset Register** – LLFA’s also have a duty to maintain a register of structures or features which are considered to have an effect on flood risk, including details on ownership and condition as a minimum. The register must be available for inspection and the Secretary of State will be able to make regulations about the content of the register and records.

NYCC are developing their existing highway asset management tools to provide the functionality required for capturing asset data relevant to flooding.

**SuDS Approving Body** – LLFA’s are designated the SuDS Approving Body (SAB) for any new drainage system, and once this aspect of the legislation has been enacted, they will be required to approve, adopt and maintain any new sustainable drainage systems (SuDS) within their area.

Although many of the details have yet to be finalised by National Government, NYCC have already started to discuss the possible delivery mechanisms with the planning authorities of the district and borough councils, and, with other key stakeholders.

**Local Flood Risk Strategy** – LLFA’s are required to develop, maintain, apply and monitor a local strategy for flood risk management in its area. The local strategy will build upon information such as national risk assessments and will use consistent risk based approaches across different local authority areas and catchments.

As noted in Section 1.3, the initial scoping of the local strategy is being developed in parallel with this PFRA.

**Designation powers** – LLFA’s, as well as district and borough councils and the Environment Agency, have powers to designate structures and features that affect flooding or coastal erosion in order to safeguard assets that are relied upon for flood or coastal erosion risk management. NYCC are engaging with the Environment Agency to ensure that, where appropriate, a consistent and coherent response is developed.
3 Methodology and Data Review

3.1 Introduction

The PFRA is a high level screening exercise used to identify areas where the risk of flooding is considered to be significant. Where this finds that further examination and management is warranted, the Flood Risk Regulations will require the production of flood risk and flood hazard maps, and, flood risk management plans.

The approach for undertaking this PFRA was based upon the Environment Agency’s PFRA Final Guidance, which was released in December 2010. The PFRA is based on readily available or derivable data, and, with this in mind, the methodology set out below has been used.

3.2 Methodology

Data Collection from Partner Organisations

Information used in this assessment has been requested, and, where readily available, collated from the following organisations:

- Craven District Council
- Hambleton District Council
- Harrogate Borough Council
- Richmondshire District Council
- Ryedale District Council
- Scarborough Borough Council
- Selby District Council
- North Yorkshire County Council
- Environment Agency
- Yorkshire Water
- Northumbrian Water
- North Yorkshire Fire and Rescue Service
- Highways North Yorkshire
- British Waterways

Assessing Historic Flood Risk

Existing datasets and anecdotal information from the stakeholders were collated and reviewed to identify details of major past flood events and associated consequences.

Information on historic flood risk has been incorporated into a GIS database. This also enables it to be used in conjunction with national property/infrastructure databases to assess what the possible consequences of historic flooding may have been.

NYCC are continuing to collect and process historic flood data to ensure that the best possible resource is available for the assessment and management of flood risk. The completion of this exercise will extend beyond the submission deadline to the Environment Agency for this PFRA.
Identifying Flood Risk Areas

The Environment Agency has used criteria defined by National Government to define Flood Risk Areas in England. This used datasets containing national surface water flooding information and datasets containing properties/infrastructure.

The approach taken by the Environment Agency considered the number and type of properties/infrastructure located within 1km² national grid squares that represented 'places where flood risk may be an issue' based on the following thresholds:

- 200 people (based on an average of 2.34 people per residential property), or;
- 20 non residential properties, or;
- 1 critical infrastructure.

Each national grid square was then given a risk rating, taking account of the consequence of flooding. The grid squares at high risk of flooding taking account of the above criteria were then put onto a national map. These are the 'blue squares' shown on the following graphic and on Figure 1.

Areas in the North East Region at high risk of flooding

Where a number of high risk areas were located in 'clusters', these were aggregated and the overall number of properties at risk evaluated. Where the overall number of properties considered as being at high risk was greater than a threshold of 30,000 people, these areas were designated as Flood Risk Areas by the Environment Agency.

There are 10 such areas nationally and none are located within the NYCC administrative area. The Flood Risk Areas that have been identified by the Environment Agency on a national basis have been reviewed for verification in a local context by NYCC.

There are only two populations in North Yorkshire that have a population greater than 30,000 and therefore have the potential to be a Flood Risk Area. These are
Harrogate and Scarborough, both of which have flood problems but not to an extent that will result in classification as a Flood Risk Area. As shown in Section 5.5, the total number of people at risk of flooding in the entire NYCC administrative area is less than 30,000.

NYCC therefore agrees with the Environment Agency’s national assessment that there are no Flood Risk Areas in North Yorkshire.

Furthermore, an independent check of the areas above the national flooding threshold (i.e. the ‘blue squares’) has been undertaken to ensure that these classifications are reasonable and no other areas are omitted. The outcome of this review is presented in Section 5. This validation exercise will also aid the development of the NYCC’s Local Flood Risk Strategy.

Assessing Future Flood Risk

The identification of flood risk through the PFRA should account for future flood risk including any flood that could potentially occur. The definition includes predicted floods extrapolated from current conditions in addition to those with allowance for climate change.

The assessment of future flood risk in this PFRA relies primarily on a technical review of the Environment Agency’s:

- Flood Map for Ordinary Watercourses (showing floods with a 1 in 100 and 1 in 1000 chance of flooding in any given year);
- Flood Map for Surface Water (showing the 1 in 200 chance of flooding in any given year);
- Groundwater Inundation Map for groundwater.

All of the data relating to future flood risk has been provided by the Environment Agency. Whilst it is undoubtedly a valuable resource for LLFA’s, it is important to stress that very little validation of the information has been possible at this stage.

The following factors were considered when assessing the future flood risk in North Yorkshire:

- Topography;
- Location of Ordinary Watercourses;
- Location of floodplain that retain water;
- Characteristics of watercourses (lengths, modifications etc);
- Effectiveness of any works constructed for the purpose of flood risk management;
- Location of populated areas;
- Areas in which economic activity is concentrated;
- Current and predicted impact of climate change;
- Impact of any long term developments.

The figures contained at the end of the main text to this report illustrate the above.

3.3 Data Sources

Table 1 catalogues the relevant information and datasets held by partner organisations and provides a description of each of the datasets.
<table>
<thead>
<tr>
<th>Dataset</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Areas Susceptible to Surface Water Flooding (ASISW)</td>
<td>The first generation national mapping, outlining areas of risk from surface water flooding across the country with three susceptibility bandings (less, intermediate and more).</td>
</tr>
<tr>
<td>Flood Map for Surface Water (FMfSW)</td>
<td>The updated (second generation) national surface water flood mapping which was released at the end of 2010. This dataset includes two flood events (with a 1 in 30 and a 1 in 200 chance of occurring in any given year) and two depth bandings (greater than 0.1m and greater than 0.3m).</td>
</tr>
<tr>
<td>Flood Map (Rivers and the Sea)</td>
<td>Shows the extent of flooding from rivers with a catchment of more than 3km² and from the sea.</td>
</tr>
<tr>
<td>Areas Susceptible to Groundwater Flooding</td>
<td>Coarse scale national mapping showing areas which are susceptible to groundwater flooding.</td>
</tr>
<tr>
<td>Groundwater Emergence Maps</td>
<td>National mapping showing areas which have a high probability of groundwater emergence.</td>
</tr>
<tr>
<td>National Receptors Dataset</td>
<td>A national dataset of social, economic, environmental and cultural receptors including residential properties, commercial properties, schools, hospitals, transport infrastructure, sewerage infrastructure and electricity substations.</td>
</tr>
<tr>
<td>Indicative Flood Risk Areas</td>
<td>Nationally identified flood risk areas, based on the definition of ‘significant’ flood risk described by Defra and WAG.</td>
</tr>
<tr>
<td>Historic Flood Map</td>
<td>Attributed spatial flood extent data for flooding from all sources.</td>
</tr>
<tr>
<td>Ouse CFMP, Esk CFMP and Derwent CFMP</td>
<td>CFMP’s consider all types of inland flooding, from rivers, groundwater, surface water and tidal flooding and are used to plan and agree the most effective way to manage flood risk in the future.</td>
</tr>
<tr>
<td>Historical flooding records</td>
<td>Historical records of flooding from surface water, groundwater and Ordinary Watercourses.</td>
</tr>
<tr>
<td>Anecdotal information relating to local flood history and flood risk areas</td>
<td>Anecdotal information from authority members regarding areas known to be susceptible to flooding from excessive surface water, groundwater or flooding from Ordinary Watercourses.</td>
</tr>
<tr>
<td>Strategic Flood Risk Assessments (SFRA)</td>
<td>SFRA’s may contain useful information on historic flooding, including local sources of flooding from surface water, groundwater and flooding from canals.</td>
</tr>
<tr>
<td>Historical flooding records</td>
<td>Historical records of flooding from surface water, groundwater and Ordinary Watercourses.</td>
</tr>
<tr>
<td>Multi-agency flood response plans</td>
<td>Regularly updated plans used by emergency responders, which hold details of historic flood locations and critical infrastructure.</td>
</tr>
<tr>
<td>DG5 Register</td>
<td>DG5 Register logs and records of sewer flooding incidents in each area.</td>
</tr>
<tr>
<td>Incident response register</td>
<td>Issue logs of all events recorded by the North Yorkshire Fire and Rescue department relating to flooding. This includes internal floods such as burst pipes and sewerage problems.</td>
</tr>
</tbody>
</table>

*Table 1 – Sources of Flood Data*
3.4 Data Limitations and Sharing

A brief assessment of the data collection process is included in this chapter to provide transparency with respect to the methodology. A number of issues arose during the data collection process, as described below:

Inconsistent Recording Systems

In common with most LLFA’s, NYCC and their partners hold a great deal of valuable information relating to historic flooding and related assets. However, a number of inconsistencies in the records exist. The wide range of recording media and methodologies, gaps in the data, and the absence of reliable confidence grades for most sources make it difficult to draw accurate conclusions about relative risk from the body of information collected in the past. As such, its main use is to confirm that an area has been subject to some form of flooding in the past.

Records of Consequences of Flooding

Very few data providers were able to supply comprehensive details of the consequences of specific past flood events, which made accurately assessing the consequences of historic flooding difficult.

National Flood Risk Prediction Datasets

There are no local or site specific datasets available for future flood risk. The existing data is all based on national scale modelling and datasets. Although these are a reasonable representation for this scale of assessment, the analysis of specific risk for finding solutions, or even for local prioritisation, will need modelling, accounting for local parameters in the future.

Data Sharing and Storage

NYCC, as part of the PFRA process, are creating three GIS datasets that will be available to all identified key stakeholders as part of their planning and emergency response activities. These datasets will cover predicted flooding, a consequence dataset and a live historical flooding dataset that will be used to collate all future information. These datasets will remain in the ownership of NYCC and be updated when new information becomes available.

3.5 Quality Assurance, Security and Data Restrictions

A good amount of historical data was available for mapping purposes, although the background information was limited.

All future flood risk data is based on national models. Although this is the best data available at this time it will need to be refined in the future. However, it does present a reasonable scale for undertaking the PFRA.

The security of data is also a key consideration when it comes to collecting, collating and storing sensitive data. All data collected is stored on local servers which are password protected. NYCC must adhere to these data security measures to ensure that sensitive data is held in a secure manner.

It should also be noted that the data provided by the Environment Agency, Water and Sewerage Companies and British Waterways is provided through an agreed
protocol and/or an end user licensing agreement. For some datasets, this may therefore place restrictions on how it can be used by NYCC.
4 Historic Flood Risk

4.1 Overview of Historic Flood Risk in North Yorkshire

Flood records across North Yorkshire were collected from the data sources identified in Section 3. This gave the locations of these past flood events and this is mapped on Figures 2, 3 and 4.

Data on these flood events came from a range of sources, and in many cases the source of flooding was unknown or not recorded. It has not therefore been possible to validate all of this historic data as part of the PFRA process. A summary of information specific to each source of flooding considered as part of the PFRA is included below.

Surface Water

Surface water flooding occurs when heavy rainfall exceeds the capacity of local drainage networks and water flows across the ground.

Information on surface water flooding incidents was obtained from NYCC, the five district councils and the two borough councils. Although no information was available regarding the number of properties that flood, we have undertaken an analysis using national property/infrastructure datasets to count those within the historic flood outlines to estimate the number of properties that may have been affected.

Groundwater Flooding

Groundwater flooding can occur as a result of water rising up from the underlying aquifer or from water flowing from abnormal springs. This may happen after long periods of sustained high rainfall, and the areas at most risk are often low-lying where the water table is more likely to be at shallow depth. Groundwater flooding is also associated with areas underlain by major aquifers, although increasingly, it is also being associated with more localised floodplain sands and gravels.

There is no substantial evidence of direct groundwater flooding in the majority of North Yorkshire. However, it is known to be a contributing factor in specific circumstances and that it may exacerbate surface water flooding. For example, it is known to be a cause of flooding to a small number of properties in some areas as a result of natural springs in the hillside next to properties, and, that both groundwater and surface water flooding both pond in the same nearby low lying areas.

Ordinary Watercourse Flooding

The historic data received from the Environment Agency that relates to fluvial flooding is associated with main river flooding only. Therefore, they have no historic record of Ordinary Watercourse flooding available for the PFRA.

Data is available from within NYCC and the various partner organisations set out in Section 3.2. This has been provided in a variety of formats and is being processed by NYCC into a usable GIS format.
Canal Flooding

A small number of canals are located in the study area. Information relating to historical flooding from canals was obtained from British Waterways.

This identified that there were only 2 records of canal flooding in NYCC’s administrative area. A third flood record exists immediately outside NYCC’s administrative area, located to the south east of Selby.

It should be noted that the data provided is associated with previous canal flooding, so the information provided is only of use to the specific issues associated with the historic event.

Sewer Flooding

Sewer flooding is often caused by excess surface water entering the drainage network.

DG5 registers from Yorkshire Water were used to locate the occurrence of sewer flooding incidents across North Yorkshire. It was found that there were a total of 43 sewer flooding events that have occurred.

No such records were available from Northumbrian Water or United Utilities at the time of writing this PFRA. However, given they only service a small proportion of NYCC’s administrative area and its rural nature, it is likely that the number of sewer flooding incidents will be very low.

Interaction with Main Rivers and the Sea

Insufficient data was available to draw definitive conclusions with regards to the interaction of the sources of flooding identified above with the main rivers and the sea. It is recognised that this may be an issue in some areas of the county and is an issue that will need to be considered further in the Local Flood Risk Strategy.

4.2 Analysis of Historic Flood Risk in North Yorkshire

The number of recorded events from the following readily available datasets is shown in the chart on the next page:

- Unconfirmed flooding records from County, District and Borough records;
- Sewer flooding records provided by Yorkshire Water;
- Records of flooding from navigable waterways obtained from British Waterways;
- Unconfirmed flooding records from NYCC Fire & Rescue record.

These data points are illustrated on Figures 2, 3 and 4.

There is a large variation in the number of recorded historical flood events within each district and borough council. However, it must be noted that this variation is at least partly due to differences between different council authorities in recording and storing flood event data, and should not be taken as a representation of the range in frequency or severity of flood risk across North Yorkshire.
Sources of Historic Flooding Across North Yorkshire

We have also made an assessment of the number of properties that may have been affected by areas shown on the Environment Agency’s historic flood map, by comparing with national receptor datasets. A total of approximately 3,700 properties may have been affected. It is probable that the majority of these floods would have been from sources that are the responsibility of the Environment Agency.

4.3 Consequences of Historic Flood Risk in North Yorkshire

A considerable number of communities across North Yorkshire have experienced flooding from a wide variety of sources in the past. It is widely acknowledged that the consequences for those communities have been considerable.

A comprehensive programme of data capture and analysis has been started in order to develop an accurate and consistent picture of flood risk in North Yorkshire and to assess the consequences for people, the economy and the environment. The first phase of this work is illustrated on Figures 2, 3 and 4.

Reflecting the development in the early stage of the LLFA role at which the PFRA has been undertaken, comprehensive details on flood extents and consequences of past flood events have not yet been fully validated. The analysis to date has not identified any past floods with significant consequences due to lack of robust evidence.

As set out in the Environment Agency’s guidance, no records of past flooding have therefore been included in Annex 1 of the Preliminary Assessment Spreadsheet (see Appendix 1 of this document). However, the data collected is recorded in the mapping provided as part of this PFRA document.

A complete record of locations where flooding has occurred will be kept by NYCC as a future evidence base. This will be built on over time by ensuring full details of future flood events are recorded. This will then be used to support and inform future PFRA cycles as well as NYCC’s Local Flood Risk Strategy.

The source of historical flooding from local sources is largely unconfirmed, however, it is a good record of where flooding has occurred

It is not possible to categorically quantify how many properties have been flooded in the past
5 Future Flood Risk

5.1 Overview of Future Flood Risk

Whilst analysis of past flooding provides valuable information on the nature and extents of flooding that have occurred in North Yorkshire in the past, it does not necessarily inform us about how and where flooding may occur in the future.

Predictions of future flood risk are produced using combinations of hydrological and hydraulic modelling and analysis of past hydrological records to make future predictions. The following sources of flooding have been considered in Section 5.3:

- Ordinary Watercourses;
- Surface water;
- Groundwater;
- Canals.

These are discussed in more detail in Section 5.3, after consideration of what readily available surface water datasets are applicable to the NYCC administrative area, given that this is considered to be one of the most important issues for NYCC and the Environment Agency.

The responsibility for dealing with sewer flooding is the responsibility of the Water and Sewerage Companies. However, it is also discussed in Section 5.3 to provide a link to the information contained in their strategic plans for the 2010 to 2015 Asset Management Period.

5.2 Local Surface Water Information

The Environment Agency has two national datasets showing surface water flooding:

- Areas Susceptible to Surface Water Flooding (AStSWF);
- Flood Map for Surface Water (FMfSW).

These datasets were used nationally to select the 10 Indicative Flood Risk Areas in England.

The surface water maps are not designed to assess the risks from other sources of flooding. However, as these datasets use a digital representation of the ground topography, they route surface runoff into channels and depressions. As flooding is dependent on topography and depressions, flooding from Ordinary Watercourses and groundwater may occur in the same places as flooding from surface runoff.

The PFRA guidance asks LLFA’s to select the dataset most representative of the risk from surface water in their area. It should be noted that this is not a legislative requirement of either the Flood Risk Regulations or the Flood and Water Management Act.

The surface water datasets in each of the five district council and the two borough council areas has been compared with available aerial photos.
This work was undertaken by the Environment Agency and concluded that, in general:

- The FMfSW data appears to be a more accurate representation of historic floods when compared to aerial photos from floods from 2007 onwards;
- The ASTSW data did however appear to more accurate in some areas, particularly in large flat areas;
- The FMfSW was considered to be more likely to represent the future flood risk in steeper and more undulating areas because it uses a more detailed digital terrain model.

The overall administrative area of North Yorkshire is 8,053km², which includes a vast range of land uses, topography, flooding causes/mechanisms, flooding probabilities and flood consequences. Artificial drainage systems within the county will also vary greatly in terms of capacity, condition and reliability. Furthermore, specific localised features could significantly affect the extent, depth and velocity of surface water flooding. For example:

- Surface features such as kerbs, ramps and privately owned walls/banks;
- Susceptibility of artificial drainage systems, channels and trash screens to become blocked during a flood event;
- Land use management, such as direction of ploughing of agricultural land, vegetation cover etc;
- Steepness and permeability of areas contributing to surface water run off.

Given the above, it is considered that either of the two national datasets could be applicable, depending on the physical characteristics of a specific location. As such, NYCC are unable to confirm the dataset that best represents surface water flooding at the time of writing the PFRA. Further work is planned as part of the development of the Local Flood Risk Strategy to investigate surface water issues in greater detail.

For the purposes of the PFRA, the FMfSW dataset has been used. This uses a more detailed digital terrain model than the ASTSW dataset, so is more likely to provide a more accurate representation of the ground surface and overland flow routes. This has been confirmed by the Environment Agency’s work to comparing the FMfSW and ASTSW datasets with aerial photo’s from recent flood events.

There is no surface water dataset that can be applied over the entire NYCC administrative area that can be considered to be an accurate representation for all areas

Actual surface water risk is likely to be a combination of factors specific to the location at which the surface water flooding occurs

5.3 Potential Probability of Future Flooding

Ordinary Watercourses

The river network data was used to identify ordinary watercourses and this was cross referenced with the Flood Map for Rivers and the Sea to assess future flood risk from this source. Flood Zone 2 extents (i.e. 1 in 1000 chance of flooding in any given year) have been used so a worst case scenario is represented. However, in
many areas the extents of Flood Zones 2 and 3 are very similar due to the local topography.

An assessment of the risk from both Main Rivers and Ordinary Watercourses is illustrated in Figure 7.

**Surface Water**

As outlined in Section 5.2, the FMfSW dataset has been used. This assumes a flood with a 1 in 200 chance of occurring in any given year, with flooding to depths of greater than 0.1m and greater than 0.3m.

An assessment of the risk from surface water is presented in Figure 5.

**Groundwater**

There is no local information available which provides evidence on future groundwater flood risk across North Yorkshire in isolation.

National Environment Agency datasets provide an assessment of groundwater risk in terms of a percentage likelihood in a given 1km national grid squares. An additional dataset is the groundwater emergence data derived by Defra, which presents the groundwater risk in a different manner. It should be noted that the Defra dataset only has coverage in the southern part of NYCC’s administrative area.

All of the above are illustrated in Figure 6.

**Canals**

The main risks from canals within the NYCC area are likely to be associated with the following:

- Areas where the water levels in the canal are elevated above the surrounding topography. In such areas, any overtopping or breaching of canal side retaining structures have the potential to flow over low lying land and pond in natural depressions;
- Areas where the canal is near to the natural river system and flood levels in the river can spill over into the canal system. If this were to occur, then the flood water from the river can be transferred to areas remote from the original spill point.

Where the above situation could affect people, properties and critical infrastructure, the consequences of flooding will be greater. However, to quantify the impacts needs a detailed understanding of the potential overland flow routes from the canal.

British Waterways are currently working on a study to better understand the future flood risk from canals, which will be available to inform the second cycle of the PFRA process.

Given the above, there is currently no readily available information to assess the future flood risk from canals.
Sewer Flooding

As discussed in Section 4.1, records of sewer flooding have been obtained from the water and sewerage companies. Based on information readily available on their websites in their “Strategic Direction Statements” they are proposing to address a significant number of flooding problems by 2015. This is to be achieved through investment in the completion of a number of studies and capital works projects.

Given the size of the areas covered by these water and sewerage companies, with Yorkshire Water servicing the majority of NYCC’s administrative area, it is likely that some of this investment will be within NYCC’s administrative area.

5.4 GIS Analysis of Future Flooding Receptors

The relationship between probabilities of flooding and the consequence of the event needs to be understood in order to define the flood risk. For an area to be classed as high risk, then the consequences of flooding above the national threshold in Table 3 have been considered.

The Environment Agency’s National Receptor Dataset (NRD) was used to develop a North Yorkshire Flood Consequence dataset in order to assess the areas above the national flooding threshold. This dataset sets out the receptors in a simple format relating to people, property and infrastructure as outlined in Table 3.

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Description</th>
<th>EA Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>People</td>
<td>People are vulnerable to flooding can be affected due to the damage caused to their property, affects to health (both physical and mental) and even the potential for loss of life.</td>
<td>200</td>
</tr>
<tr>
<td>Property</td>
<td>Property relates to the potential economic impacts on a community. Properties included in this assessment are retail, manufacturing, storage, office and other public commerce buildings.</td>
<td>20</td>
</tr>
<tr>
<td>Critical Infrastructure</td>
<td>Infrastructure assets important to a community during and after event or those that will be especially vulnerable during a flood. Includes schools, fire stations, hospitals, power stations and water supply.</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 3 – Consequences of Flooding

The land uses defined as critical infrastructure, along with their National Receptor Dataset (NRD) reference code, are:

- Schools, colleges, universities and nurseries (NRD code 610);
- Residential homes (NRD code 625);
- Fire and ambulance stations (NRD code 650);
- Police stations (NRD code 651);
- Hospitals (NRD code 660);
- Sewage treatment works (NRD code 840);
- Electricity supply installations (NRD code 960).
To ensure that only appropriate categorisations within the various NRD information were used, various rules were applied to NRD code 610. This enabled only the types of infrastructure set out in the first bullet point listed above to be taken in to account.

With regard to NRD code 960, this is likely to include several small sub stations that do not affect large numbers of properties, and, electrical facilities that may well have a backup if they fail. Similarly, NRD code 840 is likely to include several small sewage treatment and pumping facilities that do not affect large numbers of properties.

When considering the potential consequences of flooding, a sensitivity test was therefore undertaken to determine the impact of excluding certain types of infrastructure contained within attribute data for NRD codes 840 and 960. The methodology used was in line with Annex 1 of the Environment Agency’s document ‘Flood Map for Surface Water: Property Count Method’ produced in November 2010.

Figure 8 provides an assessment of the areas where the consequences of flooding are above the national thresholds set out in Table 3, when NRD codes 840 and 960 are included. Figure 9 provides a similar assessment, but with NRD codes 840 and 960 excluded from the assessment of critical infrastructure, as per the methodology referred to above.

The areas above national flooding threshold classifications from the independent verification illustrated on both Figure 8 and Figure 9 confirmed that the risk areas identified by the Environment Agency are appropriate.

Furthermore, Figure 9 illustrates that the number of 1 km grid squares are very similar to the Environment Agency’s national assessment in terms of predicted surface water flooding. As such, the Figure 9 data has been used to produce the Preliminary Assessment Spreadsheet summarising the predicted future floods, which is contained in Appendix 2 of this report.

It should be noted that both figures include areas at risk from Ordinary Watercourse flooding that was not taken into account by the Environment Agency’s national mapping. Groundwater datasets have not been taken into account in these two figures as there is no local information available which provides evidence on future groundwater risk. However, it is likely that should groundwater flooding occur, it is likely to be in low points and depressions where surface water flooding occurs.

The GIS methodology used to undertake this PFRA will assist with the development of NYCC’s Local Flood Risk Strategy and the ranking of flood risk across the county

5.5 Potential Risk of Flooding in North Yorkshire

Notwithstanding the validation exercise in Section 5.4, there are still other people and property at risk of flooding across the North Yorkshire. This risk is outlined in further detail in Table 4.
Other potential receptors of flooding that are excluded from this assessment are the transport network, public assets, environmental and cultural assets, agricultural land and the wider community business and commerce.

Flooding to North Yorkshire’s highways network has the potential to have significant disruption. This is because the majority of the county is rural and the key highway links are a small number of A roads. Should any of these routes be closed as a result of flooding, there would be significant disruption to traffic flows. This is exacerbated because the diversion routes are along minor roads that do not have the capacity to cope with the traffic that would normally use the A roads.

In addition to the above, important transport networks such as the East Coast Mainline and the M1 pass through the county. Consideration of the impacts on this infrastructure could be useful for future emergency planning.

Within North Yorkshire, agriculture forms an important aspect of the local economy (and national supply) and as such future PFRA and Local Flood Strategy reviews may need to consider this impact.

The North York Moors and the Yorkshire Dales national parks are within the risk areas although the impact should be minimal as any naturalised receptors tend to be flood compatible.

### 5.6 Effect of Climate Change and Long Term Developments

#### The Impacts of Climate Change

The impact of climate change on local flood risk is relatively poorly understood. Several national flood maps have informed the preliminary assessment report, specifically the:

- Flood Map for Surface Water (surface runoff);
- Areas Susceptible to Surface Water Flooding (surface runoff);
- Areas Susceptible to Groundwater Flooding (groundwater);
- Flood Map (Ordinary Watercourses).
These do not show the impact of climate change on local flood risk.

There was consensus amongst climate model projections presented in the IPCC fourth assessment report for northern Europe suggesting that in winter high extremes of precipitation are very likely to increase in magnitude and frequency. These models project drier summers with increased chance of intense precipitation - intense heavy downpours interspersed with longer, relatively dry periods (Solomon et al., 2007).

United Kingdom Climate Projections 2009 (UKCP09) provides the most up to date projections of future climate for the UK (http://ukclimateprojections.defra.gov.uk). In terms of precipitation, the key findings are:

By the 2080’s, under Medium emissions, over most of lowland UK, central estimates are for heavy rain days (rainfall greater than 25 mm) to increase by a factor of between 2 and 3.5 in winter, and 1 to 2 in summer.

By the 2080’s, under Medium emissions, across regions in England & Wales, the central estimate (50% probability) for winter mean precipitation percentage change ranges from +14 to +23 and the central estimate for summer mean precipitation percentage change ranges from -18 to -24.

Certain key processes such as localised convective rainfall are not represented within this modelling so there is still considerable uncertainty about rarer extreme rainfall events for the UK. We can be more certain that heavy rainfall will intensify in winter compared to summer. The proportion of summertime rainfall falling as heavy downpours may increase. The impact of these changes on local flood risk is not yet known.

**Appraisal Guidance**

Current project appraisal guidance (Defra, 2006) provides indicative sensitivity ranges for peak rainfall intensity, for use on small catchments and urban/local drainage sites. These are due to be updated following the UKCP09 projections above. They describe the following changes in peak rainfall intensity:

- +5% (1990-2025);
- +10% (2025-2055);
- +20% (2055-2085);
- +30% (2085-2115).

This was reviewed by the Met Office in 2008 using UKCP09 models (Brown et al., 2008). They suggest that, on the basis of our current understanding, these levels represent a pragmatic but not a precautionary response to uncertainty in future climate impacts. In particular for an event with a 1 in 5 annual chance of occurring, increases in precipitation intensity of 40% or more by the 2080’s are plausible across the UK at the local scale.

**Key Projections for Humber River Basin District**

If emissions follow a medium future scenario, UKCP09 projected changes by the 2050’s relative to the recent past are:
• Winter precipitation increases of around 12% (very likely to be between 2 and 26%);
• Precipitation on the wettest day in winter up by around 12% (very unlikely to be more than 24%);
• Relative sea level at Grimsby very likely to be up between 10 and 41cm from 1990 levels (not including extra potential rises from polar ice sheet loss);
• Peak river flows in a typical catchment likely to increase between 8 and 14%.

Climate changes can affect local flood risk in several ways. Impacts will depend on local conditions and vulnerability.

Wetter winters and more of this rain falling in wet spells may increase river flooding. More intense rainfall causes more surface runoff, increasing localised flooding and erosion. In turn, this may increase pressure on drains, sewers and water quality. Storm intensity in summer could increase even in drier summers, so we need to be prepared for the unexpected.

Drainage systems in the district have been modified to manage water levels and could help in adapting locally to some impacts of future climate on flooding, but may also need to be managed differently. Rising sea or river levels may also increase local flood risk inland or away from major rivers because of interactions with drains, sewers and smaller watercourses. Even small rises in sea level could add to very high tides so as to affect places a long way inland.

Where appropriate, we need local studies to understand climate impacts in detail, including effects from other factors like land use. Sustainable development and drainage will help us adapt to climate change and manage the risk of damaging floods in future.

**Long Term Developments**

It is possible that long term developments might affect the occurrence and significance of flooding. However, current planning policy aims to prevent new development from increasing flood risk.

In England, Planning Policy Statement 25 (PPS25) on development and flood risk aims to "ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk. Where new development is, exceptionally, necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and where possible, reducing flood risk overall."

Adherence to Government policy ensures that new development does not increase local flood risk. However, in exceptional circumstances the Local Planning Authority may accept that flood risk can be increased contrary to Government policy, usually because of the wider benefits of a new or proposed major development. Any exceptions would not be expected to increase risk to levels which are ‘significant’ (in terms of National Government's criteria).
6 Flood Risk Areas

6.1 Overview

In order to ensure a consistent national approach, Defra and WAG have identified significant criteria and thresholds to be used for defining flood risk areas. Guidance on applying these thresholds has been released in Defra's document “Selecting and reviewing Flood Risk Areas for local sources of flooding”. In this guidance document, Defra have set out agreed key risk indicators and threshold values which must be used to determine Flood Risk Areas.

The methodology is based on using national flood risk information to identify 1km grid squares where local flood risk exceeds a defined threshold. Where a “cluster” of these grid squares leads to an area where flood risk is most concentrated, and, over 30,000 people are predicted to be at risk of flooding, this area has been identified as an Indicative Flood Risk Area.

The Environment Agency have applied these criteria and thresholds to identify Indicative Flood Risk Areas across the country.

The Environment Agency guidance shows that there are 10 such Flood Risk Areas nationally, but there are no such areas in North Yorkshire.

6.2 Review of Flood Risk Area Analysis

As described in Section 5.5, and illustrated in Figures 8 and 9, NYCC has undertaken a further more detailed assessment looking at the areas above national flooding threshold classification to validate the national exercise.

This confirmed that no clusters have been identified that would change any classifications in NYCC’s administrative area to a Flood Risk Area.

The 1 kilometre gridsquares within NYCC’s administrative area where the Environment Agency consider the local flood risk exceeds the thresholds set by National Government are illustrated in Figure 1.

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North Yorkshire does not have a Flood Risk Area as defined by Defra for the 2011 PFRA process

The 1 kilometre grid square information will be used to establish priority areas across the County
7 Next Steps

7.1 Future Data Management Arrangements

In order to continue to fulfil their role as LLFA, NYCC are required to investigate future flood events and ensure continued collection, assessment and storage of flood risk data and information.

This requirement will be met through the NYCC Highways and Flood Risk Management teams recording events in their respective administrative areas, working closely with colleagues within the district and borough authorities. It is crucial that all records of flood events are documented consistently and in accordance with the INSPIRE Directive (2007/2/EC). A centralised database will be kept up to date by NYCC, as they have the overall responsibility to manage flood data throughout North Yorkshire. This can be used as an evidence base to inform future assessments and reviews and for input into the mapping and planning stages.

The proposed method for flood event data collection and management is being developed using the PFRA spreadsheet as a template. A simple spreadsheet system has been created in which each of the seven area offices can record details of flooding in their administrative area.

7.2 Scrutiny and Review Procedures

The scrutiny and review procedures that must be adopted when producing a PFRA are set out by the European Commission. Meeting quality standards is important in order to ensure that the appropriate sources of information have been used to understand flood risk and the most significant flood risk areas are identified. Another important aspect of the review procedure is to ensure that the guidance is applied consistently; a consistent approach will allow all partners to understand the risk and manage it appropriately. The scrutiny and review procedure will comprise two key steps, namely, Local Authority Review and Environment Agency Review.

The Review Checklist in Appendix 4 of this document is used by all LLFA’s and the Environment Agency review teams to ensure a consistent review process is applied.

Local Authority Review

The first part of the review procedure is through an internal Local Authority review of the PFRA, in accordance with appropriate internal review procedures. Internal approval should be obtained to ensure the PFRA meets the required quality standards, before it is submitted to the Environment Agency.

Within North Yorkshire, the PFRA will be taken to the NYCC Scrutiny Committee for approval before being delivered to the Environment Agency. NYCC will receive a briefing on the PFRA and the Flood and Water Management work in general but the decision was made not to carry out an official review with them.
Environment Agency Review

Under the Flood Risk Regulations, the Environment Agency has been given a role in reviewing, collating and publishing all of the PFRAs once submitted.

The Environment Agency will undertake a technical review (area review and national review) of the PFRA, which will focus on instances where Flood Risk Areas have been amended and ensure the format of these areas meets the provide standard. If satisfied, they will recommend submission to the relevant Regional Flood and Coastal Committee (RFCC) for comment. RFCC’s will make effective use of their local expertise and ensure consistency at a regional scale. Once the RFCC has reviewed the PFRA all PFRA’s will be collated, published and submitted to the European Commission.

The first review of the PFRA will be led by NYCC and must be submitted to the Environment Agency by the 22nd of June 2011. The Environment Agency will then submit it to the European Commission by the 22nd of December 2011 using the review procedure described above.

The next review cycle for the PFRA will be in 2017.
8 References
Digital copies of the supporting figures can be obtained from the CD copy of this report, located in the inside cover.
Appendix 1 – Past Flood Events

The spreadsheet containing information on past flood events can be obtained from the CD copy of this report, located in the inside cover.
Appendix 2 – Future Flood Events

The spreadsheet containing information on future flood events can be obtained from the CD copy of this report, located in the inside cover.
Appendix 3 – Flood Risk Areas

No Flood Risk Areas exist in the NYCC administrative area, so no information is required in this Appendix. As such, this Appendix is intentionally left blank.
The spreadsheet containing information on the review checklist can be obtained from the CD copy of this report, located in the inside cover.
Appendix 5 – GIS Layers

No Flood Risk Areas exist in the NYCC administrative area, so no GIS layers need to be provided to illustrate their location. As such, this Appendix is intentionally left blank.