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Revision History

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Contract

This report describes work commissioned by Hambleton District Council in May 2016. The Council's representative for the contract was Caroline Skelly. The following JBA Consulting staff contributed to this study: Greg Brown, Jacqui Wallace, Andrew Fielding, Mike Williamson and Maxine Zaidman.

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Purpose

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JBA Consulting has no liability regarding the use of this report except to Hambleton District Council.

Acknowledgements

JBA would like to thank all Hambleton District Council, Environment Agency and North Yorkshire County Council staff for their time and commitment to providing data and discussing the issues identified during this study.

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Executive Summary

This document provides a Level 1 Strategic Flood Risk Assessment (SFRA) for Hambleton District. It is informed by up-to-date flood risk data and is aligned with National Planning Policy Framework (NPPF) recommendations as well as the Flood Risk and Coastal Change Planning Practice Guidance (FRCC-PPG). As the Local Planning Authority, Hambleton District Council will use this assessment to undertake a sequential risk-based approach to the allocation of land for development and to identify whether application of the Exception Test is likely to be necessary. The SFRA forms part of the evidence base for the Council's Local Plan as well as informing its Sustainability Appraisal.

Flood risk in Hambleton District Council area

River and surface water are the main sources of flooding in the area covered by Hambleton District Council's Local Plan. Areas at risk are shown on the detailed interactive PDF maps that have been provided alongside this report (Appendix A).

**River flooding**: Most of the Local Plan area drains into the River Swale or its tributaries (which include the River Wiske and Cod Beck), before discharging into the River Ouse. South-eastern areas are drained by the River Kyle and the headwaters of the River Foss, both of which also discharge to the River Ouse. North-eastern areas drain into the River Leven, a tributary of the River Tees. With a few local exceptions, headwater flow regimes are generally flashy in nature, whilst downstream reaches include well-developed floodplains that are often saturated for long periods in winter. Receptors for fluvial flooding are primarily located within the District’s main towns which include Northallerton, Thirsk, Bedale and Stokesley.

The Environment Agency's Flood Map for Planning is the main dataset used by planners for predicting the location and extent of fluvial flooding and should be applied for sequential testing of site allocations, as per FRCC-PPG recommendations. Flooding is categorised into three zones which broadly correspond to low (Flood Zone 1), medium (Flood Zone 2) and high (Flood Zone 3a) risk of flooding. Using results from local Environment Agency modelling studies, as part of this SFRA, Flood Zone 3 has been further delineated into 'functional floodplain' (Zone 3b) and areas that would have stored or conveyed flood waters if not already developed (Zone 3ai). The Environment Agency Flood Map indicates that large flood extents are associated with the River Swale, although the areas falling within Flood Zone 3 are largely rural and sparsely populated. Receptors along this reach include the village of Topcliffe, which is located just downstream of the confluence of the Rivers Wiske and Swale. The Brompton Beck, which is a tributary of the Wiske, provides a source and pathway for flooding in the town of Northallerton, whilst Cod Beck also has a well-developed floodplain which brings a significant flood risk to Thirsk. Large flood extents are also associated with the River Leven, with the main receptor along this reach being the market town of Stokesley. This agrees well with documented past flooding of rural or agricultural land along the Rivers Swale and Wiske, as well as along Bedale Beck in Leeming and Bedale, Brompton Beck in Northallerton, Cod Beck in Thirsk and the River Leven in Stokesley.

**Surface water flooding**:

Surface water flooding is primarily associated with a limited ability for rainfall to drain away and therefore is often most problematic in urban or low lying areas. As it is influenced by local highway drainage and sewerage networks, surface water flooding can be complex to map and understand.

Information on surface water flood risk areas within Hambleton District is provided by the Environment Agency’s Risk of Flooding from Surface Water (RoFSW) Map, which up to 2016 was known as the Updated Flood Map for Surface Water (uFmFSW). The map shows where accumulations of surface water would be expected, with the scale of flooding being categorised as either very low, low, medium or high, depending on the frequency of inundation.

Surface water flooding appears to be predominantly an issue in Northallerton, although locally affects some other towns and villages in the district.
Assessment of flood risk to sites potentially allocated for development

Hambleton Council provided data and boundaries for parcels of land listed as potential allocation sites. An assessment of flood risk to all sites in this list has been undertaken to assist the Council in their decision-making process and to identify those plots that should preferentially be taken forward as part of the allocation for the Local Plan. The assessment includes sites that were submitted by land owners and/or their agents as part of Hambleton District Council’s Preferred Options consultation.

Most of the sites considered can be thought of as having low risk of fluvial flooding, falling entirely within Flood Zone 1 (406 out of the 515 sites initially proposed and 66 of the additional 84 sites flagged following the Preferred Options consultation). A good number of potential development sites are shown to be at medium (falling within Flood Zone 2) or high risk (falling with Flood Zone 3a,3ai or 3b), as summarised in the following tables. There are also a range of varying risks from surface water flooding within the total pool of potential sites.

Numbers of Potential Development Sites at risk from flooding based on the Flood Map for Planning

<table>
<thead>
<tr>
<th>Potential Development Site</th>
<th>Number of sites with at least part of their area within…</th>
<th>Flood Zone 1*</th>
<th>Flood Zone 2</th>
<th>Flood Zone 3a</th>
<th>Flood Zone 3ai</th>
<th>Flood Zone 3b</th>
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<tr>
<td>Housing</td>
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<td>69</td>
<td>57</td>
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<td>14</td>
<td>13</td>
<td>0</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Local Green Space</td>
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<td>10</td>
<td>5</td>
<td>2</td>
<td>5</td>
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<td>Recreation</td>
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<td>1</td>
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<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Gypsy/ Traveller</td>
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<td>2</td>
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<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Use not stated</td>
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<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>406</strong></td>
<td><strong>106</strong></td>
<td><strong>85</strong></td>
<td><strong>8</strong></td>
<td><strong>32</strong></td>
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</table>

*Sites with 100% area within Flood Zone 1

Numbers of Additional/Alternative Development Sites at risk from flooding based on the Flood Map for Planning

<table>
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<tr>
<th>Potential Development Site</th>
<th>Number of sites with at least part of their area within…</th>
<th>Flood Zone 1*</th>
<th>Flood Zone 2</th>
<th>Flood Zone 3a</th>
<th>Flood Zone 3ai</th>
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<td>Housing</td>
<td>58</td>
<td>15</td>
<td>12</td>
<td>2</td>
<td>5</td>
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</tr>
<tr>
<td>Employment</td>
<td>3</td>
<td>2</td>
<td>1</td>
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<tr>
<td>Mixed</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>Recreation</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>66</strong></td>
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<td><strong>14</strong></td>
<td><strong>2</strong></td>
<td><strong>6</strong></td>
<td></td>
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</tbody>
</table>

*Sites with 100% area within Flood Zone 1
Recommendations have been made for each potential development site (Appendix B), broadly entailing the following:

- Consider withdrawing the site based on the mapped level of flood risk;
- An Exception Test is required if the site passes the Sequential Test;
- Consider revising site layout and design if the site passes the Sequential Test;
- A site-specific Flood Risk Assessment (FRA) is required; and
- The site might be permitted on flood risk grounds due to negligible perceived risk, subject to consultation with the Local Planning Authority (LPA)/Lead Local Flood Authority (LLFA).

Recommendations are also given with respect to land required for current and future flood management that should be safeguarded as set out in the NPPF.

Out of the 515 sites originally provided for assessment by the Council, 32 are within or partially within the functional floodplain (Flood Zone 3b). Of these, 12 sites are recommended for withdrawal as the level of fluvial flood risk is considered too great for development to proceed. A further 6 sites are recommended for withdrawal from the allocation based on significant surface water flood risk. 28 sites are flagged as needing to be subject to an Exception Test, and 33 sites could potentially pass the Sequential Test if site boundaries are revised. The remaining sites should either be permitted subject to an FRA (if in Flood Zone 2) or are directly suitable for allocation (where wholly within Flood Zone 1).

Of the 84 additional/alternative sites considered, 3 have been identified as needing to be subject to an Exception Test, and 8 sites could potentially pass the Sequential Test if site boundaries are changed to exclude flood risk areas. The remaining sites should either be permitted subject to an FRA or are directly suitable for allocation.

The outcomes of the above assessment are summarised in Appendix C. These recommendations will enable the Council to steer development away from those areas where flood risk is considered greatest, ensuring that development allocations are as safe, cost effective and sustainable as possible. At this stage, it seems unlikely that a Level 2 SFRA will be needed.

**Guidance on flood risk management**

This SFRA also provides guidance to Hambleton District Council (as Local Planning Authority) on flood risk management in relation to both Local Plan development and approval/assessment of planning applications. It makes recommendations as to how current policy guidelines might be supplemented to help facilitate development management in the area. The SFRA also provides guidance for developers and planning officers on planning requirements. It is a reference point to which all parties involved in development planning can reliably turn to for initial advice and guidance with respect to the potential risk of flooding associated with future planning applications and helps to define the requirements for site-specific Flood Risk Assessments (FRAs) where necessary.
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Abbreviations

ABD...................................... Areas Benefitting from Defences
AEP...................................... Annual Exceedance Probability
AIMS.................................... Asset Information Management System
ASiGWF................................ Areas Susceptible to Groundwater Flooding
CC........................................ Climate change
CCA....................................... Civil Contingencies Act
CDA....................................... Critical Drainage Area
CFMP..................................... Catchment Flood Management Plan
CIL......................................... Community Infrastructure Levy
CSO....................................... Combined Sewer Overflow
DCLG..................................... Department for Communities and Local Government
DTM...................................... Digital Terrain Model
EA.......................................... Environment Agency
FEH....................................... Flood Estimation Handbook
FRA....................................... Flood Risk Assessment
FRCC-PPG............................. Flood Risk and Coastal Change Planning Practice Guidance
FRM....................................... Flood Risk Management
FRMP..................................... Flood Risk Management Plan
FRMS..................................... Flood Risk Management Strategy
FRR....................................... Flood Risk Regulations
FSA....................................... Flood Storage Area
FWA....................................... Flood Warning Area
FWMA.................................... Flood and Water Management Act
GI.......................................... Green Infrastructure
GIS........................................ Geographical Information Systems
HFM....................................... Historic Flood Map
IDB....................................... Internal Drainage Board
LA.......................................... Local Authority
LDF....................................... Local Development Framework
LFRMS.................................. Local Flood Risk Management Strategy
LLFA..................................... Lead Local Flood Authority
LPA....................................... Local Planning Authority
LRF....................................... Local Resilience Forum
MAFRP................................. Multi-Agency Flood Response Plan
NPPF.......................... National Planning Policy Framework
PFRA.................................... Preliminary Flood Risk Assessment
RBD....................................... River Basin District
RBMP............................... River Basin Management Plan
RoFRS .......................... Risk of Flooding from Rivers and the Sea Map
RMA .............................. Risk Management Authority
SA ............................... Sustainability Appraisal
SEA .............................. Strategic Environmental Assessment
SFRA .............................. Strategic Flood Risk Assessment
SoP ............................... Standard of Protection
SPD ............................... Supplementary Planning Documents
SuDS ............................... Sustainable Drainage Systems
SWMP ............................... Surface Water Management Plan
uFMfSW ............................. updated Flood Map for Surface Water
UKCP09 ........................... UK Climate Projections 2009
WFD ............................... Water Framework Directive
WIRS ............................... Wastewater Incident Register System
1 Introduction

1.1 Background

The District of Hambleton is one of seven non-metropolitan districts in North Yorkshire. It is situated between the urban areas of the Tees Valley conurbation and Darlington to the north and York and Harrogate to the south-east and south-west respectively (Figure 1-1).

Covering an area of over 1300km², but with less than 90,000 inhabitants, it has one of the lowest population densities in England. Most existing residential and commercial development is located within the District’s five market towns (Northallerton, Thirsk, Stokesley, Easingwold and Bedale). About 75% of the District lies within the Vales of York and Mowbray, which consist of low lying, fertile, and intensively farmed arable land, a further 16% falls within the North York Moors National Park and just over 1% (at the southern end of the District) is within the York Green Belt. The area is also served by the Swale and Ure Drainage Board, as well as the Kyle and Upper Ouse Internal Drainage Board.

Figure 1-1: Features of the Hambleton District

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In 2015 Hambleton District Council began the process of developing a new Local Plan for the Hambleton District (excluding the area that falls within the borders of the North York Moors National Park). The purpose of the Plan is to set out the policies by which applications for new development within the Hambleton District will be considered, as well as to identify developable land suitable for housing, employment, mixed-use and recreation up to 2035. As such, the Local Plan will play a direct role in delivering the district's regeneration and growth objectives.

The Local Plan is, or will be, informed by a range of evidence-based documentation including:

- Issues and Options Consultation
- Strategic Housing Market Assessment
- Call for Sites
- Employment Land Review
- Open Space, Sport and Recreation Study
- Retail and Town Centre Uses
- Transport Modelling
- Landscape Character Assessment
- Strategic Flood Risk Assessment
- Sustainability Appraisal
- Local Plan Viability Study
- Consultation on Preferred Sites

A first iteration of the plan was released in autumn 2016, which will be followed by a period of further public consultation in 2017. Following that, relevant modifications will be made before submitting the draft plan for examination by an independent inspector. Examination in public and adoption is planned to take place in 2018.

Hambleton District Council commissioned JBA Consulting to deliver the Level 1 Strategic Flood Risk Assessment (SFRA) that is needed to inform the Local Plan.

1.2 Requirements and objectives of the Level 1 SFRA

Flood risk should be managed effectively and sustainably through all stages of the planning process. A requirement of the Government’s latest guidance on development planning - which includes the National Planning Policy Framework (NPPF) and Flood Risk and Coastal Change Planning Practice Guidance (FRCC-PPG)¹ - is that Local Plans should take account of flood risk through the development of an SFRA.

Specifically, the SFRA provides part of the evidence base that Local Planning Authorities (LPAs) use during development of their Local Plan. It informs land allocations, local policy updates and the Sustainability Appraisal (SA). Essentially the SFRA underpins the sequential risk-based approach to the allocation of land for development and identifies whether application of the Exception Test is likely to be necessary (Figure 1-2).

The Council completed a Level 1 SFRA in January 2006, which is now out of date due to changes in legislation, policy and published flood maps, as well as on-the-ground changes due to new flood alleviation schemes and other local flood risk reduction measures.

The chief aims and objectives of Hambleton’s revised Level 1 SFRA are therefore:

- To enable Hambleton to meet its obligations under the National Planning Policy Framework (NPPF) as the Local Planning Authority (LPA).
- To form part of the evidence base and inform the Sustainability Appraisal (Incorporating the Strategic Environmental Assessment) for the Local Plan. This assessment will enable the Council to steer development away from areas where flood risk is considered greatest, ensuring that allocated areas can be developed in a safe, cost effective and sustainable manner.

¹ The latest guidance is available online via: http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change
To provide up to date information on the extent, severity and mechanisms of flood risk from all sources (including surface water as well as flooding from rivers) that can be expected within the Hambleton District Council area.

Figure 1-2: Role of Level 1 SFRA within Local Plan development (after PPG, page 6)
• To make recommendations on the suitability of potential development sites based on flood risk and to highlight specific locations where further detailed assessment of flood risk is required via a Level 2 SFRA prior to the allocation of specific developments (the scope of a Level 2 SFRA cannot fully be determined until all potential sites have been assessed by the Council).

• To identify land that should be safeguarded for current and future flood management uses as set out in the NPPF.

• To provide a reference document to which all parties involved in development planning can reliably turn to for initial advice and guidance on flood risk.

• To provide guidance on approaches for dealing with potential risks from flooding within the context of planning applications and on site-specific Flood Risk Assessments (FRAs).

• To provide guidance on the applicability of Sustainable Drainage Systems (SuDS) for managing surface water runoff.

• To align with guidance for developers and planning officers produced by North Yorkshire County Council (NYCC) in its role as Lead Local Flood Authority, including advice on the application, approval and adoption of SuDS.

1.3 Level 1 SFRA methodology

The methodology employed in the preparation of this Level 1 SFRA was therefore as follows:

i) Engagement with principal stakeholders including Hambleton District Council, The Environment Agency, North Yorkshire County Council, Yorkshire Water, Canal and Rivers Trust amongst others.

ii) Desk-based collation of flood risk datasets, including the following:

• River centreline and canal polylines.
• Environment Agency Flood Zones (Flood Map for Planning) and supporting datasets including flood defences, Areas Benefiting from Defence, Flood Storage Areas, Historic Flood extents.
• Environment Agency Risk of Flooding from Surface Water Map.
• Environment Agency Areas Susceptible to Groundwater Flooding.
• Environment Agency flood mapping outputs for areas where flood risk has been modelled in detail and/or supporting documentation for flood alleviation schemes.
• Council records on past flood events.
• Water company records related to sewer flooding.

iii) Identification of the Functional Floodplain and development of an understanding of flood risk extents and mechanisms in Hambleton district.

iv) Preliminary application of the Sequential Test to Potential Development Sites (identified through the Call for Sites) and provision of recommendations with respect to Local Plan outcomes.

v) Production of strategic flood risk maps.

vi) Preparation of guidance in relation to the strategic and specific assessment of flood risk within the context of development.

1.4 Level 1 SFRA documentation

The Level 1 SFRA deliverables include:

• This report and its textual appendices.
• A set of interactive PDF maps that illustrate flood risk extents and severities for different sources of flooding (Appendix A).
• A site assessment spreadsheet indicating the level of flood risk to each site in the Potential Development Sites list and the Additional/Alternative Sites list (Appendix B).
1.5 **Current and future validity of SFRA outcomes**

This Level 1 SFRA has been developed using data and information that was as up-to-date as possible at the time of preparation / submission (the period from June 2016 to January 2017).

**Policy and guidance**

The primary development and flood risk guidance available at the time of the finalisation of this SFRA was the Flood Risk and Coastal Change Planning Practice Guidance (FRCC-PPG) and the National Planning Policy Framework (NPPF).

**Flood risk data**

The national flood risk datasets and Environment Agency modelling outputs that have informed on flood risk and functional floodplain delineation in this SFRA were correct as of July 2016. However, the national flood risk mapping datasets are regularly updated. Understanding of flood risk can evolve following flood events, whilst residual flood risk can also change due to flood alleviation schemes and other management practices. Whilst implications of any data/model/knowledge updates with respect to the flood risk within Hambleton District will be localised, it is recommended that checks are made with Hambleton District Council/Environment Agency to ensure that latest information is being used when future decisions concerning development and flood risk are made.

**Climate change**

Policies for new development must be based on future risk, not current. It is widely accepted and understood that climate change is likely to lead to increased risks of flooding in the future. Guidance on how climate change might impact on flood risks within Hambleton District, and how this should be accounted for in planning policy and development control, is provided within this document. However, the flood risk designations utilised in this report relate to the current situation. This issue only becomes problematic if development needs for housing and employment cannot be accommodated within the present-day Flood Zone 1, in which case a Level 2 SFRA might be needed to investigate climate change impacts on local flood risk in more detail.
2 Understanding flood risk in Hambleton District

2.1 Defining flood risk

2.1.1 Sources of flooding

Flooding is a natural process that can occur from many different and combined sources and in many ways (Figure 2-1). It constitutes a temporary covering of land not normally covered by water and presents a risk when people, infrastructure or environmental assets are present in the area that floods. Assets at risk from flooding can include housing, transport and public service infrastructure, commercial and industrial enterprises, agricultural land and environmental and cultural heritage sites.

Figure 2-1: Sources of flooding typically seen in inland areas of the UK

Different types and forms of flooding present a range of different risks and hazards, with speed of inundation, depth and duration of flooding varying greatly. With climate change, the frequency, pattern and severity of flooding are expected to change and potentially become more damaging. The main sources of flooding that might be considered as possible within Hambleton District include:

- **Fluvial** (rivers) - which includes: inundation of floodplains from rivers and watercourses; inundation of areas outside the floodplain due to influence of bridges, embankments and other features that artificially raise water levels; overtopping or breaching of defences; blockages of culverts; and blockages of flood channels/corridors.
- **Surface water** - surface water flooding covers two main sources including direct run-off from adjacent land (pluvial) and surcharging of piped drainage systems (public sewers, highway drains, and so forth).
- **Groundwater** - this refers to water emerging above the ground surface in areas that are remote from a watercourse. Typically occurring when groundwater levels become elevated following prolonged rainfall, it is also associated with groundwater recovery after pumping for mining or industry has ceased. It is most likely to occur in low-lying areas underlain by permeable rock (aquifers).
- **Infrastructure failure** - This includes: reservoirs; canals; industrial processes; burst water mains; blocked sewers or failed pumping stations.

2.1.2 **Pathways and receptors of flooding**

The source – pathway – receptor model is a standard environmental risk model common to many hazards and is often applied as the starting point when aiming to understand and assess flood risk, as shown in Figure 2-2.

Figure 2-2: Example Source-Pathway-Receptor Model for flooding

A source of flooding on its own does not necessarily result in the occurrence of flood risk. Pathways must be available to convey floodwaters, which might include rivers, drains, sewers, overland flow and river and coastal floodplains and their defence assets. There must also be receptors that become affected by floodwaters, such as people, their property and the environment. Mitigation measures are therefore often focussed on blocking or impeding pathways of flooding or removing receptors. The planning process is primarily concerned with the location of receptors, taking appropriate account of potential sources and pathways that might put those receptors at risk.

2.1.3 **Qualification and quantification of flood risk**

Flood risk reflects the likelihood of receptors being affected by flooding and the resulting consequences. Flood risk is generally expressed in terms of the following relationship:

\[
\text{Flood risk} = \text{likelihood of flooding} \times \text{consequences of flooding}
\]

Flood risk is often defined in qualitative way, e.g. "high/medium/low" or "significant/insignificant". Flood risk can also be defined numerically if consequences can be quantified (for example as a damage cost).

**Likelihood**

Likelihood is commonly quantified as the percentage probability of occurrence based on the average frequency of flood events over an extended period (measured or extrapolated from records). For instance, a 1% annual exceedance probability (AEP) indicates the flood magnitude that has a 1% chance of being reached or exceeded in any one year. Because a 1% AEP event has a 1 in 100 chance of occurring within any given year and therefore over a much longer period will be seen, on average, once every hundred years, it is often described as the 100-year return period event. In other words, in a thousand-year period, assuming no external influences made flooding neither more or less likely over time, there would be an expectation of seeing 10 events that exceeded the flood magnitude associated with a 1% AEP. These 10 events might not be equally spaced in time but, roughly / based on averages, they would occur once every 100 years.

Similarly, a 0.1% AEP is an event that has a 1 in 1000 chance of occurring in any given year (1000-year return period), whilst a 0.5% AEP is an event that has a 1 in 200 chance of occurring in any
given year (200-year return period) and 3.3% AEP has a 1 in 30 chance of occurring in any given year (30-year return period).

Considered over the lifetime of a development, even a 1% AEP flood has a good chance of occurring. For example:

- A 1% AEP flood has a 26% (1 in 4) chance of occurring at least once in a 30-year period - the period of a typical residential mortgage.
- A 1% AEP flood has a 49% (1 in 2) chance of occurring in a typical human lifetime of 70 years.
- A 1% AEP flood has a 66% (2 in 3) chance of occurring a 100-year period - typically the age of much of the Victorian housing stock in the UK.

Consequence
The consequences of flooding include fatalities, property damage, disruption to lives and businesses, with severe implications for people (e.g. financial loss, emotional distress, health problems). Consequences of flooding depend on the hazards caused by flooding (depth of water, speed of flow, rate of onset, duration, wave-action effects, water quality) and the vulnerability of receptors (type of development, nature, e.g. age-structure, of the population, presence and reliability of mitigation measures and so forth).

2.1.4 Actual and residual risks
Flood risk is not static; it cannot be described simply as a fixed water level that will occur if a river overtops its banks. It is therefore important to consider the continuum of risk carefully. Risk varies depending on the severity of the event, the source of the water, the pathways of flooding and the vulnerability of receptors as mentioned above.

Actual Risk
This is the risk 'as is', accounting for any flood defences that are able to protect an area from flooding. The degree of protection offered to an area that benefits from the presence of a defence depends on its Standard of Protection (SoP). For instance, if the defence offers a Standard of Protection equivalent to the 1% AEP event, the expectation would be for properties protected by the defence to be safe during any floods that are less than the 1% AEP in magnitude.

Actual risk should take into consideration the impact of any type of flood management infrastructure including raised embankments, flood walls, flood storage schemes and pumping stations. However, it is important to recognise that risk comes from many different sources. For example, whilst the actual risk of fluvial inundation may be low behind a defence there could still be moderate risk from surface water, which may even pond behind the defence in low spots.

Residual Risk
This is the risk of flooding should any flood management infrastructure not be fully effective. It includes the risk arising from overtopping, breach or failure of raised defences, blockage of a surface water conveyance system, pump failures and overtopping of an upstream storage area in an extreme event. Therefore, even where flood management infrastructure is in place, due to residual risks it is never appropriate to use the term "flood free". In some situations, the consequences arising from residual risks can be significant. For example, a defence failure can lead to rapid inundation of fast flowing and deep floodwaters, with significant impacts to people, property and the local environment behind the defence.

Information on flood risk is often precautionary in that it may not consider the impact of flood management infrastructure. For example, the Environment Agency's Flood Map for Planning determines flood risk assuming no defences are in place.
2.2 The risk of fluvial flooding in Hambleton district

Fluvial flooding is associated with the exceedance of the channel capacity of rivers and streams during higher flows, leading to inundation of river floodplains. The frequency of occurrence of floodplain inundation depends on the characteristics of the both the watercourse and its upstream catchment. The catchment geography (which can influence rainfall patterns and magnitudes), catchment permeability and steepness (which impact on rainfall-runoff processes), the steepness and shape of the river system (which impact on the rate of downstream conveyance); and channel bank levels in relation to the surrounding floodplain (which determine bank exceedance mechanisms) are all relevant.

2.2.1 Primary sources, pathways and receptors

The area covered by the Hambleton Local Plan overlaps with three main drainage basins, those of the Rivers Ouse, Tees and Derwent (Figure 1-2). A large part of the Hambleton District drains into the River Swale or its tributaries (which include the River Wiske and Cod Beck), eventually discharging into the River Ouse. The south-eastern part of the district (around the parish of Easingwold) is drained by the River Kyle as well as the headwaters of the River Foss, both of which also eventually discharge to the River Ouse. The north-eastern part of the district drains the catchment of River Leven, a tributary of the Tees. The eastern fringes drain into River Derwent basin (the River Seph also drains into the Derwent, however its catchment is entirely within the National Park and not covered in this SFRA).

Figure 2-3: River networks in Hambleton Local Plan area
Local bedrock geologies are mostly Permian and Triassic sandstones and mudstones, but there is a fringe of Corallian Limestone bordering the Vales of Mowbray and York and the Hambleton Hills. The flow regimes of the headwater streams in the District are very much influenced by their rural upland catchments and, with a few local exceptions, are generally extremely flashy in nature, taking a very short time to respond after rainfall. However, the Corallian Limestone outcrop provides a reasonable baseflow contribution to some streams to the east of the district. In contrast, along the low-lying "washland" areas of the lower Swale and Ouse, flooding generally builds slowly. Further, floodplains can remain inundated for an extended period, which can lead to damage of agricultural land.

Being reasonably rural in nature (95% of Hambleton’s 1,300 km² extent is undeveloped) and with a total population of less than 90,000, receptors for flooding are primarily located within the districts five major market towns of Northallerton, Thirsk, Bedale, Stokesley and Easingwold which house over a third of the total population. Elsewhere property is very dispersed and the risk to people is limited.

Table 2-1: Hydrological behaviour of major rivers in Hambleton district

<table>
<thead>
<tr>
<th>Drainage Basis</th>
<th>Watercourses</th>
<th>Characteristics</th>
<th>Main receptors of flooding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tees</td>
<td>River Leven and tributaries including: - Potto Beck - Broughton Beck - River Tame - Ingleby Beck</td>
<td>Responsive flow regimes reflecting drainage from the Cleveland Hills across a mixed geology of mostly Permian and Jurassic age bedrock of low permeability, broadly overlain by boulder clay.</td>
<td>Stokesley Great Ayton Hutton Rudby</td>
</tr>
<tr>
<td>Ouse</td>
<td>River Swale and minor tributaries including: - Bedale Beck - Rawar Beck</td>
<td>Generally, extremely responsive rivers, flowing over Limestone and Gritstone geologies that have extensive drift cover.</td>
<td>Bedale Leeming Northallerton Brompton Thirsk Dalton</td>
</tr>
<tr>
<td></td>
<td>River Wiske and tributuaries including: - Carr Beck - Willow Beck</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cod Beck and tributaries including: - Broad Beck - Spittal Beck - Willow Beck</td>
<td>Larger baseflow component to Cod Beck.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>River Kyle and tributaries including: -Sun Beck -Derrings Beck</td>
<td></td>
<td>Easingwold Aine Stillington Huby</td>
</tr>
<tr>
<td></td>
<td>River Foss</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.2.2 Mapped flood probabilities and extents

There are two main national mapping products that inform on flood risk areas within Hambleton District boundaries:

- The Environment Agency’s Flood Map for Planning. This is the main dataset used by planners for predicting the location and extent of fluvial and tidal flooding and is applied for sequential testing of site allocations, as per the FRCC-PPG.
- The Environment Agency Risk of Flooding from Rivers and the Sea Map (RoFRSM) which bands flood risk into high, medium, low and very low categories. The RoFRSM is normally a supplementary piece of information with regards to planning requirements.

Environment Agency Flood Map for Planning

The Environment Agency’s Flood Map for Planning\(^2\) is the main dataset used by planners for predicting the location and extent of fluvial and tidal flooding and informs the Sequential Test, as per the FRCC-PPG. It uses a four-tier system to categorise flood risk, as shown in Table 2-2.

<table>
<thead>
<tr>
<th>Flood Zone</th>
<th>Annual Probability of Flooding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low Probability: This zone comprises land assessed as having a less than 1 in 1,000 (&lt;0.1%) annual probability of river or sea flooding (all land outside Zones 2 and 3).</td>
</tr>
<tr>
<td>2</td>
<td>Medium Probability: This zone comprises land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%) or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%).</td>
</tr>
</tbody>
</table>
| 3          | a) High Probability: This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.  
  
  b) Functional Floodplain: This zone comprises land where water has to flow or be stored in times of flood.  
  
  Note: The Flood Map for Planning does not map the extent of the Functional Floodplain. |

Flood Zone 3 delineates areas that have a reasonably high chance of flooding, whilst Flood Zone 2 highlights those areas that will flood in a more extreme event. Flood Zone 1 delineates those areas where fluvial flooding is unlikely. Flood Zones were originally prepared by the Environment Agency using a broad-scale modelling methodology to determine extents and depths of floodplain inundation in the 1% and 0.1% AEP events. However, as part of their flood risk management activities, the Environment Agency has implemented a rolling programme of updates to Flood Zones, with extents of flooding being determined more accurately using detailed hydraulic models. In many areas Flood Zones can be assumed to have a good level of accuracy. The version used in this SFRA was obtained under licence from the Environment Agency’s Partner Database in July 2016.

The Flood Zones are, however, precautionary in that they do not take account of flood defences (which can be breached, overtopped or may not be in existence for the lifetime of the development) and, therefore, represent a worst-case scenario of flooding. Where flood defences are in place, the Flood Map for Planning does also show those areas that would benefit from the flood defences if the 1% AEP flood occurred, provided there was no failure or breaching of the defences. The Flood Zones also do not take account of climate change, and primarily cover Main Rivers only.

The SFRA Maps in Appendix A present the extents of Flood Zones 2 and 3 across the district which, as highlighted above, indicate the extent of floodplain inundation that can be expected in at least the 1% AEP and 0.1% AEP events (i.e. the 100-year and 1000-year events) respectively. Areas of functional floodplain are mapped only where detailed modelling outputs exist to inform on boundaries.

Environment Agency Risk of Flooding from Rivers and the Sea Map (RoFRSM)

The RoFRSM\(^3\) shows the likelihood of flooding from rivers and the sea based on the presence and effect of all flood defences, predicted flood levels and ground levels. The map bands the likelihood of flooding into four risk categories:

- **High** – greater than to equal to 1 in 30 (3.3%) chance in any given year.
- **Medium** – less than 1 in 30 (3.3%) but greater than or equal to 1 in 100 (1%) chance in any given year.
- **Low** – less than 1 in 100 (1%) but greater than or equal to 1 in 1,000 (0.1%) chance in any given year.
- **Very Low** – less than 1 in 1,000 (0.1%) chance in any given year.

Whilst the RFFRSM acts as a supplementary piece of information with regards to flood risk, it should be taken as indicative only and is not suitable for planning purposes. The RoFRSM bands are however delineated for reference on the SRFA Maps presented in Appendix A.

Areas likely to be affected by fluvial flooding

The Environment Agency Flood Maps indicate that, without defences in place, large flood extents are associated with the River Swale, although the areas falling within Flood Zone 3 are largely rural and sparsely populated. Receptors along this reach include the village of Topcliffe, which is located just downstream of the confluence of the Rivers Wiske and Swale. The Brompton Beck, which is a tributary of the Wiske, provides a source and pathway for flooding for Northallerton, Brompton and Romanby. The Cod Beck has a well-developed floodplain which results in a significant flood risk around Thirsk. Large flood extents are also associated with the River Leven, with the main receptor along this reach being the town of Stokesley.

2.2.3 Functional floodplain

The functional floodplain is the term used to describe those areas of floodplain that are closest to the river and flood frequently. It is generally accepted as representing the portion of land within Flood Zone 3 where water has to flow or be stored in times of flood and therefore can include water conveyance routes as well as natural and designated flood storage areas. It is normally differentiated as Flood Zone 3b (as per Table 2-2).

There is no published map or dataset that delineates the extent of the functional floodplain, and it therefore needs to be defined on local basis. Paragraph 015 of the FRCC-PPG explains that the identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. However, land which would naturally flood with an annual probability of 1 in 20 (5%) or greater in any year, or is designed to flood (such as a flood attenuation scheme) in an extreme (0.1% annual probability) flood, should provide a starting point to help identify the functional floodplain.

Accepted practice is that the functional floodplain should account for the effects of all flood risk management infrastructure including defences. This means that areas which would naturally flood, but which are prevented from doing so by existing defences and infrastructure or solid buildings, will not normally be identified as functional floodplain. If an area is intended to flood (e.g. an upstream flood storage area designed to protect communities further downstream), then this should be safeguarded from development and identified as functional floodplain, even though it might not flood very often.

The technical note provided in Appendix C explains the methodology applied to determine the extent of the functional floodplain of rivers within the Hambleton District. The outline is also

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\(^3\) [http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=floodmap&scale=9&ep=map&layerGroups=default&lang=_e&y=180882\&x=531194\&x=531194\&y=180882\&scale=9](http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=floodmap&scale=9&ep=map&layerGroups=default&lang=_e&y=180882\&x=531194\&x=531194\&y=180882\&scale=9)  
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displayed on the interactive PDF maps presented in Appendix A. It has been defined on the basis of detailed river model outputs for 1 in 20-year (5% AEP) flood events accounting for any formal flood defences in place (or 1 in 25-year if 1 in 20-year not available), with exclusion of the following:

- Land already benefiting from raised flood defences as identified in the Environment Agency's Areas Benefiting from Defences (ABD) GIS layer.
- Currently developed land where no flood alleviation function has been defined.
- Major transport infrastructure (e.g. roads and railways).

Where river models were not available, it has not been possible to delineate the extent of functional floodplain.

A further delineation applied in this SRFA is Flood Zone 3ai, which is defined as *land where water would flow or be stored in times of flooding if constraints due to development or infrastructure did not already exist*. Flood Zone 3ai therefore represents the areas of land that would be in Flood Zone 3b if not already developed. Although not considered within the Sequential Test, the identification of FZ3ai allows the council to assess risk within Flood Zone 3a in more detail by showing areas where existing development or infrastructure is likely to be restricting flood flows in areas that would otherwise be within the functional floodplain. Should any potential development sites in Flood Zone 3ai become available for new or further development (e.g. brownfield sites) then both the risk at the sites and their influence on flood risk in the surrounding area should be carefully considered.

### 2.2.4 Areas that have been historically affected by flooding

Past river flooding in Hambleton district is recorded, documented or reported in a number of sources including:

- The Environment Agency's Historic Flood Map (HFM).
- North Yorkshire County Council's Local Flood Risk Management Strategy (LFRMS) and Preliminary Flood Risk Assessment (PRFA).
- Records maintained by the Emergency Planning Unit of Hambleton District Council.
- North Yorkshire Fire and Rescue Service (NYFRS) incident records.

For some of these datasets fluvial flooding is not necessarily identified separately from flooding arising from other sources.

**Environment Agency Historic Flood Map**

The Historic Flood Map (HFM) contains outlines of past fluvial, tidal and groundwater flooding though does not contain any information regarding flood source, return period/AEP or date of flood. These outlines can be viewed on the accompanying SFRA Maps in Appendix A.

The HFM outlines show that there has been widespread fluvial flooding from Main Rivers in the past. In general, the HFM extents agree with the areas designated as Flood Zones 2 and 3. There has been past flooding of rural or agricultural land along the Rivers Swale and Wiske, but also flooding along Bedale Beck in Leeming and Bedale, Brompton Beck in Northallerton, Cod Beck in Thirsk and the River Leven in Stokesley.

**Hambleton DC and NYCC data**

Both the District and County Council maintain databases of past flood events, although these are by no means complete or detailed. However, the data is useful because it covers locations affected by flooding from ordinary watercourses as well as Main Rivers. The main locations identified include:
North Yorkshire Fire and Rescue Service Flood Incident Data

North Yorkshire Fire and Rescue Service (NYFRS) maintain a GIS dataset that records their attendance at flood incidents during the five-year period ending March 2016. Of these only a limited number were in Hambleton District. The records include non-fluvial flooding incidents (such as leaks in homes and flash flooding) and are reasonably generalised, and for this reason are not included on the SFRA maps.

2.3 The risk of surface water flooding in Hambleton district

Surface water flooding is primarily associated with a limited ability of rainfall to drain away, and can be influenced by local highway drainage and sewerage networks in urban areas. During rainfall events, the rate that water falls onto the ground surface can sometimes exceed infiltration rates. The rainfall that is not able to infiltrate will build up and start to flow in a direction controlled by the topographic gradient. In some areas these waters can accumulate to significant depths.

2.3.1 Primary sources, pathways and receptors

The amount of surface water runoff that occurs during a rainfall event depends on the intensity of the rainfall and the nature of the surface. In rural areas intense rainfall rates are normally needed to generate significant volumes of surface runoff, but this will depend on factors like vegetation, nature of the soil, degree of soil compaction and surface slope. In urban areas, where surfaces are much more likely to be impermeable, runoff can start to occur at much lower rainfall intensities. However urban areas have man-made drainage networks for dealing with this runoff. These include highway drains and surface water sewers which may either convey runoff to discharge points in local watercourses, or join into the foul water sewerage network (combined sewers). The capacities of these networks will depend on their age, design and degree of maintenance. Newer systems will normally have been designed to accept all the surface runoff that will be generated in a 1 in 30-year rainfall storm, however an older system that has several blockages or collapses might only be able to convey away runoff arising from the 1 in 10-year rainstorm for example. Surface runoff than cannot be conveyed within the urban drainage network will appear as excess water flowing along roads, or across land. Such flow routes are unlikely to respect property boundaries.
In some situations, the amount of water entering an urban storm water drainage system may exceed the rate at which the system can safely discharge. This could be down to the capacity of the system being exceeded at pinch points, due to a blockage in the system or an inability to discharge due to elevated water levels in the receiving watercourse. Pinch points and failures within the drainage network may also restrict flows. Water then begins to back up through the sewers and surcharge through manholes, potentially flooding highways and properties. Sewer flooding in 'dry weather' resulting from blockage, collapse or pumping station mechanical failure (for example), is the sole concern of the drainage undertaker. There are certain locations where the probability and consequence of surface water flooding is more prominent due to the complex hydraulic interactions in the urban environment. Urban watercourse connectivity, sewer capacity, and the location and condition of highway gullies all have a major role to play in surface water flood risk.

It should be acknowledged that once an area is flooded during a large rainfall event, it is often difficult to identify the route, cause and ultimately the source of flooding without undertaking further site-specific and detailed investigations.

2.3.2 Mapped flood probabilities and extents

The main national mapping product that provides information on surface water flood risk areas within the Hambleton district is the Environment Agency's Risk of Flooding from Surface Water Map (RoFSWM), which up to 2016 was known as the Updated Flood Map for Surface Water (uFMfSW). The map shows where accumulations of surface water would be expected, with the scale of flooding being categorised as either very low, low, medium or high (Table 2-3).

Table 2-3: Categories of flooding on the Risk of Flooding from Surface Water Map

<table>
<thead>
<tr>
<th>Category</th>
<th>Annual Probability of Flooding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Low</td>
<td>This area has a chance of flooding of less than 1 in 1000 (0.1%).</td>
</tr>
<tr>
<td>Low</td>
<td>This area has a chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%).</td>
</tr>
<tr>
<td>Medium</td>
<td>This area has a chance of flooding of between 1 in 100 (1%) and 1 in 30 (3.3%).</td>
</tr>
<tr>
<td>High</td>
<td>This area has a chance of flooding of greater than 1 in 30 (3.3%).</td>
</tr>
</tbody>
</table>

These outlines can be viewed on the accompanying SFRA Maps in Appendix A. As might be expected, areas in the highest risk category are limited but do occur in some urban areas as well as in low lying reaches of the Vale of Mowbray.

2.3.3 Records of sewer flooding incidences

Yorkshire Water is the water company responsible for the management of the majority of the district's drainage network. Yorkshire Water's DG5 Register records flood incidents attributable to its sewer networks, whether foul and / or surface water sewers. Although a data request was made no provision of the data was made within the timescales needed to produce the draft SFRA. As DG5 Registers normally record incidents at property level, due to the sensitive nature of this information, it is not, in any case, appropriate to show these data on the SFRA maps.

2.3.4 Other records

The NYFS and Hambleton District Council both hold ad-hoc records of surface water incidents.
2.3.5 Critical Drainage Areas

Critical Drainage Area (CDAs) are areas that the Environment Agency or LLFA (in this case the NYCC) have identified as having especial problems with drainage. The local planning authority should be notified of any such areas and ensure that FRA's are carried out for any proposed developments in Flood Zone 1 that also fall within CDAs. To the best of available knowledge, to date no CDAs have been formally designated within the Hambleton District.

2.4 The risk of flooding from other sources

NYCC’s PFRA demonstrates that fluvial and surface water flooding are the two main mechanisms by which flooding occurs within Hambleton District. Other sources of flooding that might potentially occur in exceptional circumstances include:

- Groundwater flooding.
- Flooding from canals.
- Flooding resulting from failure or overtopping of impoundments.

2.4.1 Groundwater flooding

Groundwater flooding occurs when the groundwater table becomes elevated above its normal position allowing groundwater to emerge above ground level. This typically happens only after long periods of sustained high rainfall, and the areas at most risk are often low-lying where the water table is already likely to be at shallow depth. Depending on the nature of the local bedrock and drift deposits, groundwater emergence might occur diffusely, such as where the groundwater table intersects the axis of a valley, or as a point source such as due to a spring being activated.

Groundwater flooding is generally associated with productive bedrock aquifers, such as the Chalk, and locally some sandstones and limestones, but can also occur with tertiary deposits such as floodplain sands and gravels. Groundwater flooding can also be driven by other factors - such as groundwater rebound or mine water rebound.

The occurrence of groundwater flooding is usually localised and unlike flooding from rivers and the sea, does not generally pose a significant risk to life due to the slow rate at which the water level rises. However, where groundwater flooding does occur, it can cause significant damage to property, especially within cellars or basements, and can pose further risks to the environment and ground stability. Development within areas that are susceptible to groundwater flooding will generally not be suited to SuDS; however, this is dependent on detailed site investigation and risk assessment. Groundwater flooding may exacerbate surface water flooding by taking up the capacity of urban drainage systems or if it emerges in areas where ponding or attenuation of surface water flooding normally takes place.

The Environment Agency’s national dataset, Areas Susceptible to Groundwater Flooding (ASTIGWF), has been used to assess the risk of groundwater flooding within the Hambleton DC area. The ASTIGWF map uses four susceptibility categories to show the proportion of each 1 km grid square where geological and hydrogeological conditions show that groundwater might emerge. The data indicates that groundwater flooding is most possible in the alluvial deposits along the Vale of Mowbray. However, given its low resolution, this map is not suitable for planning considerations at a site-specific level, and furthermore does not indicate the probability of groundwater flooding occurring. Whilst shown on the SFRA Maps for reference, it should only be used as a trigger for further investigation as to the possibility of groundwater flooding.

2.4.2 Risk of flooding from canals

Canals are man-made structures and behave very differently to a natural watercourse. Flooding is much more likely to be related to overtopping or breaching of canal side retaining structures, especially in areas where water levels in the canal are elevated above the surrounding topography. Many canals run in parallel to natural rivers and in times of flood the river may spill water in the canal, which can be subsequently transferred along the canal system and cause overtopping elsewhere. Canals can also have a significant interaction with other sources, such as watercourses that feed them and minor watercourses or drains that cross underneath.

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Fortunately, there are no operative canals in the Hambleton district and the risk of flooding from canals can be considered as negligible.

2.4.3 Flooding from reservoirs or impoundments
A reservoir can usually be described as an artificial lake where water is stored for use. Most reservoirs supply water for household and industrial use, but may have a secondary use such as for fishing lakes or leisure. Like canals, the risk of flooding associated with reservoirs is residual and is associated with failure of reservoir outfalls or breaching. This risk is minimised through regular maintenance by the operating authority (water company) who have a duty of care to ensure against reservoir failure. Reservoirs in the UK have an extremely good safety record with no incidents resulting in the loss of life since 1925.

The Environment Agency is the enforcement authority for the Reservoirs Act 1975 in England. All large reservoirs must be regularly inspected and supervised by reservoir panel engineers. Local Authorities are responsible for coordinating emergency plans for reservoir flooding and ensuring communities are well prepared. To assist with this, the Environment Agency has prepared reservoir flood maps\(^5\) for all large reservoirs that they regulate under the Reservoirs Act 1975 (reservoirs that hold over 25,000m\(^3\) of water\(^6\)). In Hambleton District, only one reservoir falls into this category; Cod Beck Reservoir near Osmotherley. However, failure of Thornton Reservoir, which outside the district boundary, could cause flooding to Leeming Beck and downstream areas. The Environment Agency maps show the largest area that might be flooded if either of these reservoirs were to fail and release the water held (although they do not give any information about the depth or speed of the flood waters). Hambleton DC’s Emergency Planners should have access to this information so they can develop effective Emergency Plans. Due to the sensitivity of the information, detailed information on reservoirs is not provided within this SFRA.

2.5 The impact of Flood Risk Management schemes on flood risk
Flood Risk Management (FRM) assets and FRM schemes in the district can and do have an impact on actual flood risk mechanisms, extents and likelihood. A number of future schemes are planned / or in progress for high flood risk areas, aimed at of reducing the probability of flood events and reducing the overall level of risk. Both existing assets and future schemes will therefore have a further impact on the type, form and location of new development or regeneration.

2.5.1 Flood defence assets
The Environment Agency provided an ArcGIS shapefile of their flood defence dataset (AIMS) which shows that there is a large network of flood defence infrastructure throughout the district, most of which owned privately or by the Environment Agency.

The majority of flood defence assets are designated as formal raised embankments or walls intended to provide protection against fluvial and/or tidal flooding from Main Rivers such as the River Swale, River Wiske (to reduce flooding in Northallerton, Brompton and Romanby) and Cod Beck (to provide protection for urban areas around Thirsk). Information such as the Standard of Protection (SoP) offered by the defence, the crest height or the defence condition has not been made available for this study.

As well as the ownership and maintenance of a network of formal defence structures, the Environment Agency carries out a range of other flood risk management activities that help to reduce the probability of flooding, whilst also addressing the consequences of flooding. These include:

- Maintaining and improving the existing flood defences, structures and watercourses.
- Enforcement and maintenance where riparian owners unknowingly carry out work that may be detrimental to flood risk.
- Identifying and promoting new flood alleviation schemes (FAS) where appropriate.

\(^5\) [http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=reservoir](http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=reservoir)

\(^6\) The FWMA updated the Reservoirs Act and targeted a reduction in the capacity at which reservoirs should be regulated from 25,000m\(^3\) to 10,000m\(^3\). This reduction is, at the time of writing, yet to be confirmed meaning the requirements of the Reservoirs Act 1975 should still be adhered to.

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• Working with local authorities to influence the location, layout and design of new and redeveloped property and ensuring that only appropriate development is allowed on the floodplain.
• Operation of Floodline Warnings Direct and warning services for areas within designated Flood Warning Areas (FWA) or Flood Alert Areas (FAA).
• Promoting awareness of flooding so that organisations, communities and individuals are aware of the risk and are prepared in case they need to take action in time of flood.
• Promoting resilience and resistance measures for those properties already in the floodplain.

Other assets to be considered include those maintained by water companies, Hambleton District Council or NYCC. Water company assets include Wastewater Treatment Works, Combined Sewer Overflows (CSOs), pumping stations, detention tanks, sewer networks and manholes. NYCC assets may include culverts, bridge structures and trash screens. The majority of these lie along ordinary watercourses, especially within urban areas. Other managed assets include highway drains and gullies on major and minor roads. All these assets can have flood risk management functions as well as an effect on flood risk if they become blocked or fail.

As part of their FWMA duties as LLFA, NYCC has a duty to maintain a register of structures or features, which are considered to have a significant effect on flood risk, including details on ownership and condition as a minimum. The Council as an RMA, has duties to pass on relevant information to the LLFA and will therefore need to be involved in collecting data for the asset register and maintaining assets within the region.

The Asset Register should include feature type, description of principal materials, location, measurements (height, length, width, diameter) and condition grade. The Asset Register should also outline how NYCC intend to manage these assets or features including their ongoing maintenance programme. Where assets or features are located in a high risk area or have been assessed to have the potential to effect flood risk, NYCC should prioritise and focus any maintenance or upgrades. At the time of writing NYCC are still developing their FRM asset database, therefore it has not been made available for this assessment.

2.5.2 Future Flood Risk Management work programmes

Based on information provided by the Environment Agency, a number of flood risk management work programmes are ongoing within the district. In the Flood and Coastal Erosion Risk Management (FCERM) Development Programme, proposed or ongoing works include:

• Stokesley Flood Alleviation Scheme
• Great Ayton
• Hutton Rudby PLO
• Potto village defence study
• Upper Tees FRMP
• Northallerton (Sun and Turker Becks) Flood Alleviation scheme
• River Wiske Flood Risk Management Plan
• Swale Washlands West Flood Risk Management Plan
3 Accounting for flood risk in the Hambleton Local Plan

3.1 The planning framework and flood risk

The main links between legislation, national policy, local planning policy and flood risk assessments are illustrated in Figure 3-1. Whilst the key pieces of legislation and policy are separate, they are closely related and have driven Environment Agency and LLFA (in this case NYCC) strategies for flood risk management within communities. As the Local Planning Authority, Hambleton District Council have responsibilities and duties in respect to managing local flood risk and Appendix D of this report provides more information on the relevant legislation and policies that the council needs to consider. These include the Flood Risk Regulations (FRR) 2009, the Flood and Water Management Act (FWMA) 2010, the National Planning Policy Framework (NPPF) 2012 and the Planning Practice Guidance (PPG) 2014.

Although non-statutory, the Strategic Flood Risk Assessment (SFRA) can provide much of the base data required to support the delivery of statutory flood risk management tasks as well supporting Local Authorities in developing capacity and effective working arrangements. It may also inform Local Flood Risk Management Strategies (LFRMS) and Local Plans, which in turn help deliver flood risk management infrastructure and new development at a local level. This SFRA should be used to support Hambleton’s Local Plan and to help inform planning decisions.
3.2 Flood risk and Local Plans

In the context of allocating land in Local Plans, flood risk should be managed by the LPA using the five-stage hierarchy illustrated in Figure 3-2. A similar process is applied in relation to planning applications for development. Actions to avoid, substitute, control and mitigate flood risk are central to this management framework. Examples of how these may translate into the council’s management decisions and actions are also shown in Figure 3-2.

Figure 3-2: Flood Risk Management hierarchy

3.2.1 Step 1 - Assessing risk

As indicated by the hierarchy, it is important to assess the level of risk to an appropriate scale during the decision-making process, (starting with this Level 1 SFRA7). Once this evidence has been provided, positive planning decisions can be made and effective flood risk management opportunities identified.

3.2.2 Steps 2 and 3 - Applying the sequential approach and Sequential Test to avoid or substitute flood risk

The sequential approach, which is integrated into all stages of the development planning process, is a requirement of the NPPF. The Flood Risk and Coastal Change Planning Practice Guidance (FRCC-PPG) further outlines the purpose and requirements of the Sequential Approach. Essentially having the sequential approach in place helps to ensure that development can be safely and sustainably delivered and developers do not waste their time promoting proposals which are inappropriate on flood risk grounds. Thereby it provides opportunities to reduce flood risk to people, their property and the environment to acceptable levels. The sequential approach is facilitated by the Sequential Test, which is used to evaluate whether the flood risk is commensurate with the intended use/vulnerability of the site.

3.2.3 Steps 4 and 5 - Control and mitigation

If development in an area of flood risk cannot be avoided, then control or mitigation strategies come into play. At a strategic level these include the promotion of Sustainable Drainage Systems (SuDS) or the use of emergency planning strategies to mitigate the impact of the risk on those who might be affected. Control and mitigation measures are discussed separately in Chapter 5.

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7 This SFRA does not remove the need for a site-specific Flood Risk Assessment at a development management stage.
3.3 Applying the sequential approach

3.3.1 Processes

As the LPA, Hambleton District Council should seek to avoid allocating land for development in areas at flood risk through the adoption of the sequential approach. In this way, development can be directed away from areas at highest risk and measures can be taken to ensure that development does not increase risk and, where possible, helps to reduce the risk from flooding to existing communities.

The process diagram presented in Figure 3-3 illustrates how the sequential approach should be used to assess potential development sites against the Environment Agency’s Flood Zones and how development should be compatible with the vulnerability of the proposed use for the development. The outcomes of this process will be either to avoid or remove a potential site, or to keep the potential site in the allocation if flood risk is avoided directly or through substitution.

Figure 3-3: Local Plan sequential approach to site allocation

This is a stepwise process, but a challenging one, as some of the criteria used are qualitative and based on experienced judgement. The process must be documented and evidence used to support decisions recorded. In this respect, this Level 1 document provides the supporting evidence needed.

The main steps taken when applying the sequential approach will be as follows:

1. Applying the Sequential Test for each potential development site and if the Sequential Test is passed, applying the Exception Test, if required.
2. Safeguarding land that is required for current and future flood management.
3. Using opportunities offered by new development to reduce the causes and impacts of flooding. This may include possibilities to reduce flood risk to existing developments, especially those that are not considered as being sustainable in the long term due to climate change impacts on flood risk.
4. Seeking opportunities to facilitate the relocation of development, including housing, to more sustainable locations.

3.3.2 Vulnerability classes
The proposed use of a development has an influence on how flood risk implications are dealt with within the sequential approach. The Flood Risk and Coastal Change PPG classifies vulnerability as follows (refer to the guidance for a complete list):

- Essential infrastructure - essential transport, utilities (include electricity power stations, substations and water treatment works), wind turbines.
- Highly vulnerable - police/ambulance/fire/command stations, emergency dispersal points, basement dwellings, caravan and mobile parks (including gypsy traveller sites) and hazardous substance installations.
- More vulnerable - hospitals, residential institutions (e.g. prisons, hostels), dwellings, schools, landfill sites and camping sites.
- Less vulnerable - shops, offices, general industry sites, non-residential institutions, mineral workings, sewage treatment works.
- Water compatible - sand and gravel workings, docks, recreation areas, amenity open space etc. Water compatible uses are allowed in Flood Zone 3b, however they should be designed and constructed so as to remain operational and safe for users in times of flood, result in no net loss of floodplain storage and not impede water flows or increase flood risk elsewhere.

Mixed use sites should be placed into the higher of the relevant classes of flood risk sensitivity.

3.4 Sequential Test

3.4.1 Objectives
The overall aim of applying the Sequential Test for Local Plan preparation is to steer new development into areas that have the lowest flood risk. Although the Sequential Test is primarily informed by the Flood Zones, other forms of flooding should also be accounted for.

The application of the Sequential Test, must address the following sequence of questions:

- Can development be allocated in Flood Zone 1? If so the Sequential Test is passed, provided other sources of flooding are not problematic.
- If not all development can be allocated in Flood Zone 1, can the remaining development be allocated in Flood Zone 2? If so the allocation is accepted, however the Exception Test would need to be applied if any proposed development is "highly vulnerable".
- If not all development can be allocated in Flood Zones 1 and 2, can development be allocated within the lowest risk sites in Flood Zone 3 (i.e. the area designated as Zone 3a)? This would need an Exception Test to justify the development.
- If development would need to take place in remaining areas (e.g. in the Functional Floodplain / Zone 3b), the appropriateness of development would need to be strategically reviewed through the Sustainability Appraisal.

In other words, where there are no reasonably available sites in Flood Zone 1, reasonably available sites in Flood Zone 2 can be considered, applying the Exception Test if required. Only where there are no reasonably available sites in Flood Zones 1 or 2 should the suitability of sites at higher flood risk (Flood Zone 3) be considered. This should account for the vulnerability of the proposed development type and the likelihood of meeting the requirements of the Exception Test if required. If the Sequential Test indicates that a large number of potential allocations need to be evaluated through an Exception Test, this would be addressed in a Level 2 SFRA.

3.4.2 Sequential Test outcomes
The FRCC-PPG flood risk vulnerability classification states that only water-compatible uses and essential infrastructure should be permitted in Flood Zone 3b, though any essential infrastructure must pass the Exception Test and clearly demonstrate that it does not increase or exacerbate flood risk. No other development in Flood Zone 3b is permitted (although if the boundary could be changed to avoid 3b however, then part of the site could still be included).
Gypsy and traveller sites fall within the highly vulnerable category and are not permitted in Flood Zones 3b or 3a. They are permitted in Flood Zone 2 only if an Exception Test is passed.

Uses that fall into the more vulnerable categories are permitted in Flood Zone 3a if the Exception Test is passed. This means that land allocated for housing and waste management sites for hazardous materials (which fall into the more vulnerable category) are not permitted in Flood Zone 3b and only in Flood Zone 3a with an Exception Test and FRA. Such sites are permitted in Flood Zone 2 subject to the undertaking of an FRA.

Sites for employment/retail, recreation/leisure and minerals/waste (all of which are less vulnerable uses) are not permitted in Flood Zone 3b, but are permitted in Flood Zone 3a or Flood Zone 2, subject to the undertaking of an FRA.

The main outcomes that may arise from the application of the Sequential Test to land being considered for development allocation are therefore:

**Development site can be allocated**

Development sites can be allocated where the Sequential Test and the Exception Test (if required) are passed. In addition, a site is likely to be allocated without the need to assess flood risk where the proposed use is for open space. Assuming the site is not to include any development and is to be left open then the allocations is likely to be acceptable from a flood risk point of view. For such sites, opportunities for flood storage should be explored however.

**Exception Test required**

The Exception Test is primarily required where Essential Infrastructure is proposed for Flood Zones 3a and 3b, or where Residential and other uses in the More vulnerable category are proposed in Flood Zone 3a. To avoid having to apply the Exception Test, the LPA should attempt to avoid allocating land for development in the risk area altogether.

**Site-Specific Flood Risk Assessment**

All development proposals within Flood Zones 2 or 3 must be accompanied by a Flood Risk Assessment. Also any sites that have 100% of their footprints within Flood Zone 1 and exceed 1 hectare in area must be subject to a Flood Risk Assessment and consideration of sources of flooding other than fluvial.

**Consideration of revisions to site layout and design**

Site layout and site design is important at the site planning stage where flood risk exists. If a site footprint can be altered to avoid Flood Zone 3b entirely, the site could remain in the allocation, if viable. Otherwise the recommendation would be for the Exception Test to be applied immediately. Viability might depend on size (i.e. the net developable area remains sufficient once flood risk areas are excluded or space in Flood Zone 3a is allocated for on-site storage of flood water).

Surface water risk and opportunities for SuDS should also be assessed at this stage. If surface water flood risk is significant but opportunities for on-site storage or use of SuDS are inadequate, such sites should still be rejected.

**Withdrawal of the site from the allocation list**

A potential development site which fails to pass the Sequential Test (and / or the Exception Test) would need to be withdrawn from the allocation list.

3.4.3 **Reviewing flood risk to potential sites as part of the Sequential Test**

The following criteria are used to inform the Sequential Test outcomes for potential allocation sites. These criteria are applied sequentially based on an understanding of the proportion of each site’s footprint in Flood Zones 1, 2, 3a (and 3ai) and 3b.
Table 3-1: Criteria used to inform on the outcomes of the Sequential Test.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Reasons</th>
</tr>
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| **Consider Withdrawal of Site** | • 10% or greater of the site footprint is within Flood Zone 3b.  
• The scale of surface water risk on the site is considered large enough that possible mitigation of the risk on site is deemed unlikely to be achievable. |
| **Exception Test (plus FRA)** | • Greater than 10% or of the footprint of any residential site or essential infrastructure site is within Flood Zone 3a (water-compatible and less vulnerable uses of land do not require the Exception Test if in Flood Zone 3a).  
• Greater than 10% of the footprint of any mixed-use site that may entail residential use is within Flood Zone 3a.  
• Any highly vulnerable developments with the entirety of their footprint in Flood Zones 2 and 1. |
| **Consider site layout and design** | • Where the site fails the Sequential Test due to a very small proportion of its footprint: e.g.  
  o Less than 10% of the footprint of the area of any site type is within Flood Zone 3b.  
  o Less than 10% of the footprint of any residential site is within Flood Zone 3a.  
  o Less than 10% of the footprint of any mixed use site that may entail residential use is within Flood Zone 3a.  
  o Less than 10% of the footprint of any essential infrastructure site is within Flood Zone 3a. |
| **Development could be allocated subject to FRA** | • Any site within Flood Zone 2 that does not have any part of its footprint within Flood Zone 3a (with the exception of highly vulnerable developments such as gypsy and traveller sites) would be subject to, and have to pass, the Exception Test.  
• Employment, retail, recreation and leisure sites within Flood Zone 3a assuming the site use falls within the less vulnerable or water-compatible category of the flood risk vulnerability classification of the FRCC-PPG. No part of the site can be within Flood Zone 3b.  
• Any site within Flood Zone 3ai that is not withdrawn/subject to Exception Test or site boundary revision. Risk at such sites should be carefully considered through an FRA in line with Local Plan policies.  
• Any site entirely in Flood Zone 1 where surface water flood risk is significant enough to require investigation through a site-specific FRA.  
• Any site 100% within Flood Zone 1 that is greater than or equal to 1 hectare in area. |
| **Should be allocated on flood risk grounds subject to consultation with the LLFA** | • Any site 100% within Flood Zone 1 that is less than or equal to 1 hectare in area and has no surface water flood risk issues. |
Surface water flood risk is informed by the proportion of the footprint of each allocation site that falls within the 3.3% AEP (1 in 30-year), 1% AEP (1 in 100-year) and 0.1% (1 in 1000-year) risk envelopes shown on the Risk of Flooding from Surface Water map. The risk levels applied are:

- High risk if more than 10% of site footprint is within the 3.3% AEP event.
- Medium risk if more than 10% of site footprint is within the 1% AEP event.
- Lower risk if more than 20% of footprint is within the 0.1% AEP event.

The percentage thresholds are not specified in policy, but are sensible values that relate to practical issues with managing surface water on-site. As the thresholds do not account for local conditions, a site-specific FRA should be carried out to investigate possible mitigation measures for flood storage or infiltration techniques through appropriate SuDS.

For sites at surface water flood risk the following should be considered:

- Possible withdrawal, redesign or relocation of the site, certainly for those sites at higher risk from the 3.3% AEP event and those with a large percentage area at risk. Such sites would be considered as too small to be able to adequately mitigate the apparent level of surface water risk.
- A detailed site-specific Flood Risk Assessment incorporating surface water flood risk management and investigation of possible mitigation measures for flood storage or infiltration techniques through appropriate SuDS.
- Whether it would be more appropriate for the site to be nominated as open greenspace, thereby incorporating social and environmental benefits.

The LPA should also consider whether the delineation of areas of critical drainage may be appropriate for areas particularly prone to surface water flooding. Hambleton would need to undertake detailed analysis and consultation with the NYCC, Yorkshire Water and the Environment Agency. It may then be beneficial to carry out a Surface Water Management Plan (SWMP) or drainage strategy for targeted locations. Investigation into the capacity of existing sewer systems would be needed to identify critical parts of the system. Drainage model outputs could be obtained to confirm the critical parts of the drainage network and subsequent recommendations could then be made for future development i.e. strategic SuDS sites, parts of the drainage system where any new connections should be avoided and parts of the system that may have any additional capacity and recommended runoff rates.

### 3.4.4 Local factors to consider

Whilst the outcomes of the Sequential Test are based on flood risk designation, it is important to consider that each individual site will require further investigation, as local circumstances may dictate the outcome of the recommendation. Such local circumstances may include the following:

- If sites have planning permission but construction has not started, the SFRA will only be able to influence the design of the development e.g. finished floor levels. New, more extensive flood extents (from new models) cannot be used to reject development where planning permission has already been granted.
- Some sites may be able to develop around the flood risk. Planners are best placed to make this judgement i.e. to determine if the site will still be deliverable if part of it is retained to make space for flood water.
- Surrounding infrastructure may influence scope for layout redesign/removal of site footprints from risk.
- Current land use should be considered. For brownfield sites, extensions to existing development may not necessarily lead to increased flood risk as new-build properties in risk areas could be built with flood protection in mind. However, the Environment Agency may have their own views on this.
- Existing planning permissions may exist for some sites where the Environment Agency may have already passed comment and/or agreed to appropriate remedial works concerning flood risk. Previous flood risk investigations/FRAs may already have been carried out at some sites.
3.5 Exception Test, land for flood storage and Sustainability Appraisal

3.5.1 Exception Test

If it is not possible within the context of the Local Plan, for all development to take place in zones having lower probability of flooding, it would be necessary to demonstrate that the requirements of the Exception Test can be achieved (Figure 3-4). It would need to be shown that any developments would provide wider sustainability benefits to the community and that these benefits would outweigh any flood risk implications.

The following figure (taken from the PPG) shows where the Exception Test would be required according to proposed use (if a development has different types of use, its vulnerability should be based on the highest vulnerability category).

For the Exception Test to be passed, the NPPF Paragraph 102 states:

a. It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk informed by a Strategic Flood Risk Assessment where one has been prepared; and

b. A site-specific Flood Risk Assessment (FRA) must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

Both elements of the test will have to be passed for development to be allocated or permitted.

Although passing the Exception Test will require the completion of a site-specific FRA, Hambleton District should be able to assess the likelihood of passing the test at the Local Plan level by using the information contained in this SFRA to answer the following questions:

- Can development within higher risk areas be avoided or substituted?
- Is flood risk associated with possible development sites considered too high; and will this mean that the criteria for Exception Testing are unachievable?
- Can risk be sustainably managed through appropriate development techniques (resilience and resistance) and incorporate Sustainable Drainage Systems without compromising the viability of the development?
- Can the site, and any residual risks to the site, be safely managed to ensure that its occupiers remain safe during times of flood if developed?
Where it is unlikely that the Exception Test can be passed (due to few sustainability benefits identified, the risk of flooding being too great, or the viability of the site being compromised by the level of flood risk management work required), then consideration should be given to avoiding the site all together. Once the process has been completed the LPA should then be able to allocate appropriate development sites through the Local Plan as well as prepare flood risk policy including the requirement to prepare site-specific FRAs for all allocated sites that remain at risk of flooding.

3.5.2 Safeguarding Land for Flood Storage

Where possible, the Council may look to allocate land designed for flood storage functions. Such land can be explored through the site allocation process whereby an assessment is made, using this SFRA, of the flood risk at potential sites and what benefit could be gained by leaving the site undeveloped. In some instances, the storage of flood water can help to alleviate flooding elsewhere, such as downstream developments. Where there is a large area of a site at risk that is considered large enough to hinder development, it may be appropriate to safeguard this land for the storage of flood water.

Potential development sites that might be applicable for flood storage would include any current greenfield sites:

- That are large enough (>1 hectare) to store flood water to achieve effective mitigation.
- With large areas of their footprint at risk from 3.3% or 1% AEP surface water flood events (based on the RoFSW Map).
- That are within the functional floodplain (Flood Zone 3b).
- With large areas of their footprint at risk from Flood Zone 3a.
- That are large enough and within a suitable distance to receive flood water from a nearby development site using appropriate SuDS techniques which may involve pumping, piping or swales / drains.

Brownfield sites could also be considered though this would entail clearance of existing buildings and conversion to greenspace.

3.5.3 Sustainability Appraisal

The Sustainability Appraisal should help to ensure that flood risk is taken into account at all stages of the planning process with a view to directing development away from areas at flood risk, now and in the future, by following the sequential approach to site allocation. Using the Sequential Test outputs, the Council should be able to make decisions on the sustainability of specific sites, with regards to flood risk. By avoiding sites identified as being at significant risk or by considering how changes in site layout can avoid those parts of a site at flood risk, the Council would be demonstrating a sustainable approach to development.

In terms of surface water, the same approach should be followed whereby those sites at highest risk should be avoided or site layout should be tailored to ensure sustainable development. This should involve investigation into appropriate SuDS techniques. The formal designation of Critical Drainage Areas through Surface Water Management Plans or drainage strategies, should also provide sustainability benefits by ensuring that any site within a CDA that is greater than 0.5 ha in extent should be subject to a site-specific FRA and be subject to a larger reduction on existing runoff rates to ensure appropriate mitigation of surface water risk.

Once the Council has decided on a final list of sites following application of the Sequential Test and, where required, the Exception Test, a phased approach to development should be carried out to avoid any cumulative impacts that multiple developments may have on flood risk. For example, for any site involving development in Flood Zone 3, detailed modelling would be required to ascertain where displaced water may flow and to calculate subsequent increases in downstream flood volumes. The modelling should investigate the use of compensatory storage to ensure that downstream or nearby sites are not adversely affected.
A phased approach to development based on modelling of floodwater storage options, should ensure that any sites at risk of causing flooding to other sites are developed first. This will ensure flood storage measures are in place before other sites are developed, which is a more sustainable approach to site development. Also, it may be possible that flood mitigation measures put in place at sites upstream could alleviate flooding at downstream or nearby sites.

3.6 Application of the Sequential Test to potential development sites

3.6.1 Potential and preferred sites

Hambleton District Council have identified potential development sites drawing, as suggested in the PPG, on a broad range of sources including the SHELAA, existing planning commitments and sites promoted through a “call for sites” exercise (carried out in 2015 as part of the pre-publication of the Local Plan). The inclusion of a site in the list of potential sites does not mean it will be developed, which will ultimately depend on the suitability for development, availability and the likelihood of development being financially viable.

In the original (September 2016) list of potential development sites, 515 site boundaries were flagged for consideration, of which the majority (427 sites) are proposed for housing. The remaining sites are either proposed for employment (23), mixed use (22), local green space/recreation (35) or gypsy/traveller sites (2). For 6 sites the proposed use remains undetermined, so assessment has assumed residential use.

Most of the 84 additional sites identified through the November 2016 Preferred Options Consultation were flagged for housing, although 5 employment, 4 mixed use sites and 2 sites suitable for recreational use or green space uses were also included.

The NPPF and PPG advocate that land assessments for housing and economic development should be undertaken as part of the same exercise in order that sites may be allocated for the most appropriate use. In line with this guidance Hambleton District Council has carried out the land assessment for housing and employment sites in a joined-up manner, and has started to identify which of the potential sites should be earmarked as preferred sites for development on this basis.

As part of this SFRA, an analysis has been undertaken on the list of potential and additional sites to quantify flood risk and provide recommendations of how the flood risk implications should be dealt with within the context of planning policy and development of the Local Plan. This analysis has been achieved by application of the Sequential Test in line with PPG. The outcomes of this assessment are presented in the Development Site Assessment Spreadsheet (Appendix B) and summarised in Appendix C.

3.6.2 Specific considerations

In understanding the current degree of flood risk, the following were undertaken prior to the analysis:

- Delineation of the functional floodplain (Flood Zone 3b) based on defended flood extent envelopes from the following Environment Agency mapping studies:
  - Potto Beck
  - Stokesley
  - Great Ayton
  - Cod Beck
  - North Beck

The FZ3b extent was derived by combining the extents of the above model flood outlines into one envelope and adding to this any areas designed by the Environment Agency as Flood Storage Areas (FSAs) and any areas falling within the Environment Agency’s historic flood map. The historic flood map data was used only where deemed to be reliable and in all cases clipped to exclude any areas outside the current Flood Zone 3 boundary. Any areas in which urban development and/or significant infrastructure (major roads for example) would prevent conveyance of flood flows were identified (see Flood Zone 3ai) and removed to create the final FZ3b extent.
• Delineation of areas of land where water would flow or be stored in times of flooding if
constraints due to development or infrastructure did not already exist (Flood Zone
3ai). Flood Zone 3ai therefore represents the areas of land that would be in Flood Zone
3b if not already developed.

Such areas were delineated by using OS 1:10,000 scale maps to identify areas of urban
development and major infrastructure (roads and rail) falling within the boundary of FZ3,
and intersecting this with the draft FZ3b envelope through GIS analysis.

Although not considered within the Sequential Test, the identification of FZ3ai allows the Council
to assess risk within FZ3a in more detail by showing areas where existing development or
infrastructure is likely to be restricting flood flows in areas that would otherwise be within the
Functional Floodplain. Should any potential development sites in Flood Zone 3ai become
available for new or further development (e.g. brownfield sites) then both the risk at the sites and
their influence on flood risk in the surrounding area should be carefully considered in line with
Local Plan policies.

3.6.3 Accounting for future climate change

The flood risk designations utilised in this report relate to the current situation, since the Flood Map
for Planning and the Risk of Flooding from Surface Water Map do not incorporate the impacts of
climate change.

However, because lifetimes for residential developments can be significant, policies for new
development must be based on future levels of risk, rather than those that apply currently. It is
widely accepted and understood that climate change is likely to lead to increased risks of flooding
in the future, with risks increasing over time. This will have implications for both the type of
development that is appropriate and design standards for any SuDS or mitigation schemes
proposed.

The impact of climate change on flood risk won’t be the same everywhere, however. For example,
risks are expected to increase more in certain parts of the country. Local differences in the scale
of change may be governed by geographic conditions. For very flat floodplains, where flood
extents can increase significantly for a small increase in flood peak magnitudes, locations currently
within lower risk zones could in future be re-classified as lying within a higher risk zone due to
climate change. Residential development in such areas may therefore not be appropriate without
suitable flood mitigation measures (such as flood resilient or resistant houses for instance). In
more well-defined floodplains, increased flows will primarily result in increased flood depths,
thereby influencing building type and design (e.g. having elevated floor levels) for any new
development that takes place.

In the absence of any published information on exactly how Flood Zone boundaries might change
due to climate change, a workable assumption is that the current day Flood Zone 2 extent will be
entirely taken up by Flood Zone 3 in the future. This approach, whilst precautionary, is considered
a pragmatic methodology for the purposes of a Level 1 SFRA, particularly as it is consistent with
professional experience indicating that the flood magnitude equal to the present day 0.1%AEP
event could occur at a 1% AEP frequency in the future. As such, for any sites within Flood Zone
2, the possibility of these sites being within Flood Zone 3 at some future point should be
considered, depending on the expected life time of the development. This issue only becomes
problematic if development needs for housing and employment cannot be accommodated within
the present-day Flood Zone 1.

A more detailed assessment of the impacts of climate change could be carried out as part of a
Level 2 SFRA or site-specific FRA. This should consider the updated climate change allowances
(published by the Environment Agency in February 2016)\(^8\) to provide an appropriately robust
response to the uncertainty about climate change impacts on peak river flow rates and rainfall
intensities. For example, the Environment Agency’s specified peak river flow allowances for the
Humber River Basin District, range between +10% and +20% for the period covered by the Local
Plan, but rise to as much as +50% by the 2080’s (Table 3-2), whilst peak rainfall rates may be
increased by the allowances stated in Table 3-3.

\(^8\) https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances
Table 3-2: Recommended peak river flow allowances

<table>
<thead>
<tr>
<th>Allowance Category</th>
<th>Total Potential Change Anticipated for…</th>
<th>2020s (2015-2039)</th>
<th>2050s (2040-2069)</th>
<th>2080s (2070-2115)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Humber rivers (all tributaries of the Ouse and Derwent)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper end</td>
<td>+20%</td>
<td>+30%</td>
<td>+50%</td>
<td></td>
</tr>
<tr>
<td>Higher central</td>
<td>+15%</td>
<td>+20%</td>
<td>+30%</td>
<td></td>
</tr>
<tr>
<td>Central</td>
<td>+10%</td>
<td>+15%</td>
<td>+20%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Northumbrian rivers (Leven catchment only)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper end</td>
<td>+20%</td>
<td>+30%</td>
<td>+50%</td>
<td></td>
</tr>
<tr>
<td>Higher central</td>
<td>+15%</td>
<td>+20%</td>
<td>+25%</td>
<td></td>
</tr>
<tr>
<td>Central</td>
<td>+10%</td>
<td>+15%</td>
<td>+20%</td>
<td></td>
</tr>
</tbody>
</table>

Table 3-3: Peak Rainfall Intensity Allowance in Small and Urban Catchments for England

<table>
<thead>
<tr>
<th>Allowance Category</th>
<th>Total Potential Change Anticipated for…</th>
<th>2015-2039</th>
<th>2040-2069</th>
<th>2070-2115</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper end</td>
<td>+10%</td>
<td>+20%</td>
<td>+40%</td>
<td></td>
</tr>
<tr>
<td>Central</td>
<td>+5%</td>
<td>+10%</td>
<td>+20%</td>
<td></td>
</tr>
</tbody>
</table>

The Environment Agency will also require consideration, if appropriate, of the ‘high++ allowances’ for peak river flows and mean sea level rise where a development is very sensitive to flood risk and has an intended lifetime that extends into the next century. This could include infrastructure projects or developments that significantly change existing settlement patterns. The high++ allowances can be found in the Environment Agency’s Adapting to Climate Change: Advice for Flood and Coastal Erosion Risk Management Authorities⁹, which uses science from UKCP09. This guidance is based on Government’s policy for climate change adaptation, and is specifically intended for projects or strategies seeking Government Flood Defence Grant in Aid (FDGiA) funding. However, RMAs in England may also find it useful in developing plans and making Flood and Coastal Erosion Risk Management (FCERM) investment decisions even if there is no intention of applying for central government funding. This is important for any future large scale infrastructure used to support the delivery of strategic sites such as flood defence schemes.

Although, it is anticipated that increases in river flows will lie somewhere within the range of the central to upper end estimates, more extreme change cannot be discounted. The high++ allowances can be used to represent more severe climate change impacts and help to identify the options that would be required. The UKCP09 high++ allowances for peak river flows are presented in Table 3-4.

Table 3-4: UKCP09 High++ Allowances for Peak River Flow for the Humber River Basin District

<table>
<thead>
<tr>
<th>River Basin District</th>
<th>Total Potential Change Anticipated for…</th>
<th>2020s (2015-39)</th>
<th>2050s (2040-69)</th>
<th>2080s (2070-2115)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humber</td>
<td>+20%</td>
<td>+35%</td>
<td>+65%</td>
<td></td>
</tr>
<tr>
<td>Northumbria</td>
<td>+20%</td>
<td>+35%</td>
<td>+65%</td>
<td></td>
</tr>
</tbody>
</table>

Modelled climate change outputs, using the above allowances, are not available at the time of writing for this Level 1 SFRA. However, any Level 2 assessment, if deemed to be required, could involve the modelling of appropriate climate change events where fully functioning Environment Agency hydraulic models are available.

⁹ Environment Agency Adapting to Climate Change: Advice for Flood and Coastal Erosion Risk Management Authorities
2016s4298 Hambleton DC Level 1 SFRA (FINAL March 2017).docx
3.6.4 Outcomes

Initial list of sites (September 2016)

Of the 515 original potential sites, 32 have parts of their footprints within Flood Zone 3b, 8 have parts of their footprint within 3ai, and a further 85 have parts within 3a. A further 106 have parts of their footprint in Flood Zone 2. 211 of the potential sites are also at high risk from surface water flooding, however for only a small number of these does surface water impact on more than 10% of the site.

Application of the Sequential Test (see Appendix C) showed that 166 sites in the allocation appear permittable for development as they have minimal implications for flood risk. A further 229 sites were deemed to be suitable for inclusion in the allocation subject to an FRA being able to demonstrate no significant impacts of flooding from other sources. A total of 12 sites were identified as needing to be withdrawn from the allocation as large proportions of their footprints were Flood Zone 3b. 28 sites were identified as needing to be subject to the Exception Test. 32 sites were identified as having the potential to pass the Sequential Test following site boundary adjustments (to exclude parts of the footprint at higher flood risk).

Additional sites (March 2017)

Of the 84 additional sites, 6 sites have parts of their footprints within Flood Zone 3b, 2 have parts of their footprints within 3ai and a further 14 sites have parts of their footprints within 3a. A further of 18 sites have parts of their footprint in Flood Zone 2. Only three of the proposed sites could be considered at high risk from surface flooding.

Application of the Sequential Test showed 35 sites have minimal implications with respect to flood risk and would be expected to be permitted for development. For 33 sites an FRA would be needed to investigate impacts of flooding from other sources. 8 sites were identified as having the potential to pass the Sequential Test following site boundary adjustments (to exclude parts of the footprint at higher flood risk). 3 sites were identified as needing to be subject to the Exception Test. Two sites were deemed as having a water compatible use.
4 Accounting for flood risk in planning applications

4.1 Introduction

Just as with Local Plan allocations (Chapter 3), a hierarchical approach needs to be applied within the development management process to assess, control and mitigate the potential risk of flooding associated with planning applications.

The NPPF (Paragraph 103) states that when determining planning applications, LPAs should ensure flood risk is not increased elsewhere and only consider development appropriate in areas at risk of flooding where it can be demonstrated that i) within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location; and ii) development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including by emergency planning; and it gives priority to the use of sustainable drainage systems.

This means that most development planning applications must be informed by a site-specific Flood Risk Assessment (FRA) and be subject to the Sequential Test and, if required, the Exception Test.

Paragraph 011 of the NPPF re-affirms planning law, stating that applications for planning permission “…must be determined in accordance with the development plan unless material considerations indicate otherwise”. Development proposals that are in line with Local Plan policies should be approved. However, those that conflict with Local Plan policies should be refused unless material considerations indicate otherwise.

4.2 Site-specific Flood Risk Assessment

Purpose

A site-specific FRA is carried out by (or on behalf of) a developer to assess the flood risk to and from a development site, and should normally be provided when a planning application is submitted to the relevant LPA. The FRCC-PPG requires that an FRA should demonstrate to the decision-maker how flood risk will be managed over the entire lifetime of the development with regard to the vulnerability of its users. The FRA should also take climate change into account.

Applicability

According to NPPF footnote 20, a site-specific FRA should be prepared when the application site is:

- Situated in Flood Zone 2 and 3; for all proposals for new development (including minor development and change of use).
- 1 hectare or greater in size and located in Flood Zone 1.
- Located in Flood Zone 1 where there are critical drainage problems.
- At risk of flooding from other sources of flooding, such as those identified in this SFRA.
- Subject to a change of use to a higher vulnerability classification which may be subject to other sources of flooding.

The LPA may also like to consider further situations in which a FRA is deemed as statutory, such as for example:

- Where the proposed development site is situated in an area currently benefitting from defences.
- Where the proposed development site is situated within 20 metres of the bank top of a Main River.
- Where the proposed development site is situated over a culverted watercourse or where development will require controlling the flow of any river or stream or the development could potentially change structures known to influence flood flow.

These requirements should be considered during the preparation and development of the Local Plan.
Objectives

The objectives of a site-specific FRA are to establish whether a proposed development is likely to be affected by current or future flooding (including effects of climate change) from any source. This should include referencing this SFRA to establish sources of flooding. Further analysis should be performed to improve understanding of flood risk including agreement with the council on areas of functional floodplain that have not been specified within this SFRA. The FRA should provide evidence for the LPA to apply (if necessary) the Sequential Test, and should determine:

- Whether the development will increase flood risk elsewhere.
- Whether the measures proposed to deal with these effects and risks are appropriate.
- Whether the development will be safe and pass the Exception Test, if applicable.

The FRA should determine the potential of increased flood risk elsewhere due to the addition of hard surfaces on-site and the effect of new development on surface water runoff, and consider opportunities to reduce the overall level of flood risk in the area and beyond. This can be achieved, for instance, through the layout and form of development, including green infrastructure and the appropriate application of sustainable drainage systems, through safeguarding land for flood risk management, or where appropriate, through designing off-site works required to protect and support development in ways that benefit the area more generally.  

The FRCC-PPG doesn’t contain any further detail on the minimum requirements for site-specific FRAs. It is therefore important that the Environment Agency’s FRA guidance is referred to and the site-specific Flood Risk Assessment Checklist in paragraph 068 of the FRCC-PPG should be consulted. CIRIA’s report ‘C624 Development and Flood Risk’ also provides useful guidance.

In particular, the following might be considered for inclusion within the FRA:

- Detailed surface water modelling, especially for the larger sites which may influence sites elsewhere.
- An evaluation of the possibility of increased surface water flood risk caused by development on current Greenfield land, and cumulative impacts of this within specific areas. This may be especially relevant if the development site is large.
- Strategies for management and re-use of surface water on-site, assuming the site is large enough to facilitate this and achieve effective mitigation.
- The possibility of leaving surface water flood prone areas as open greenspace, incorporating social and environmental benefits.
- Demonstration of effective surface water management to ensure risks on and off site are controlled.
- Demonstration of appropriate use of SuDS to control runoff to Greenfield rates. Developers should refer to the NYCC SuDS Design Guidance. Restrictions on surface water runoff from new development should be incorporated into the development planning stage. For brownfield sites, where current infrastructure may be staying in place, then runoff should attempt to mimic that of Greenfield rates, unless it can be demonstrated that this is unachievable or hydraulically impractical.

4.3 Demonstrating the Sequential Test for planning applications

4.3.1 Process stages

Figure 4-1 illustrates the process of applying the Sequential Test within the context of development management (note this does not apply to change of use applications unless it is for change of land use to a caravan, camping or chalet site, or to a mobile home site or park home site). Close working between LPA Development Management and Planning Policy departments will be required to implement this process. Any locally agreed approaches to the application of the Sequential Test (e.g. arising from consultations with the Environment Agency or the LFFA) should be taken into consideration.

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11 http://m.northyorks.gov.uk/CHttpHandler.ashx?id=30769&p=0
The Environment Agency’s Standing Advice\(^{12}\) recommends the following approach is used by LPAs to apply the Sequential Test to planning applications located in Flood Zones 2 or 3:

- **First**, check the Local Plan for sites that have already been allocated for development and could be suitable for the development you’re proposing,
- **Also** look at sites that haven’t been allocated in the Local Plan, but that have been granted planning permission for a development that’s the same or similar to the development you’re proposing,
- **Finally**, check whether there are any ‘windfall sites’ in your search area. Windfall sites are sites that are not allocated in the Local Plan and don’t have planning permission, but could be available for development. You can look for windfall sites yourself and also reference the Council’s Housing Land Monitor Report and the Housing and Employment Land Availability Assessment.

The current documentation relevant to the above include the 2014 Strategic Housing Land Availability Assessment and the Employment Land Review\(^{13}\).

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Stage 1 - Strategic review
Stage 1 considers strategic application and development vulnerability. In other words, the Sequential Test can be considered adequately demonstrated if both the following criteria are met:

- The Sequential Test has already been carried out for the site (for the same development type) as part of the Local Plan.
- The development vulnerability is appropriate to the Flood Zone.

If both these criteria are met, a reference should be provided for the site allocation of the Local Plan document and the vulnerability of the development should be clearly stated.

Stage 2 - Defining the evidence base
Stage 2 defines the evidence base. It aims to identify whether there are other potential sites which could suit the proposed development, and should consider the following:

- The geographic area in which the Sequential Test is to be applied. For Hambleton District Council, this would be defined by the local circumstances relating to the catchment and for the type of development being proposed.
- The source of reasonable available sites against which the application site will be tested.
- The evidence and method used to compare flood risk between sites.

Stage 3 - Apply the Sequential Test
This stage involves comparing the proposed development site with the pool of sites identified in Stage 2. Sites should be compared in relation to flood risk; Local Plan status; capacity; and constraints to delivery including availability, policy restrictions, physical problems or limitations, potential impacts of the development, and future environmental conditions that would be experienced by the inhabitants of the development. The test should conclude if there are any reasonably available sites in areas with a lower probability of flooding, that would be appropriate to the type of development proposed.

If the planning application passes the Sequential Test, then the applicant should apply the Exception Test in the circumstances set out by Tables 1 and 3 of the FRCC-PPG. In all circumstances, where the site is within areas at risk of flooding and where a site-specific FRA has not already been carried out, a site-specific FRA should be completed in line with the NPPF and the FRCC-PPG.

4.3.2 Other considerations
In addition to the formal Sequential Test, the NPPF sets out the requirement for developers to apply the sequential approach to locating development within the site. As part of their application and master planning discussions with applicants, LPAs should seek to determine if:

- Flood risk can be avoided by substituting less vulnerable uses or by amending the site layout.
- Less vulnerable uses for the site have been considered.
- Density can be varied to reduce the number or the vulnerability of units located in higher risk parts of the site.

Careful layout and design at the site planning stage may apply to such sites where it is considered viable based on the level of risk. Surface water risk and opportunities for SuDS should also be assessed at this stage. Developers should refer to NYCC’s SuDS Design Guide which provides details when and where SuDS are required. Further guidance on this is also given in Chapter 5.1. Any site layout and design options should take account of the 8m easement buffer along watercourses, from the top of the bank or the landward toe of a defence on main rivers, where development is not permitted. This easement buffer is recommended by the Environment Agency to allow ease of access to watercourses for maintenance works.

14 http://m.northyorks.gov.uk/CHandler.ashx?id=30769&p=0
Depending on local circumstances, if it is not possible to adjust the site boundary to avoid areas of higher flood risk, then development should not be permitted. If it is also preferable to adjust the developable area of a site to remove any proposed development in Flood Zone 3a or to incorporate the on-site storage of water within site design. If this can’t be achieved, then the Exception Test would have to be passed as part of a site-specific FRA.

If a site is located within Flood Zone 3ai then any redevelopment of the site should have regard to restrictions set out in policies of the Local Plan. Where possible, such sites should look to reduce risk when designing for new development. Any site redesign, where Flood Zone 3ai is included within the site footprint, should allow water to flow naturally or be stored in times of flood through application of appropriate SuDS techniques, as per the NYCC SuDS Design Guide.

4.4 Specific guidance for developers

The following specific guidance is offered to developers on using this SFRA. When initially considering the development options for a site, developers should use this SFRA, the NPPF and the Planning Practice Guidance to:

a. Assess whether the site is a windfall development, allocated development, within a regeneration area, single property or subject to a change of use to identify if the Sequential and Exception Tests are required.

b. Check whether the Sequential Test and / or the Exception Test have already been applied. This includes requesting information from the LPA on whether the Sequential Test, or the likelihood of the site passing the Exception Test, have been assessed. If the site was not considered in the Local Plan, it is necessary to provide evidence to the LPA that the site passes the Sequential Test and will pass the Exception Test.

c. Consult with the LPA Development Control, the LLFA, the Environment Agency and the wider group of flood risk consultees, where appropriate, to scope an appropriate FRA if required (accounting for guidance on FRAs provided earlier in this SFRA, plus referring to the Environment Agency Standing Advice, CIRIA Report C624, NYCC SuDS Design Guidance, the NPPF and the Planning Practice Guidance).

d. Submit FRA to Development Control and the Environment Agency for approval, where necessary.

Table 4-1 identifies, for developers, when the Sequential and Exception Tests are required for certain types of development, who is responsible for providing the evidence and those who should apply the tests if required.

A more detailed assessment of the impacts of climate change on flooding from the land and rivers should be carried out as part of a FRA. This should be carried out using the sensitivity ranges and climate change allowances, published by the Environment Agency in February 201615.

## Table 4-1: Development types and application of Sequential and Exception Tests for developers

<table>
<thead>
<tr>
<th>Development</th>
<th>Sequential Test Required?</th>
<th>Who Applies the Sequential Test?</th>
<th>Exception Test Required?</th>
<th>Who Applies the Exception Test?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allocated Sites</td>
<td>No (provided no change in development type)</td>
<td>LPA should have already carried out the test during the allocation of development sites</td>
<td>Dependent on land use vulnerability</td>
<td>LPA to advise on the likelihood of test being passed. The developer must also provide evidence that the test can be passed by providing planning justification and producing a detailed FRA</td>
</tr>
<tr>
<td>Windfall Sites</td>
<td>Yes</td>
<td>Developer provides evidence, to the LPA that the test can be passed. An area of search will be defined by local circumstances relating to the catchment and for the type of development being proposed</td>
<td>Dependent on land use vulnerability</td>
<td>Developer must provide evidence that the test can be passed by providing planning justification and producing a detailed FRA</td>
</tr>
<tr>
<td>Regeneration Sites Identified Within Local Plan</td>
<td>No</td>
<td>-</td>
<td>Dependent on land use vulnerability</td>
<td>LPA to advise on the likelihood of test being passed. The developer must also provide evidence that the test can be passed by providing planning justification and producing a detailed FRA</td>
</tr>
<tr>
<td>Redevelopment of Existing Single Properties</td>
<td>No</td>
<td>-</td>
<td>Dependent on land use vulnerability</td>
<td>Developer must provide evidence that the test can be passed by providing planning justification and producing a detailed FRA</td>
</tr>
<tr>
<td>Changes of Use</td>
<td>No (except for any proposal involving changes of use to land involving a caravan, camping or chalet site)</td>
<td>Developer provides evidence, to the LPA that the test can be passed</td>
<td>Dependent on land use vulnerability</td>
<td>Developer must provide evidence that the test can be passed by providing planning justification and producing a detailed FRA</td>
</tr>
</tbody>
</table>
5 Flood control and mitigation strategies

5.1 Overview
Where the flood risk associated with a development cannot be avoided, plans must be put into place to reduced and/or mitigate the impact of the risk on those who might be affected. Such flood control and mitigation measures should be considered at both a strategic and site-specific level (i.e. within the context of the Local Plan, and as part of a development application).

5.1.1 Control measures
Control is preferred to be achieved by use of Sustainable Drainage Systems (SuDS) to encourage infiltration rather than runoff of rainfall from a developed site. Until recently the adoption and maintenance of SuDS was the responsibility of Sustainable Drainage Systems Approval Bodies (SABs), which were supposed to be established by local authorities, or LLFA’s, under Schedule 3 of the FWMA. However, the Department for Communities and Local Government (DCLG) announced in December 2014 that local planners would henceforth be responsible for delivering SuDS16. Major applications consisting of ten or more residential units (or equivalent commercial development) require sustainable drainage measures to be considered in accordance with current technical standards (Defra, 201517). Policy changes to the planning system can also be introduced relatively quickly so that flood risk benefits from sustainable drainage systems can be brought forward as part of planning application proposals.

Wherever possible planning applications should propose the use of SuDS, and the use of SuDS should be a factor that is considered before approving an application. The NPPF continues to reinforce that planning applications failing to deliver SuDS above conventional drainage techniques could be rejected. Maintenance of sustainable drainage option should also form part of integrated design secured by detailed planning conditions. These must clearly identify who will be responsible for SuDS maintenance, ensure funding for maintenance is fair for householders and occupiers and set out a minimum standard for maintenance. Guidance on the application, design and adoption of SuDS is provided in Section 5.2.

In addition, the Local Planning Authority may set local requirements for planning permission that include more rigorous obligations than outlined in Defra’s technical standards. More stringent requirements should be considered where current Greenfield sites lie upstream of high risk areas. This could include improvements on Greenfield runoff rates, for example. It is common practice to assume a nominal Greenfield runoff rate of 5 l/s/ha (1.4 l/s/ha where in an IDB) but the LPA may consider to impose the use of lower values unless the developer submits conclusive calculations that demonstrate local rates are greater than this.

5.1.2 Mitigation measures
A range of different mitigation strategies are possible. These include emergency plans (Section 5.3), evacuation plans (Section 5.4) and measures to improve flood awareness and preparedness (Section 5.5). Property level protection or resilience measures can also be included in this category.

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5.2 Sustainable Drainage Systems (SuDS)

5.2.1 Purpose of a SuDS

Development has the potential to cause an increase in impermeable area, an associated increase in surface water runoff rates and volumes, and consequently a potential increase in downstream flood risk due to overloading of sewers, watercourses, culverts and other drainage infrastructure. Managing surface water discharges from new development is therefore crucial in managing and reducing flood risk to new and existing development downstream. Carefully planned development can also play a role in reducing the amount of properties that are directly at risk from surface water flooding.

Sustainable drainage systems (SuDS) are drainage systems that store or re-use surface water at source, thereby reducing the peak or the volume of water that is discharged from the development. By mimicking natural drainage patterns SuDS are also able to provide water quality, amenity and biodiversity benefits that are not seen when conventional drainage methods are implemented.

5.2.2 Designing a SuDS

The design, construction and ongoing maintenance regime of any SuDS scheme must be carefully defined as part of a site-specific FRA. However, as any drainage solution employed should be site-specific to the site, a range of different SuDS techniques and arrangements can be implemented. In most cases, a combination of techniques, using the Management Train principle (see Figure 5-1), will be required, where source control is the primary aim.

**Figure 5-1: SuDS Management Train Principle**

Source control methods involve the interception of run-off water from roofs or hard standing for subsequent re-use (e.g. for irrigation) or for storage and subsequent evapotranspiration (e.g. green roofs). Pre-treatment steps, such as vegetated swales (ditches) or filter trenches, might also be included in the scheme, these being used to remove pollutants from surface water prior to discharge to watercourses or aquifers. Retention systems, used to delay the discharge of surface water to watercourses, involve the use of storage within ponds, retention basins and wetlands for example, whilst infiltration systems, such as infiltration trenches and soakaways facilitate recharge of the underlying soil and geology.

The runoff destination should always be the first consideration when considering design criteria for SuDS including the following possible destinations in order of preference:

1. To ground.
2. To surface water body.

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3. To surface water sewer.
4. To combined sewer.

Effects on water quality should also be investigated when considering runoff destination in terms of the potential hazards arising from development and the sensitivity of the runoff destination. Developers should also establish that proposed outfalls are hydraulically capable of accepting the runoff from SuDS through consultation with the LLFA, Environment Agency (if the discharge was to a main river), the local drainage board (if relevant) and the relevant water company (e.g. Yorkshire Water). The non-statutory technical standards for sustainable drainage systems (Defra, 2015) also set out appropriate design criteria based on the following:

- Flood risk outside the development.
- Peak flow control.
- Volume control.
- Flood risk within the development.
- Structural integrity.
- Designing for maintenance considerations.
- Construction.

The effectiveness of a flow management scheme within a single site is heavily limited by land use and site characteristics including (but not limited to) topography; geology and soil (permeability); and available area. Therefore, a clear and comprehensive understanding of the catchment hydrological processes (i.e. nature and capacity of the existing drainage system) is essential for successful SuDS implementation. Potential ground contamination associated with urban and former industrial sites should be investigated with concern being placed on the depth of the local water table and potential contamination risks that will affect water quality.

### 5.2.3 CIRIA SuDS Manual

CIRIA has also produced documentation relating to SuDS which should be consulted by the LPA and developers. The CIRIA SuDS Manual (C753)\(^\text{19}\) was updated in 2015, and includes technical and practical advice on the SuDS design process, types of treatment systems, methods of hydrology and hydraulics design, construction, operation and maintenance. CIRIA, and a range of other organisations, also provide training in the design of SuDS.

### 5.2.4 North Yorkshire County Council SuDS Design Guidance

As previously noted, NYCC has produced a SuDS Design Guidance document for developers\(^\text{20}\) which should be referred to alongside this SFRA. The guidance note details the requirements of North Yorkshire County Council, in its capacity as the LLFA, for SuDS design. NYCC emphasise that the three most important requirements are i) that people, property and critical flooding should be protected from flooding, ii) that development should not increase flood risk off site and iii) that SuDS should be economically maintained for the lifetime of the development. Other stipulations include that:

- Discharge to the ground (infiltration) should be prioritised, flooding from the on-site drainage system should not occur on any part of the site for a 1 in 30-year rainfall events or for buildings in the 1 in 100-year event, accounting for climate change.
- The assumed greenfield runoff rate should not exceed 1.4l/s/ha unless modelling conclusively demonstrates it to be greater than this.
- The runoff volume from the developed site for the 1 in 100-year 7-hour duration rainfall event must not exceed the greenfield runoff volume for the same event.
- The runoff volume should, where possible, be dealt with using infiltration methods, but if this is no possible, there should be no additional flood risk due to its discharge.

Requirements for brownfield sites are different and the developer should refer to the NYCC document for further guidance on these. The NYCC guidance applies to all major development in

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\(^{20}\) http://m.northyorks.gov.uk/CHttpHandler.ashx?id=30769&p=0
Hambleton District that the LLFA are consulted on as a statutory consultee (see section 1 of the NYCC SuDS Guidance).

Decisions regarding the use of SuDS within non-major development falls to Hambleton District Council alone. The guidance provides direction to the relevant design guidance for the successful implementation of SuDS and is the basis on which planning consultations from Local Planning Authorities will be assessed.

5.3 Mitigation through emergency plans

5.3.1 Emergency planning processes

The provisions for emergency planning for local authorities as Category 1 responders are set out by the Civil Contingencies Act, 2004 and the National Flood Emergency Framework for England, December 2014\(^\text{21}\). This framework is a resource for all involved in emergency planning and response to flooding from the sea, rivers, surface water, groundwater and reservoirs. The Framework sets out the Government’s strategic approach to:

- Ensuring all delivery bodies understand their respective roles and responsibilities when planning for and responding to flood related emergencies.
- Give all players in an emergency flooding situation a common point of reference which includes key information, guidance and key policies.
- Establish clear thresholds for emergency response arrangements.
- Place proper emphasis on the multi-agency approach to managing flooding events.
- Provide clarity on the means of improving resilience and minimising the impact of flooding events.
- Provide a basis for individual responders to develop and review their own plans.
- Being a long-term asset that will provide the basis for continuous improvement in flood emergency management.

Along with the Environment Agency flood warning systems, there are a range of flood plans at a sub-regional and local level, outlining the major risk of flooding and the strategic and tactical response framework for key responders.

This SFRA contains useful data to allow emergency planning processes to be tailored to the needs of the area and be specific to the flood risks faced. The SFRA Maps provided alongside this report should be made available for consultation by emergency planners during an event and throughout the planning process.

5.3.2 Civil Contingencies Act

Under the Civil Contingencies Act (CCA, 2004)\(^\text{22}\), Hambleton District Council is classified as a Category 1 responder and has duties to assess the risk of emergencies occurring, and uses this to:

- Inform contingency planning.
- Put in place emergency plans.
- Put in place Business continuity management arrangements.
- Put in place arrangements to make information available to the public about civil protection matters.
- Maintain arrangements to warn, inform and advise the public in the event of an emergency.
- Share information with other local responders to enhance coordination.
- Cooperate with other local responders to enhance coordination and efficiency and to provide advice and assistance to businesses and voluntary organisations about business continuity management.


\(^{22}\) https://www.gov.uk/preparation-and-planning-for-emergencies-responsibilities-of-responder-agencies-and-others#the-civil-contingencies-act
During an emergency, such as a flood event, the local authority must also co-operate with other Category 1 responders (such as the emergency services and the Environment Agency) to provide the core response.

5.3.3 North Yorkshire Local Resilience Forum

Hambleton District Council is a partner of the North Yorkshire Local Resilience Forum (NYLRF)23. The role of the Resilience Forum is to ensure an appropriate level of preparedness to enable an effective multi-agency response to emergency incidents that may have a significant impact on the communities within the Hambleton District and other boroughs within North Yorkshire County. NYLRF consists of representatives from the Emergency Services, all eight of North Yorkshire’s local authorities (Harrogate Borough Council, City of York Council, Craven District Council, Hambleton District Council, Ryedale District Council, Scarborough Borough Council, Selby District Council, Richmondshire District Council), the North Yorkshire and York PCT, the Yorkshire and the Humber SHA (part of the NHS Trust), the Environment Agency, Public Health England and the Maritime and Coastguard Agency.

Community Risk Register

As a strategic decision-making organisation, the NYLRF prepared a Community Risk Register (CRR)24, last updated in 2013, which considers the likelihood and consequences of the most significant risks and hazards the area faces, including fluvial and urban flooding. This SFRA can help to inform this. The CRR is considered as the first step in the emergency planning process and is designed to reassure the local community that measures and plans are in place to respond to the potential hazards listed within the CRR.

Community Emergency Plan

Communities may need to rely on their own resources to minimise the impact of an emergency, including a flood, before the emergency services arrive. Many communities already help each other in times of need, but experience shows that those who are prepared cope better during an emergency. Communities with local knowledge, enthusiasm and information are a great asset and a Community Emergency Plan can help. NYLRF has produced a template on how to produce a Community Emergency Plan, though some communities across Harrogate Borough already have one in place. To check whether a community already has an emergency plan in place, a map of the county is available via the following link:

http://maps.northyorks.gov.uk/connect/analyst/?mapcfg=comm_emergency_plans

For more information, communities should contact their town or parish council.

Household Plans

The NYLRF recommends individual families should create a Household Plan and Grab Bag to prepare for emergencies. A template for creating a Household Plan is available via:

http://emergencynorthyorks.gov.uk/CHttpHandler.ashx?id=32986&p=0

5.3.4 Local flood plans

This SFRA summarises the flood risk data sources that should be used when producing or updating flood plans. Hambleton District Council will be unable to write specific flood plans for new developments at flood risk. Developers should write their own. Guidance can be found on the Environment Agency web site25. Generally, owners with individual properties at risk should write their own individual flood plans, however larger developments or regeneration areas, such as retail parks, hotels and leisure complexes, should consider writing one collective plan for the assets within an area.

This SFRA can help to:

- Update these flood plans if appropriate.

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23 http://www.emergencynorthyorks.gov.uk/
25 https://www.gov.uk/prepare-for-a-flood/make-a-flood-plan
- Inform emergency planners in understanding the possibility, likelihood and spatial distribution of all sources of flooding (emergency planners may however have access to more detailed information, such as for Reservoir Inundation Maps, which have not been made available for this SFRA, but are available online).
- Identify safe evacuation routes and access routes for emergency services (these should take account of the possible future impact of climate change on flood extents).
- Identify key strategic locations to be protected in flooding emergencies, and the locations of refuge areas which are capable of remaining operational during flood events.
- Provide information on risks in relation to key infrastructure, and any risk management activities, plans or business continuity arrangements.
- Raise awareness and engage local communities.
- Support emergency responders in planning for and delivering a proportionate, scalable and flexible response to the level of risk.
- Provide flood risk evidence for further studies.

5.4 Flood evacuation plans

5.4.1 Purpose of evaluation plans
Developments that include areas that are designed to flood (e.g. ground floor car parking and amenity areas) or have a residual risk associated with them, will need to provide appropriate flood warning and instructions so users and residents are safe in a flood. This will include both physical warning signs and written flood warning and evacuation plans. Those using the new development should be made aware of any evacuation plans and procedures.

Whilst there is no statutory requirement on the Environment Agency or the emergency services to approve evacuation plans, Hambleton District Council is accountable under its Civil Contingencies duties, via planning condition or agreement, to ensure that plans are suitable. This should be done in consultation with Development Management Officers. Given the cross-cutting nature of flooding, it is recommended that further discussions are held internally between emergency planners at Hambleton District Council, policy planners/development management officers, the LLFA, drainage engineers and also to external stakeholders such as the emergency services, the Environment Agency, Yorkshire Water and the Swale and Ure Drainage Board.

It may be useful for both the LLFA and spatial planners to consider whether, as a condition of planning approval, flood evacuation plans should be provided by the developer which aim to safely evacuate people out of flood risk areas, using as few emergency service resources as possible. The application of such a condition is likely to require policy support in the Local Plan, and discussions within the North Yorkshire Local Resilience Forum are essential to establish the feasibility/effectiveness of such an approach, prior to it being progressed. It may also be useful to consider how key parts of agreed flood evacuation plans could be incorporated within local development documents, including in terms of protecting evacuation routes and assembly areas from inappropriate development.

Once the development goes ahead, it will be the requirement of the plan owner (developer) to make sure the plan is put in place, and to liaise with the Council regarding maintenance and updating of the plan.

5.4.2 What should the Plan Include?
Flood warning and evacuation plans should include the information stated in Table 5-1. Advice and guidance on plans is accessible from the Environment Agency website and there are templates available for businesses and local communities.
## Table 5-1: Flood warning and evacuation plans

<table>
<thead>
<tr>
<th>Consideration</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of existing flood warning system</td>
<td>The Environment Agency offers a flood warning service that currently covers designated Flood Warning Areas in England and Wales. In these areas they are able to provide a full Flood Warning Service.</td>
</tr>
<tr>
<td>Rate of onset of flooding</td>
<td>The rate of onset is how quickly the water arrives and the speed at which it rises, which, in turn, will govern the opportunity for people to effectively prepare for and respond to a flood. This is an important factor within Emergency Planning in assessing the response time available to the emergency services.</td>
</tr>
<tr>
<td>How flood warning is given and occupants awareness of the likely frequency and duration of flood events</td>
<td>Everyone eligible to receive flood warnings should be signed up to the Environment Agency flood warning service. Where applicable, the display of flood warning signs should be considered. In particular sites that will be visited by members of the public on a daily basis such as sports complexes, car parks, retail stores. It is envisaged that the responsibility should fall upon the developers and should be a condition of the planning permission. Information should be provided to new occupants of houses concerning the level of risk and subsequent procedures if a flood occurs.</td>
</tr>
<tr>
<td>The availability of staff / occupants / users to respond to a flood warning and the time taken to respond to a flood warning</td>
<td>The plan should identify roles and responsibilities of all responders. The use of community flood wardens should also be considered.</td>
</tr>
<tr>
<td>Designing and locating safe access routes, preparing evacuation routes and the identification of safe locations for evacuees</td>
<td>Dry routes will be critical for people to evacuate as well as emergency services entering the site. The extent, depth and flood hazard rating, including allowance for climate change, should be considered when identifying these routes.</td>
</tr>
<tr>
<td>Vulnerability of occupants</td>
<td>Vulnerability classifications associated with development as outlined in the FRCC-PPG. This is closely linked to its occupiers.</td>
</tr>
<tr>
<td>How easily damaged items will be relocated and the expected time taken to re-establish normal use following an event</td>
<td>The impact of flooding can be long lasting well after the event has taken place affecting both the property which has been flooded and the lives that have been disrupted. The resilience of the community to get back to normal will be important including time taken to repair / replace damages.</td>
</tr>
</tbody>
</table>

### 5.5 Flood awareness

Emergency planners may also use the outputs from this SFRA to raise awareness within local communities. This should include raising awareness of flood risks, roles and responsibilities and measures that people can take to make their homes more resilient to flooding from all sources whilst also encouraging all those at fluvial flood risk to sign up to the Environment Agency’s Floodline Warnings Direct service.

It is also recommended that Category 1 responders are provided with appropriate flood response training to help prepare them for the possibility of a major flood with an increased number of people living within flood risk areas, to ensure that adequate pre-planning, response and recovery arrangements are in place.
6 Conclusions and recommendations

6.1 Conclusions
This SFRA has provided a strategic review of flooding from all sources in the Hambleton Local Plan area, which has included the collation of key flood risk data into a comprehensive suite of interactive PDF maps. Together with the maps, the flood risk information, assessment, guidance and recommendations provided in this report provide Hambleton District Council with the evidence needed to apply the Sequential and Exception Tests, as required under the NPPF, and demonstrate that a risk-based, sequential approach has been applied in the preparation of its new Local Plan.

The outcomes of a provisional application of the Sequential Test to the list of potential development sites compiled by the Council is presented in the accompanying Development Site Assessment spreadsheet. This shows that it is likely that the Council might potentially be able to avoid high flood risk areas when allocating land for development, depending on other relevant considerations.

The undertaking of this SFRA has established stronger links between planning and flood risk management policies. However, as this is a strategic study, detailed local information on flood risk is not fully accounted for. For a more detailed assessment of specific areas or sites, a Level 2 SFRA may be required.

6.2 Recommendations relating to planning policy and flood risk
Table 6-1 outlines seven recommendations for planning policies that should be adopted. These will enable the Council to translate the information provided in this Level 1 SFRA into meaningful Local Plan policy for flood risk and water management.

Table 6-1: Recommendations for local planning policy

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No development within Flood Zone 3b</td>
<td>As per the NPPF and FRCC-PPG, no development should be permitted within Flood Zone 3b, unless in exceptional circumstances such as for essential infrastructure or where development is water compatible. Development must not impede the flow of water within Flood Zone 3b nor should it reduce the volume available for storage of flood water. Reference is made to Tables 1 to 3 of the FRCC-PPG.</td>
</tr>
<tr>
<td>2. Consider surface water flood risk</td>
<td>Consider surface water flood risk alongside fluvial risk, including possible withdrawal, redesign or relocation for sites at significant surface water risk. Flood Risk Assessments should always consider surface water flood risk management and options for on-site flood storage.</td>
</tr>
<tr>
<td>3. Adoption of a sequential approach to site allocation and site layout</td>
<td>A sequential approach to site allocation and site layout must be followed by planning teams within Hambleton District Council to ensure sustainable development when either allocating land in Local Plans or determining planning applications for development. This SFRA, the NPPF and FRCC-PPG should be consulted throughout this process. The overall aim of the Sequential Test should be to steer new development to areas of low flood risk (Flood Zone 1). Where there are no reasonably available sites in Flood Zone 1, reasonably available sites in Flood Zone 2 should be considered, depending on proposed use, applying the Exception Test if required. Only where there are no reasonably available sites in Flood Zones 1 or 2 should the suitability of sites in the higher risk Flood Zone 3, be considered. This should account for the flood risk vulnerability of land uses and the likelihood of meeting the requirements of the Exception Test, if required.</td>
</tr>
</tbody>
</table>
### 4: Requirement for a site-specific Flood Risk Assessment

Developers should be required to undertake a site-specific Flood Risk Assessment if the proposed development site meets any of the following criteria:

- Within Flood Zone 3a or Flood Zone 2.
- Within Flood Zone 1 and 1 hectare or greater in size.
- At risk from surface water flooding.
- Situated in an area currently benefitting from defences.
- Situated within 20 metres of the bank top of a Main River.
- Situated over a culverted watercourse or where development will be required to control or influence the flow of any watercourse.

Before deciding on the scope of the FRA, this SFRA should be consulted along with the LPA, LLFA and Environment Agency. The FRA should be submitted to and approved by the LPA including suitable consultation with the LLFA and the Environment Agency.

### 5: Use of appropriately sourced of SuDS

The interim national standards published in March 2015 required that SuDS are implemented for all major developments (consisting of 10 or more residential units or an equivalent commercial development). The scoping and design of a SuDS, as part of a site-specific FRA, must be included within the early stages of the site design. Hambleton District Council, NYCC, Yorkshire Water and the local drainage board (if appropriate) must be consulted during the site design stage and the FRA must be submitted to and approved by the Council. Further, the Environment Agency should be consulted if surface water is being discharged from the site to a Main River. Hambleton District Council is the main consultee where surface water drainage is discharged to an Ordinary Watercourse.

### 6: Phasing of development

Hambleton District Council should adopt a policy of phasing development to avoid cumulative impacts of flood risk. Development that may cause or increase flooding to other sites should be developed first with suitable flood storage measures being put in place. It may be possible that flood mitigation measures put in place at sites upstream could alleviate flooding at downstream or nearby sites.

### 7: Conditions on planning permission for at risk sites

Planning permission for at risk sites should only be granted by Hambleton District Council where a site-specific FRA shows that:

- The NPPF and FRCC-PPG have been referenced together with appropriate consultation with the NYCC, the Environment Agency, Yorkshire Water and the IDB, where applicable.
- The effects of climate change have been accounted for using the February 2016 allowances developed by the Environment Agency, though modelled climate change outputs are not available and have not been used in this update.
- There is no loss in floodplain storage resulting from the development.
- The development will not increase flood risk elsewhere.
- There is no adverse effect on the operational functions of any existing flood defence infrastructure.
- Proposed resistance / resilience measures designed to deal with current and future risks are appropriate.
- Appropriate SuDS techniques have been considered and are to be incorporated into the design of the site, where applicable.
- The development will be safe and has passed the Exception Test, if applicable.
6.3 Recommendations for further work

The SFRA process has developed into more than just a planning tool. Sitting alongside the North Yorkshire LFRMS and PFRA, it can be used to provide a much broader and inclusive vehicle for integrated, strategic and local flood risk management and delivery.

Table 6-2 recommends a number of plans and assessments that would be of benefit to the Council and / or NYCC, in developing their flood risk evidence base to support the delivery of the Local Plan or to help fill critical gaps in flood risk information.

Table 6-2: Recommended further work for the Council and / or NYCC

<table>
<thead>
<tr>
<th>Type</th>
<th>Study</th>
<th>Explanation</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding of local flood risk</td>
<td>Environment Agency Flood Risk Mapping updates</td>
<td>Environment Agency modelling updates of older models e.g. Cod Beck. Updates of Flood Map for Planning upon completion</td>
<td>Medium term</td>
</tr>
<tr>
<td></td>
<td>Level 2 SFRA</td>
<td>Further, more detailed assessment of flood risk to high risk sites, as notified by this Level 1 SFRA</td>
<td>Short term</td>
</tr>
<tr>
<td></td>
<td>SWMP / drainage strategy</td>
<td>For those high surface water risk sites / areas as notified by this Level 1 SFRA</td>
<td>Short term</td>
</tr>
<tr>
<td>Climate change (February 2016 allowances)</td>
<td>Level 2 SFRA</td>
<td>Modelling of climate change for available Environment Agency models, where applicable</td>
<td>Short term</td>
</tr>
<tr>
<td>CDA designation</td>
<td>Level 2 SFRA</td>
<td>Exploration of the possibility of designating official CDAs as notified to the LPA by the Environment Agency or identification of areas of critical drainage for use in the council's Local Plan</td>
<td>Short term</td>
</tr>
<tr>
<td>Flood storage</td>
<td>Community Infrastructure Levy (CIL)</td>
<td>For new developments, GI assets can be secured from a landowner's 'land value uplift' and as part of development agreements. The LPA could include capital for the purchase, design, planning and maintenance of GI within its CIL programme.</td>
<td>Short term</td>
</tr>
<tr>
<td>Data Collection</td>
<td>Flood Incident Data</td>
<td>NYCC, in collaboration with Hambleton District Council, has a duty to investigate and record details of locally significant flood events within the county. General data collected for each incident, should include date, location, weather, flood source (if apparent without an investigation), impacts (properties flooded or number of people affected) and response by any RMA.</td>
<td>Short Term / Ongoing</td>
</tr>
<tr>
<td></td>
<td>FRM Asset Register</td>
<td>NYCC should continue to update and maintain their flood risk management register of structures and features, which are considered to affect flood risk. This should be shared with Hambleton District Council.</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Risk assessment</td>
<td>Asset Register Risk Assessment</td>
<td>NYCC, in collaboration with Hambleton District Council, should carry out a strategic assessment of structures and features on the FRM Asset Register to inform capital programme and prioritise maintenance programme.</td>
<td>Short Term</td>
</tr>
<tr>
<td>Capacity</td>
<td>SuDS review / guidance</td>
<td>Hambleton District Council should identify internal capacity required to deal with SuDS applications, set local specification and set policy for adoption and maintenance of SuDS.</td>
<td>Specification adopted</td>
</tr>
<tr>
<td>Partnership</td>
<td>Water companies</td>
<td>Hambleton District Council should work with local water companies on sewer and surface water projects.</td>
<td>Ongoing</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Environment Agency</td>
<td>NYCC / Hambleton District Council should continue to work with the Environment Agency on fluvial and tidal flood risk management projects. Hambleton District Council should also identify potential opportunities for joint schemes to tackle flooding from all sources.</td>
<td>Ongoing</td>
<td></td>
</tr>
<tr>
<td>Community</td>
<td>Continued involvement with the community through NYCC’s and Hambleton District Council’s existing flood risk partnerships.</td>
<td>Ongoing</td>
<td></td>
</tr>
</tbody>
</table>

The Council should also review the sites involving high density/ significant development, using the supporting maps and spreadsheet provided alongside this report. Hambleton District Council will need to provide evidence in their Local Plan to show that proposed housing numbers (and other sites) can be delivered. The Local Plan may be rejected if a large number of sites require the Exception Test to be passed but there is no evidence that this will be possible. Once all sites within this Level 1 assessment have been reviewed by Hambleton District Council then further advice or guidance should be sought to discuss possible next steps.

Provisional indications are that a Level 2 SFRA is unlikely to be required unless a large site, or group of sites, are within Flood Zone 3 and have strategic planning objectives, which means they cannot be relocated or avoided. There are additional reasons for a Level 2 SFRA; it can be used to consider surface water flood risk in more detail which would be essential if many potential sites are within Flood Zone 2 or are at significant risk of surface water flooding. Residual flood risk should also be taken account of when considering options for future work. A Level 2 assessment could also be used to model the February 2016 climate change allowances, where current Environment Agency models are available.

If commissioned, a Level 2 SFRA should build on the source information provided in this Level 1 assessment and should show the likelihood that sites would pass the Exception Test, if required. Further sites may therefore be ruled out following a Level 2 SFRA. A Level 2 study may also assess locations and options for the implementation of open space, or Green Infrastructure, to help manage flood risk in key areas.
Appendices

A SFRA maps in interactive GeoPDF format

A set of interactive GeoPDF maps accompany this SFRA. These can be viewed in any standard PDF reader software.

Overall there are 209 detailed maps, each of which covers a 3km by 3km area within the Hambleton Local Plan Area. An example map is shown below. The maps are set up to allow the user to vary the datasets displayed. By using the drop-down legend on the right-hand side, different layers can be switched on and off, enabling the user to customise what is shown on the maps. In the example shown the Flood Zones have been selected, but other options available to the user include layers showing surface water and groundwater flooding, flood defence structures, areas benefiting from defence, and historic flood outlines (where available).

The sites being considered in the Local Plan allocations are also shown, these are colour coded by proposed use. The potential development site reference labels can also be switched on and off using the toggle button to the bottom right of the legend.

Figure A-1 GeoPDF map example
To help users navigate around the map, a set of overview index maps have also been provided. An example is shown in the figure below. Each index map contains a set of index squares covering different areas of Hambleton District. Clicking on an index square will open up the more detailed map of that area by way of a hyperlink, however this requires the maps to be stored in the same folder structure as supplied (otherwise the hyperlinks cease to operate).

For users that are specifically interested in one or more of the allocations sites, the spreadsheet presented in Appendix B also states on which map each site is shown.

Figure A-2 GeoPDF index map example
B Development Site Assessment Spreadsheet

This Excel spreadsheet provides an assessment of flood risk to potential sites based on the intersection with Environment Agency's Flood Map for Planning Flood Zones 2 and 3, the functional floodplain delineated from this SFRA, and High/Medium/Low zones in the Risk of Flooding from Surface Water Map. Recommendations for the sequential approach are included.

The spreadsheet includes 515 sites initially identified as potential development areas through the call for sites exercise as well as 84 additional sites submitted for consideration by land owners in response to the Preferred Options consultation in November 2016.
C Outcomes of preliminary site assessment

C.1 Potential and preferred sites for development

C.1.1 Initial list of potential sites
Hambleton DC’s Strategic Housing and Employment Land Availability Assessment (SHELAA) sets out a list of sites that have been suggested as having potential for either housing development, for economic development (employment sites) or both (mixed use). The SHELAA essentially sets out the choice of development sites available to Hambleton DC for consideration in the Local Plan. Maintaining the SHELAA helps the council to meet one of the requirements of the National Planning Policy Framework (NPPF), which is to demonstrate a sufficient supply of potential sites that are suitable for residential development according to local housing requirements as well as sites for economic development uses. In addition to SHELAA sites, for the Local Plan, other potential sites have also been identified by Hambleton DC based on a broad range of sources as suggested in Planning Practice Guidance (PPG), including existing planning commitments and sites promoted through a “call for sites” exercise (carried out in 2015 as part of the pre-publication of the Local Plan). The inclusion of a site in the list of potential sites does not mean it will be developed, which will ultimately depend on the suitability for development, availability and the likelihood of development being financially viable. Hambleton DC have started to identify which of the potential sites should be earmarked as preferred sites for development on this basis.

A total of 515 sites appear in the initial list of potential development sites, of which the majority (427 sites) are proposed for housing. The remaining sites are either proposed for employment (23), mixed use (22), local green space or recreation (35) or gypsy/traveller sites (2). For 6 sites proposed use is undefined.

C.1.2 Sites identified following the November 2016 Preferred Options Consultation
A further 84 sites were added to the pool of potential sites following the consultation on Preferred Options carried out by Hambleton District Council in November 2016. Most of these sites were put forward for consideration by land owners or their agents. The majority (73 sites) are proposed for housing. The proposed uses of the remaining sites are employment (5 sites), mixed use (4 sites) and local green space/recreation (2 sites).

C.1.3 Quantifying the flood risk of potential sites
The NPPF identifies advantages of carrying out land assessments for housing and economic development as part of the same exercise in order that sites may be allocated for the most appropriate use. Since 2015 the Planning Practice Guidance (PPG) has also included guidance on undertaking a joint assessment of both housing and economic land availability. In line with this guidance Hambleton DC has carried out the land assessment for housing and employment sites in a joined-up manner.

As part of the joint assessment process, Hambleton DC need to understand the flood risk of all potential sites. This will help steer preferred allocations to sites with minimal flood risk (preferably in Flood Zone 1). This appendix documents the analysis that has been undertaken on the 575 potential sites, and 84 additional sites, in order to quantify flood risk and provide recommendations of how the flood risk implications should be dealt with within the context of planning policy and development of the Local Plan. This analysis has been achieved by application of the Sequential Test in line with PPG.

C.2 Flood Zone designations

C.2.4 Flood Map for Planning
The Environment Agency’s Flood Map for Planning (Rivers and Sea), available on the Environment Agency’s web site, indicates the probability of river and sea flooding at any location, ignoring the presence of defences. It is one of the key datasets used to inform the Sequential Test (see Section C.3). The map is delineated into three zones:
Table C-1: Flood Zone Designations

<table>
<thead>
<tr>
<th>Flood Zone</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flood Zone 1 (FZ1)</td>
<td>Land having a less than 1 in 1000 annual probability of flooding from river and sea. In other words, land falling within Flood Zone 1 can be considered as having a very low flood risk.</td>
</tr>
<tr>
<td>Flood Zone 1 (FZ2)</td>
<td>Land having between a 1 in 100 and 1 in 1000 annual probability of river flooding or between a 1 in 200 and 1 in 1000 annual probability of sea flooding. These areas have a medium risk of flooding - they would only be affected during a significant flood event, and would not be routinely inundated.</td>
</tr>
<tr>
<td>Flood Zone 3 (FZ3)</td>
<td>Land having a 1 in 100 or greater annual probability of river flooding or a 1 in 200 or greater annual probability of sea flooding. Land falling within FZ3 can be considered as a being at high flood risk.</td>
</tr>
</tbody>
</table>

The Flood Zones shown on the Environment Agency’s Flood Map for Planning (Rivers and Sea) do not take account of the possible impacts of climate change and consequent changes in the future probability of flooding. Reference should therefore also be made to the Strategic Flood Risk Assessment when considering location and potential future flood risks to developments and land uses.

C.2.5 Subdivisions of Flood Zone 3

Local planning authorities should identify areas of Functional Floodplain in their Strategic Flood Risk Assessments in discussion with the Environment Agency and the Lead Local Flood Authority. There should be no development in areas of functional floodplain as this is the area that needs to be allowed for out of bank conveyance of most flood waters when flooding occurs. Functional Floodplain should not exceed the area designated as having a high probability of flooding. This requires the SFRA to delineate FZ3 into three units as follows.

Table C-2: Delineation of Flood Zone 3

<table>
<thead>
<tr>
<th>Zone</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 3b</td>
<td>Land that is known through modelling or other data source to be understood to behave as Functional Floodplain: i.e. land where water has to flow or be stored in times of flood.</td>
</tr>
<tr>
<td>Zone 3a</td>
<td>Land in FZ3 that could either not be defined as Zone 3b (due to lack of data), or does not fall within Zone 3b.</td>
</tr>
<tr>
<td>Zone 3ai</td>
<td>This is land that is in FZ3a, but would have been designated as Functional Floodplain (and that would be expected to convey or store flood waters) if it had not already been built upon.</td>
</tr>
</tbody>
</table>
C.2.6 Flood Zone 3b

The Functional Floodplain is one of the main datasets used to inform the Sequential Test. Although its identification should take account of local circumstances and not be defined solely on rigid probability parameters, it is normally taken as the total extent of land that:

- would naturally flood with an annual probability of 1 in 20 (5%) or greater in any year.
- is designed to flood (such as a flood attenuation scheme) in an extreme (0.1% annual probability) flood.

It is impractical to determine the Functional Floodplain for reaches that have not been subject to detailed modelling. The 1 in 20-year flood outline is likely to be available for main rivers in urban areas, but may not have been defined for small watercourse or in rural areas. Other flood outlines, if available, can be used as an alternative (such as 1 in 30-year extents), or mapped extents of flooding from historic events, if considered reliable. However, it remains likely that it may not be possible to define FZ3b for many areas. Land not in FZ3b is designated as FZ3a.

The area identified as Functional Floodplain should account for the effects of defences and other flood risk management infrastructure. Areas which would naturally flood, but which are prevented from doing so by existing defences, infrastructure or solid buildings, will not normally be included in FZ3b. If an area is intended to flood, e.g. an upstream flood storage area designed to protect communities further downstream, then this should be safeguarded from development and included in FZ3b, even though it might not flood very often.

C.2.7 Flood Zone 3ai

Flood Zone 3ai can be defined as land where water would flow or be stored in times of flooding if constraints due to development or infrastructure did not already exist. Flood Zone 3ai therefore represents the areas of land that would be in Flood Zone 3b if not already developed.

Although not considered within the Sequential Test, the identification of FZ3ai allows the council to assess risk within FZ3a in more detail by showing areas where existing development or infrastructure is likely to be restricting flood flows in areas that would otherwise be within the Functional Floodplain. Should any potential development sites in Flood Zone 3ai become available for new or further development (e.g. brownfield sites) then both the risk at the sites and their role in managing flood risk in the surrounding area should be carefully considered in line with Local Plan policies.

C.2.8 FZ1, FZ2, FZ3a, FZ3ai and FZ3b in Hambleton DC

As reported in the SFRA it has been possible to identify the various Flood Zone extents for Hambleton DC. This has involved:

- Update of FZ2 and FZ3 boundaries where modelling outputs supersede those currently published (July, 2016) on the Environment Agency Flood Map for Planning (everywhere beyond FZ2/FZ3 is deemed as FZ1).
- Delineation of FZ3b based on defended flood extent envelopes from the following Environment Agency mapping studies:
  - Potto Beck
  - Stokesley
  - Great Ayton
  - Cod Beck
  - North Beck

The FZ3b extent was derived by combining the extents of the above model flood outlines into one envelope and adding to this any areas designed by the Environment Agency as Flood Storage Areas (FSAs) and any areas falling within the Environment Agency's historic flood map. The historic flood map data was used only where deemed to be reliable and in all cases clipped to exclude any areas outside the current FZ3 boundary. Any areas in which urban development and/or significant infrastructure (major roads for example) would prevent conveyance of flood flows were identified (see FZ3ai) and removed to create the final FZ3b extent.
Delineation of FZ3ai, based on areas of urban development and/or significant infrastructure that were removed from FZ3b. Such areas were delineated by using OS 1:10,000 scale maps to identify areas of urban development and major infrastructure (roads and rail) falling within the boundary of FZ3, and intersecting this with the draft FZ3b envelope.

Table C-3 provides further detail on the mapping studies whose outputs were used to inform on Functional Floodplain Extent within Hambleton DC area. All mapping outputs were taken at face value.

**Table C-3: Delineation of Flood Zone 3**

<table>
<thead>
<tr>
<th>Modelling Study (and date)</th>
<th>Watercourses included</th>
<th>Main towns</th>
<th>Return period (years) on which FF based</th>
<th>Other relevant factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potto Beck</td>
<td>Potto Beck</td>
<td>Potto</td>
<td>20</td>
<td>None</td>
</tr>
<tr>
<td>Stokesley</td>
<td>River Leven, River Tame, Eller Beck</td>
<td>Stokesley</td>
<td>20</td>
<td>None</td>
</tr>
<tr>
<td>Great Ayton</td>
<td>River Leven, Dikes Beck</td>
<td>Great Ayton, Little Ayton, Easby</td>
<td>25</td>
<td>None</td>
</tr>
<tr>
<td>Cod Beck</td>
<td>Cod Beck</td>
<td>Thirsk</td>
<td>25</td>
<td>None</td>
</tr>
<tr>
<td>North Beck</td>
<td>North Beck</td>
<td>Northallerton</td>
<td>25</td>
<td>Flood Alleviation Scheme post-dates the study</td>
</tr>
</tbody>
</table>

**C.3 The Sequential Approach and other considerations**

**C.3.1 The Sequential Approach**

The Sequential Approach for allocation of development through the Local Plan is illustrated in Figure C-1. The main SFRA report documents the principles and practice in more detail. By following the Sequential Approach, potential development sites that have significant flood risk implications are substituted for sites considered to be at lower flood risk, providing these are suitable for development on economic or practical grounds. In this way the Local Plan will be able to make policy recommendations regarding site allocations that are as robust as possible by directing development away from areas at flood risk, now and in the future.

Although the Sequential Approach is focused on fluvial flood risk, other sources of flooding need to be considered. For example, a site could be entirely in Flood Zone 1 (FZ1), but suffer from surface water or sewer flood risk and therefore be considered unsuitable for development.
C.3.2 Exception Test
If it is not possible within the context of the Local Plan, for all development to be located in zones with a lower probability of flooding, it would be necessary to demonstrate that the requirements of the Exception Test can be achieved. In which case, it would need to be shown that any developments in areas of higher flood risk would provide wider sustainability benefits to the community, and that these benefits would outweigh any flood risk implications. This Strategic Flood Risk Assessment helps to inform on this.

For each development, a site-specific flood risk assessment would also be required to demonstrate that it will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

C.3.3 Sustainability Appraisal
By avoiding potential sites that are identified as being at significant fluvial flood risk or by considering how changes in site layout can avoid those parts of a site at flood risk, the Council would be demonstrating a sustainable approach to development.

In terms of surface water, the same approach should be followed whereby those sites at highest risk should be avoided or site layout should be tailored to ensure sustainable development. This should involve investigation into appropriate SuDS techniques (covered in the SFRA report). The designation of Critical Drainage Areas\(^\text{27}\) (CDAs), either through formal notification from the Environment Agency or as part of the SFRA process, could also provide sustainability benefits. All proposed development areas falling within an CDA should be subject to a site-specific FRA if greater than 0.5 hectares in size and measures put into place to ensure runoff is reduced below current rates to bring about appropriate mitigation of surface water risk.

Once the council has decided on a final list of sites following application of the Sequential Test and, where required, the Exception Test following a site-specific FRA, a phased approach to development should be carried out to avoid any cumulative impacts that multiple developments

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\(^\text{27}\) An area contributing surface water runoff, either as direct overland flow or from the existing sewer network, which causes flooding at locations within that area.
may have on flood risk. For example, for any site where it is required to develop in Flood Zone 3, detailed modelling would be required to ascertain where water displaced by development may flow and to calculate subsequent increases in downstream flood volumes. The modelling should also investigate whether compensatory storage techniques could be used to hold back any displaced flood volumes to ensure that downstream or nearby sites are not adversely affected by development on other sites.

A phased approach to development, informed by the understanding of potential floodwater storage options, should ensure that any sites at risk of causing flooding to other sites are developed first. Compensatory flood storage measures should be in place before other sites are developed, thereby maximising sustainability aspects. Also, it may be possible that flood mitigation measures put in place at sites upstream could alleviate flooding at downstream or nearby sites.

C.3.4 Safeguarded Land for Flood Storage
Where possible, the council may look to allocate land to be ring-fenced for flood storage. Where the proportion of a site considered as being at flood risk is large enough to hinder development, it may be appropriate to safeguard this land for the storage of flood water, particularly if benefits might be gained by leaving the site undeveloped. In some instances, the storage of flood water can help to alleviate flooding elsewhere, such as downstream developments.

Sites that would potentially be suitable for flood storage would be any greenfield sites that meet any one or more (ideally) of the following criteria:

- Are large enough (typically exceeding 1 hectare) to ensure effective storage of flood water.
- Are within the functional floodplain (Flood Zone 3b).
- Have large proportion of their footprint at risk from 1 in 30 or 1 in 100 AEP surface water flood events - based on the Environment Agency's updated Flood Map for Surface Water dataset (uFMSW).
- Have large areas of their footprint at risk from Flood Zone 3a.
- Are large enough and within a suitable distance to receive flood water from a nearby development site using appropriate SuDS techniques which may involve pumping, piping or swales / drains.

Brownfield sites could also be considered though this would entail site clearance of existing buildings and conversion to greenspace.

C.3.5 Vulnerability classes
The proposed use of a development has an influence on how flood risk implications are dealt with. The Flood Risk and Coastal Change PPG classifies vulnerability as follows (refer to the guidance for a complete list):

- Essential infrastructure - essential transport, utilities (include electricity power stations, substations and water treatment works), wind turbines.
- Highly vulnerable - police/ambulance/fire/command stations, emergency dispersal points, basement dwellings, caravan and mobile parks (including gypsy traveller sites) and hazardous substance installations.
- More vulnerable - hospitals, residential institutions (e.g. prisons, hostels), dwellings, schools, landfill sites and camping sites.
- Less vulnerable - shops, offices, general industry sites, non-residential institutions, mineral workings, sewage treatment works.
- Water compatible - sand and gravel workings, docks, recreation areas, amenity open space etc.

The following figure (taken from the PPG) shows which types of development use is permitted within different Flood Zones. If a development has different types of use, its vulnerability should be based on the highest vulnerability category. Water compatible uses are allowed in Flood Zone 3b, however they should be designed and constructed so as to remain operational and safe for users in times of flood, result in no net loss of floodplain storage and not impede water flows or increase flood risk elsewhere.
C.3.6 Summary of development options

Rejection of site

A site which fails to pass the Sequential Test and / or the Exception Test would be rejected. Rejection would also apply to any residential dwelling or employment site within Flood Zone 3b. The PPG flood risk vulnerability classification states that only water-compatible uses and essential infrastructure should be permitted in Flood Zone 3b, though any essential infrastructure must pass the Exception Test. Development should not be permitted for sites within the highly vulnerable, more vulnerable and less vulnerable categories that fall within Flood Zone 3b.

Land allocated for housing and mixed use sites that entail residential fall into the more vulnerable category, employment sites fall into the less vulnerable category, whilst gypsy and traveller sites are considered highly vulnerable. None of these uses are permitted in Flood Zone 3b. If the developer is able to avoid Flood Zone 3b, part of the site could still be delivered.

If surface water flood risk is considered significant or where the size of the site does not allow for on-site storage or application of appropriate SuDS, such sites could also be rejected.

Exception Test required

For those sites that, according to the FRCC-PPG vulnerability tables, would require the Exception Test, the likelihood of passing the test should be assessed as part of a Level 2 Strategic Flood Risk Assessment. Only water-compatible and less vulnerable uses of land would not require the Exception Test in Flood Zone 3a. More vulnerable uses, including residential, and essential infrastructure are only permitted if the Exception Test is passed and all development proposals in Flood Zone 3a must be accompanied by a Flood Risk Assessment. To avoid having to apply the Exception Test, the developer / LPA should attempt to avoid the risk area altogether.

Consideration of site layout and design

Site layout and site design is important at the site planning stage where flood risk exists. The site area would have to be large enough to enable any alteration of the developable area of the site to remove development from the functional floodplain, or to leave space for on-site storage of flood water within Flood Zone 3a. Careful layout and design at the site planning stage may apply to

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**Table: Flood Risk Vulnerability Classification**

<table>
<thead>
<tr>
<th>Flood Zones</th>
<th>Flood Risk Vulnerability Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Essential infrastructure</td>
</tr>
<tr>
<td>Zone 1</td>
<td>✓</td>
</tr>
<tr>
<td>Zone 2</td>
<td>✓</td>
</tr>
<tr>
<td>Zone 3a †</td>
<td>Exception Test required †</td>
</tr>
<tr>
<td>Zone 3b ‡</td>
<td>Exception Test required ‡</td>
</tr>
</tbody>
</table>

Key:

✓ Development is appropriate

x Development should not be permitted.
such sites where it is considered viable based on the level of risk. Surface water risk and opportunities for SuDS should also be assessed during the planning stage.

Depending on local circumstances, if it is not possible to adjust the site boundary to remove the site footprint from Flood Zone 3b to a lower risk zone then development should not be permitted. If it is not possible to adjust the developable area of a site to remove the proposed development from Flood Zone 3a or to incorporate the on-site storage of water within site design, then the Exception Test would have to be passed as part of a site-specific Flood Risk Assessment.

Any site layout and design options should take account of the 8m easement buffer along watercourses where development is not permitted. This easement buffer is recommended by the Environment Agency to allow ease of access to watercourses for maintenance works. Any site redesign, where Flood Zone 3a is included within the site footprint, should allow water to flow naturally or be stored in times of flood through application of appropriate SuDS techniques.

**Flood Risk Assessment**

The SFRA report provides further guidance on the adoption of site-specific Flood Risk Assessments.

**Site should be permitted on flood risk grounds**

Development sites could be allocated or granted planning permission where the Sequential Test and the Exception Test (if required) are passed. In addition, a site is likely to be permitted without the need to assess flood risk where the proposed use is for open space. Assuming the site is not to include any development and is to be left open then the proposal is likely to be acceptable from a flood risk point of view. For such sites, opportunities for flood storage should be explored however as part of an FRA.

All development proposals within flood zones 2 or 3 must be accompanied by a Flood Risk Assessment. Any sites over 1ha in size that fall entirely within Flood Zone 1 must be accompanied by a Flood Risk Assessment to determine vulnerability to flooding from other sources as well as fluvial. The FRA should determine the potential of increased flood risk elsewhere due to the addition of hard surfaces on-site and the effect of new development on surface water runoff.

The Flood Risk and Coastal Change PPG states:

“Local authorities and developers should seek opportunities to reduce the overall level of flood risk in the area and beyond. This can be achieved, for instance, through the layout and form of development, including green infrastructure and the appropriate application of sustainable drainage systems, through safeguarding land for flood risk management, or where appropriate, through designing off-site works required to protect and support development in ways that benefit the area more generally.” (Paragraph 50).

**C.3.7 Development options for sites with a significant surface water flood risk**

As discussed above, although the Sequential Approach is focused on fluvial flood risk, the risk from other sources of flooding such as surface water can impact on the suitability of a site for development. If a significant risk from surface water exists at the site (based on the Environment Agency's uFMISW), the following development options should be considered:

- Possible withdrawal, redesign or relocation of the site, certainly for those sites at higher risk from the 1 in 30-year event and those with a large percentage area at risk.
- A detailed site-specific FRA incorporating surface water flood risk management.
- A FRA may want to consider detailed surface water modelling, particularly for the larger sites which may influence sites elsewhere.
- The size of development and the possibility of increased surface water flood risk caused by development on current Greenfield land, and cumulative impacts of this within specific areas.
- Management and re-use of surface water on-site, assuming the site is large enough to facilitate this and achieve effective mitigation.
- Larger sites could leave surface water flood prone areas as open greenspace, incorporating social and environmental benefits.
- Effective surface water management should ensure risks on and off site are controlled.
• SuDS should be used where possible. Appropriate SuDS may offer opportunities to control runoff to Greenfield rates. Restrictions on surface water runoff from new development should be incorporated into the development planning stage. For brownfield sites, where current infrastructure may be staying in place, then runoff should attempt to mimic that of Greenfield rates, unless it can be demonstrated that this is unachievable or hydraulically impractical.

• Whether the delineation of CDAs may be appropriate for areas particularly prone to surface water flooding.

Detailed analysis and consultation with the LLFA, Yorkshire Water, and the Environment Agency would be required. It may then be beneficial to carry out a Surface Water Management Plan (SWMP) or drainage strategy for targeted locations within any such areas. Investigation into the capacity of existing sewer systems would be required. For example drainage model outputs could be obtained to confirm the critical parts of the drainage network and subsequent recommendations could then be made for future development i.e. strategic SuDS sites, parts of the drainage system where any new connections should be avoided, and parts of the system that may have any additional capacity and recommended runoff rates.

C.4 General flood risk implications of potential sites

C.4.1 High level screening

In order to inform the first part of the Sequential Approach for allocation of development through the Local Plan, a high-level flood risk screening exercise has been undertaken. This has involved using GIS software to determine how the boundaries of the potential sites intersect with:

i) Flood Zones 1, 2, 3a, 3ai and 3b, thereby indicating the degree of fluvial flood risk.

ii) the Environment Agency's updated Flood Map for Surface Water dataset (uFMfSW), thereby helping to identify the degree of surface water flood risk and likelihood of critical drainage problems.

A Development Site Assessment spreadsheet is provided alongside this appendix. This provides a breakdown of the area and percentage coverage of each flood zone and each surface water flood zone within each Development Site.

The spreadsheet has two sheets. The first sheet shows the list of 515 initial sites. An additional flag is given for those potential sites included in Hambleton DC's list of preferred sites prior to the November 2016 consultation. The second sheet shows the additional 84 sites suggested during the consultation.

C.4.2 Fluvial flood risk

In assessing fluvial flood risk Flood Zones 3b, 3a, 3ai and 2 are considered in isolation. Any area of a site within the higher risk Flood Zone 3b that is also within Flood Zone 3 is excluded from Flood Zone 3a and any area within Flood Zone 3a is excluded from Flood Zone 2. This allows the sequential assessment of risk at each site by addressing those sites at higher risk first. Table C-4 documents how many of sites fall within each Flood Zone.
Table C-4: Number of potential development sites at risk from fluvial flooding

<table>
<thead>
<tr>
<th>Stated use</th>
<th>Number of potential sites (from pool of 515 sites) within...</th>
<th>Number of additional sites (from pool of 84 sites) within...</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Flood Zone 3b</td>
<td>Flood Zone 3ai</td>
</tr>
<tr>
<td>Housing</td>
<td>16</td>
<td>5</td>
</tr>
<tr>
<td>Employment</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Mixed</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Local Green Space</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Recreation</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Gypsy Traveller</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Use not stated</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>32</td>
<td>8</td>
</tr>
</tbody>
</table>

Of the 515 original potential sites, 32 have parts of their footprints within Flood Zone 3b, 8 have parts of their footprint within 3ai, and a further 85 have parts within 3a. A further 106 have parts of their footprint in Flood Zone 2.

Of the 84 additional sites, just 6 sites have parts of their footprints within Flood Zone 3b, two of which also has parts of their footprint within 3ai. Altogether 14 sites have parts of their area within 3a. A total of 18 sites have parts of their footprint in Flood Zone 2.

Recommendation:

Hambleton DC should use the Development Site Assessment spreadsheets to identify which sites should be avoided during the Sequential Test. The spreadsheet can also be used to assess whether or not economic and housing projections can be met by purely allocating sites in areas at low risk of flooding.

If this is not the case, or where wider strategic objectives require regeneration in areas already at risk of flooding, then Hambleton DC should consider the compatibility of vulnerability classifications and Flood Zones (refer to FRCC-PPG) and whether or not the Exception Test will be required before finalising sites. The decision making process on site suitability should be transparent and information from this SFRA should be used to justify decisions to allocate land in areas at high risk of flooding.
C.4.3 Surface water flood risk

The surface water risk for each of the Preferred sites has been evaluated based on the Risk of Flooding from Surface Water (RoFSW) Map. This includes three flood outlines - indicating the risk in the 1 in 30-year, 1 in 100-year and 1 in 1000-year surface water flood events respectively. These can be considered as representing high, medium and low risk of surface water flooding. Table C-5 summarises the number of sites at risk from each surface water flood zone. Note that, to allow a sequential assessment of risk at each site, any part of the footprint of a site falling within the higher risk outline was excluded from the medium risk outline and any part of the footprint falling within the medium risk outline was excluded from the lower risk 1 in 1000-year outline.

Of the 515 sites in the initial list, 211 sites intersect the 1 in 30-year surface water flood event outline, and of these 12 have 10% or more of their site footprint at risk. 16 sites have 10% or more of the footprint at medium risk (affected in the 1 in 100-year event). For the lower risk 1 in 1000-year extreme event, 40 sites have 20% or more of their area at risk.

Of the 84 additional sites, 29 sites intersect the high risk of surface water flooding zone, of which only just three sites have greater than 10% of their areas at risk. 34 sites intersecting with the medium risk zone of which only two sites have greater than 10% of their areas at risk. Of the 56 sites falling within the low risk of surface water flooding envelope, 2 sites have 20% or more of their area at risk.

Table C-5: Number of potential development sites at risk from surface water flooding

<table>
<thead>
<tr>
<th>RoFSW event outline</th>
<th>Potential sites</th>
<th>Additional sites</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of sites affected</td>
<td>Number of sites where large* % area affected</td>
</tr>
<tr>
<td>1 in 30-year (high risk)</td>
<td>211</td>
<td>12</td>
</tr>
<tr>
<td>1 in 100-year (medium risk)</td>
<td>273</td>
<td>16</td>
</tr>
<tr>
<td>1 in 1000-year (low risk)</td>
<td>373</td>
<td>40</td>
</tr>
</tbody>
</table>

In reality, sites within the 1 in 30-year outline will also be in the 1 in 100-year outline and those within the 1 in 100-year outline will also be in the 1 in 1000-year outline.

* Risk is based on with >=10% footprint falling within 1 in 30-year or 1 in 100-years outlines or with >=20% footprint falling within 1 in 1000-year outline

C.4.4 Safeguarded Land for Flood Storage

Potential sites covering existing greenfield land that could be safeguarded for flood storage are listed in Table C-6. Note that parts of these sites may still be available for development, depending on the percentage area at risk and local conditions. By using the sequential approach to site layout, the LPA and developers should be able to avoid the areas at risk and leave clear for potential flood storage. See the SFRA Maps to spatially assess the areas of the sites at risk.
### Table C-6: Potential greenfield areas to safeguard for flood storage

<table>
<thead>
<tr>
<th>ID</th>
<th>Location</th>
<th>Proposed Use</th>
<th>Area (ha)</th>
<th>Main source of risk</th>
<th>% area at risk</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>S/058/010</td>
<td>Yarm Lane, Great Ayton</td>
<td>Housing</td>
<td>11.1</td>
<td>Fluvial</td>
<td>4% in FZ3a</td>
<td>Flood storage will help to protect Stokesley, Mainly in FZ1, but adjacent to river and in FZ3a</td>
</tr>
<tr>
<td>S/058/012</td>
<td>Yarm Lane, Great Ayton</td>
<td>Housing</td>
<td>2.73</td>
<td>Fluvial</td>
<td>8% in FZ3b, 50% in FZ3a</td>
<td>Flood storage will help to protect Stokesley</td>
</tr>
<tr>
<td>S/142/007</td>
<td>Mill Riggs Field, Stokesley</td>
<td>Housing</td>
<td>13.2</td>
<td>Fluvial</td>
<td>17% in FZ3a</td>
<td>Flood storage will help to protect Stokesley</td>
</tr>
<tr>
<td>S/143/023</td>
<td>The Stripe Stokesley</td>
<td>Housing</td>
<td>28.32</td>
<td>Fluvial</td>
<td>20% in FZ3b</td>
<td>Flood storage will help to protect Stokesley</td>
</tr>
<tr>
<td>N/110/023</td>
<td>Brompton area</td>
<td>Housing</td>
<td>52.8</td>
<td>Fluvial</td>
<td>6.5% in FZ3b</td>
<td>Brompton Beck functional floodplain</td>
</tr>
<tr>
<td>N/110/017</td>
<td>Playing Fields at Northallerton</td>
<td>Housing</td>
<td>2.85</td>
<td>Fluvial and surface water</td>
<td>35% in FZ3b</td>
<td>Functional floodplain of Willow Beck, also significant surface water risk.</td>
</tr>
<tr>
<td>N/123/009</td>
<td>Romanby</td>
<td>Housing</td>
<td>10.00</td>
<td>Fluvial</td>
<td>2% in FZ 3b</td>
<td>Functional floodplain of Willow Beck</td>
</tr>
<tr>
<td>N/123/010</td>
<td>Romanby</td>
<td>Housing</td>
<td>4.29</td>
<td>Fluvial</td>
<td>18% in FZ 3b</td>
<td>Functional floodplain of Willow Beck</td>
</tr>
<tr>
<td>N110/004/G</td>
<td>Brompton</td>
<td>Local Green Space</td>
<td>7.9</td>
<td>Fluvial</td>
<td>7% in FZ3b</td>
<td>Agree should be local green space</td>
</tr>
<tr>
<td>B/004/015/G</td>
<td>Aiskew</td>
<td>Local Green Space</td>
<td>2.673</td>
<td>Fluvial</td>
<td>99% in FZ3b</td>
<td>Agree should be local green space</td>
</tr>
<tr>
<td>B/011/009/G</td>
<td>Bedale</td>
<td>Local Green Space</td>
<td>8.47</td>
<td>Fluvial</td>
<td>20% in FZ3b</td>
<td>Agree should be local green space</td>
</tr>
<tr>
<td>B/011/031/G</td>
<td>Bedale</td>
<td>Local Green Space</td>
<td>1.83</td>
<td>Fluvial</td>
<td>30% in FZ3b</td>
<td>Agree should be local green space</td>
</tr>
<tr>
<td>T/152/004</td>
<td>Thirsk</td>
<td>Housing</td>
<td>3.7</td>
<td>Fluvial &amp; surface water</td>
<td>63% in FZ3b</td>
<td></td>
</tr>
<tr>
<td>E/117/001</td>
<td>Overton</td>
<td>Mixed</td>
<td>5.5</td>
<td>Fluvial</td>
<td>46% in FZ3b</td>
<td></td>
</tr>
</tbody>
</table>

The above sites are all located within the Northallerton area, which has been subject to a recent flood alleviation scheme. The impact of the scheme on the suitability of these sites for flood storage will need to be assessed. NB: the ID given above refers to the reference in the accompanying spreadsheet.
C.5 Flood risk implications for individual sites

C.5.1 Review of potential Development Sites

This section of the report assesses flood risk to each individual site in the Development Sites list. It is important to consider that each individual site will require further investigation, as local circumstances may dictate the outcome of the recommendation. Such local circumstances may include the following:

- Existing planning permissions exists for a number of the potential sites. For these the Environment Agency may have already passed comment and/or agreed to appropriate remedial works concerning flood risk. Previous flood risk investigations/FRAs may already have been carried out at some sites. If sites have planning permission but construction has not started, the SFRA will only be able to influence the design of the development e.g. finished floor levels. New, more extensive flood extents (from new models) cannot be used to reject development where planning permission has already been granted.
- It may be possible at some sites to develop around the flood risk. Planners are best placed to make this judgement i.e. will the site still be deliverable if part of it needs to be retained to make space for flood water.
- Surrounding infrastructure may influence scope for layout redesign/removal of site footprints from risk.
- Some sites included in the assessment are brownfield rather than greenfield sites. Thus extending existing development may not lead to increased flood risk particularly as new-build properties in risk areas could be built with flood protection in mind. However, the Environment Agency may have their own views on this.

C.5.2 Application of the Sequential Test

The following recommendations provide only a guide, based on the flood risk information made available for this Level 1 SFRA. Information regarding local, site specific information is beyond the scope of this SFRA. It is Hambleton DC’s responsibility to carry out sequential testing of each site using the information provided in this SFRA and more specifically using their local, site specific knowledge and advice from the Environment Agency. These sections should be read alongside the Development Site Assessment spreadsheet.

The recommendations provided in the spreadsheets DO NOT take account of local circumstances, only the understanding of flood risk based on intersection of the site footprint with the Environment Agency Flood Zone maps.

Recommendation A - Consider Withdrawal of Site

Withdrawal of a Site is recommended to any site within the functional floodplain where any of the following criteria are true:

- 10% or greater of the site area is within Flood Zone 3b.
- The scale of surface water risk on the site is considered significant enough that possible mitigation of the risk on site is deemed unlikely to be achievable.

The FRCC-PPG flood risk vulnerability classification states that only water-compatible uses and essential infrastructure should be permitted in Flood Zone 3b, though any essential infrastructure must pass the Exception Test. Land allocated for housing falls in to the more vulnerable category and sites for employment; retail; recreation and leisure; and mineral and waste are in the less vulnerable category, though waste management sites for hazardous materials fall with the more vulnerable category. Gypsy and traveller sites fall within the highly vulnerable category. Mixed use sites should be placed into the higher of the relevant classes of flood risk sensitivity. Development should not be permitted for sites within the more vulnerable and less vulnerable categories that fall within Flood Zone 3b. If the developer is able to avoid 3b however, then part of the site could still be delivered.

It should be noted that the 10% threshold is not included within any policy, however it is a practicable cut-off point at which it would likely prove difficult for developers to deliver a site, based on the NPPF. This 10% threshold does not account for local circumstances therefore it may be
possible to deliver some of the sites included with Recommendation A upon more detailed investigation.

As outlined in Table C-7 the assessment has identified 15 sites where withdrawal should be considered given the large portion of site footprint which falls within the functional floodplain. Sites that have been designated for water compatible use such as green space or recreation have been excluded from this list.

Table C-7: Sites to consider withdrawing that are within Flood Zone 3b

<table>
<thead>
<tr>
<th>ID</th>
<th>Site Name</th>
<th>Proposed use</th>
<th>Site Area (ha)</th>
<th>% Area within FZ3b</th>
</tr>
</thead>
<tbody>
<tr>
<td>B/011/024</td>
<td>OS Fields 3674, 4169 &amp; 4275 Bedale North Yorkshire</td>
<td>Housing</td>
<td>1.265</td>
<td>19.26</td>
</tr>
<tr>
<td>E/117/001</td>
<td>OS Field 4300 Overton North Yorkshire</td>
<td>Mixed</td>
<td>5.501</td>
<td>46.19</td>
</tr>
<tr>
<td>N/020/003</td>
<td>Woodlands Station Road Brompton North Yorkshire DL6 2RE</td>
<td>Gypsy Traveller</td>
<td>0.193</td>
<td>22.06</td>
</tr>
<tr>
<td>N/020/004</td>
<td>Station Road Industrial Estate Station Road Brompton North Yorkshire DL6 2RU</td>
<td>Housing</td>
<td>0.867</td>
<td>48.62</td>
</tr>
<tr>
<td>N/110/017</td>
<td>Playing Fields at Springwell Lane Northallerton North Yorkshire</td>
<td>Housing</td>
<td>2.481</td>
<td>35.01</td>
</tr>
<tr>
<td>N/123/010</td>
<td>Land South Of Northallerton Football Grounds Ainderby Road Northallerton North Yorkshire</td>
<td>Housing</td>
<td>4.285</td>
<td>18.25</td>
</tr>
<tr>
<td>S/142/003</td>
<td>Land East of Carolina Farm Stokesley North Yorkshire</td>
<td>Gypsy Traveller</td>
<td>4.924</td>
<td>61.72</td>
</tr>
<tr>
<td>S/142/013</td>
<td>OS Field 7300, 8100 and 9173 Thirsk Road Stokesley North Yorkshire</td>
<td>Mixed</td>
<td>13.903</td>
<td>57.08</td>
</tr>
<tr>
<td>S/142/023</td>
<td>OS Fields 0004, 0010, 0721, 1200, 1595, 6177, 7100, 7272, 8122, 8600 and Land At End Of The Stripe The Stripe Stokesley North Yorkshire</td>
<td>Housing</td>
<td>28.315</td>
<td>20.01</td>
</tr>
<tr>
<td>T/126/003</td>
<td>West of Sandhutton</td>
<td>Employment</td>
<td>114.278</td>
<td>27.51</td>
</tr>
<tr>
<td>T/137/002</td>
<td>Land Opposite Street Close West Side Of Stockton Road South Kilvington North Yorkshire</td>
<td>Mixed</td>
<td>3.376</td>
<td>21.01</td>
</tr>
<tr>
<td>T/152/004</td>
<td>Part Of Fields 9370 8564 9454 Stockton Road Thirsk North Yorkshire</td>
<td>Housing</td>
<td>3.705</td>
<td>63.17</td>
</tr>
<tr>
<td>ALT/T/126/04/E</td>
<td>Land to the North of Disused Airfield, Bewteen R Swale and Sand Hutton, North Yorkshire</td>
<td>Employment</td>
<td>118.947</td>
<td>25.84</td>
</tr>
<tr>
<td>ALT/T/152/013</td>
<td>Land Between Whitellas Beck (N) and Shire House Farm (S), Thirsk, North Yorkshire</td>
<td>Housing</td>
<td>3.682</td>
<td>63.61</td>
</tr>
<tr>
<td>ALT/T/152/020</td>
<td>Land Adjacent to Cod Beck, North of Whitellas Bridge, Stockton Rd, Thirsk, North Yorkshire</td>
<td>Housing</td>
<td>8.487</td>
<td>41.53</td>
</tr>
</tbody>
</table>

NB: the ID given above refers to the reference in the accompanying spreadsheet.

Recommendation B - Exception Test

Recommendation B applies to sites where it is likely the Exception Test would be required because the development lies wholly or partially within Flood Zone 3a. Recommending that an Exception Test should be applied does not imply that there is a likelihood that the site would pass the test. These sites would need to be examined as part of a more in-depth Level 2 SFRA. The developer / LPA should attempt to avoid the risk area where possible. Also, all development proposals in Flood Zone 3a must be accompanied by a flood risk assessment.

Recommendation B applies to sites where any of the following criteria are true:
- 10% or greater of any residential site or essential infrastructure site that is within Flood Zone 3a. Only water-compatible and less vulnerable uses of land are appropriate in this zone.
- 10% or greater of any mixed-use site that may entail residential use that is within Flood Zone 3a.

It should be noted that the 10% threshold is not specified by policy; rather it is considered difficult for developers to avoid Flood Zone 3a when 10% or more of the site footprint is within it. This 10% threshold does not account for local circumstances - for some of the sites flagged for Exception Test it may be possible to avoid Flood Zone 3a altogether with careful development design.

Table C-8 lists the 28 original and 3 additional sites where Recommendation B should apply based on the 10% threshold of the site footprint being within Flood Zone 3a. Further details are given in the Development Site Assessment spreadsheet.

Table C-8: Sites where application of the Exception Test would be required

<table>
<thead>
<tr>
<th>ID</th>
<th>Site Name(s)</th>
<th>Proposed use</th>
<th>Site Area (ha)</th>
<th>% Area within FZ3a</th>
</tr>
</thead>
<tbody>
<tr>
<td>B/021/003</td>
<td>Old Hall Farm, Hall Farm Cottage &amp; Land North of Albert House Burneston North Yorkshire DL8 2HX</td>
<td>Housing</td>
<td>1.874</td>
<td>28.23</td>
</tr>
<tr>
<td>B/135/001</td>
<td>Prices Paving And Tiles Limited The Manor House Snape North Yorkshire DL8 2TA</td>
<td>Housing</td>
<td>1.378</td>
<td>21.27</td>
</tr>
<tr>
<td>B/135/002</td>
<td>Land To The West Of West End House Snape North Yorkshire</td>
<td>Housing</td>
<td>2.543</td>
<td>24.89</td>
</tr>
<tr>
<td>B/135/004</td>
<td>OS Field 7500 Snape North Yorkshire</td>
<td>Housing</td>
<td>3.095</td>
<td>46.01</td>
</tr>
<tr>
<td>B/135/006</td>
<td>OS Field 2949 Ings Lane Snape North Yorkshire</td>
<td>Housing</td>
<td>0.401</td>
<td>58.63</td>
</tr>
<tr>
<td>B/170/007</td>
<td>The Old Coach House West Tanfield North Yorkshire HG4 5JH</td>
<td>Housing</td>
<td>0.667</td>
<td>20.21</td>
</tr>
<tr>
<td>E/041/025</td>
<td>OS Field 0651 Easingwold North Yorkshire</td>
<td>Housing</td>
<td>17.073</td>
<td>13.69</td>
</tr>
<tr>
<td>E/153/002</td>
<td>Land And Buildings To Rear Of Beckside Farm Main Street Tholthorpe North Yorkshire</td>
<td>Housing</td>
<td>0.189</td>
<td>19.33</td>
</tr>
<tr>
<td>N/042/004</td>
<td>Land To The West Of All Saints Parish Church East Cowton North Yorkshire</td>
<td>Housing</td>
<td>0.613</td>
<td>30.48</td>
</tr>
<tr>
<td>N/042/005</td>
<td>Land To The West Of All Saints Parish Church East Cowton North Yorkshire</td>
<td>Housing</td>
<td>0.647</td>
<td>16.35</td>
</tr>
<tr>
<td>N/123/006</td>
<td>Land South Of Broomfield House Farm Boroughbridge Road, OS Field 7456 St Michaels Court, OS Field 9755 St Hildas Road, OS Field 2256 St Anthony’s Avenue and OS Fields 3860, 4251 and 5039 Thirsk Road Northallerton North Yorkshire</td>
<td>Mixed</td>
<td>21.987</td>
<td>44.20</td>
</tr>
<tr>
<td>N/123/007</td>
<td>Low Thormborough Farm Thirsk Road Northallerton North Yorkshire DL8 3SA</td>
<td>Housing</td>
<td>8.220</td>
<td>16.78</td>
</tr>
<tr>
<td>N/123/015</td>
<td>OS Fields 0231, 2145, 2832, 7827, 7837, 8729 &amp; 9342 Thirsk Road Northallerton North Yorkshire</td>
<td>Housing</td>
<td>18.106</td>
<td>14.00</td>
</tr>
<tr>
<td>S/033/003</td>
<td>Land East Of Cricket Ground Back Lane Craphorne North Yorkshire</td>
<td>Housing</td>
<td>0.087</td>
<td>47.37</td>
</tr>
<tr>
<td>ID</td>
<td>Site Name(s)</td>
<td>Proposed use</td>
<td>Site Area (ha)</td>
<td>% Area within FZ3a</td>
</tr>
<tr>
<td>----------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------------</td>
<td>----------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>S/057/008</td>
<td>Land North Of Broughton Grange Farm High Street Great Broughton North Yorkshire</td>
<td>Housing</td>
<td>2.686</td>
<td>17.23</td>
</tr>
<tr>
<td>S/058/008</td>
<td>Great Ayton Tennis Club Mill Terrace Great Ayton North Yorkshire TS9 6PF</td>
<td>Housing</td>
<td>0.579</td>
<td>43.05</td>
</tr>
<tr>
<td>S/058/009</td>
<td>Land On The South East Side Of Levenside Great Ayton North Yorkshire TS9 6PA</td>
<td>Housing</td>
<td>0.105</td>
<td>37.00</td>
</tr>
<tr>
<td>S/082/001</td>
<td>Land South And East Of Bridge House Station Road Stokesley North Yorkshire</td>
<td>Mixed</td>
<td>6.427</td>
<td>30.45</td>
</tr>
<tr>
<td>S/142/004</td>
<td>OS Field 6523 Stokesley North Yorkshire</td>
<td>Housing</td>
<td>1.148</td>
<td>91.17</td>
</tr>
<tr>
<td>S/142/005</td>
<td>OS Field 7126 Stokesley North Yorkshire</td>
<td>Housing</td>
<td>0.355</td>
<td>96.74</td>
</tr>
<tr>
<td>S/142/007</td>
<td>Mill Riggs Field East Of Mill Riggs Farm Stokesley North Yorkshire</td>
<td>Housing</td>
<td>13.159</td>
<td>17.40</td>
</tr>
<tr>
<td>S/142/010</td>
<td>OS Field 5933 Levenside Stokesley North Yorkshire</td>
<td>Housing</td>
<td>0.779</td>
<td>77.89</td>
</tr>
<tr>
<td>S/142/011</td>
<td>Union Mill, Land to the rear of Levenside Place and Land to the rear of 27 Levenside Stokesley North Yorkshire TS9 5QH</td>
<td>Housing</td>
<td>1.433</td>
<td>71.19</td>
</tr>
<tr>
<td>S/142/012</td>
<td>OS Field 5721 Stokesley North Yorkshire</td>
<td>Housing</td>
<td>1.314</td>
<td>71.53</td>
</tr>
<tr>
<td>S/142/022</td>
<td>OS Field 2200 and 2700 Stokesley North Yorkshire</td>
<td>Mixed</td>
<td>8.580</td>
<td>94.85</td>
</tr>
<tr>
<td>S/142/026</td>
<td>The Rectory Leven Close Stokesley North Yorkshire TS9 5AP</td>
<td>Housing</td>
<td>2.222</td>
<td>25.26</td>
</tr>
<tr>
<td>S/142/027</td>
<td>Land To The Rear Of Hambleton Gate Stokesley North Yorkshire</td>
<td>Housing</td>
<td>1.005</td>
<td>25.77</td>
</tr>
<tr>
<td>T/037/007</td>
<td>Moor And Pheasant Inn Dalton Moor Dalton North Yorkshire YO7 3JD</td>
<td>Housing</td>
<td>0.615</td>
<td>29.31</td>
</tr>
<tr>
<td>ALT/E/041/047</td>
<td>Land East of York Road, Opposite Roxby House, South of Easingwold, Easingwold</td>
<td>Housing</td>
<td>3.222</td>
<td>37.93</td>
</tr>
<tr>
<td>ALT/T/037/014</td>
<td>Plot 1 to the Right of Rose Lea, Plot 2 to the Left of Rose Lea, Dalton</td>
<td>Housing</td>
<td>0.194</td>
<td>11.41</td>
</tr>
<tr>
<td>ALT/T/037/015</td>
<td>Land Surrounding The Moor &amp; Pheasant PH, Dalton Moor, Dalton, Thirsk, North Yorkshire</td>
<td>Housing</td>
<td>0.614</td>
<td>29.37</td>
</tr>
</tbody>
</table>

NB: the ID given above refers to the reference in the accompanying spreadsheet.

Recommendation C - Consider site layout and design

Any site that is classified as Recommendation C should undergo a review of site layout and/or design at the development planning stage in order for development to proceed. A Level 2 SFRA or site-specific FRA would be required to inform on site layout and design. Recommendation C applies to sites where any of the following criteria are true:

- <10% of the area of any site type is within Flood Zone 3b.
<10% of any residential site is within Flood Zone 3a.
<10% of any mixed-use site that may entail residential use is within Flood Zone 3a.
<10% of any essential infrastructure site is within Flood Zone 3a.

The 10% threshold is not included within any policy, it is merely considered that it may be possible for developers to avoid Flood Zone 3b and Flood Zone 3a when less than 10% of the site area is at risk. This 10% threshold does not account for local circumstances.

The Development Site Assessment spreadsheet categorise as Recommendation C those sites having less than 10% of their area within Flood Zone 3b, such that site layout should be examined with a view to removing the site footprint from Flood Zone 3b. Depending on local circumstances, it may not be possible to successfully adjust the site boundary to remove the site footprint from Flood Zone 3b to a lower risk zone. In such cases, development should not be permitted.

Also listed as Recommendation C within the spreadsheet are the housing and mixed use sites which have a small proportion (<10%) of their footprint within Flood Zone 3a. The additional comments provided within the spreadsheets differentiate these from the sites falling under Recommendation C due to overlap with FZ3b. For these sites, site layout and/or design should be examined with a view to removing the site footprint from Flood Zone 3a or incorporating on-site storage of water into the site design. Any site layout and design should take account of the 8m easement buffer along watercourses where development is not permitted. This easement buffer is recommended by the Environment Agency to allow ease of access to watercourses for maintenance works. Any site redesign, where Flood Zone 3a is included within the site footprint, should allow water to flow naturally or be stored in times of flood through application of suitable SuDS. Depending on local circumstances, if it is not possible to reduce flood risk through site layout or design, then the Exception Test should be undertaken and passed as part of a site-specific FRA. Overall there are 41 (33 initial and 8 additional) potential sites to which Recommendation C applies, listed in Table C-9.

<table>
<thead>
<tr>
<th>ID</th>
<th>Site Reference(s)</th>
<th>Proposed Use</th>
<th>Site Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B/062/001</td>
<td>OS Field 2839 &amp; 0034 North Road Hackforth North Yorkshire</td>
<td>Housing</td>
<td>7.378</td>
</tr>
<tr>
<td>E/041/037</td>
<td>OS Fields 0488, 1879, 3982 &amp; 4291 York Road Easingwold North Yorkshire</td>
<td>Mixed</td>
<td>9.721</td>
</tr>
<tr>
<td>E/041/039</td>
<td>OS Field 3565 Pennycarr Lane Easingwold North Yorkshire</td>
<td>Housing</td>
<td>6.965</td>
</tr>
<tr>
<td>E/041/040</td>
<td>OS Field 1879 York Road Easingwold North Yorkshire</td>
<td>Housing</td>
<td>2.779</td>
</tr>
<tr>
<td>E/070/014</td>
<td>New Parks Estate (call For Sites) New Parks Wood Track Huby North Yorkshire</td>
<td>Mixed</td>
<td>862.879</td>
</tr>
<tr>
<td>E/071/001</td>
<td>Land Adjacent Hustraite Sewage Treatment Hustraite Sewage Works Track Hustrwaite North Yorkshire</td>
<td>Mixed</td>
<td>2.437</td>
</tr>
<tr>
<td>E/141/004</td>
<td>Land to The East Of Oakdene Mill Lane Stillington North Yorkshire</td>
<td>Housing</td>
<td>0.230</td>
</tr>
<tr>
<td>E/153/003</td>
<td>OS Field 004 Moor Lane, OS Fields 0072, 0082, 1600 and 2746 Tofts Lane and Land to the South East Of Moor Lane Industrial Estate Moor Lane Tholthorpe North Yorkshire</td>
<td>Housing</td>
<td>50.810</td>
</tr>
<tr>
<td>N/008/002</td>
<td>OS Fields 1846, 2944 &amp; 2961 Front Street Appleton Wiske North Yorkshire</td>
<td>Housing</td>
<td>4.119</td>
</tr>
<tr>
<td>N/020/001</td>
<td>Land West Of The Glen Stokesley Road Brompton North Yorkshire</td>
<td>Housing</td>
<td>1.673</td>
</tr>
<tr>
<td>N/110/010</td>
<td>Land To East Of Lewis Road And Turker Lane Bullamoor Road Northallerton North Yorkshire</td>
<td>Housing</td>
<td>12.186</td>
</tr>
<tr>
<td>N/110/011</td>
<td>Land To Rear Of Winton Road Northallerton North Yorkshire</td>
<td>Mixed</td>
<td>47.626</td>
</tr>
<tr>
<td>N/110/014</td>
<td>Land Adjacent Bank Close and OS Fields 0002, 0083 and 2500 Scholla Lane Northallerton North Yorkshire</td>
<td>Housing</td>
<td>19.074</td>
</tr>
<tr>
<td>N/110/023</td>
<td>Land To The East Of Darlington Road, West Of Stokesley Road, North Of Thurston Road</td>
<td>Housing</td>
<td>52.799</td>
</tr>
<tr>
<td>ID</td>
<td>Site Reference(s)</td>
<td>Proposed Use</td>
<td>Site Area (ha)</td>
</tr>
<tr>
<td>----------</td>
<td>----------------------------------------------------------------------------------</td>
<td>--------------</td>
<td>----------------</td>
</tr>
<tr>
<td>N/123/001</td>
<td>Central Depot Cricket Club Ainderby Road Northallerton North Yorkshire DL7 9JR</td>
<td>Housing</td>
<td>2.196</td>
</tr>
<tr>
<td>N/123/009</td>
<td>OS Fields 0069, 0077, 0093 and 8477 Yafforth Road Romanby and Central Dept Cricket Club Ainderby Road Northallerton North Yorkshire</td>
<td>Housing</td>
<td>10.016</td>
</tr>
<tr>
<td>N/123/011</td>
<td>OS Field 4217 and Romanby Grange Boroughbridge Road Northallerton North Yorkshire DL7 9EN</td>
<td>Housing</td>
<td>8.636</td>
</tr>
<tr>
<td>N/123/012</td>
<td>Northallerton Town Football Club Grounds Ainderby Road Northallerton North Yorkshire DL7 8UX</td>
<td>Mixed</td>
<td>2.820</td>
</tr>
<tr>
<td>S/057/012</td>
<td>OS Fields 2583, 2768, 3555 &amp; 4244 Kirkby Lane Great Broughton North Yorkshire</td>
<td>Housing</td>
<td>10.075</td>
</tr>
<tr>
<td>S/057/013</td>
<td>Broughton Bridge Farm Stokesley North Yorkshire TS9 5JQ</td>
<td>Employment</td>
<td>0.561</td>
</tr>
<tr>
<td>S/058/001</td>
<td>Land To East Of 17 And North Of 37 Station Road Great Ayton North Yorkshire</td>
<td>Housing</td>
<td>4.576</td>
</tr>
<tr>
<td>S/058/003</td>
<td>Land North West Of Langbaugh Grange Great Ayton North Yorkshire</td>
<td>Housing</td>
<td>19.450</td>
</tr>
<tr>
<td>S/058/010</td>
<td>OS Fields 0054, 0066, 1255, 1772 and 2553 Yarm Lane Great Ayton North Yorkshire</td>
<td>Housing</td>
<td>11.072</td>
</tr>
<tr>
<td>S/142/006</td>
<td>Small Riggs Field South West Of Mill Riggs Farm Stokesley North Yorkshire</td>
<td>Housing</td>
<td>1.216</td>
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<tr>
<td>S/142/014</td>
<td>OS Field 3738 Stokesley North Yorkshire</td>
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<td>7.773</td>
</tr>
<tr>
<td>S/142/024</td>
<td>Stokesley School Station Road Stokesley North Yorkshire TS9 5AL</td>
<td>Housing</td>
<td>1.712</td>
</tr>
<tr>
<td>S/142/025</td>
<td>Tanton Park House Stokesley North Yorkshire TS9 5JS</td>
<td>Housing</td>
<td>13.165</td>
</tr>
<tr>
<td>T/037/002</td>
<td>Land To Rear Of Chapel Row Dalton North Yorkshire</td>
<td>Housing</td>
<td>0.405</td>
</tr>
<tr>
<td>T/037/009</td>
<td>Land To The Rear Of Springfield House Dalton North Yorkshire</td>
<td>Housing</td>
<td>0.218</td>
</tr>
<tr>
<td>T/137/003</td>
<td>OS Fields 1059, 1646, 2031, 9436, 9628, 9719 &amp; 9913 Stockton Road and OS Fields 2112 &amp; 3823, Stoneybrough Lane Thirsk</td>
<td>Mixed</td>
<td>25.666</td>
</tr>
<tr>
<td>T/137/004</td>
<td>OS Fields 7800 &amp; 7819 Stockton Road Thirsk North Yorkshire</td>
<td>Mixed</td>
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</tr>
<tr>
<td>T/138/002</td>
<td>The Forge South Otterington North Yorkshire DL7 9HJ</td>
<td>Housing</td>
<td>0.869</td>
</tr>
<tr>
<td>T/138/003</td>
<td>Whitley Grange South Otterington North Yorkshire DL7 9HJ</td>
<td>Housing</td>
<td>2.711</td>
</tr>
<tr>
<td>ALT/E/153/007</td>
<td>Pond View Farm, Tholthorpe, York, North Yorkshire, YO61</td>
<td>Housing</td>
<td>5.169</td>
</tr>
<tr>
<td>ALT/N/020 /006</td>
<td>Land to the North of The Glen, OS Field 2565, Little Lane, Brompton, Northallerton</td>
<td>Housing</td>
<td>0.417</td>
</tr>
<tr>
<td>ALT/N/123 /017</td>
<td>Land West of St Wilfred Drive,OS Field 6822, Wooden Hill Lane, Northallerton, North Yorkshire</td>
<td>Housing</td>
<td>1.797</td>
</tr>
<tr>
<td>ALT/N/123 /030</td>
<td>Ainderby Road Parcel 2/3/5, Romanby</td>
<td>Housing</td>
<td>7.347</td>
</tr>
<tr>
<td>ALT/S/057/016</td>
<td>Land Adjacent to Broughton Beck, North of Hallgarth, Great Broughton, North Yorkshire</td>
<td>Housing</td>
<td>0.703</td>
</tr>
<tr>
<td>ALT/T/100/001</td>
<td>Part of OS Field 3146, Adj to Church, Maunby, North Yorkshire</td>
<td>Housing</td>
<td>0.724</td>
</tr>
<tr>
<td>ALT/S/120/004</td>
<td>Clemis Close, Adjacent to Cooper Lane, South of Potto, North Yorkshire</td>
<td>Housing</td>
<td>0.946</td>
</tr>
<tr>
<td>ALT/T/152/019</td>
<td>Land North of Stoneybrough Lane, Thirsk, North Yorkshire</td>
<td>Housing</td>
<td>25.999</td>
</tr>
</tbody>
</table>

NB: the ID given above refers to the reference in the accompanying spreadsheet.

**Recommendation D – Development could be permitted subject to FRA**

For those sites classified as Recommendation D, development could be permitted if a site-specific FRA shows the site can be safe and if it is demonstrated that the site is sequentially preferable. A site within Flood Zone 2 could still be rejected if the conclusions of the FRA state that development is unsafe or inappropriate.
Recommendation D applies to sites where any of the following criteria are true:

- Any site within Flood Zone 2 that does not have any part of its footprint within Flood Zone 3a.
- Employment sites within Flood Zone 3a assuming the site use falls within the less vulnerable or water-compatible category of the flood risk vulnerability classification of the FRCC-PPG. No part of the site can be within Flood Zone 3b.
- Any site 100% within Flood Zone 1 where surface water flood risk is considered significant enough so as to require investigation through a site-specific FRA.
- Any site 100% within Flood Zone 1 that is greater than or equal to 1 hectare in area.

Recommendation D applies to 262 (229 plus 33 additional) sites in the list of potential sites, which are listed in the Local Plan Potential Development Sites Assessment spreadsheet (not tabulated due to the number of sites to be listed). Of these a number (24) only fall under Recommendation D due to surface water considerations - these are flagged separately (see later). Comments are also provided in the Assessment Spreadsheet to highlight where this is the case.

All development proposals within Flood Zone 2 or Flood Zone 3a must be accompanied by a site-specific Flood Risk Assessment. Any sites 100% within Flood Zone 1 that are equal to or greater than 1 hectare in area must be accompanied by a site-specific Flood Risk Assessment to determine vulnerability to flooding from other sources as well as fluvial and tidal. The FRA should determine the potential of increased flood risk elsewhere as a result of the addition of hard surfaces on-site and the effect of new development on surface water runoff. Paragraph 50 of the FRCC-PPG states:

"Local authorities and developers should seek opportunities to reduce the overall level of flood risk in the area and beyond. This can be achieved, for instance, through the layout and form of development, including green infrastructure and the appropriate application of sustainable drainage systems, through safeguarding land for flood risk management, or where appropriate, through designing off-site works required to protect and support development in ways that benefit the area more generally."

Recommendation E - Should be permitted on flood risk grounds subject to consultation with the LPA / LLFA

Recommendation E relates to cases where, based on the evidence provided within this SFRA, the development may be permitted on flood risk grounds. Further investigation may be required by the developer and the council should be consulted as to whether a FRA may be required based on any further or new information that may not have been included within this SFRA. Recommendation E applies to:

- Any site with its area 100% within Flood Zone 1 and with either no risk or minimal risk from surface water, based on the updated Flood Map for Surface Water.

As shown in the Local Plan Potential Development Sites Assessment spreadsheet 201 (166 plus 35 additional) sites appear to be suitable for permitted development, which equates to over 33% of the sites assessed.
C.5.3 Assessment of surface water flood risk

NOTE: This assessment of surface water risk to sites DOES NOT take account of local circumstances, only that part of a site area falls within a surface water flood outline of the updated Flood Map for Surface Water.

The percentage thresholds applied as representing where surface water flood risk is considered significant enough to impact on development are 10% of footprint within 1 in 30-year or 1 in 100-year outlines, or 20% in 1 in 1000-year outline. These thresholds are not based on policy but are representative of likely scenarios where surface water considerations might prevent development if no mitigation can be achieved. The spreadsheet identifies the 12, 16 sites and 40 sites that fall into these categories respectively for the original list of potential sites, plus the 3, 2 and 2 additional sites that fall in to these categories respectively.

Where there is a significant risk of surface water flooding it could prove difficult to manage this surface water on-site. For all these sites a site-specific FRA should be carried out to investigate possible mitigation measures for flood storage or infiltration techniques through appropriate SuDS. Otherwise the sites might best be withdrawn from the list, particularly where the site is at higher risk or has a large percentage area at risk.

Table C-10 indicates those sites where the representing where surface water flood risk can be thought of as extremely significant since greater than 40% of footprint is within either the 1 in 30-year, 1 in 100-year or in 1 in 1000-year outline. Mitigation of the surface water risk is considered to be unlikely to be achievable on these sites, and therefore they should be considered for withdrawal. As such they have been flagged with Recommendation A in the Assessment spreadsheet.

Table C-10: Sites to consider for FRA/withdrawal based on surface water risk

<table>
<thead>
<tr>
<th>ID</th>
<th>Proposed use</th>
<th>Site Area (ha)</th>
<th>% Area within 1 in 30 Year Outline (uFMfSW)</th>
<th>% Area within 1 in 100 Year Outline (uFMfSW)</th>
<th>% Area within 1 in 1000 Year Outline (uFMfSW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B/004/004</td>
<td>Housing</td>
<td>0.147</td>
<td>0</td>
<td>6.12</td>
<td>45.18</td>
</tr>
<tr>
<td>E/041/035</td>
<td>Housing</td>
<td>5.146</td>
<td>10.98</td>
<td>9.31</td>
<td>43.30</td>
</tr>
<tr>
<td>E/131/008</td>
<td>Housing</td>
<td>2.033</td>
<td>0</td>
<td>1.91</td>
<td>43.24</td>
</tr>
<tr>
<td>N/123/004</td>
<td>Housing</td>
<td>0.852</td>
<td>0</td>
<td>9.91</td>
<td>56.42</td>
</tr>
<tr>
<td>S/058/012</td>
<td>Housing</td>
<td>2.728</td>
<td>2.91</td>
<td>1.95</td>
<td>43.12</td>
</tr>
<tr>
<td>T/002/001</td>
<td>Housing</td>
<td>0.157</td>
<td>0</td>
<td>0.44</td>
<td>43.57</td>
</tr>
</tbody>
</table>

Of the other sites with surface water risks, some are also flagged as being subject to an FRA because they fall within Flood Zone 1 (see earlier) and site area exceeds 1ha. Those sites that are below 1ha in extent but should be subject to an FRA due to surface water issues are listed in Table C-11.

Table C-11: Sites needing an FRA to properly assess surface water flood risk

<table>
<thead>
<tr>
<th>ID</th>
<th>Proposed use</th>
<th>Site Area (ha)</th>
<th>% Area within 1 in 30 Year Outline (uFMfSW)</th>
<th>% Area within 1 in 100 Year Outline (uFMfSW)</th>
<th>% Area within 1 in 1000 Year Outline (uFMfSW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B/083/005</td>
<td>Housing</td>
<td>0.302</td>
<td>0.00</td>
<td>6.66</td>
<td>28.21</td>
</tr>
<tr>
<td>B/170/002</td>
<td>Housing</td>
<td>0.205</td>
<td>0.00</td>
<td>0.14</td>
<td>30.50</td>
</tr>
<tr>
<td>E/070/001</td>
<td>Housing</td>
<td>0.801</td>
<td>0.00</td>
<td>10.26</td>
<td>18.84</td>
</tr>
<tr>
<td>N/110/025</td>
<td>Housing</td>
<td>0.588</td>
<td>0.00</td>
<td>4.67</td>
<td>25.54</td>
</tr>
<tr>
<td>S/082/004</td>
<td>Housing</td>
<td>0.324</td>
<td>9.54</td>
<td>13.30</td>
<td>20.38</td>
</tr>
<tr>
<td>S/128/007</td>
<td>Housing</td>
<td>0.297</td>
<td>1.68</td>
<td>4.24</td>
<td>23.60</td>
</tr>
<tr>
<td>T/025/003</td>
<td>Housing</td>
<td>0.284</td>
<td>4.29</td>
<td>13.20</td>
<td>24.69</td>
</tr>
<tr>
<td>T/025/004</td>
<td>Housing</td>
<td>0.214</td>
<td>5.70</td>
<td>17.52</td>
<td>32.77</td>
</tr>
<tr>
<td>ID</td>
<td>Proposed use</td>
<td>Site Area (ha)</td>
<td>% Area within 1 in 30 Year Outline (uFMfSW)</td>
<td>% Area within 1 in 100 Year Outline (uFMfSW)</td>
<td>% Area within 1 in 1000 Year Outline (uFMfSW)</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------</td>
<td>----------------</td>
<td>-------------------------------------------</td>
<td>---------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>T/129/006</td>
<td>Housing</td>
<td>0.841</td>
<td>11.93</td>
<td>2.00</td>
<td>7.70</td>
</tr>
<tr>
<td>T/025/005</td>
<td>Housing</td>
<td>0.538</td>
<td>4.74</td>
<td>2.00</td>
<td>28.92</td>
</tr>
<tr>
<td>ALT/S/142/031</td>
<td>Housing</td>
<td>0.783</td>
<td>4.25</td>
<td>8.90</td>
<td>22.80</td>
</tr>
<tr>
<td>ALT/T/139/025</td>
<td>Housing</td>
<td>0.631</td>
<td>4.50</td>
<td>11.35</td>
<td>7.58</td>
</tr>
</tbody>
</table>
D Relevant legislation and policy

D.1 Legislation related to flood risk

D.1.1 EU Floods Directive & the Flood Risk Regulations

The European Floods Directive (2007) set out the EU’s approach to managing the risks posed by flooding to human health, the environment, cultural heritage and economic activity. The Directive was translated into English law by the Flood Risk Regulations (FRR) 2009 which require the production of Flood Risk Management Plans (FRMPs). Responsibilities for producing these plans fall to the Environment Agency for Main Rivers, the sea and reservoirs, and Lead Local Flood Authorities (LLFAs) for Ordinary Watercourses, surface water, groundwater and other local sources of flooding.

As illustrated in Figure D-1, the Flood Risk Regulations legislate for a six-year cycle that involves the undertaking of Preliminary Flood Risk Assessments (PFRAs) - leading to the identification of Flood Risk Areas, the undertaking of flood hazard mapping, and the subsequent preparation of Flood Risk Management Plans (FRMPs). The FRMPs consider objectives for reducing the likelihood and consequences of flooding, and measures to achieve those objectives. The current (second) cycle will deliver FRMPs in 2021.

With Main River hazard mapping assessments, already having been undertaken at national scale, and having already published a variety of river basin/catchment scale flood risk management plans (such as CFMPs for example), the Environment Agency focused their efforts on assisting LLFAs to meet their own obligations under the Regulations, producing guidance on the delivery of PRFAs and recommendations for significant Flood Risk Areas.

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The relevant PRA for Hambleton District is that published in August 2011 by North Yorkshire County Council[28], the LLFA for all seven North Yorkshire LPAs. As required under the Regulations, the PRA stated local sources of flooding, excluding Main River, including surface water, Ordinary Watercourses, groundwater and canals. For Hambleton, the analysis indicated that over 500 dwellings are at risk from Ordinary Watercourse flooding and over 2000 are at risk from surface water. It was also stated that only one building was known to have suffered flooding as a result of groundwater ingress.

The PRA found that there were no nationally significant harmful consequences that could be deduced from information on past flood events within North Yorkshire. An analysis of surface water flood risk (using an earlier iteration of the Environment Agency’s current Risk of Flooding

from Surface Water Map\(^2\), revealed that up to 4,883 properties could be at risk from the 1 in 200 AEP rainfall event. However, as these properties were scattered over the district, there were no significant clusters and therefore the scale of risk was not considered to be enough to consider the district as a Flood Risk Area at a European level. NYCC therefore was not required to produce a Flood Risk Management Plan.

D.1.2 Flood & Water Management Act

Driven in part by the recommendations of the Pitt Review\(^3\) of lessons learned from the 2007 floods, the Flood and Water Management Act (FWMA) was passed in April 2010 with objectives relating to the improvement of both flood risk and water resource management practices. The FWMA created clearer roles and responsibilities and helped to define a more risk-based approach to dealing with flooding. It made Lead Local Flood Authorities (County Councils and Unitary Authorities) responsible for managing local flood risk (from surface water, ground water and Ordinary Watercourses) and set out how the Environment Agency should provide a strategic overview role relating to all sources of flood risk.

The content and implications of the FWMA provide considerable opportunities for improved and integrated land use planning and flood risk management by Local Authorities and other key partners. The integration and synergy of strategies and plans at national, regional and local scales, is increasingly important to protect vulnerable communities and deliver sustainable regeneration and growth.

D.1.3 Water Framework Directive & Water Environment Regulations

The purpose of the Water Framework Directive (WFD), which was transposed into English Law by the Water Environment Regulations (2003), is to deliver improvements across Europe in relation to the management of water quality and water resources. The Regulations require the development of River Basin Management Plans (RBMP), which set out how organisations, stakeholders and communities will work together to improve the water environment. The Environment Agency is responsible for monitoring and reporting on the objectives of the WFD on behalf of Government and as such are also responsible for compilation of the RBMPs. To date, two cycles of RBMPs have been completed (in 2009 and 2015) in line with the broader WFD programme\(^3\).

Most of the Hambleton district is covered by the Humber River Basin Management Plan\(^3\), although the Leven catchment is covered by the Northumbrian Plan\(^3\). Both plans show how water quality and flood risk can go hand in hand. For example, the plans outline how flood risk management activities are helping to deliver habitat restoration techniques. The Humber RBMP includes examples whereby land management techniques have been designed to reduce flood risk whilst also reducing sediment loss and improving water quality.

The main responsibilities for Hambleton District Council and NYCC are related to working in partnership with the Environment Agency to develop links between river basin management planning and the development of Local Authority plans, policies and assessments. The programme of actions (measures) within the Humber and Northumbrian RBMPs highlight the need for:

- Water Cycle Studies to promote water efficiency in new development through regional strategies and local development frameworks.
- Surface Water Management Plan implementation.
- Considering the WFD objectives (achieving good status or potential as appropriate) in the spatial planning process, including LDDs and Sustainable Community Strategies.
- Promoting the wide scale use of Sustainable Drainage Systems (SuDS) in new development.

\(^2\) The analysis used the second generation product known as the Flood Map for Surface Water (FMSW)

\(^3\) The Pitt Review - Learning Lessons from the 2007 floods, Cabinet Office, 22 Whitehall, London SW1A 2WH


D.2 Roles and responsibilities under the FWMA and Flood Risk Regulations

The responsibilities for the Risk Management Authorities (RMA) under the Flood and Water Management Act and the Flood Risk Regulations are summarised below.

D.2.1 Environment Agency as a RMA

- Has a strategic overview role in relation to all forms/sources of flooding.
- Has the power to request information from any partner in connection with its risk management functions.
- Must exercise its flood or coastal erosion risk management functions in a manner consistent with the National Strategy and Local Strategies.
- Must be consulted on Local Strategies, if affected by the strategy, by the LLFA.
- Must help advise on sustainable development.

D.2.2 Hambleton LPA as a RMA

- Has a duty to act in a manner that is consistent with the National Strategy and have regard to Local Strategies.
- Must be consulted on Local Strategies, if affected by the strategy, by the LLFA.
- Has a duty to be subject to scrutiny from the LLFA.
- Has a duty to cooperate and share information with other RMAs.

D.2.3 NYCC LLFA as a RMA

- Must develop, maintain, apply and monitor a strategy for local flood risk management. This must be consulted on with all RMAs, the public and all other partners with an interest in local flood risk, and must comply with the National Strategy.
- Is required to coordinate and share information on local flood risk management between relevant authorities and partners.
- Is empowered to request information from others when it is needed in relation to its flood risk management functions.
- Must investigate flooding incidents in its area where it considers it necessary or appropriate.
- Has a duty to establish and maintain a record of structures within its area that have a significant impact on local flood risk.
- Is empowered to designate structures and features that affect flooding.
- Has powers to undertake works to manage flood risk from surface runoff, groundwater and ordinary watercourses.
- Must exercise its flood and coastal erosion risk management functions in a manner consistent with the National Strategy and the Local Strategy.
- Is permitted to agree the transfer of responsibilities for risk management functions (except the production of a Local Strategy) to other RMAs.
- Must aim to contribute to sustainable development.
- Should consider flooding issues that require collaboration with neighbouring LLFAs and other RMAs.

Table D-1 provides an overview of the key LLFA responsibilities under the FWMA.
<table>
<thead>
<tr>
<th>FWMA Responsibility</th>
<th>Description of duties and powers</th>
<th>NYCC LLFA Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Strategy for Flood Risk Management</td>
<td>A LLFA has a duty to develop, maintain, apply and monitor a local strategy for flood risk management in its area. The local strategies will build on information such as national risk assessments and will use consistent risk based approaches across different LA areas and catchments. The local strategy will not be secondary to the national strategy; rather it will have distinct objectives to manage local flood risks important to local communities.</td>
<td>Implemented</td>
</tr>
<tr>
<td>Duty to contribute to sustainable development</td>
<td>The LLFA has a duty to contribute towards the achievement of sustainable development.</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Duty to comply with national strategy</td>
<td>The LLFA has a duty to comply with national flood and coastal risk management strategy principles and objectives in respects of its flood risk management functions.</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Investigating Flood Incidents</td>
<td>The LLFA, on becoming aware of a flood in its area, has (to the extent it considers necessary and appropriate) to investigate and record details of &quot;locally significant&quot; flood events within their area. This duty includes identifying the relevant risk management authorities and their functions and how they intend to exercise those functions in response to a flood. The responding risk management authority must publish the results of its investigation and notify any other relevant risk management authorities.</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Asset Register</td>
<td>A LLFA has a duty to maintain a register of structures or features, which are considered to affect 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.</td>
<td>Unknown</td>
</tr>
<tr>
<td>Duty to co-operate and Powers to Request Information</td>
<td>The LLFA must co-operate with other relevant authorities in the exercise of their flood and coastal erosion management functions.</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Ordinary Watercourse Consents</td>
<td>A LLFA has a duty to deal with enquiries and determine watercourse consents where the altering, removing or replacing of certain flood risk management structures or features that affect flow on ordinary watercourses is required. It also has provisions or powers relating to the enforcement of unconsented works.</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Works Powers</td>
<td>The Act provides a LLFA with powers to undertake works to manage flood risk from surface runoff, groundwater and on ordinary watercourses, consistent with the local flood risk management strategy for the area.</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Designation Powers</td>
<td>The Act provides a LLFA with powers to designate structures and features that affect flooding or coastal erosion. The powers are intended to overcome the risk of a person damaging or removing a structure or feature that is on private land and which is relied on for flood or coastal erosion risk management. Once a feature is designated, the owner must seek consent to alter, remove, or replace it.</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Emergency Planning</td>
<td>A LLFA is required to play a lead role in emergency planning and recovery after a flood event.</td>
<td>North Yorkshire Local Resilience Forum</td>
</tr>
</tbody>
</table>
Community Involvement
A LLFA should engage local communities in local flood risk management issues. This could include the training of community volunteers, the development of local flood action groups and the preparation of community flood plans, and general awareness raising around roles and responsibilities plans.

Planning Requirements for SuDS
Sustainable Drainage Systems (SuDS) are to become a planning requirement for major planning applications of 10 or more residential units or equivalent commercial development schemes with sustainable drainage. The LLFA is now a statutory planning consultee and it will be between the LPA and the LLFA to determine the acceptability of these proposed sustainable drainage schemes subject to exemptions and thresholds. Approval must be given before the developer can commence construction. Planning authorities should use planning conditions or obligations to make sure that arrangements are in place for ongoing maintenance of any SuDS over the lifetime of the development.

Reservoirs
Designate high risk reservoirs, with preparation of a flood plan by the owner, including all relevant data.

Latest changes to FWMA legislation

D.2.4 Yorkshire Water and Northumbrian Water as a RMAs
- Have a duty to act in a manner that is consistent with the National Strategy and have regard to Local Strategies.
- Must be consulted on Local Strategies, if affected by the strategy, by the relevant LLFA.
- Have a duty to be subject to scrutiny from LLFAs.
- Have a duty to cooperate and share information with other RMAs.
- Are responsible for managing the risks of flooding from water and foul or combined sewer systems providing drainage from buildings and yards.

D.2.5 Swale and Ure Drainage Board and Kyle and Upper Ouse IDB as a RMAs
Having the powers to regulate activities that may impede drainage, the Swale and Ure Drainage Board and the Kyle and Upper Ouse IDB are able to provide comments to relevant LPAs (including Hambleton District Council) on developments in their district and when asked, make recommendations on measures required to manage flood risk and to provide adequate drainage. Each drainage board:
- Has responsibility for water level management in low lying areas within their boundary.
- Can make byelaws to prevent flooding or remedy or mitigate damage caused by flooding.
- Must work in partnership with other authorities to actively manage and reduce the risk of flooding.

D.2.6 Highways (NYCC) as a RMA
- Has a duty to act consistently with the National Strategy and Local Strategies.
- Has responsibility for ensuring effective drainage of local roads in so far as ensuring drains and gullies are maintained.
- Must be consulted on Local Strategies, if affected by the Strategy, by the LLFA.
- Has a duty to be subject to scrutiny from LLFAs.

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D.2.7 The local community

- Must be consulted on Local Strategies by the LLFA.
- Has a key role in ensuring local strategies are successfully delivered. They should actively participate in this process and be engaged by the LLFA.

D.2.8 Riparian owners

A riparian owner is someone who owns land or property alongside a river or other watercourses including a culvert. A watercourse is any natural or artificial channel through which water flows, such as a river including where rivers flow through a culvert, brook, beck, or mill stream.

Riparian owners have statutory responsibilities, including:

- Maintaining river beds and banks.
- Allowing the flow of water to pass without obstruction.
- Controlling invasive alien species.

Further guidance for riverside property owners can be found in the Environment Agency’s helpful booklet ‘Living on the Edge’.

D.2.9 Developers

Have a vital role in ensuring effective local flood risk management by avoiding development in areas at risk of flooding. Local Strategies should form a key element of local planning guidance.

D.3 Planning policy and regulations

D.3.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) was published in March 2012, accompanied by a number of Planning Practice Guidance notes. The NPPF must be taken into account in the preparation of Local Plans and is a material consideration in planning decisions. Section 10 Paragraph 100 of the NPPF states that Local Plans…

“…should be supported by a Strategic Flood Risk Assessment and develop policies to manage flood risk from all sources, taking account of advice from the Environment Agency and other relevant flood risk management bodies, such as Lead Local Flood Authorities and Internal Drainage Boards. Local Plans should apply a sequential, risk-based approach to the location of development to avoid, where possible, flood risk to people and property and manage any residual risk, taking account of the impacts of climate change, by applying the Sequential Test, if necessary applying the Exception Test, safeguarding land from development that is required for current and future flood management, using opportunities offered by new development to reduce the causes and impacts of flooding and where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long term, seeking opportunities to facilitate the relocation of development including housing to more sustainable locations”.

The NPPF therefore stipulates that the Sequential Test should be used to ensure that all new development is directed towards locations which have the lowest probability of flooding. It must therefore be performed by the LPA when considering the placement of future development and assessing planning proposals. Essentially it prevents development in areas of flood risk from being allocated or permitted if the development could be alternatively sited in an area that is not at flood risk (or has a lower probability of flooding). The Sequential Test is discussed further in Chapter 3.

D.3.2 Flood Risk and Coastal Change Planning Practice Guidance (FRCC-PPG)

The Flood Risk and Coastal Change Planning Practice Guidance (FRCC-PPG) sits alongside the NPPF and sets out detailed guidance on how the policy contained in the NPPF should be implemented. An updated version of the guidance was launched in March 2014 by the Department for Communities and Local Government (DCLG), taking the form of a web-based resource, which is accessible to all and is regularly updated. Whilst the NPPF concentrates on high level national
policy, the FRCC-PPG is more detailed. It advises on how planning can take account of the risks associated with flooding and coastal change, and how these risks should be reflected in planning and the development management process, particularly in respect of Local Plans, SFRAs, the sequential and exception tests, permitted development, site-specific flood risk, Neighbourhood Planning, flood resilience and flood resistance measures.

D.3.3 Localism Act

The Localism Act was given Royal Assent in November 2011 with the purpose of shifting power from Central Government back to local councils, communities and individuals. The Government abolished Regional Spatial Strategies, providing the opportunity for councils to re-examine the local evidence base and establish their own local development requirements for employment, housing and other land uses through the plan making process. Additionally, this act places a duty to cooperate on local authorities, including statutory bodies and other groups, in relation to the planning of sustainable development. This duty to cooperate requires local authorities to:

“...engage constructively, actively and on an ongoing basis in any process by means of which development plan documents are prepared so far as relating to a strategic matter.” (Provision 110).

This act, together with the Neighbourhood Planning (General) Regulations 2012, also provides new rights to allow Parish or Town Councils to deliver additional development through neighbourhood planning (Neighbourhood Plans). This means local people can help decide where new homes and businesses should go and what they should look like.

D.3.4 Town and Country Planning Regulations 2012

The Local Planning regulations sit at the core of the planning system. They require the LPA to develop the Local Plan, which is a statutory document that sets out the policies by which planning applications for new development will be considered and identify developable land suitable for housing, employment, mixed use and recreation over the coming years, based on an understanding of future needs with regards to development.

A Local Plan needs to promote and deliver sustainable development, by setting out a framework for future development of the local area that addresses needs and opportunities in relation to housing, the economy, community facilities and infrastructure as well as safeguarding the environment, adapting to climate change and securing good design. Each Plan should therefore set the context for guiding decisions and development proposals, such that i) the long-term use of land and buildings reconciles the competing interests of development and conservation, ii) any land use changes proceed coherently, efficiently, and with maximum community benefit and iii) there is an understanding of how local residents, landowners, and other interested parties might be affected by land use change. Local Plans are subject to regular periods of intensive public consultation, public involvement, negotiation and approval. The vision set out in the Plan needs to be clear and kept up to date.

In 2015, Hambleton District Council initiated a new Local Plan, which will address a 17-year period from adoption of the Plan to the year 2035. The Plan excludes the area within Hambleton District Council that sits within the North York Moors National Park (as the Park Authority is the relevant LPA for that area). Once finalised the plan will completely replace the existing planning documents, which are collectively known as the Local Development Framework (LDF), and are now out of date due to changes in National Planning Policy as well as emphasis on increasing the supply of new housing. The Local Plan is being developed using a staged approach, which to date has included a series of stakeholder workshops, the preparation of an Issues and Options document, an updated Strategic Housing Market Assessment and Call for Sites exercise. A first iteration of the plan is to be released in autumn 2016, which will be followed by a period of further public consultation in 2017. Following that, relevant modifications will be made before submitting the draft plan for examination by an independent inspector. Examination in public and adoption will take place in 2018.

The NPPF requires that the evidence base for the Local Plan must clearly set out what is intended over the lifetime of the plan, where and when this will occur and how it will be delivered. The Local
Plan should be informed by a range of evidence-based documentation including a Strategic Flood Risk Assessment and a Sustainability Appraisal.

**Strategic Flood Risk Assessment (SFRA)**

The NPPF states that local plans should be supported by a SFRA and should take account of advice provided by the Environment Agency and other flood risk management bodies. The SFRA should be used to ensure that when allocating land or determining planning applications, development is located in areas at lowest risk of flooding. Policies to manage, mitigate and design appropriately for flood risk should be written into the Local Plan, informed by both the SFRA and Sustainability Appraisal. This document constitutes Hambleton District Council’s current Level 1 SFRA. It replaces the previous SFRA published in 2006.

**Sustainability Appraisal (SA)**

The Sustainability Appraisal ensured that sustainability issues are addressed during the preparation of local plans. The appraisal should meet the requirements of the Strategic Environmental Assessment Directive 2001/42/EC which assesses and reports on a plan’s potential impact on the environment, economy, and society. It involves the undertaking of an assessment of the potential impacts of draft policies (at various stages throughout the preparation of the Local Plan) including a review of how each policy and its viable alternatives stand up against the plan’s objectives and policies. This ensures that the potential impacts from the plan on the aim of achieving sustainable development are considered, in terms of the impacts, and that adequate mitigation and monitoring mechanisms are implemented.

In January 2016 Hambleton District Council published a Sustainability Appraisal Scoping Report which represented the initial phase in establishing the framework for undertaking Sustainability Appraisal and Strategic Environmental Assessment for the Hambleton Local Plan. It is understood that further reporting of sustainability appraisals will take place as the plan progresses.

**Green Infrastructure Assessments**

Open space, or Green Infrastructure, should be designed and managed as a multifunctional resource capable of delivering a wide range of environmental and quality of life benefits for local communities and should be provided as an integral part of all new development, alongside other infrastructure such as utilities and transport networks.

Open space can provide many social, economic and environmental benefits close to where people live and work including:

- Places for outdoor relaxation and play.
- Space and habitat for wildlife with access to nature for people.
- Environmental education.
- Local food production - in allotments, gardens and through agriculture.
- Improved health and well-being – lowering stress levels and providing opportunities for exercise.
- Climate change adaptation - for example flood alleviation and cooling urban heat islands.

The NPPF explains that open space can perform many functions, including flood risk mitigation, and that Local Plans should account for increased flood risk, resulting from climate change, through the planning of Green Infrastructure (GI). GI can have an important role to play in reducing the likelihood of flooding by providing space for flood storage, reducing runoff and increasing infiltration, whilst also providing other benefits as stated above.

Alongside GI should be the implementation of Sustainable Drainage Systems (SuDS), specifically within potential development sites, where possible. The suitability of GI and SuDS can be informed by this SFRA through utilisation of open space for water in the areas of greatest flood risk.

The Hambleton Local Plan will include guidance aimed at helping applicants and developers to ensure that proposals for development across the district make the most of opportunities to improve existing open spaces and create new green infrastructure, where feasible. Some land

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identified as potentially developable land has already been earmarked by the council for Green Space or for the purposes of recreation.

D.4 Other flood risk management policy

D.4.1 Flood Risk Management Plans

Flood risk management plans (FRMPs) explain the risk of flooding from rivers, the sea, surface water, groundwater and reservoirs with each FRMP covering a specific river basin district. FRMPs set out how risk management authorities, including the Environment Agency and LLFAs, will work with communities to manage flood risk over the period 2015 - 2021. Each EU member country must produce FRMPs as set out in the EU Floods Directive 2007.

As explained previously, as LLFA, NYCC was not required to produce a FRMP for its own area following the PFRA process because significant flood risk areas were not identified in the PFRA. However, two Environment Agency authored FRMP's are relevant.

- The Humber FRMP\(^{39}\) presents the strategic flood risk management plan for the Humber River Basin District. It covers flooding issues for main rivers, the sea and reservoirs across the whole of the Humber Basin, and flooding issues for local sources (ordinary watercourses, surface water and groundwater) for North Yorkshire County Council area.
- The Northumbria FRMP\(^{40}\) presents the strategic flood risk management plan for the Tyne, Wear, Tees and parts of Northumberland.

Two Environment Agency Catchment Flood Management Plans (CFMPs) are also relevant:

- The Ouse CFMP\(^{41}\), which covers the part of the Hambleton District Council area that falls within the wider catchment of the River Ouse (i.e. areas draining into the Swale, Wiske and Ouse). This CFMP makes specific reference to the flood risk in Northallerton and Thirsk. It states for Northallerton that surface water drainage and sewers have the potential to affect some urban areas and cause flooding. It also states that key predictions for the impact of climate change within the Ouse basin are for more frequent and intense storms causing more widespread and regular flooding from drainage systems and some rivers; and increased winter rainfall leading to increased likelihood of largescale flood events.
- The Tees CFMP\(^{42}\), which covers the part of the Hambleton District Council area that falls within the Leven catchment (a tributary of the Tees).

D.4.2 National and Local Flood Risk Management Strategies

The FWMA establishes how flood risk will be managed within the framework of National Strategies for England and Local Strategies for each LLFA area. The National Strategy for England has been developed by the Environment Agency with the support and guidance of Defra. It sets out principles for how flood risk should be managed and provides strategic information about different types of flood risk and which organisations are responsible for their effective management. The Act requires risk management authorities (local authorities, internal drainage boards, sewerage companies and highways authorities) to work together and act consistently with the National Strategy in carrying out their flood and coastal erosion risk management functions effectively, efficiently and in collaboration with communities, business and infrastructure operators to deliver more effective flood risk management.

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LLFAs have responsibility for developing a Local Flood Risk Management Strategy (LFRMS) for their area covering local sources of flooding. The local strategy produced must be consistent with the National Strategy. The strategy should set out the framework for local flood risk management functions and activities and should raise awareness of local organisations with responsibilities for flood risk management in the area. The strategy should also facilitate partnership arrangements to ensure co-ordination between local organisations and an assessment of flood risk and plans and actions for managing risk, as set out under section 9 of the FWMA.

NYCC, as the LLFA, has published its LFRMS\footnote{http://www.northyorks.gov.uk/article/29725/North-Yorkshire-local-flood-risk-strategy} in partnership with the seven district councils of North Yorkshire (Harrogate, Selby, Hambleton, Ryedale, Richmondshire, Scarborough and Craven). The LFRMS sets out how NYCC, as LLFA, will manage flood risk from all types of flooding such as surface water runoff, groundwater and ordinary watercourses for which the County Council has a responsibility as LLFA, and other types of flooding where local agents can play a supporting role to lead agencies. Hambleton District Council as an LPA within NYCC are required to work in partnership with the LLFA to manage flood risk.

The LFRMS has six key objectives:

- To provide a greater role for communities in managing flood risk.
- To improve the knowledge and understanding of flood risk and management responsibilities within NYCC and amongst partners, stakeholders, communities and the media.
- To encourage sustainable and appropriate development utilising sustainable drainage where ever possible.
- To increase knowledge of watercourse network and drainage infrastructure.
- To carry out flood risk management measures that deliver social, economic and environmental benefits.
- To make the best use of all potential funding opportunities to deliver flood risk management measures.

The Strategy also sets out an action plan of how the LLFA intend to achieve these objectives. Proposed actions are divided into four categories: Prevention, Protection, Preparedness and Recovery & Review. Each category contains the following information:

- A description of the action required.
- The timescale for implementation of the action.
- The source of flooding that relates to the action.
- The level of priority.
- The organisation to lead the action and support organisations.
- The estimated cost of the action.

\section*{D.4.3 Surface Water Management Plans}

The Pitt Review recommended that "...Local Surface Water Management Plans (SWMPs) … coordinated by local authorities, should provide the basis for managing all local flood risk." This led to the development of formal governmental guidance document\footnote{Surface Water Management Plan Technical Guidance - https://www.gov.uk/government/publications/surface-water-management-plan-technical-guidance} (published in 2011) for SWMPs. This defines a SWMP as:

- A framework through which key local partners with responsibility for surface water and drainage in their area, work together to understand the causes of surface water flooding and agree the most cost-effective way of managing surface water flood risk.
- A tool to facilitate sustainable surface water management decisions that are evidence based, risk based, future proofed and inclusive of stakeholder views and preferences.
- A plan for the management of urban water quality through the removal of surface water from combined systems and the promotion of SuDS.
As a demonstration of its commitment to SWMPs as a structured way forward in managing local flood risk, Defra announced an initiative to provide funding for the highest flood risk authorities to produce SWMPs. The LLFA has not carried out any SWMPs within the Hambleton District.

D.4.4 Flood Risk Partnerships and Partnership Plans
Hambleton District Council has been involved in the development of partnerships designed to provide collaboration between public agencies, businesses and the community. Partnerships and plans that affect the district include:

- North Yorkshire Local Resilience Forum (NYLRF).
- North Yorkshire County Council Emergency Planning Unit.
- Community Emergency Plans (at the town / parish council level).
- Community Risk Register.
- ‘Yorkshire Floods’ (support & recovery group).
- Hambleton Community Action45.