Eden Local Plan 2014-2032
Strategic Flood Risk Assessment

September 2015

Eden
District Council

www.eden.gov.uk

Contents

1.0 Introduction

Background

1.1 Eden District Council is a largely rural area with the main population concentrated in the principal settlement of Penrith and the market towns of Appleby, Kirkby Stephen and Alston. With the River Eden running through the district, flooding is the most frequently occurring natural hazard and considered a factor in the spatial planning process.

1.2 The River Eden runs through Eden District and into Carlisle District.

1.3 Eden District Council currently has an adopted Development Plan consisting of a Core Strategy Development Plan Document and the Saved Policies of the Eden Local Plan 1996. The Core Strategy was adopted in 2010. As part of the Local Development Framework process, the evidence base included a Strategic Flood Risk Assessment (SFRA). Commissioned by Eden District Council and carried out by Jacobs, the Strategic Flood Risk Assessment was carried out in 2008 with the most recent update in January 2009.

1.4 Eden District Council is now seeking to produce a new Local Plan which will encompass strategic policies, development management policies and site allocations in a single document. As part of the development of this document, a new Strategic Flood Risk Assessment has been undertaken.

Future Development in Eden

1.5 It is anticipated that the majority of new development within Eden District will take place in the 4 larger settlements of Penrith, Alston, Appleby and Kirkby Stephen. These settlements will form the focus for new housing and employment provision throughout the lifetime of the Plan.

1.6 In addition, there are a number of villages which are considered appropriate for smaller scale development appropriate to the size of the village, these are:

Armathwaite, Bolton, Brough and Church Brough, Clifton, Culgaith, Great Asby, Great Salkeld Greystoke, Hackthorpe, High Hesket, Kirkby Thore, Langwathby, Lazonby, Long Marton, Low Hesket, Morland, Nenthead, Newton Reiny, Orton, Plumpton, Shap, Skelton, Sockbrige and Tirril, Stainton, Tebay, Temple Sowerby, and Warcop.

1.7 Below this tier of settlements, are further villages which may be appropriate for a low level of housing to support diverse and sustainable communities.

Purpose and Objectives

1.8 A Strategic Flood Risk Assessment must be carried out when preparing the Local Plan as it will provide an assessment of the potential impacts the proposed site allocations may have on current and future flood risk. This requirement is contained within paragraph 100 of the National Planning Policy Framework (to be referred to as NPPF):

"Local Plans should be supported by 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."

1.8 There are two potential levels of Strategic Flood Risk Assessment – Level One and Level Two. A Level One Strategic Flood Risk Assessment is carried out where flooding is not a major issue and where development pressures are low. A Level Two Assessment is undertaken where land that falls into a low flood risk area cannot appropriately accommodate all the necessary proposed development and when the Exception Test (as set out in the NPPF) needs to be applied.

1.9 The key aims and objectives of this Strategic Flood Risk Assessment are:

- To understand the extent and severity of flood risk across Eden District from all sources and to use the information to try and direct development away from areas at highest risk;
- To ensure that the potential flooding risk associated with the proposed site allocations is fully considered;
- To update the Sustainability Appraisal and site assessment documents;
- To assist in the preparation of appropriate planning policies for the management of flood risk and site allocations;
- To identify site- specific requirements in relation to the provision of Flood Risk Assessments;
- To identify site-specific measures to reduce flood risk on sites;
- To inform the development management stage when planning applications area submitted to determine the appropriate mitigation; and
- To meet the obligations as set out in the NPPF and the associated National Planning Practice Guidance.

2.0 Policy Framework

2.1 Since the previous SFRA carried out in 2007-9, the planning policy framework has considerably altered. This Section provides a summary of the key planning and flood risk legislation and policy documents which have been used to inform the preparation of the Eden Local Plan.

European Floods Directive and Flood Risk Regulations 2009

2.2 The European Floods Directive (2007/60/EC) came into force on 26 November 2007. This Directive required all European Member States to carry out a preliminary flood risk assessment by December 2011 which identified river basins and associated coastal areas at risk of flooding. Following the completion of this work, flood risk maps were to be drawn up by 2013 with flood risk management plans written by 2015 focusing on prevention, protection and preparedness. In order to ensure that this workstream was co-ordinated with flood risk management plans and river basin management plans, it was to be carried out alongside the requirements of the Water Framework Directive.

2.3 In December 2009, the Flood Risk Regulations 2009 were enacted to implement the European Flood Directive. These Regulations place Cumbria County Council as the Lead Local Flood Authority for Cumbria and require the County Council to prepare the following documents:

- Preliminary Flood Risk Assessment Report;
- Flood Hazard Maps and Flood Risk Maps;
- Flood Risk Management Plan.

The Flood Risk Strategy is currently out to consultation.

Pitt Review and the Flood and Water Management Act 2010

2.4 Following the floods which took place in the summer of 2007, Sir Michael Pitt was instructed to undertake a review in order to learn the lessons of these events. As part of this review, a number of recommendations were made to improve the management of potential future events. The 92 recommendations which came from the review addressed issues dealing with: prediction; flood warning; prevention; emergency management, resilience; and recovery.

2.5 As a consequence of this review, Cumbria County Council is now the Lead Flood Authority for Cumbria with responsibility for managing

floods from local sources (e.g. ordinary watercourses, surface water and ground water).

The National Flood and Coastal Erosion Risk Management Strategy for England

2.6 This national strategy was written by the Environment Agency and published in May 2011. The document contains references to the links between the preparation of Local Plans and the reduction of flood risk.

2.7 A key message coming from the document is that the use of land should be effectively managed in order to avoid increasing flood risk and worsening coastal erosion. This means that new developments should take such issues into account and should be safe from flooding and where possible should reduce the risk of flood. As a District Council, Eden is to work with Cumbria County Council and the Environment Agency through the production of the Local Plan in order to ensure flooding is fully considered. Sustainable Urban Drainage Systems (SUDS) should be employed in new development and design should be undertaken in such a way as to reduce the risk to life and damages which are caused by flooding.

Water Framework Directive and Water Environment Regulations

2.8 The Water Framework Directive (200/60/EC) and The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 require the preparation of management plans and tasked to the Environment Agency. Eden is covered by three different management plans:

- North West River Basin Management Plan (Environment Agency)
- Northumbria Basin Management Plan (Environment Agency) and
- Solway Tweed River Basin Management Plan (Scottish Environment Protection Agency)

These plans focus on the protection, improvement and sustainable use of the water environment. Local Plans should seek to continue to protect and enhance river basins and the objectives of these plans should be taken into account in appropriately worded Local Plan policies.

NPPF and National Planning Policy Guidance

2.9 There are 12 core planning principles identified within the NPPF. Of these, two relate to flood risk:

- 'Support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change, and encourage the reuse of existing resources, including conversion of existing buildings, and encourage the use of renewable resources (for example, by the development of renewable energy); and
- Promote mixed use developments, and encourage multiple benefits from the use of land in urban and rural areas, recognising that some open land can perform many functions (such as for wildlife, recreation, flood risk mitigation, carbon storage, or food production).'

2.10 Section 10, paragraph 100 notes that:

> *'Local Plans should be supported by 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…'*

2.11 The National Planning Practice Guidance (to be referred to as NPPG) supports these requirements detailing various issues such as the definition of flood risk, sequential testing and the Exception Test process and how flooding can be reduced amongst other issues. Section 2 of the NPPG, in respect of flood risk and coastal change details how flood risk should be taken into account in the preparation of Local Plans, who should be approached for advice and Section 3 deals with the writing of SFRA. The key task requirements when preparing the document are:

1. Consultation with sewerage undertakers and a collaborative approach with other authorities;
2. Use of the surface water flood mapping available through the Environment Agency;
3. Identification of any risk from catastrophic damages from reservoir failure;
4. Identification of areas of functional floodplain through input from the Environment Agency and the lead local flood authority;

5. Identification of appropriate potential mitigation measures (where necessary);

6. Identify areas at risk from surface water flooding and/or drainage issues.

Further information is provided in the use of Sequential and Exception testing in the preparation of the Local Plan. Sequential testing should ensure that land allocated for development is in the lowest flood risk area. Exceptionally, land can be allocated for development in areas of higher flood risk. In both instances, the wider sustainability benefits for the community must outweigh the flood risk and it must be proven that the development will be safe over its lifetime without causing an increase in flood risk elsewhere and, where possible, reduce overall flood risk.

The Localism Act

2.12 The Localism Act was enacted in November 2011, setting out a series of measures in which power will be moved into the hands of the more locally accountable local authorities and communities. The Act introduces a Duty to Co-operate on strategic cross-boundary issues which includes flooding.

Current Policies

2.13 Eden District Council currently has an adopted Core Strategy. Adopted in March 2010, the Core Strategy contains strategic policies in relation to flood risk. Amongst these policies the following are of relevance in relation to flooding:

Policy CS1 Sustainable Development Principles

"9. Contribute to reducing the causes of climate change and flood risk and respond by adaptation to those impacts that are unavoidable"

Policy CS4 Flood Risk

Development should:

1. Have regard to the flood zone typologies identified in PPS25 and not take place in areas at risk from flooding. Details of areas at risk from flooding can be found in the Council's Strategic Flood Risk Assessment and associated maps, and also on the website of the Environment Agency.
2. Proposals and allocations will be subject to the sequential and exceptions tests of PPS25 to direct development to areas at the

lowest probability of flooding, taking account of the vulnerability of the type of development proposed. Exceptionally, if sites needs to be developed in areas at risk of flooding, then suitable flood protection measures that will reduce flood risk overall be implemented.

3. Not increase the risk of flooding elsewhere (e.g. through a net increase in surface water run-off, or a reduction in the capacity of flood water storage areas).
4. Make use of Sustainable Drainage Systems (SuDS) to manage surface water run-off, where technically feasible and where beneficial for the local environment and community.
5. Be informed by a flood risk assessment, unless the site lies within an area where there is little or no risk of flooding (ie the annual probability of flooding is less than 0.1%).

Policy CS6 Developer Contributions

Contributions may be sought for the following:

8. Drainage and flood prevention

9. Water and sewerage infrastructure

CS18 Design of New Development

6. Maximises opportunities for the use of sustainable construction techniques, sustainable drainage systems, renewable energy generation on site, incorporates water efficiency, recycling and conservation methods and maximises opportunities for the minimisation, re-use and recycling of waste.

Emerging Policies

2.14 The Preferred Options Local Plan was released for public consultation in July 2014. The Plan includes strategic policies, development management policies and site allocations. The Preferred Options document builds on the policies within the adopted Core Strategy. Policy DEV2 relates to water management and flood risk and requires that development meets the sequential approach to development in flood risk areas, requiring SUDS to be implemented; Policy ENV4 notes that financial contributions may be required to assist in mitigation of possible flood impacts; Policy ENV5 requires that new development consider the use of permeable paving and green roofs to manage on site surface water; Policy ENV10 protects groundwater quality.

3.0 Roles and Responsibilities

3.1 There are a number of Risk Management Authorities throughout Eden. In addition, DEFRA has overall national responsibility for policies on flood and coastal erosion risk management. Table 1 below summarises the areas of responsibility depending on flood source.

Body	Flood Source Responsibility	Requirements
Environment Agency	➢ Main river ➢ The sea ➢ Reservoirs	• To set the direction for managing risks through strategic plans; • To provide evidence and advice to inform Government policy and support others • To work collaboratively to support the development of risk management skills and capacity • To provide a framework to support local delivery
Lead Local Flood Authority	➢ Surface water ➢ Ordinary watercourse ➢ Groundwater	• To development and maintain a Local Flood Risk Management Strategy for Cumbria • To maintain a register of assets which are structures or features considered to have a significant effect on flood risk • To record and investigate significant flood events and report on findings • To work with stakeholders and organisations in emergency planning and recovery when a flood event occurs • To deal with applications for the alteration, removal or replacement of structure or features from ordinary watercourses • To act in consultation with District Councils to provide technical expertise on the acceptability of SUDS proposals

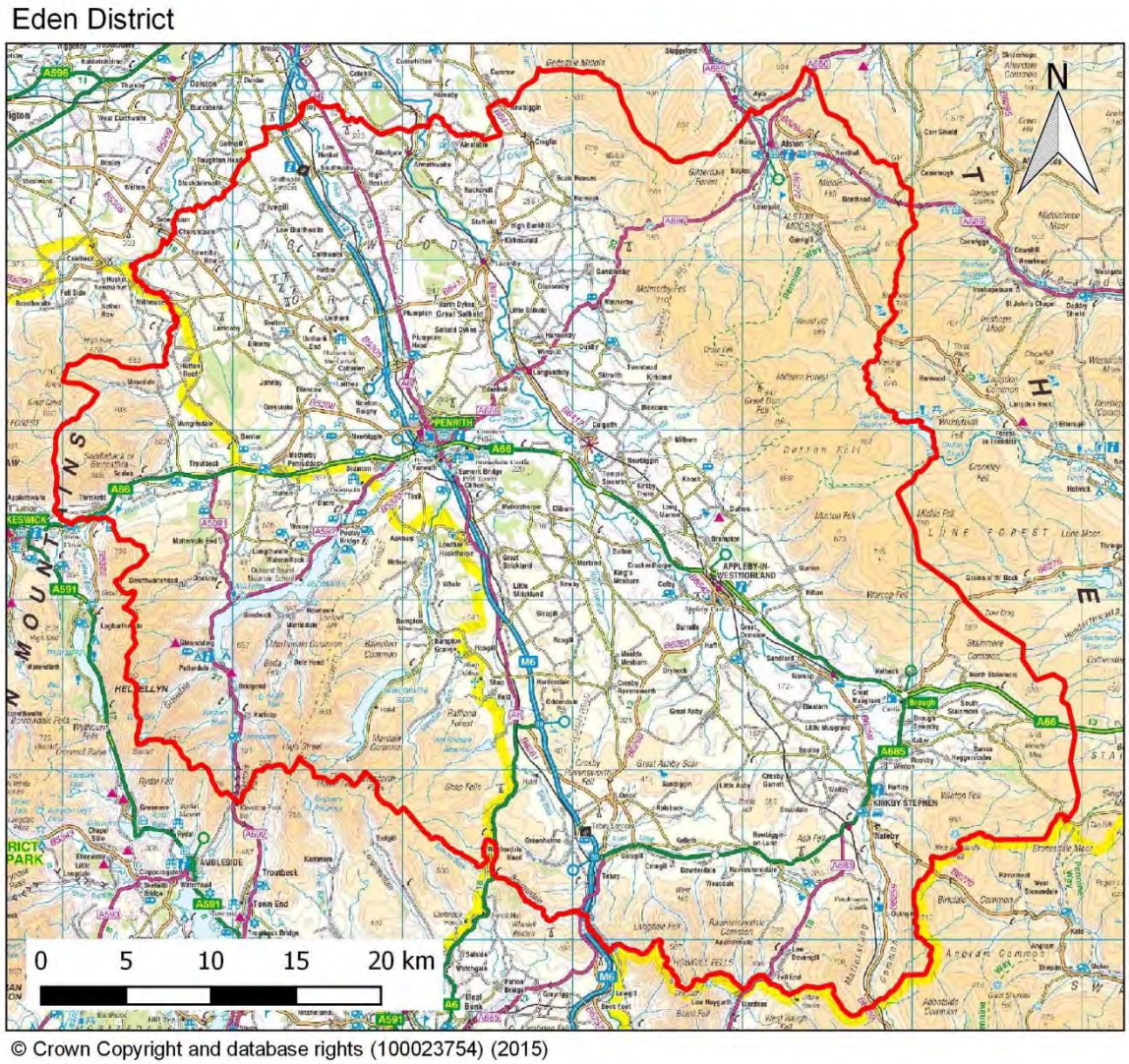
District Councils	➢ Ordinary watercourse	• To work with the Lead Local Flood Authority in planning for local flood risk management • To carry out flood risk management works on minor watercourses, working with the Lead Local Flood Authority and others • To require the use of SUDS through planning policies and conditions and make provision through planning conditions for their maintenance
United Utilities	➢ Sewer flooding	• To manage the risks of flooding from water and foul or combined sewer systems providing drainage from buildings and yards
Highways Authority	➢ Surface water (on or coming from the highway)	• To provide and manage highway drainage and roadside ditches and to ensure that road projects do not increase flood risk

Table 1: Risk Management Authorities Areas of Responsibility

4.0 Study Area

4.1 The area covered by this SFRA is the administrative area of Eden District Council excluding that within the Lake District National Park which is under the Lake District Planning Board for planning policy and decision making purposes. The area is as shown on the Map below:

Map: Eden District SFRA Study Area



4.2 A Catchment Flood Management Plan (CFMP) is in place for the River Eden which was produced by the Environment Agency in December 2009. The Plan includes Eden District Council and Carlisle City as the adjoining Authority that the Eden flows into.

4.3 The CFMP identifies a range of between 153-750 properties at risk of flooding in Eden District, concentrated at Penrith, Eamont Bridge and Appleby. The key messages from the document are:

- Flood resistance, improved defences, improved site layout;
- Encouraging land management which make a positive contribution to reduction of surface water run off; and
- Encouraging the use of SUDS in new developments to control run-off at source.

5.0 Flood Risk in Eden

5.1 Flooding can occur from several sources. The following table summarises the potential sources of flooding in the Eden area:

Flooding Type	Key Causes
Flooding from Rivers and Ordinary Watercourses	Flooding of rivers is usually caused by prolonged intense rainfall, often intensified by changes in drainage or restrictions in a watercourse's capacity causing flooding of adjacent land further up the catchment. Soil permeability and other factors such as the extent to which surfaces over which runoff can flow are paved, compacted or covered by trees and vegetation can affect the rate at which water enters rivers.
Flooding from Surface Water and Sewers	Flooding from surface water and sewers occurs when the drainage system cannot cope with rainfall. Flooding may occur as water flows downhill and gathers in low lying areas or depressions in the land, or when the drainage system is near to capacity water can be forced back up sewer overflows.
Flooding from High Groundwater Levels	Periods of sustained heavy rainfall can result in a rise in groundwater levels.
Flooding from Reservoirs and Artificial Sources	These are non-natural sources of flood risk such as reservoirs or man-made lakes. This flooding can occur when the facility is overwhelmed by heavy rainfall or when there is a failure of a dam of bank. Such catastrophic failure can happen suddenly causing damage and potential loss of life.

5.2 The largest river in the district is the River Eden. Its catchment includes several other significant rivers including the Lowther, Eamont and Petteril. There are numerous other watercourses throughout the District which drain the upland areas of the Pennines and the Lake District.

5.3 The majority of flood risk is considered to come from fluvial flooding along principle watercourses, in particular the Eden and the Eamont.

5.4 In 2011, a £5.6m flood alleviation scheme was carried out in Penrith providing a flood storage reservoir and fixing and replacing more than 675m of culverting to protect homes and businesses in Penrith. Appleby is also protected partially by flood defences from the River Eden which runs through it with temporary flood defences being used in times of high rainfall. The largest flood occurred in Appleby in 1968 when 61 residential properties and 31 commercial premises were affected.

5.5 Water levels in the rivers and streams in Eden District respond rapidly following high rainfall. The small, steep catchments transfer water in the channels quickly ie there are 'flashy'. This results in flood warning times being typically short and difficult to accurately predict.

5.6 In respect of local drainage issues, United Utilities have been involved throughout the plan making process and their input used to shape the policies in respect of water infrastructure. There are no known issues which would preclude development of sites.

Previous Flood Incidents

5.7 As the Lead Local Flood Authority, Cumbria County Council produce Flood Investigation Reports for each flood event. These reports note the period of flooding, properties affected, contributing factors and identify recommended actions and those who could carry out the actions including community resilience actions.

5.8 In 2014, 4 Flood Reports for Eden were produced for the areas of Croglin, Gamblesby, Glassonby and Renwick covering 8 incidences, 5 of which occurred in 2012 and 3 in 2013. These reports and their findings should be reviewed regularly.

Flood Data

5.9 The primary source of data in the SFRA is that provided by the Environment Agency. The Environment Agency have provided mapping to Flood Zone 3 information, this is enhanced by information relating to 1 in 20 year flooding which is taken to form the basis of the functional flood plain (or Flood Zone 3b). More specific modelling was made available for:

- Appleby: River Eden;
- Eamont Bridge: River Eamont; and
- Thacka Beck: Penrith.

Mapping is available in relation to sites which are proposed for allocation within Appendix B of this report and flood maps of the top two tiers of settlements generally to aid with decision making.

5.10 Definitions of the different types of flood risk zones are provided within the National Planning Practice Guidance. This identifies the probability of river and sea flooding assuming no defences are in place. Table 2 below provides these definitions:

Flood Zone	Probability of Flooding	Definition
1	Low	Land having less than a 1 in 1,000 annual probability of river or sea flooding
2	Medium	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding, or land having a 1 in 200 and 1 in 1,000 annual probability of sea flooding
3a	High	Land having a 1 in 100 or greater annual probability of river flooding or land having a 1 in 200 or greater annual probability of sea flooding
3b	Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood, land with a 1 in 20 probability of flooding

Table 2: Definitions of Flood Zones (Taken from National Planning Practice Guidance)

When assessing site allocations for suitability through the Local Plan process, consideration has been given to flood risk using the above table.

5.11 The SFRA also considers surface water flooding in relation to 1 in 30 years and 1 in 200 years.

5.12 In addition, in relation to the sequential and exception test, flood risk vulnerability and flood compatibility is considered within the National Planning Practice Guidance. The following table details flood zones and when exception tests are required:

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception test required	✓	✓	✓

Zone 3a	Exception test required	×	Exception test required	✓	✓
Zone 3b	Exception test required	×	×	×	✓

Table 3: Requirements for Exception Test (NPPG)

The sequential test should be applied in all development decisions, directing development to Flood Zone 1 in the first instance then Flood Zone 2 and finally 3.

Flood Defences

5.13 Flood defences are typically raised structures that alter natural flow patterns and prevent floodwater from entering properties in times of flooding. They are generally categorised as either 'formal' or 'informal' defences. A 'formal' defence is one which is maintained by its respective owner as a defence. An 'informal' defence is one which may not have been constructed for the purposes of flood defence such as boundary walls or large buildings situated near to river corridors which may hold back floodwater.

5.14 Appleby benefits from raised flood defences protecting the town centre area against a 1 in 100 year event. In addition Penrith has had a recent flood alleviation scheme carried out in order to enable the storage of floodwater in a flood storage reservoir to relieve Thacka Beck and protect central Penrith. Other smaller defences are provided throughout Eden District.

Flood Hazard Due to Flood Defence Failure

5.15 Hazards can be caused by the failure of flood defences which can lead to fast flowing inundation which may knock people off their feet leading to the possibility of loss of life.

5.16 The town of Appleby is defended by raised defences which physically prevent water reaching properties in times of flood. The defences are typically in excess of 1m in height. There is a small risk that these defences may fail when a flood is in progress. In this instance, a surge of water may penetrate the failed defence. Such an event is likely only to affect people who are immediately standing behind the defence at the time of failure. It is not considered that such an event would cause a risk to life.

5.17 Development which takes place in Appleby should refer to the flood defences and any impact it may have on the defences through the FRA or on the impact a defence failure might have.

5.18 The flood storage reservoir at Penrith has been constructed on a piece of land which is nearby an industrial estate. The storage is in the form of a bunded pond. In the event that the bund failed in a period of flood water storage, it is considered that it would only affect any persons adjacent to the failure. Due to the nature of the surrounding open and undeveloped land, it is unlikely that this would pose a risk to human life.

Local Drainage Issues

5.19 United Utilities have not raised any issues in relation to flood concerns throughout the District.

5.20 In order to assist in the flooding issue within the District, the use of SUDS is promoted through the proposed policy DEV2 – Water Management and Flood Risk which states:

"New development must be in a location which:

1. *Avoids risks to water supply, or includes sufficient mitigation measures to ensure there is no risk to water supply*
2. *Would not compromise the effectiveness of existing floor defences*
3. *Meets the sequential approach to development in flood risk areas. Inappropriate development will not be permitted in flood zones 2 and 3, areas at risk of surface water flooding (critical drainage areas) or areas which have a history of groundwater flooding, or where it would increase flood risk elsewhere unless there is an overriding need and absence of suitable alternatives. If sites, as an exception, need to be developed in areas at risk of flooding, suitable flood protection measures will be required. M*

Protecting greenfield run-off rates in developments coming forward will assist in managing the risk of flooding in the District.

Groundwater Issues

5.21 There is no known significant groundwater flooding issue within the Eden District area.

5.22 All major developments (of over 1ha) will require a Flood Risk Assessment (FRA) at planning application stage. This should include consideration of ground water but it is unlikely to form any significant issue.

Critical Drainage Areas

5.23 A Critical Drainage Area is an area that has critical drainage problems and which has been notified to the local planning authority by the Environment Agency. These areas are separate to those considered as being within a flood zone. The Environment Agency has confirmed that there are no critical drainage areas within Eden.

Climate Change

5.21 Climate change is perceived to represent an increasing risk to properties in relation to flood water.

5.22 The modelling received from the Environment Agency does not consider climate change. Therefore, it is essential that developers consider the possible change in flood risk over the lifetime of the development as a result of climate change. The likely increase in flow over the lifetime of the development should be assessed proportionally to the guidance. In the process of allocating sites, care has been taken to ensure that generally no sites are in close proximity to flood zones. In Penrith town centre in particular however, sites will require consideration of climate change effects.

6.0 Planning and Development Management

6.1 Wherever possible, development should be restricted to the permissible land uses summarised in the Table at para 5.9. However, it is noted that whilst a small amount of the District is situated within Flood Zone 3a (High Probability) there may be in some instances a pressing planning 'need' that may warrant future consideration of these areas. Should this be the case, the proposal should be subjected to an Exception Test which should demonstrate the following:

- The development must provide wider sustainability benefits to the community that outweigh flood risk, informed by a SFRA where one has been prepared;
- the development should be on developable. previously developed land to if not on previously developed land, there should be no reasonable alternative sites on previously developed land; and
- a FRA must demonstrate that the development will be safe, without increasing flood risk elsewhere and where possible, will reduce flood risk overall.

6.2 The management of flood risk must be assured should development be permitted to proceed. It is the responsibility of the prospective developer to build on the recommendations and findings of this SFRA as part of a detailed Flood Risk Assessment to ensure that specific requirements can be met.

6.3 A user guide to assisting in the application of the SFRA recommendations is provided in Appendix A of this report.

Development in Flood Zone 3b Functional Floodplain

6.4 No allocations of land in Flood Zone 3b have been included in the Submission Draft Local Plan.

6.5 Should future applications be made for development within this flood category, this should not be permitted with the exception of water compatible uses and essential infrastructure.

Development in Flood Zone 3a High Probability

6.6 No allocations of land in Flood Zone 3a have been included in the Submission Draft Local Plan.

6.7 Should future applications be made for development within this flood category, this should be restricted to 'less vulnerable' land uses with 'more vulnerable' land uses such as housing steered toward lower

flood risk areas. All proposed development will require a detailed Flood Risk Assessment, flood levels must be situated 1% above the predicted maximum flood level plus free board and allowing for climate change. Specific attention should be paid to ensure that any proposed development would not have a detrimental impact on adjoining property.

Development in Flood Zone 2 Medium Probability

6.8 No allocations on land in Flood Zone 2 have been included in the Submission Draft Local Plan.

6.9 Should future applications be made for development within this flood category, they should demonstrate that the requirements of the Exception Test can be met. They will further need to be accompanied by a Flood Risk Assessment, floor levels should be set above the 1% (100 year) predicted maximum flood level plus freeboard and allowing for climate change.

Development in Flood Zone 1 Low Probability

6.10 All development within the Submission Draft document is within this flood zone where there are no flood risk related constraints placed upon development.

6.11 Notwithstanding the low risk, major development applications should be accompanied by a Flood Risk Assessment and Drainage Impact Assessment which considers the impacts of the site again allowing for climate change.

7.0 Overview of Flood Risk at Proposed Site Allocations – Housing and Employment

Site	Flood Zone	Proposed Site Use	Any Issues
Penrith			
E1 - Carleton	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues
E3 - Carleton	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues
E4 - Carleton Hall	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues
N1 – Salkeld Road/Fairhill	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues
N1a – Salkeld Road/ Fairhill	1	Housing	Site will be expected to incorporate SUDS, particular attention will need to be paid to run off to the highway due to the slope of the site no known flooding issues
N3 – Raiselands	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues
TC1 – Old London Road	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues
P2 – Gilwilly Road	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues
P8 – Myers Lane, Norfolk Road	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues
P61 – Garage at Roper Street	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues
P71 – Brent Road Garages	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues
P93 – Barn and Yard at Brunswick Road	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues
P94 – QEGS Annex, Ullswater Road	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues
P115 – Car park off Brentfield Way	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues

2A – Gilwilly Industrial Estate Extension	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues. Particular attention will have to be paid to run off rates.
MPC - Skirsgill	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues
Alston			
AL1 – Jollybeard Lane	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues
AL11 – Land South of Primary School	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues
AL12 – High Mill	1	Housing	Reuse of an existing building – no known issues
AL13 - Clitheroe	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues
AL16 - Land Adjacent Primary School	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues
24 – Skelgillside Workshops	1	Employment	Site will be expected to incorporate SUDS, no known flooding issues
26 – High Mill	1	Employment	Reuse of an existing building – no known issues
Appleby			
AP10 – Land to the South of Station Road	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues
AP11 – Fields Adj to Coal Yard	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues
19 – Cross Croft Industrial Estate	1	Employment	Site will be expected to incorporate SUDS, no known flooding issues
21 – The Old Creamery	1	Employment	Site will be expected to incorporate SUDS, no known flooding issues
23 – Shire Hall	1	Employment	Reuse of an existing building – no known issues
Kirkby Stephen			
KS4 – Croglam Lane	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues
KS13 – Land to the west of Faraday Road	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues
KS15 – Land Adj Croglam Lane	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues

KS17 – Land behind Park Terrace	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues
KS18 – Land Adj to Croglam Park	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues
33 – Kirkby Stephen Business Park	1	Housing	Site will be expected to incorporate SUDS, no known flooding issues

8.0 Sustainable Management of Flood Risk

8.1 Whilst the SFRA provides an overview of flood risk, it is important that site-based FRAs are carried out by the development for all proposed developments over 1 hectare (the current size requirement for an FRA to be carried out). The SFRA does not replace the requirement for site specific FRAs to address flood risk and any further risks development of the site may cause downstream.

8.2 Planning policies should continue to require that FRAs are carried out which are commensurate with the risk of flooding posed to the site and ensuring that runoff from the site does not contribute to increased flood risks elsewhere.

8.3 The Sequential and Exception test should be implemented as required by policy should development be proposed in Flood Zones 2 or 3 to ensure that development in these zones is appropriate and compatible with the increased risk of flooding. Alternatively it may be demonstrated that the proposed development brings other benefits which outweigh the risks.

8.4 The management of rainfall (surface water) is an essential element of reducing future flood risk. It is imperative therefore that wherever possible, SUDS are positively used in new developments to reduce the rate of run off from urban sites to greenfield run off rates or better.

8.5 SUDS can be used to improve the sustainable management of site water by:

- Reducing peak flows to watercourses or sewers reducing the risk of potential downstream flooding;
- Reducing volumes and the frequency of water flowing directly into watercourses or sewers from developed sites;
- Improving water quality over conventional surface water sewers by removing pollutants from diffuse pollutant sources;
- Reducing potable water demand through rainwater harvesting;
- Improving amenity through rainwater harvesting;
- Improving amenity through the provision of public open space and wildlife habitat;
- Replicating natural drainage patterns, including the recharge of groundwater so that base flows are maintained.

8.6 There are a number of ways that SUDS can be incorporated into a development. The most common forms of SUDS are described below. The most appropriate forms of SUDS are site specific and dependant on the topography and geology of the site and its surrounding. Drainage strategies should explain the reasoning behind the choice of SUDS employed on the site.

SUDS Component	Description
Pervious surfaces	Surfaces that allow inflow of rainwater into the underlying construction or soil
Green roofs	Vegetated roofs that reduce the volume and rate of runoff and remove pollution
Filter drain	Linear drains consisting of trenches filled with a permeable material, often with a perforated pipe in the base of the trench to assist drainage to store and conduct water, they may also permit infiltration
Filter strips	Vegetated areas of gently sloping ground designed to drain water evenly off impermeable areas and to filter out silt and other particulates
Swales	Shallow vegetated channels that conduct and retain water, and may also permit infiltration. The vegetation filters particulate matter
Basins, ponds and wetlands	Areas that may be used for the storage of surface water runoff
Infiltration devices	Sub-surface structures to promote the infiltration of surface water to ground. They can be trenches, basins or soakaways
Bioretention areas	Vegetated areas designed to collect and treat water before discharge via a piped system or infiltration to the ground
Pipes and accessories	A series of conduits and their accessories normally laid underground that convey surface water to a suitable location for treatment and/or disposal (Although sustainable, these techniques should be considered where other SUDS provision is not practical)

Local Measures

8.7 Locally measures can be undertaken by homeowners to reduce the risk or impact of flooding.

For new homes or those being redeveloped:

- Raising of floor levels

  The raising of floor levels above anticipated maximum flood levels ensures that interiors are not directly affected by flooding avoiding damage to possessions;

- Raising of electrical wiring

Rising wiring to a level above flood level reduces both risks to health and safety as well as reducing the time required for works carried out as a result of flood damage.

For existing homes

- Use of flood gates and air brick covers to avoid the inundation of buildings.

Emergency Planning

8.8 Where predicted water levels are expected to result in a flood event, the Environment Agency will issue a series of flood warnings via telephone to those subscribed to the service. This will allow residents to move possessions up stairs or to less vulnerable areas of the property.

9.0 Conclusions and Recommendations

9.1 The main threats of flooding within Eden District come from river flooding, localised runoff, sewer and (to a much lesser extent groundwater) flooding.

9.2 The River Eden and its tributaries is the greatest source of flood risk.

9.3 A planning solution to flood risk should be sought wherever possible. Steering vulnerable development away from areas affected by flooding in accordance with the sequential testing within the NPPF. Allocated sites have all been assessed with respect to the risk of flooding.

9.4 The Local Plan should seek to continue to ensure that sustainable drainage techniques are employed through the imposition of conditions or requirements through development management.

9.5 Flood Investigation Reports should be regularly reviewed and actions followed up.

9.6 The SFRA should be considered a ‘living’ document and regularly reviewed in light of any updated information and emerging new policies which may come forward.