

Flood and Coastal Risk Management Strategy (2017-2022)



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Table of Contents

Executive Summary	I
Foreword	II
Abbreviations and Glossary of terms.....	III
1.0 Introduction	5
1.1: What is South Tyneside’s Flood and Coastal Risk Management Strategy?	5
1.2: Why do we need a Flood and Coastal Risk Management Strategy?	5
1.3: What will the strategy cover?	6
2.0: Legislative Context.....	8
2.1: The National Picture	8
2.1.7: Other Relevant Legislation	11
2.2: The Regional Picture	11
2.3: The Local Picture.....	13
2.4: Partnership working.....	16
2.5: Powers and responsibilities	16
2.5.1: Risk management authorities.....	16
2.5.1.1: Internal	16
2.5.1.2: External.....	18
2.5.1.3: Others	18
Part 1 Flood Risk Management.....	20
3.0: Flood risk in South Tyneside	21
3.1: What is Flood Risk?.....	21
3.2: Historic Flooding	22
3.3: Types of flood risk in South Tyneside	23
3.3.1: Surface water flooding	23
3.3.2: Groundwater flooding.....	23
3.3.3: River Flooding (Fluvial)	24
3.3.4: Coastal Flooding	24
3.3.5: Sewer Flooding	24
3.3.6: Highways Flooding.....	24
3.4: Factors increasing flood risk	25
3.4.1: Topography	25
3.4.2: Climate change	25
3.4.3: Drainage capacity	26
3.4.4: Increase in impermeable surfaces	26
3.4.5: Location.....	26
3.4.6: Flooding, coastal erosion and climate change	27

4.0: Flood Risk Management	28
4.1: National Strategy	28
4.2: Emergency planning	29
4.2.1: Flood Investigation	30
4.2.2: Prioritisation	30
4.3: Schemes.....	31
4.4: Sustainable Drainage Systems (SUDS)	32
4.5: Environment, landscape and maintenance	33
4.5.1: Land management	33
4.5.2: Maintenance.....	34
4.5.3: Drainage Infrastructure	34
Part 2 Coastal Erosion Risk Management Strategy	35
5.0: Coastal Risk in South Tyneside	36
5.1: What is coastal risk?	36
5.2: Historic events	36
5.3: Types of risk	36
5.3.1: Storms.....	36
5.3.2: Coastal defence breach	37
5.3.3: Tidal surge	37
5.4: Factors increasing coastal risk.....	37
5.4.1: Our Coastal Environment.....	37
5.4.2: Geology, topography and relief of South Tyneside’s Coastline	38
5.4.3: The Challenges of Climate change	38
6.0: Coastal Management	39
6.1: National Strategy	39
6.2: Coastal Investigation	39
6.3: Coastal management areas.....	39
6.3.1: Management area 1 – River Tyne to South Pier	39
6.3.2: Management area 2 - Herd Sands	41
6.3.3: Management Area 3 - Trow.....	43
6.3.4: Management Area 4 – Frenchman’s Bay to Lizard Point	44
6.3.5: Management Area 5 – Lizard Point to Souter Point	46
6.3.6: Management Area 6 – Souter Point to Whitburn.....	47
7.0: Delivery of Part 1 and 2.....	48
7.1: Funding.....	48
7.2: Flood and coastal risk management delivery.....	49
7.3 Residual Risk.....	50

8.0 Reviewing the Strategy and Next steps.....	51
8.1: Review.....	51
8.2: Next Steps.....	51

Table of Figures

Figure 1: What is expected during the planning stages with regards to flood risk. (Matrix from the LASOO Best Practice Guidance.	17
Figure 2: Some of the Fellgate Flood Alleviation Scheme SUDS Features.....	33
Figure 3: Littlehaven Sea Wall	41
Figure 4: Herd Sands Access Ramp and Gabions.....	42
Figure 5: Trow Quarry Coastal Protection Scheme.....	44
Figure 6: Funding Application Steps	50

Appendix

Appendix 1: Action Plan	54
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Executive Summary

Welcome to South Tyneside's Flood and Coastal Risk Management Strategy

The floods that took place across the UK in 2007, 2010, 2012 and 2015 highlighted the devastating impacts that flooding and coastal erosion can have on communities. In 2007, 13 people lost their lives, approximately 48,000 households and 7,300 businesses were flooded and billions of pounds worth of damage was caused.

Since December 2013 and throughout January and February 2014 much of the UK has not only experienced unusually high tides in coastal regions but also persistent rainfall which has led to severe flooding, damage and loss of life.

South Tyneside Council recognises the importance of planning and managing flood risk to reduce the impact it has on our community. Flooding can have a devastating effect on both residents and businesses alike, and although we may not be able to prevent flooding altogether, it is envisaged that this strategy will coordinate our services so that flood risk is reduced and the aftermath of flooding incidents is minimised.

Our Flood and Coastal Risk Management Strategy aims to adopt a new approach to flood risk management which will see improved communication and close working partnerships with other organisations involved in flood risk management to protect the public and economy from immediate and future risks. It will show how we are attempting to create a balance between modelled risk and the work needed to support areas previously affected by flooding. As a result, our community will be better informed with regard to flood risk and how it can be reduced.

The strategy has been developed in consultation with our partners setting out how we plan to respond to flooding incidents which are predicted to become more frequent due to the milder, wetter winters, more frequent downpours and higher sea levels resulting from climate change.

This strategy fulfils the requirements set by the Flood and Water Management Act 2010 and sets a programme of local actions for the next five years so that we meet the challenges of managing flood and coastal erosion risk within catchments and along the coast and balance the needs of communities, the economy and the environment.

Foreword

Flooding can be devastating and those impacts have been witnessed in many communities across the country in recent years. Flooding has particularly affected South Tyneside with large-scale damaging events like those in 2012 where many properties were internally flooded, a number of roads were left impassable and businesses were also affected. Due to the increasing effects of climate change we need to make sure that on both a local and national scale, we are aware and prepared for flooding and coastal erosion.

South Tyneside has a number of different sources of possible flooding such as ordinary watercourses, overland flow, main rivers and the sea. Proximity to these sources can increase the likelihood and impacts of flooding so we, as a borough, must be informed and prepared.

I represent the borough on the Northumbria Regional Flood and Coastal Committee. This helps to keep me informed of the current position across the region and to promote the case for flood and coastal investment in South Tyneside. My attendance on this Committee helps to ensure that the communities of South Tyneside are better protected and well versed in how to respond to future flooding and coastal events. With greater likelihood of more frequent and intense storms and events in the future due to climate change, this is becoming increasingly important.

There have been a number of projects already undertaken in the borough and more are planned for the future, many of which are outlined in this strategy.

Partnership working is very important in tackling the problems faced by flooding and coastal erosion. As Lead Local Flood Authority, it is important that we work well and in partnership with others, such as the Environment Agency, Northumbrian Water Group, and other local authorities. Partnership working ensures projects can be delivered in a more cost effective way with less disruption. Close working with local communities allows this to happen and ensures we can focus on reducing risk in more vulnerable areas. Some project examples are the award winning Littlehaven Promenade and Sea Wall and the Fellgate Estate Flood Alleviation Scheme.

As flooding and coastal erosion are natural processes, we cannot prevent these from happening. It is our duty however, to work together to limit the risk and effects of both of these processes over time and this strategy outlines how we intend to achieve this.

**Councillor Moira Smith,
Lead Member for Area Management and Community Safety**

Abbreviations and Glossary of terms

AEP	Annual Exceedance Probability. The chance of a flood happening expressed as a percentage chance of occurring in any 1 year
Asset	A structure or a system of structures used to manage flood risk.
Catchment	An area that serves a river with rainwater. Every part of land where the rainfall drains to a single watercourse is in the same catchment.
CFMP	Catchment Flood Management Plan
Coastal erosion	The wearing away of the coastline, usually by wind and/or wave action
Coastal flooding	Occurs when coastal defences are unable to contain the normal predicted high tides that can cause flooding, usually when a high tide combines with a storm surge (created by high winds or very low atmospheric pressure)
Consenting	The process of obtaining permission to add/amend structures in/near to a watercourse
Critical Drainage Area	A drainage area where the flood risks from surface water run-off are likely to be most significant
Culvert	A covered structure under a road, embankment etc. to direct flow of water
Defence	A structure that is used to reduce the probability of floodwater or coastal erosion affecting a particular area (for example, a raised embankment or sea wall)
DEFRA	Department for Environment, Food and Rural Affairs
DG5	Previously recorded flooding issues relating to surface and foul water sewers, held by the sewerage undertaker
EA	Environment Agency
EU	European Union
FCERM	Flood and Coastal Erosion Risk Management
FDGiA	Flood Defence Grant in Aid
Flood	The temporary cover by water of land not normally covered with water.
Flood Risk Area	An area determined as having a significant risk of flooding in accordance with guidance published by DEFRA
FWMA	Flood and Water Management Act (2010)
Groundwater	Water that is below the surface of the ground and in direct contact with the ground or subsoil
Groundwater flooding	Occurs when water levels in the ground rise above the natural surface. Low-lying areas underlain by permeable strata are particularly susceptible.
Indicative Flood Risk Areas	Areas determined by the Environment Agency as indicatively having a significant flood risk, based on guidance published by DEFRA and the use of national datasets. These indicative areas are intended to provide a starting point for the determination of Flood Risk Areas by LLFAs.
LDF	Local Development Framework
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
LRF	Local Resilience Forum
Main river	A watercourse shown as such on the main river Map, and for which the Environment Agency has responsibilities and powers
NRD	National Receptor Dataset – A collection of risk receptors produced by the Environment Agency
NRFCC	Northumbria Regional Flood and Coastal Committee
NWG	Northumbrian Water Group

OFWAT	The Water Services Regulation Authority, or OFWAT, is the body responsible for economic regulation of the privatised water and sewerage industry in England and Wales.
Ordinary Watercourse	All watercourses that are not designated main river, and which are the responsibility of Local Authorities, or where they exist Internal Drainage Boards
PAR	Project Appraisal Report - a report that used to be required to outline a project and attain funding. The Five Case Business Model has now replaced this.
PFRA	Preliminary Flood Risk Assessment
RBD	River Basin District
Recovery	The process of rebuilding, restoring and rehabilitating the community following an emergency
Resilience	The ability of the community, services, area or infrastructure to withstand the consequences of an incident
Risk Management Authorities	Organisations that have a key role in flood and coastal erosion risk management as defined by the Flood and Water Management Act (2010). These are the Environment Agency, Lead Local Flood Authorities, Internal Drainage Boards, Water Companies and Highways Authorities.
River flooding	Occurs when water levels in a channel overwhelms the capacity of the channel.
SFRA	Strategic Flood Risk Assessment
SuDS	Sustainable Drainage Systems
Surface Water Flooding	Occurs when rainwater does not drain away through the normal drainage system or soak into the ground, but lies on or flows over the ground instead.
SWMP	Surface Water Management Plan

1.0 Introduction

Section Overview

In this section, we will cover the following:

- What is the Flood and Coastal Risk Management Strategy?
- Why do we need it?
- What will the Strategy cover?
- Review

1.1 What is South Tyneside's Flood and Coastal Risk Management Strategy?

The Flood and Coastal Risk Management Strategy details our approach to flood risk and coastal management over the next five years (2017-2022). The strategy will identify some broad actions to be implemented in the near future and sets out the steps we intend to take in the long term.

The strategy has adopted a new approach to flood risk management. This will see improved communication and close working partnerships with other organisations involved in flood risk management and better communication with the public about flood risk, coastal erosion and what can be done to mitigate the impacts.

The strategic approach adopted, together with the comprehensive action plan, will be key to managing flood risk and reducing the impact it has on our local communities. Part 1 of the strategy addresses flooding from surface water, ground water and ordinary watercourses. Sewer and river flooding are also considered.

Part 2 examines coastal erosion risk management including how we aim to reduce the threat of coastal erosion as well as how we deliver social, economic and environmental benefits to the borough.

South Tyneside's strategy reflects the content of the National Flood and Coastal Erosion Risk Management Strategy and includes a 5-year action plan that details the significant actions needed to reduce the risk to the borough.

1.2 Why do we need a Flood and Coastal Risk Management Strategy?

Sir Michael Pitt's review: 'Learning Lessons from the 2007 Floods' identified gaps in the way that flood risk is managed. The Government accepted the 92 recommendations made in the report. These recommendations were transposed into UK legislation under The Flood and Water Management Act 2010 (FWMA), and gained royal assent in April 2010.

In fulfilment of Section 7 of the FWMA, the Environment Agency produced a national flood and coastal erosion risk management strategy. The national strategy provides a strategic overview role of all sources of flooding and coastal erosion supports local decision-making and engagement in flood and coastal erosion risk management, and aids lead local flood authorities

in the development of their own local strategies. The Flood and Water Management Act 2010 Section 7 also requires each local authority to produce a local flood risk strategy that is consistent with the national strategy, therefore South Tyneside Council designated as a Lead Local Flood Authority (LLFA) has decided to adopt a similar approach and produce a combined coastal and flood risk management strategy.

Current climate change predictions forecast more extreme weather events, milder wetter winters and rising sea levels, which will inevitably increase the risk of increased flooding and coastal erosion. This is not just a local problem but one that is faced regionally, nationally and globally. Over the past few years, the UK has experienced the effects of severe weather first-hand.

In 2012, South Tyneside experienced several episodes of extreme rainfall, which affected hundreds of properties, businesses and the local road network. In December 2013 we saw the arrival of several severe weather storms in the UK causing unusually high tides, persistent heavy rainfall and strong winds. Coastal regions experienced the highest tides on record not only destroying sea defences, infrastructure and cliff faces, but taking with it homes and the belongings of those living next to the sea.

As more heavy rain fell in early 2014, ground conditions became saturated, rivers and watercourses reached capacity and broke their banks and sewerage systems were unable to cope with the extra rainfall. Critical infrastructure was destroyed and essential services including power supplies, transport links and telecommunications were disrupted across many areas.

This Flood and Coastal Erosion Risk Management Strategy will ensure that South Tyneside has policies in place to address these issues and a governance structure that demonstrates a collaborative working approach, both within South Tyneside Council and with external partners.

1.3 What Will the Strategy Cover?

This strategy provides a framework for delivering local flood and coastal risk management in South Tyneside and has the following aims and objectives:

Aim and objectives for Part 1 Flood Risk Management:

Aim:

To improve knowledge and understanding of local flood risk for both Risk Management Authorities and local communities; to work together to create innovative solutions and make sure resources are targeted for greatest affect to minimise flood risk.

Objectives:

- To provide an explanation of stakeholder responsibilities in flooding issues
- To provide an understanding of the risks of various types of flooding
- To ensure an integrated approach is followed and actions undertaken in response to flooding do not affect other areas.
- To provide an explanation of how areas at risk of flooding are assessed and the resources prioritised
- To state how stakeholders will work together to both manage resources and share information.
- To enable residents and businesses to be aware of the flood risks related to the relevant properties and enable them to manage the residual risk
- To communicate with the public to ensure that there are realistic expectations of the outcomes of flood risk management.

- To ensure that planning decisions are informed by current understandings and to research flood matters and by previous issues to ensure that, developments do not create additional flood risk.
- To ensure that emergency plans and responses to flood incidents are effective so that communities are able to respond effectively.
- To minimise the number of properties that are flooded internally

Aim and Objectives for Part 2 Coastal Erosion Risk Management:

Aim:

To sustainably enhance our coastal and estuarine environment to encourage tourism and regeneration, while protecting our cultural, environmental and economic assets and meeting the challenges of climate change and natural coastal erosion.

To ensure that we achieve the aim for this part of the strategy, our objectives are to:

- Manage our coastline in a practical and sustainable way, protect valuable assets wherever possible and prevent or minimise the impact of flooding, while protecting environmental designations
- Promote the importance of the coast, foreshore and river frontage
- Encourage stakeholder participation and support effective liaison through the North East Coastal Group (NECG)
- Highlight the need for strategic planning in light of climate change induced flooding and sea level rise
- Promote sustainable developments that neither rely on costly or maintenance-intensive defences nor increase the risk of flooding
- Facilitate improvement of our designated bathing beaches, increase tourism and economic wellbeing associated with the coast; and work with riparian landowners to protect valuable assets along the coastline and estuary
- Participate in the Local Government Authority Coastal Special Interest Group and in regional monitoring to increase understanding of the processes that impact on our coastline and to enable better prediction of coastal erosion rates

2.0 Legislative Context

Section Overview

In this section, we will cover the following:

- The National Picture
- The Local Picture
- Partnership working
- Roles and Responsibilities

2.1 The National Picture

Legislation	Summary	Relates to
Making Space for Water (2005)	This is the Government's strategy for Flood & Coastal Erosion Risk Management. It takes a holistic approach to management of risk from all forms of flooding (river, coastal, groundwater, surface run-off and sewer) and coastal erosion. The strategy aims to ensure sustainable development, and contribute to implementation of the Water Framework Directive by addressing water quality issues through effective management.	Flood and Coastal Management Risk Strategy
The Flood and Water Management Act (2010)	This Act sets out the agencies responsible for managing flood risk. The Environment Agency was given a strategic overview role and some local authorities, such as South Tyneside Council, were designated as LLFA. LLFA's are given responsibility for the co-ordination and management of local sources of flood risk from groundwater, surface water and ordinary watercourses. The Act identifies LLFA's, Internal Drainage Boards, Highways Authorities and the Environment Agency as risk management authorities. The relevant authorities are required to co-operate in exercising their functions under the legislation.	Flood Risk Strategy

Name	Summary	Relates to
The Flood Risk Regulations (2009)	These regulations transpose the EU Flood Directive into law in England and Wales. The regulations require local authorities and the Environment Agency to undertake a Preliminary Flood Risk Assessment (PFRA) to identify those areas that meet the criteria of a 'significant flood risk area' as defined by the regulations. South Tyneside's PFRA is undertaken in 2011 and although no significant flood risk areas are identified under the criteria given, it is appreciated that those communities impacted by flooding may view it as significant. The PFRA is to be reviewed in 2017.	Flood Risk Strategy
Coast Protection Act (1949)	The Coast Protection Act 1949 provides the legal framework for the protection of the coast against erosion and encroachment by the sea. This Act gives Local Authorities permissive powers to undertake coast protection works on their frontage. A coast protection authority has the power to carry out any necessary or expedient coast protection works for the protection of any land in its area from erosion or encroachment by the sea.	Flood and Coastal Management Risk Strategy
The National Planning Policy Framework (NPPF) (2012)	<p>This requires developers to consider flood risk within new development. Developers need to assess and demonstrate how flood risk from all sources impacts on a development, how it will be managed onsite and how it affects others. Future climate change predictions must be considered. A site-specific flood risk assessment is required for those developments, which are deemed to be at high risk of flooding.</p> <p>As of 6th April 2015, Sustainable Drainage Systems (SuDS) were formally introduced into the planning process. Any major planning application of 10 or more houses or a major commercial scheme is expected to include sustainable drainage systems before they are granted planning permission. Sustainable drainage systems include features such as detention basins, ponds and permeable paving. Their purpose is to intercept and store surface water run-off to stop water running directly into the drainage systems and overwhelming its capacity. SuDS replicate natural drainage processes, which were present before the developments were built.</p>	Flood and Coastal Management Risk Strategy
The National Strategy for Flood and Coastal Erosion Risk Management	The National Strategy provides a framework for all of the flood risk and the coastal erosion risk management authorities. It sets out the long-term objectives to manage flood and coastal erosion risks and the measures proposed to achieve them. It encourages the management of flood and coastal erosion risk using all options in a co-ordinated and effective way across all catchments.	Flood and Coastal Management Risk Strategy
The Revised Bathing Water Quality Directive (2006/7/EC)	In 2015, this directive integrated into national law; its overall objective remains the protection of public health while bathing, but it also offers an opportunity to improve management practices at bathing waters. The new revision of this directive tightens up the water quality standards and assesses all bathing waters against four categories, (excellent, good, sufficient and poor). All bathing waters across the UK should hold a minimum quality categorisation of "sufficient", with some limited exceptions, by 2015. Designated Beaches in South Tyneside at Sandhaven and Marsden Bay exceeded this target.	Coastal Risk Strategy

Integrated Coastal Zone Management (ICZM)	This is the UK's response to the EU recommendation for an integrated approach to the management of coastal areas. The objective of this programme is to establish sustainable levels of economic and social activity in our coastal areas while protecting the environment.	Coastal Risk Strategy
Shoreline Management Plans (SMP's)	Collectively provide a long-term strategy for coastal defence in England. They provide a large-scale assessment of the risks associated with coastal processes and present a long-term policy framework to reduce these risks to people and to the developed, historic and natural environment in a sustainable manner.	Flood and Coastal Management Risk Strategy
The 'Marine Bill' White Paper	This was prepared to help deliver the Government's vision 'for the marine environment to be clean, healthy, safe, productive and biologically diverse'. Included in it are policy proposals for the achievement of a legal and management framework for the seas, with the aim of keeping them clean and healthy for future generations.	Coastal Risk Strategy
The Local Government Association's Special Interest Group On Coastal Issues	This Group comprised of Elected Members from coastal local authorities. Its principal aim is to establish improved governance, management and community well-being along the UK coastline and to identify appropriate and sustainable funding strategies to support this aim. South Tyneside Council is a member and Vice Chair of the Local Government Association's Coastal Special Interest Group	Coastal Risk Strategy
The Water Resources Act 1991 (as amended)	The Act includes the current legal basis for various flood defence matters including schemes to reduce the risks of flooding from rivers and the sea.	Flood Risk Strategy
Land Drainage Act 1991 (as amended)	This Act gives the Council permissive powers to undertake flood defence works and powers of enforcement on ordinary watercourses.	Flood Risk Strategy

2.1.7 Other Relevant Legislation

Other pieces of legislation relative to flood risk are:

- The Conservation of Habitats and Species Regulations (2010)
- The Climate Change Act (2008)
- The Civil Contingencies Act (2004)
- The Strategic Environmental Assessment (SEA) Directive (2001)
- The Water Framework Directive 2000 (WFD)
- The Land Drainage Act 1991 and 1994
- The Marine and Coastal Access Act 2009
- The Countryside Rights of Way Act (2000)
- Building Regulations Part H (amended 2010)
- The Highways Act 1980
- Water Resources Act 1991
- Town and Country Planning Act 1995 (amended 2008)

2.2 The Regional Picture

In certain cases, the co-ordination of Flood Risk and Coastal Erosion risk management needs to be considered at a wider scale than a Local Authority's administrative boundary, such as a river catchment level or a coastal sediment cell scale. Using a regional overview, allows risk, actions, impacts and all interactions to be considered collectively. A range of policy documents and guidance exists at this level.

Name	Summary	Relates to....
Northumbria Regional Flood and Coastal Committee (NRFCC)	The Committee manages the risk of flooding across the North East by setting Environment Agency Flood defence policy, managing medium and long-term business plans for the area and determining the local levy on council tax for work that cannot be funded from central government grant-in-aid. The Council is represented on this Committee to ensure that local needs and priorities are considered. It also provides a link between the Environment Agency, LLFAs, other risk management authorities and other relevant bodies. In this way it is possible to build understanding of regional flood and coastal risks that will facilitate more coherent partnership working.	Flood and Coastal Management Risk Strategy

River Basin Management Plan	<p>The Management Plan covers the Northumbrian River Basin district which is made up of 452 water bodies and covers an area of 9,029km² from the Scottish Border to just South of Guisborough, and from the Pennines east to the North Sea.</p> <p>The RBMP describes the work to be carried out to improve the water environment over a number of years. Overall, it is expected that the implementation of those measures will achieve significant environmental improvements and ensure no deterioration to the environment.</p> <p>The first review of this document confirms that measures have been successful, with 98% of measures implemented. The aim for the plan remains the same, looking towards further improvements to the quality and ecology of the river basin areas by 2021 and beyond.</p>	Flood Risk Strategy
Catchment Flood Management Plan (2009)	<p>In relation to South Tyneside the highest risk is in Hebburn from the River Don due to restrictive culvert capacity and surface water runoff. However, the main areas at risk already benefit from defences. It is concluded that the risk is not likely to increase significantly in the future. Suggestions for risk minimisation in the future include making sure watercourses are clean and clear, maximising capacity for flow. It is also suggested that South Tyneside Council promote the flood warning services where applicable and provide advice in ways such as through this document.</p>	Flood Risk Strategy
Flood Risk Strategy	<p>This document acts as the Flood Risk Strategy for South Tyneside. It outlines the current and possible future problems along with actions taken to reduce risk across the borough. Reducing and managing flood risk can minimise damage and subsequent costs for owners and occupants of property and business in the event of a flood.</p>	Flood Risk Strategy

2.3 The Local Picture

Consideration of Flood Risk and Coastal Management needs to be co-ordinated at a local scale, where there can be an appreciation of local circumstances and risk areas. South Tyneside Council has undertaken a number of detailed studies within its Surface Water Management Plan and historic flooding incidents help to inform local flood risk management.

Name	Summary	Relates to
Strategic Flood Risk Assessment 2010	<p>Local Planning Authorities (LPAs) carry out Strategic Flood Risk Assessments (SFRAs) to provide an evidence base in relation to flood risk to help inform spatial planning decisions. They are a central source of relevant flood risk information for the LPA. The SFRA categorises the vulnerability of flooding into four bands:</p> <ul style="list-style-type: none"> • Zone 1 – Low probability • Zone 2 – Medium probability • Zone 3a-High probability • Zone 3b – Functional floodplain <p>Within South Tyneside, there are 3 sites close to the River Don which fall into Zones 3a/b. These are also identified as Critical Drainage Areas (CDA). The SFRA identified Critical Drainage Areas across South Tyneside.</p> <p>These areas are at significant risk of surface water flooding and where larger developments are planned in these areas, recommendations should be made for the provision of future surface water management. This may include the use of Sustainable Drainage Systems (SuDS).</p>	Flood Risk Strategy

<p>Preliminary Flood Risk Assessment 2011</p>	<p>The Preliminary Flood Risk Assessment (PFRA) considered past and potential future flood risk across the administrative area from all local sources of flooding: surface water, ground water, and ordinary watercourses. The report collated evidence of 152 historic flooding events, varying in impact and significance. The recorded events had many different reporting mechanisms, and acknowledged that on a local level these were significant to those communities affected. However, the level of local flood risk within South Tyneside was not considered to be nationally significant, and no areas were assessed as meeting the indicative flood risk area thresholds, as defined by the national criteria produced by DEFRA. Collating the historic data for the PFRA highlighted the limited extent to which surface water flooding events have been recorded across South Tyneside, particularly extent and depth information.</p> <p>The Environment Agency national data sets were assessed within the PFRA This included the Areas Susceptible to Surface Water Flooding and a Flood Map for Surface Water. It was recognised that the Flood Map for Surface Water is more representative of surface water flood risk within South Tyneside; however this map is not suitable for identifying whether individual properties are at risk.</p> <p>The datasets were used to estimate the number of properties at risk. For a rainfall event with a 0.5% AEP (1 in 200 year) chance of occurring, approximately 4,000 residential properties and 100 businesses were estimated to be at risk from flooding to a depth of 0.3m.</p>	<p>Flood Risk Strategy</p>
<p>Contaminated Land Strategy</p>	<p>Sets out the Council's framework for identifying and dealing with contaminated or potentially contaminated land under Part IIA of the Environmental Protection Act 1990. The Borough has inherited a legacy of land formerly used for heavy industrial and mineral activities. Some of these activities have been undertaken close to the coast and it is prudent that the approaches set out in the Contaminated Land Strategy link closely to our coastal management activities.</p>	<p>Coastal Risk Strategy</p>
<p>Local Development Framework</p>	<p>The South Tyneside Local Development Framework (LDF) is our current statutory development plan and guides the future development and use of land in the borough. The LDF's suite of Development Plan Documents are currently being reviewed in the form of a new-style Local Plan that will set out the spatial strategy and policies for the sustainable use of land and buildings in the borough over the next 15-20 years, laying the foundations for regeneration and economic growth while ensuring protection of our most valuable environmental assets. Along with national policy and guidance, the Plan's policies (supported by non-statutory advisory guidance in Supplementary Planning Documents) set the basis for assessing all planning applications and other development proposals. Coastal erosion and flood risk issues are enshrined in the Plan.</p>	<p>Flood and Coastal Management Risk Strategy</p>

Local Transport Plan	Sets out current and future transport links and needs. Environmental sustainability is one of the overarching policy principles and therefore coastal erosion and flooding issues will need to be addressed when assessing current and future transport needs.	Flood and Coastal Management Risk Strategy
Emergency Response Plan	Supported by a specific Flood Response Plan which sets out the arrangements that the Council and partners have in place for responding to and mitigating the impacts of major and critical incidents, including flooding	Flood and Coastal Management Risk Strategy
The Council's Foreshore Steering Group	Creates and implements work programmes centred on improving the environment, infrastructure, tourism and regeneration along the foreshore. The steering group ensures the foreshore remains a thriving tourist attraction for the borough.	Coastal Risk Strategy

2.4 Partnership Working

In South Tyneside, we realise the importance of partnership working to deliver our strategy and achieve our aims and objectives. Flood risk issues are rarely managed by a single organisation or landowner, therefore it is recognised that partnership working will be essential in developing solutions. Partnership working has been fundamental in the development of both elements of this strategy.

The management of flood risk and coastal erosion is shared amongst different partner organisations both internal and external to South Tyneside Council and each with their own roles, responsibilities and powers. Partnership working was one of the key messages of the Pitt Review.

South Tyneside has representation on a variety of regional groups designed to share expertise and ensure that flood risk is addressed strategically. These regional groups operate at different levels from senior management level, to officer level. This ensures that the correct information is distributed to the most relevant officers. The groups can include officers from regional local authorities, the private sector, Councillors and colleagues from other departments within the Council.

2.5 Powers and Responsibilities

This section outlines the main partners and management authorities who have responsibilities in South Tyneside and their role in relation to flood risk management, powers and responsibilities.

2.5.1 Risk Management Authorities

Risk Management Authorities (RMA) are defined under Section 6 of the Flood and Water Management Act 2010 and are made up of a range of **internal** and **external** partners including the following:

- A Lead Local Authority (South Tyneside Council)
- The Environment Agency
- Water and Sewerage Company (Northumbrian Water Group)
- An Internal Drainage Board

2.5.1.1 Internal

Lead Local Flood Authority

South Tyneside Council is a Lead Local Flood Authority. The Flood and Water Management Act 2010 gives South Tyneside Council a strategic overview of local flooding issues and flooding management functions. These include:

- The duty to investigate flooding
- The power to regulate ordinary watercourses
- The duty to maintain a register of significant structures and features for example those that protect from flooding
- To act as a statutory consultee in planning applications where flood risk and SuDS are material considerations
- The power to undertake work that manages surface water runoff or groundwater.

- The power to request information from a person in relation to the authority’s risk management functions
- Contribution towards the achievement of sustainable development through exercising risk management functions

In addition to the above responsibilities, an educational role exists to ensure that where no action can be taken, householders and businesses can be given the relevant advice to help protect their property.

Emergency Planning

As a category one responder under the Civil Contingencies Act 2004, South Tyneside Council’s role, as set out in the Multi Agency Flood Plan, is to develop Emergency Plans and Business Continuity Plans, make arrangements for Civil Preparedness information (weather warnings, advice etc.) and to work in partnership with other key responders.

Planning Authority

The Council as CPA has the determining responsibility for planning applications for new developments, both commercial and residential. Where a scheme is above 1 Hectare in size a Flood Risk Assessment is required. When a development falls within an area of flood risk or is located in flood zones 2 and 3, a flood risk assessment is compulsory. Options should be considered to ensure the new development does not increase flood risk for any other properties in the surrounding area. This can be done through the use of Sustainable Drainage Systems (see section 4.4). Below is a matrix from the Local Authority SUDS Officer Organisation (LASOO) Best Practice Guidance of what would be expected during the different planning stages with regards to flood risk (Figure 1)

Pre-app	Outline	Full	Reserved	Discharge	Document submitted
✓	✓	✓			Flood Risk Assessment/Statement (checklist)
✓	✓	✓			Drainage Strategy/Statement & sketch layout plan (checklist)
	✓				Preliminary layout drawings
	✓				Preliminary "Outline" hydraulic calculations
	✓				Preliminary landscape proposals
	✓				Ground investigation report (for infiltration)
	✓	✓			Evidence of third party agreement for discharge to their system (in principle/ consent to discharge)
		✓		✓	Maintenance program and on-going maintenance responsibilities
		✓	✓		Detailed development layout
		✓	✓	✓	Detailed flood & drainage design drawings
		✓	✓	✓	Full Structural, hydraulic & ground investigations
		✓	✓	✓	Geotechnical factual and interpretive reports, including infiltration results
		✓	✓	✓	Detailed landscaping details
		✓	✓	✓	Discharge agreements (temporary and permanent)
		✓	✓	✓	Development Management & Construction Phasing Plan

Figure 1: What is expected during the planning stages with regards to flood risk. (Matrix from the LASOO Best Practice Guidance.

Highways

As well as the maintenance of roads and streets, the Council in its role of LHA is responsible for maintenance and cleaning of gullies and highway drainage. The Environmental Protection and Resilience units work closely with the LHA in responding to flood complaints.

Internal Drainage Board

There is no internal drainage board for South Tyneside.

2.5.1.2 External

Environment Agency (EA)

The Environment Agency is a non-departmental Public Body responsible to the Secretary of State for Environment, Food and Rural Affairs. It was established to protect and improve the environment and to contribute to sustainable development by implementing UK government policies.

The EA is responsible for main rivers and coastal flooding. Its functions include implementing flood defence schemes and working with Lead Local Flood Authorities and communities to respond to area priorities.

Amongst many other responsibilities, the EA is also responsible for issuing flood warnings for fluvial (river) and coastal flood risk and responding to flood incidents as a result of main river or coastal flooding. The EA also administer funding for flood and coastal erosion risk projects and maintenance on behalf of DEFRA.

Northumbrian Water Group

Northumbrian Water Group (NWG) is responsible for managing risks from water supply, surface water, foul and combined sewers.

Water and sewage companies have several responsibilities around flood risk management. A few of these key responsibilities include:

- Responding to flooding incidents involving their assets.
- Undertaking investment to reduce the risk of sewer flooding – regulated by OFWAT
- Providing, maintaining and operating public sewers for the purpose of effectively draining an area
- Adopt assets offered for adoption.

The planning authority will consult Northumbrian Water Group as a non-statutory consultee where appropriate.

2.5.1.3 Others

Private Land Owners/Individuals

It is the responsibility of homeowners and businesses to look after and maintain their own property – this includes protecting it from flood risk. Although there may be circumstances where other parties may be liable, there will be many occasions when it is the responsibility of the property owner. It is therefore important for homeowners to know whether or not their property is at risk and if so, to have knowledge of the measures that can be taken to ensure their properties are adequately protected. Protection could be afforded through either the use of permanent features including flood doors, air bricks and sealants or temporary measures such as sandbags, flood guards etc. Information on properties in a flood risk area

is available via the Environment Agency website. This includes properties at risk of surface water, coastal and river flooding.

A common risk of flooding to properties is the run off from fields during episodes of heavy or prolonged rainfall. Many of the fields in South Tyneside are privately owned and let to farmers. South Tyneside Council continues to work closely with these organisations and the farmers to try to reduce the risk to surrounding homeowners.

Developers

Developers have a responsibility to ensure that developments are appropriate and should not increase flood risk elsewhere. They have a vital role in delivering sustainable drainage where possible and developments should aim to reduce flood risks both on and off site and at the same time ensure that the development will not cause flooding elsewhere in the borough. Some developments will require a Flood Risk assessment, which will be reviewed by the local authority. Not all developments will require a Flood risk assessment to be submitted formally, as this will depend on what requirements are specified within planning policy. However where a flood risk assessment is not required the developer will need to consider flood risk.

Planning policy is subject to change therefore developers are advised to consult with the LPA at an early stage in the process to discuss flood risk requirements and ensure that they apply the most up to date planning policy to the development.

Part 1 - Flood Risk Management

3.0 Flood Risk in South Tyneside

Section Overview

In this section, we will cover the following:

- What is flood risk?
- Types of flood risk in South Tyneside
- Historic flooding
- Factors increasing flood risk

3.1 What is Flood Risk?

Flooding is a natural process and is influenced by a number of factors. It only becomes a risk when it has the potential to impact on people, housing and infrastructure. Risk is a combination of the probability (likelihood or chance) of an event happening and the consequences (impact) if it occurred.

The likelihood of flooding is usually expressed as an Annual Exceedance Probability (AEP). The AEP is the chance or probability of a storm event occurring annually and is usually expressed as a percentage. More extreme rainfall events occur (are exceeded) less often and therefore have a lower annual probability.

For example:

Low exceedance probability: A 2% Annual Exceedance Probability rainfall event has a 2% chance of occurring in a year, so once in every 50 years

High exceedance probability: A 20% Annual Exceedance Probability rainfall event has a 20% chance of occurring in a year, so once in every 5 years.

The nature of flood risk in South Tyneside is varied and there is no single cause of flooding. A flood is identified by a volume of water lying on land which is not usually covered by water. This water can result from one, or a combination of sources and factors. The level of flood risk is dependent on the depth, velocity and area the water covers.

It should be noted that flooding from any part of the sewerage system (unless an increase in the volume of rainwater entering or affecting is a contributing factor) or water from a burst water pipe, is not considered as a flood under the Flood and Water Management Act 2010.

The consequences of the flooding are dependent on the severity of the storm/flood and the vulnerability of the area.

The severity is determined by the nature of the flood and is influenced by a number of factors which have the potential to cause damage to the surrounding area. These include, but are not limited to:

- Duration of the rainfall/storm
- Depth and velocity of flood water

- Water quality (surface water or sewerage)
- Impacts of climate change (more severe weather events)

The vulnerability of an area affected by the flooding can also be influenced by a number of factors. Again, these include, but are not limited to:

- The number of properties at risk of flooding
- The size of the area affected
- The nature of the land use (housing, business or farmland)
- Whether any flood mitigation measures have been installed

It is for these reasons that flood risk management should rely on adaptation, mitigation and a level of preparedness rather than a solely reactive stance once an event has occurred.

Managing flood risk in South Tyneside is not straight forward and involves several steps – there is no ‘one size fits all’ solution. These steps include:

- Gathering historical information – knowing which areas have flooded and are susceptible to future floods
- Assessment of the circumstances that may cause flooding e.g. Topography, hydrogeology etc.
- Taking appropriate steps to reduce the likelihood of future flooding to “at risk” areas
- Adapting and taking action to reduce the disruption, damage and risk to life caused by flooding.

These steps have been looked at as part of South Tyneside’s Surface Water Management Plan, which is discussed in section 2.3.

3.2 Historic Flooding

South Tyneside has a long history of flood risk, with some areas suffering more frequently than others. Some areas have suffered the effects of long, persistent rainfall events, whereas for others it has been shorter but heavier extreme storm events. We have witnessed these latter events, more frequently, in recent years. Flooding is usually the result of excess surface water and local watercourses, such as burns and small rivers, that run close to residential areas, reaching capacity and over-flowing. Damage has also resulted from tidal flooding such as the high tides experienced in December 2013, which affected businesses on Wapping Street, South Shields.

Parts of the borough have experienced flooding problems for many decades, such as Ocean Road, however in recent years we have seen other parts of the borough affected.

Two of the most severe rainfall events were experienced in 2012. On 28th June 2012, South Tyneside experienced a significant storm event, which caused widespread flooding across the borough. Over 400 residential properties and 33 businesses were affected by flooding. This event resulted in 7 major road closures (including the A19, Tyne Tunnel and A194), 26 additional roads were flooded and 5 schools were closed.

Following this event, the borough suffered further severe rainfall on 5th August 2012. This event saw approximately 100 properties flooded as well as businesses on Ocean Road, Monkton Business Park and Boldon Business Park; 7 roads were closed and 7 schools were affected. A large number of properties were flooded on both dates. Areas particularly

affected by internal flooding were Wuppertal Court in Jarrow, Fellgate Estate and Lukes Lane Estate, Hebburn.

Rainfall data provided by the Environment Agency identified that on 28th June 45mm of rain fell within a 2.5 hour period, with 30mm of this falling within the first hour. It has been estimated that this event had a calculated return period of 1 in 80 years. However it has been difficult to obtain an accurate figure as South Tyneside's nearest rain gauge is based in Howdon, 8 miles away.

The storm on 5th August indicated that 29mm of rainfall fell within 2 hours, which is 60% of the anticipated monthly rainfall for August.

Since then, South Tyneside has suffered bursts of heavy rainfall which have affected properties, businesses, schools and roads, although in smaller numbers.

Although these events are considered rare, with Climate Change, it is expected that we will see them more frequently. It is therefore important that we look to reduce the risk of flooding across the borough and have in place emergency plans to help deal with extreme weather events, such as those, which occurred in 2012.

3.3 Types of Flood Risk in South Tyneside

Although flooding can happen anywhere, at any time and under a variety of circumstances, there is always a source, or combination of sources, from which the flooding occurred.

By looking at the homes affected by previous flooding events, we are able to identify the main sources. In addition to this data, historical mapping, studies and modelling have been carried out and four different sources of flooding identified. These include surface water, groundwater, fluvial (river) and coastal flooding.

3.3.1 Surface Water Flooding

Surface water flooding occurs when the volume of rainwater falling does not drain away through the existing drainage systems or soaks into the ground, but lies on or flows over the ground instead. This type of flooding is usually short-lived and associated with heavy downpours of rain, thunder storms etc.

A Preliminary Flood Risk Assessment was undertaken in 2011 and highlighted 152 historic flooding incidents. For a rainfall event with a 1 in 200 chance of occurring, it estimated that approximately 4,000 residential and 100 business (or critical services) properties are at risk from surface water flooding to a depth of 0.3m.

It is surface water flooding that is the main contributor to the problems encountered in many events across the Borough. The floods of June and August 2012 resulted in over 400 residential properties affected by flooding from this source.

3.3.2 Groundwater flooding

This occurs when the level of water in the ground exceeds the surface. This type of flooding can occur after a period of prolonged and sustained heavy rainfall. Areas at risk are those where the groundwater table is at a shallow depth.

The underlying geology of the land can also significantly increase the risk of groundwater flooding. This is not thought to be a significant issue throughout South Tyneside due to the geology of the area.

3.3.3 River Flooding (Fluvial)

Fluvial flooding occurs when a river cannot cope with the volume of water draining into it from the surrounding land.

The Environment Agency is responsible for flooding in main rivers. The River Tyne and Part of the River Don are classed as main rivers, therefore it is the responsibility of the EA to maintain these to prevent the increase of flood risk. Tributaries of the River Don flow through the borough and are managed by South Tyneside Council. These include the Monkton Burn, Bedes Burn and Calf Close Burn. These Burns can back up and contribute to flooding to nearby housing estates.

On 5th and 6th December 2013, the North East experienced its most severe tidal surge on record. In South Tyneside, parts of the River Tyne around Mill Dam and at Hebburn were affected by this tidal surge. The volume of water in the river at the time was also raised due to prolonged rainfall experienced earlier that day.

3.3.4 Coastal Flooding

Coastal flooding occurs when extreme weather combines with high tides, causing the sea level to rise and breach any sea defences, forcing water onto the land.

South Tyneside has recently completed a multi-million pound project to replace the existing coastal defence at Littlehaven. The previous sea wall suffered many years of erosion causing the car park behind it to become flooded on many occasions such that it was close to collapse. The new sea wall will ensure that this part of the coastline is protected from coastal erosion and flooding for many years to come.

However, as climate change and sea-level rise become more of a threat, there are other parts of our coastline which are at risk from erosion and subsequent flooding.

3.3.5 Sewer Flooding

Sewer flooding occurs either when the sewer network becomes blocked or if it is overwhelmed by the amount of water entering it.

It can occur during storm events when large volumes of surface water run-off enters the network and the capacity of the system is unable to cope. Depending on the layout of the network this can either be just surface water or a combination of surface water and foul.

When this happens and effluent enters a property, the water and sewerage company – Northumbrian Water, has a responsibility to investigate and take appropriate action.

3.3.6 Highways Flooding

Highways are at risk of flooding due to the large amount of impermeable surfaces. They have an extensive drainage network and flooding of the highway occurs when the quantity of rainfall and/or overland flows of water is in excess of the drainage network's capacity. In some cases this can lead to the road being impassable by traffic, resulting in a road closure.

As a highways authority, South Tyneside Council is responsible for clearing gullies and drains in public roads. The vast majority of gullies are scheduled to be cleaned annually, however gullies in higher risk areas or areas more susceptible to flooding have a higher frequency of cleaning.

Highways England maintains motorways and major A roads, while the responsibility for maintenance of private roads remains with the landowner.

3.4 Factors Increasing Flood Risk

In some areas, local flooding is difficult to predict as there can be many underlying contributory factors, including poor maintenance or unknown damage to drainage networks, blockages or severe storms, which are hard to predict. However, there are a number of known factors, which can contribute to flooding in areas. These include:

- Topography
- Effects of climate change (increase in severe weather events)
- Changes in capacity of the drainage system (increase in new housing developments putting pressure on existing networks)
- Increase in impermeable surfaces
- Location

The absence of flooding events in the past does not mean that an area will not experience flooding in the future. There is no one factor that leads to an area flooding, and in some areas it can be a combination of factors – some of which change over time, therefore increasing the risk and number of people affected by flooding.

3.4.1 Topography

One of the most common causes of flooding is topography. Topography is a geographical term for land forms or surface features relating to their position and elevation. Historically, when housing estates were built, flooding and land topography was not taken into consideration. As a result, many properties were built at the bottom of a hill or in a natural basin. Water will naturally make its way to the lowest point of the land and therefore to the properties. The problem is often exacerbated by incapacity in drainage systems, as large volumes of water enter systems that were not designed to accommodate additional loads.

3.4.2 Climate Change

Climate change is a big challenge and without decisive action has the potential to cause both a global economic and environmental disaster. Extensive work is currently underway both nationally and internationally, to understand the implications of climate change, including the potential effects on flood risk.

In 2008, the Climate Change Act was introduced establishing legal parameters for climate change mitigation and adaptation. It set the requirements for the Climate Change Risk Assessment and the National Adaptation Programme.

In 2012, the UK Climate Change Risk Assessment was produced, providing a detailed analysis of the key impacts of climate change including flooding and the risks associated with coastal erosion. This risk assessment was based on the UK's climate projection data (UKCP09) which looked at climate change over three time periods; 2020's, 2050's and 2080's (short, medium and long term).

This was followed by the climate change National Adaptation Programme (NAP) report which was published in 2013. The report sets out what Government, businesses and society are doing to adapt better to the changing climate. This will be reviewed in the future by the Adaptation Sub Committee to assess how well the NAP report has been implemented.

The reports suggest that the UK is likely to experience warmer wetter winters, hotter and wetter summers and an increase in heavy thunderstorms by up to 40%. In recent years, the UK has experienced wetter summers and severe thunderstorms and scientists project that climate change will make some of these extreme weather events more likely to occur.

If these events are likely to be a thing of the future, then an increase in rainfall should be taken into account when designing drainage for new developments and flood management infrastructure.

In 2012, South Tyneside Council produced a Climate Change Adaptation Strategy which looked at the direct effect climate change has on South Tyneside and any adaptation or mitigation measures that could be taken. This strategy touches on the risks associated with flooding and coastal erosion.

3.4.3 Drainage Capacity

The past decade has seen an increase in the number of housing developments, not only in South Tyneside but across the country. Many of these developments rely on existing drainage networks built over 100 years ago which, during thunderstorms or prolonged rainfall, can become overwhelmed. NW ensure that New Development discharges to the public sewer network will not adversely affect the probability of customers suffering flooding.

3.4.4 Increase in Impermeable Surfaces

The infrastructure associated with it, such as highways, paths, facilities and land lost for the properties are also significant contributors. Without management, this results in an increase in impermeable surfaces and fewer areas to store flood water.

Planning policies already require new developments to manage run off sustainably. These are known as Sustainable Drainage Systems (SuDS) and were introduced as part of The Flood and Water Management Act 2010.

It is also becoming increasingly common for homeowners to make changes to their gardens and driveways to accommodate cars or for easier maintenance. The replacement of grassed gardens with paving stones or gravel can slow down the infiltration of rainwater and result in flooding of gardens and adjacent land. The Town and Country Planning Act 1995, was amended in 2008 to reflect this. It states that proposals for paved front gardens, over 5m², constructed with impermeable materials, require planning permission. If permeable paving or viable sustainable drainage options are used, planning permission need not be sought.

3.4.5 Location

Development in inappropriate locations can exacerbate the problems associated with flooding. Common areas at risk are those where properties are built on flood plains, close to coastal areas/cliffs or rivers and those in low lying areas, in particular where water has ponded historically.

3.4.6 Flooding, Coastal Erosion and Climate Change

Coastal environments are particularly vulnerable to the impacts of climate change because they are subject to changes in both the marine and terrestrial environments.

Climate change impacts are well documented and include sea level rise, changes in wave directions, potential increase in intensity, severity and frequency of coastal storms, and rainfall events affecting flooding in fluvial catchments and urban surface water systems. These affects may have a consequence on coastal and river erosion and are forecast to increase the rate and impact of coastal change. Our watercourses and flood defences are faced with similar challenges.

Coastal flooding may also become increasingly common. As storms and sea levels increase, more people, property, infrastructure, environmental designations will be affected.

4.0 Flood Risk Management

Section Overview

In this section, we will cover the following:

- National Strategy
- Flood investigation
- Schemes
- Sustainable Drainage Systems

4.1 National Strategy

The National Flood and Coastal Erosion Risk Management Strategy for England is the basis for this Local Strategy. The National Strategy sets out six high level guiding principles, providing a guideline for the delivery of flood risk management.

To ensure consistency with the national strategy South Tyneside Council has taken these principles and used them to develop key objectives for the borough.

The six guiding principles include:

- **Community focus and partnership working**
Risk management authorities should be working in partnership with communities to help them understand and prepare for the risks as well as encourage them to have direct involvement in decision making and risk management actions.
Partnership working to produce and implement local strategies will enable expertise and important information to be shared and efficiencies in flood risk management to be identified, managing flood risk.
- **A catchment and coastal “cell” based approach**
As well as understanding and managing flood and coastal risk locally, it is essential that consideration is given to the impacts on other parts of the catchment or coast. Activities must seek to avoid passing risk on to others within the catchment or further along the coast without prior agreement. Strategic plans such as Catchment Flood Management Plans (CFMP’s) and Shoreline Management Plans (SMP’s) provide an important building block for this priority and should be used to help set out key priorities for local strategies.
- **Sustainability**
LLFA’s should support communities by managing risks in ways that take account of every impact of flooding (for example, people, properties, local economy, and infrastructure) and the whole-life costs of investment in flood risk management.

Solutions should be forward thinking and take into account potential risks that may arise in the future as well as being adaptable to climate change. Opportunities should also work with the natural process where possible and enhance the local environment.

- **Proportionate risk based approaches**

It is not technically, economically or environmentally feasible to prevent flooding and coastal erosion altogether therefore a risk based management approach targets resources to those where they have their greatest effect.

All aspects of risk management should be carried out in a proportionate way that reflects the size and complexity of the risk and societies ability to manage it.

- **Multiple Benefits**

As well as reducing the risks to people and property, FCERM (Flood and Coastal Erosion Risk Management) can bring significant economic, environmental and social benefits. In producing local strategies, LLFA's can help deliver a greater range of benefits by working with natural processes and providing broader environmental benefits, for example through the use of SuDS (Sustainable Drainage Systems). It can contribute to regeneration and income generation, protect infrastructure and contribute to economic growth.

- **Beneficiaries should be allowed and encouraged to invest in local risk management**

The benefits achieved when flood and coastal erosion risks are managed can be both localised and private, through the protection of specific individuals, communities and businesses.

When developing flood risk management plans, opportunities to seek alternative sources of funding should be considered, instead of relying on Government funds.

There is an opportunity for significantly more risk management activity if alternative funds can be found, helping to realise significant local benefits.

Following these six principles and the requirements of the Flood and Water Management Act 2010, South Tyneside Council has produced key objectives for flood risk management. These objectives will form our 5-year action plan and will outline what needs to be done to reduce flood risk to the borough (These are listed in Appendix 1).

4.2 Emergency Planning

South Tyneside Council has a number of initiatives in place to assist preparation for a flood event.

The Civil Contingencies Act 2004 places a legal duty on all category 1 responders to assess all the risks of an emergency occurring within their area. In order to do this, South Tyneside Council has developed emergency plans to deal with severe flooding events.

All risk management authorities are encouraged to record all reported incidents of flooding and collate this information in a consistent way so that it is easily available to other risk management authorities. This information can be used to assist in the identification of flood prone areas that may benefit from schemes or to help prepare, prior to a flood event.

When preparing for a flood, there are several parties involved, not just the local authority. These include the Environment Agency, Northumbria Police, Northumbrian Water, Tyne and Wear Fire and Rescue Service and South Tyneside NHS Trust, as well as other Category 1 and 2 responders. Each has their own role including:

Environment Agency

- Issuing flood warnings
- Maintaining flood defences
- Providing specialist advice
- Providing and distributing public information on flooding
- Emergency response

Tyne and Wear Fire and Rescue

- Responding to flood emergencies
- Providing specialist equipment
- Coordinating the rescue of trapped people or casualties
- Gathering information and risk assessment

Northumbria Police

- Leading and controlling the multi-agency approach
- Coordinating road closures and traffic management

South Tyneside Council is involved in all phases of flood risk management from resilience to emergency response and recovery.

4.2.1 Flood Investigation

As LLFA South Tyneside Council has a duty to undertake flood Investigations. The aim of these investigations is to determine which risk management authority has responsibility and is unlikely to form a detailed investigation. Detailed investigations may be undertaken, where it is necessary to improve understanding of flood risk such as during complex flooding issues.

Areas across the borough at greater risk of flooding are identified in the Surface Water Management Plan (Section 2.3). This enables the local authority to prioritise areas identified as most at risk, to reduce the impact of flooding.

The FWMA 2010 places a responsibility on lead local flood authorities to maintain a register of assets – physical features that have a significant effect on flooding in their area. This ensures that their assets are the most effective and it takes into account the impact up and downstream, and the impact other authorities assets will have. South Tyneside Council works in partnership with neighbouring authorities to achieve this.

4.2.2 Prioritisation

High priority areas include:

- Areas where more than 10 properties have flooded internally
- Critical services i.e. hospitals, police, fire stations, nursing homes and schools
- Areas where vulnerable residents live.

Medium priority areas include:

- Local infrastructure, main roads, bus routes, the Tyne and Wear Metro, the South Shields ferry and properties historically close to internal flooding

Low priority areas include:

- Those where properties have flooded externally
- minor roads, side streets and fields/land (not affecting properties)

Before a flood

This phase is not just about preventing flooding as in many cases this is not possible. Teams involved in this phase look at resilience and planning to reduce the risk of flooding. This includes maintenance, applying for funding for schemes, preparedness, liaising with relevant organisations, improving resilience and flood warnings.

During a flood

This phase involves actions and responsibilities for dealing with a flooding event and reducing the impact on the local community and infrastructure. Relevant Council Departments will liaise with emergency response teams to put into action, plans made prior to a flood. This could include sandbagging, evacuation, rescue centres and emergency response.

After a flood

This phase looks at the recovery of communities and enabling them to get back to normality after a flooding event. This includes social, environmental and emotional wellbeing, clear up and reconstruction. It is also a phase which enables us to identify new flood risk areas and sources of flooding we may not have experienced in the past.

4.3 Schemes

Not all flooding issues will require a scheme in order to reduce risks. Some can be resolved through simple measures such as repairs to drainage. Where schemes are suggested to mitigate flooding these will need to be carefully considered. These considerations will include:

- How this might impact on other areas. Schemes should not go ahead if there is the potential for a negative impact elsewhere. Modelling will be used in the planning of such schemes to ensure that problems are not shifted elsewhere
- Cost – whether the scheme is economically viable
- Feasibility of the scheme with considerations such as available land and public perception

When planning a scheme, a variety of different options are assessed to ensure the most appropriate proposal is always taken forward. This includes a 'Do nothing' option, which highlights the risk if works are not carried out and the potential severity as a result. This is usually supported by detailed modelling of the area including a 1 in 30, 1 in 75, 1 in 100 and a 1 in 200 year flooding event.

To date, South Tyneside Council has carried out a number of feasibility studies on flood risk throughout the borough. Some of these were carried out following identification of 'at risk' areas in the Surface Water Management Plan. These include:

Monkton phase 1 and 2 – Hebburn	<ul style="list-style-type: none"> • In partnership with Northumbrian Water • 221 homes at risk
Fellgate – Jarrow	<ul style="list-style-type: none"> • In partnership with Northumbrian Water • 202 homes internally affected • Surface water runoff from agricultural fields
Lindisfarne roundabout – Jarrow	<ul style="list-style-type: none"> • Highways drains are overwhelmed • Flooding modelled at a 3.33% AEP. • Some flood improvements are included in the current ongoing scheme
Cleadon Lea - Cleadon	<ul style="list-style-type: none"> • Surface water runoff from agricultural fields • Storm sewers become overwhelmed with smallest flood event modelled (3.33% AEP)
Reay Crescent – Boldon	<ul style="list-style-type: none"> • 10 properties at risk of surface water flooding • Re-profiling of the River Don flood bank option was considered, however the study found the bank was adequate and no further improvements would be made.
Sunderland Road - Cleadon	<ul style="list-style-type: none"> • Surface water runoff from agricultural fields • Storm sewers become overwhelmed in the smallest flood event modelled (3.33% AEP)
Newmarket Walk – S/S	<ul style="list-style-type: none"> • Flooding due to surface water runoff and discharge of the sewers, overwhelmed at the lowest modelled flood event (3.33% AEP) • 91 properties at risk from flooding

4.4 Sustainable Drainage Systems (SUDS)

In recent years surface water runoff has been recognised as a key element of our drainage systems that has been historically overlooked. Following the recent severe flooding across the Country, there has been a growing concern and need for a greater understanding of how to manage surface water in a more sustainable manner. This has been recognised by all parties from Government level down. Relevant provisions are to be implemented under Schedule 3 of The Flood and Water Management Act (FWMA) 2010. Under the Act, Local Authorities became Lead Local Flood Authorities and were given powers in relation to local sources of flood risk.

One of the most significant implications of the FWMA 2010 concerns sustainable drainage and specifically Sustainable Drainage Systems (SuDS). From 6th April 2015, all new developments have to look at sustainable drainage as an option.

SuDS are designed to reduce the potential impact of new and existing developments with respect to surface water drainage, via a sequence of techniques to attenuate or minimise surface water run-off at source. Retrofit to an existing development is an example of this, demonstrated to best effect by the award winning Fellgate Flood Alleviation Scheme (Figure 2). The scheme consists of a number of sustainable drainage features such as detention basins, swales and ponds, which reduce peak flow into surface water and sewer systems. This considerably reduces risk of flooding in the area. South Tyneside Council has also worked with the two schools in the area to use the ecology of the ponds created as an educational resource.

The objective is to avoid rapid run-off that may cause flooding to the development or its surrounding areas and to reduce the harm to drainage systems and watercourses by removing contaminants that lead to poor stream water quality and reduced biodiversity.

Currently SuDS are implemented by the Local Planning Authority on all proposed major developments (10 dwellings or more; or equivalent non-residential or mixed development) unless it is demonstrated inappropriate. These SuDS systems will manage all surface water from the surrounding sites and are a planning consideration for all major planning applications.



Figure 2: Some of the Fellgate Flood Alleviation Scheme SUDS Features

4.5 Environment, landscape and maintenance

As previously mentioned, flood risk management schemes should be seen as an opportunity to enhance the natural environment and where they can, help meet aims and objectives of other action plans and strategies.

Environmental impacts should be considered at an early stage of any proposed project. As South Tyneside Council works very closely with partners, relevant authorities will always be fully consulted throughout the proposal. The Environment Agency, Natural England and Durham Wildlife Trust are all key consultees for such projects.

4.5.1 Land Management

Reviewing the way land is managed can be an effective way of reducing overland flooding in key risk areas. Basic changes to agricultural practices such as altering the direction in which fields are ploughed can reduce channelling of water over land during episodes of heavy rain.

Planting additional trees, reducing the amount of impermeable surfaces and implementing sustainable drainage systems can also contribute to effective land management and a reduction in surface water flooding. These are factors, which are considered during the planning process and through the redevelopment of land.

As well as the social and economic benefits of reducing flood risk, it is important to acknowledge the wider environmental benefits of flood risk schemes. Implementation of these schemes should be recognised as an opportunity to improve the business and residential environments, improve biodiversity and increase habitats for local wildlife.

4.5.2 Maintenance

It is important to review the management and maintenance of assets owned by South Tyneside Council, in particular drainage systems such as culverts, gullies, highways drainage and council managed watercourses.

4.5.3 Drainage Infrastructure

South Tyneside Council own a number of gully-cleansing vehicles that maintain the gullies located throughout the borough. The Highways team has developed a plan to check most gullies at least once annually, with those in high-risk areas the subject of a more frequent inspection programme.

As well as having a gully cleanser carry out routine maintenance, an additional vehicle responds to complaints, urgent blockages and helps during flooding incidents.

Part 2 - Coastal Erosion Risk Management Strategy

5.0 Coastal Risk in South Tyneside

5.1 What is Coastal Risk?

Coastal risk is the risk posed by the sea to cliffs, people and assets. These risks can be coastal cliff erosion caused by the interaction between the sea and the cliff face, coastal flooding caused by the over topping of sea defences stormy tides causing damage to assets, or events such as tidal surges caused by interaction between the sea and water courses in the area, such as rivers.

The close proximity of areas to such a large, unpredictable body of water, lends itself to risk to the public, property, infrastructure and business. This risk needs to be reduced and managed to the greatest standard possible while at the same time maintaining a cost benefit stance.

5.2 Historic Events

As to be expected with somewhere in such close proximity to the sea there have been a large number of flooding and other events associated with the sea encroaching on the land escalating to a flood.

A tidal surge on the 5th December 2013 caused damage to a lot of the North East Coast with Newcastle quayside and areas in South Shields affected. The tidal surge hit the east of the United Kingdom and was said to be the worst surge seen in 60 years. The River Tyne burst its banks in multiple locations causing damage to properties and businesses and road closures in the worst hit areas. The worst affected areas were parts of South Shields including Mill Dam, and Hebburn. The threat of events reoccurring in the future, with different more damaging outcomes, is still there. Unfortunately, due to close proximity to the sea, risk cannot be completely managed or predicted, and therefore the only action that can be reasonably taken to minimise risk is to increase resilience, alongside preparedness for recovery after an event has occurred.

The old Littlehaven sea wall was a structure that had been in place for a long period and which was becoming breached on an increasingly frequent basis. This led to repetitive flooding and closure of the car parks which are directly behind the main structure. The sea wall includes a promenade, adding amenity value and protection for the coastal face against 1 in 100 year storms, with considerations added for increasing climate change. This level of protection is much higher than that of the original sea wall. The new sea wall reduces the risk of a breach occurring. The original wall had also begun to affect the size of the beach as it had started to be detrimental to deposition. Design of the new sea wall is such that it will promote beach material deposition, therefore making the beach larger.

5.3 Types of Risk

5.3.1 Storms

Storms are a common occurrence due to the proximity of the sea. Storms off shore can affect the level of water travelling towards the sea front. High, frequent and powerful waves can cause beach scouring, damage to the coast or sea defences and cause flooding.

5.3.2 Coastal Defence Breach

If storm surges are large enough they can cause damage to sea defences. There could also be overtopping of the defence, which can lead to costly damage caused by flooding and debris deposition after the storm waters recede.

5.3.3 Tidal Surge

A tidal surge is generally caused by large storms out to sea causing the level of water approaching the shore to be higher than the highest astronomical sea level. The higher sea level can cause large scale flooding if the shores are unprotected. In the case of South Tyneside where there is not only a coast, but also the River Tyne and River Don, the water which is coming in from the increased sea level can overpower the flow of the river. Water then travels up the course of the rivers increasing the water level. In some instances this can raise water levels above the banks, leading to flooding in areas up stream that are unlikely to be protected. Damage can be very costly, widespread and severe in areas not expected to flood.

5.4 Factors Increasing Coastal Risk

5.4.1 Our Coastal Environment

South Tyneside has a coastline of approximately 12 kilometres, some 3 kilometres of this is defended by manmade structures. The remaining 9 kilometres is defended by natural cliff.

The coastline has been fashioned by storms and unconquerable seas and there is an abundance of wildlife, hidden coves and clifftop paths. Stunning coastal scenery and beaches, which stretch from the mouth of the Tyne to Whitburn, make the coastline one of the principle attractions for visitors to South Tyneside.

Sandhaven beach has been awarded the Blue Flag/Seaside Award for several years in recognition of its excellent facilities, amenities and water quality. Marsden Bay is renowned for the largest seabird colonies in this part of the country and The Leas, a two mile grassy sweep is designated a Site of Special Scientific Interest and is managed by the National Trust.

The whole of our coastline (albeit a fairly narrow strip) is protected by various international, European, national and local wildlife habitat designations, including the Northumbria Coast Special Protection Area (SPA) and the Durham Coast Special Area of Conservation (SAC) which are also designated as a Site of Special Scientific Interest (SSSI) protected for its vegetation, geology and biodiversity. Some of the coastal Leas are managed by the National Trust and some by the Local Authority, with a small section coming under private ownership.

South Tyneside has many picturesque coastal walking trails and the coastal cycle routes form part of the National Cycle Network and National Coastal Footpath. It has one of only two sand dunes in the area covered by the Durham Biodiversity Partnership.

South Tyneside has a rich legacy of great seafront parks, many established for over a hundred years. This supports our vision for increased visitor numbers and being the North East's premier coastal resort.

The Council is faced with a wide range of challenges along the coastline, from climate change to regeneration. To effectively address these challenges, it is important to achieve a balance between prudent coastal defence policies and the social and economic needs of the Borough.

5.4.2 Geology, topography and relief of South Tyneside's Coastline

The coastline of South Tyneside is controlled by the underlying geology. The northern area represents part of the natural estuary formed by the River Tyne; much of the land around South Shields has been reclaimed from sea and salt marsh since Roman times. The area from Trow Point northwards is chiefly man made (in the form of the new Littlehaven sea wall and promenades). South of Trow point, the cliff line is much more defined with rugged sea cliffs forming bays and headlands, gradually rising in height towards Lizard Point before dipping gently towards Sunderland.

The geology of South Tyneside is dominated by extensive cliff and foreshore exposures of limestone of the Upper Permian age, known as Magnesian Limestone. This geology significantly contributes to our coastal geomorphology, and is instrumental in the formation of sea-caves and the stacks that are characteristic features of the area, the most celebrated being Marsden Rock. Furthermore the strata is heavily bedded and jointed and due to its unique geological history has undergone various collapse mechanisms. By this very nature, the strata is subject to different rates of erosion making it more susceptible to processes such as rock wedge failure.

Two former quarries along the coast have been filled with imported material. Trow Quarry has been subject to several ground investigations leading to remediation works completed in 2008. Studies at this site highlighted the potential risk of contaminants from the old landfill site being exposed to the coastal and marine environment, therefore funding was granted to develop to a scheme to mitigate this risk. Another quarry lies to the south of Souther Lighthouse and now forms part of Whitburn Coastal Park. Harbour Quarry, as it was known, was filled with quarry and mining material during the reclamation of Whitburn Colliery. The walls of the quarry have been breached in places and remedial action has been taken in the form of revetment at Potter's Hole and concrete filling of caves.

5.4.3 The Challenges of Climate Change

Coastal environments are particularly vulnerable to the impacts of climate change because they are subject to changes both in the marine and terrestrial environments.

Climate change impacts are well documented and include sea level rise, changes in wave directions and the potential increase in intensity, severity and frequency of coastal storms, and rainfall events affecting flooding in fluvial catchments and urban surface water systems.

These effects may have consequences on coastal and river erosion and are forecast to increase the rate and impact of coastal change. Our watercourses and flood defences are faced with similar challenges.

Coastal flooding may also become increasingly common. As storms and sea levels increase more people, property, infrastructure and environmental designations will be affected.

Development in inappropriate locations can exacerbate the problems associated with flooding.

6.0 Coastal Management

6.1 National Strategy

As previously outlined in section 4.1, South Tyneside Council aims to fulfil its duties for coastal risk management in line with the National Flood and Coastal Risk Management Strategy.

6.2 Coastal Investigation

Monitoring the coastal environment facilitates the development of sustainable coastal management policies and projects aimed at protecting, improving and sustaining both the natural and built environment.

Emphasis is placed on monitoring the key projects, which are identified in the following sections. The monitoring data is used to assist the Council in its coastal defence management activities.

The Second Shoreline Management Plan identified the need for a strategic monitoring programme to provide synergy across the full length of coastal frontage extending from the River Tyne, in the north, to Flamborough Head in the south, a distance of approximately 170 km.

A regional monitoring scheme is ongoing between the Council and North East Coastal Group partners. It commenced in 2008 and looks at beach profile, wave and storm data, erosion measurements and observations to gather data on the coastline.

The main objective of this programme is to inform and progress coastal and flood defence work, in line with national objectives by:

- developing a more consistent approach;
- improving understanding of coastal processes; and
- assisting in making more sustainable shoreline management decisions.

This programme is ongoing subject to funding.

6.3 Coastal Management Areas

6.3.1 Management area 1 – River Tyne to South Pier

6.3.1.1 Description of Management Area 1

This area comprises Littlehaven beach, which is a section of sand beach between the South Groyne and South Pier. Prior to the completion of the Littlehaven promenade and sea wall scheme, the previous coastal defence protruded out at an angle beyond the normal line of high water

Policy Unit	Until 2025	2025 to 2055	2055 to 2105
South Groyne	Hold the Line	Hold the Line	Hold the Line
Littlehaven	Managed Realignment	Hold the Line on Retreated Alignment	Hold the Line on Retreated Alignment

South Pier	Hold the Line	Hold the Line	Hold the Line
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6.3.1.2 Implications of SMP2

The preferred policy for this area was to maintain the coastal control offered by the South Groyne and South Pier while promoting a policy for managed realignment of the defence (Littlehaven Sea Wall) rather than seeking to hold the existing line of defence. The purpose of this policy is to guarantee local management of Littlehaven beach, while maintaining the operation of the Port of Tyne.

6.3.1.3 The Groyne and South Pier

These structures provide the control points for the formation of Littlehaven Beach, as such it is recognised that these need to be retained. Consequently, we have engaged with landowners, The Port of Tyne Authority.

6.3.1.4 What we have done so far?

Littlehaven Sea Wall

A new sea wall and promenade was constructed following submission of a Project Appraisal Report to the Environment Agency as outlined in South Tyneside's previous Coastal Erosion Risk Management Strategy (Figure 3). The Littlehaven Promenade and Sea wall was officially opened on 5th April 2014 and has since won nine awards including the Institution of Civil Engineers 'region's best scheme over £4m' and the best Infrastructure project at the Royal Institute of Chartered Surveyors North East Renaissance Awards.

This structure forms a vital defence for the Littlehaven car parks, a hotel, and the Harbour Drive access route to residential and commercial premises in River Drive and Wapping Street. It prevents regression of the high water mark.

The newly constructed scheme has restored flood and coastal risk protection to the area. The previous sea wall, in place for many years, had begun to age, increasing the vulnerability of the area it protected. The new sea wall covers a wider expanse and incorporates a promenade, which acts as a tourist attraction with art work such as The Sail and The Eye, considerably improving the aesthetics of the area and at the same time providing the necessary level of protection. Along with the commission of the new promenade and sea wall there has also been work to regenerate the beach by widening it, as over time it had begun to regress. The new wider beach provides added protection. South Tyneside Council, the Environment Agency and Northumbrian Water Group funded the £5m investment and worked in partnership to put the asset in place in a time efficient and cost effective manner.

The sea wall and promenade has already proven its potential as an effective coastal defence when it withstood the December 2013 North Sea storm surge. The River Tyne tide gauge recorded its highest level on record, higher than the 1953 storm surge which had previously held the record and had ravaged the coastline. The water level came to halfway up the stepped part of the wall with some sea spray reaching the promenade. The sea wall worked perfectly protecting the foreshore despite the record-breaking abnormal conditions.

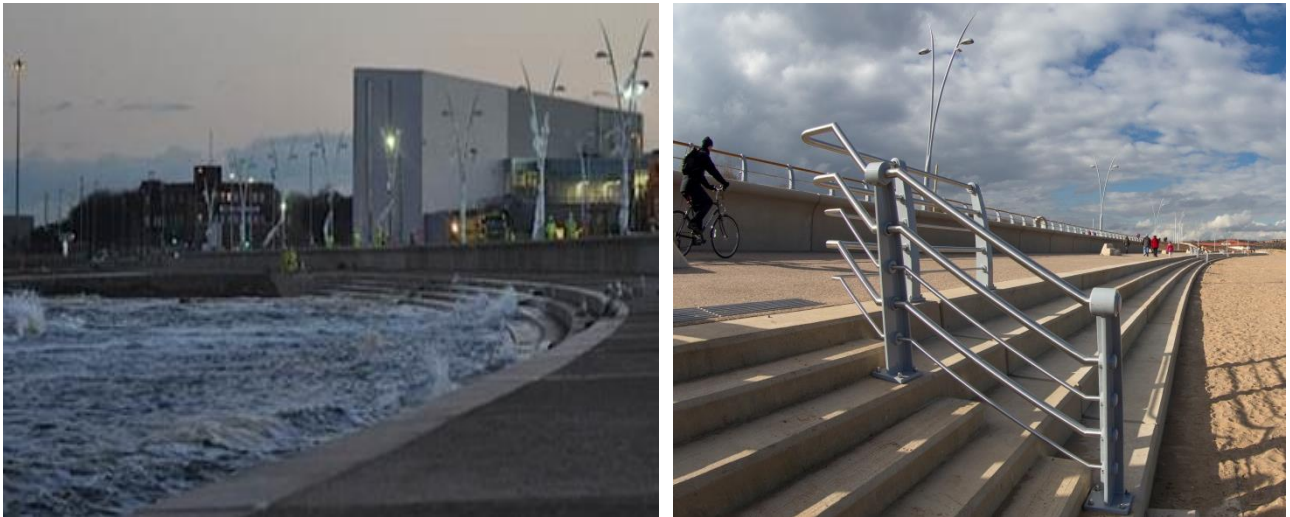


Figure 3: Littlehaven Sea Wall

6.3.2 Management Area 2 - Herd Sands

6.3.2.1: Description of Management Area 2

Herd Sands, known locally as Sandhaven beach, is a low lying coastal frontage separated from Littlehaven by the South Pier. There is a dune formation to the northern end of Sandhaven, reducing down to Trow Point.

Sandhaven Beach is an EU designated beach, classified as excellent, with Blue Flag Status which it has retained for many years.

The South Pier and Trow Point essentially form the control structures for this beach.

The Environment Agency's Flood Maps identify this area as being at risk of flooding by the sea. The dune systems along Sandhaven not only constitute a valuable environmental asset, but also form the basis of a natural flood defence protecting the structures and other assets behind.

The area behind the beach is relatively low lying and is occupied by a recreational development and the main A183 coastal road.

Policy Unit	Until 2025	2025 to 2055	2055 to 2105
Herd Sands (North)	Hold the Line	Hold the Line	Allow for Retreat
Herd Sands (South)	Hold the Line	Managed Realignment	Hold the Line on Retreated Alignment
Trow Point (North)	Allow for Retreat	Managed Realignment	Hold the Line on Retreated Alignment

6.3.2.2 Implications of SMP2

The preferred policy for this area is to maintain the coastal control offered by South Pier and Trow Point, while promoting an overall policy to hold the line along Herd Sands beach.

6.3.2.3 What have we done so far?

Herd sands dunes stabilisation

It is recognised that over time Herd Sands South will become more vulnerable to coastal flooding; therefore, a plan of managed realignment has been recognised as the most sustainable way of managing this area.

Due to the dune areas being accessed by the public for recreational activities, the quality and integrity of the dunes has been at risk. They were damaged and their lifespan seriously reduced. The dunes act as a natural coastal defence protecting the shore in storm conditions. They have also been there for many years and consequently have become a very notable visual feature of the Herd Sands coastline. To protect them and allow for the dunes to recover and grow, a dune stabilisation project has been put into place. By planting juvenile Marram grass and Lyme grass onto the dunes surface, consolidation of the slopes has been promoted. The roots of the grass bind the sand together protecting it from being blown or washed away. The grass can also shelter the windblown sand, catching it, increasing the size of the dunes and maintaining them. This is a continuing emplacement and the grasses will grow and spread increasing the area of protection for many years to come.

Herd Sands Access Ramp and Gabions

In July 2016 South Tyneside Council completed a project to repair the access ramp and repair damaged gabions at Herd Sands. The previous ramp had been suffering from deterioration before it was badly damaged in the East Coast tidal surge of December 2013. During the storm event, the central section of the ramp was undermined causing it to lose structural stability. A section of gabions that offered coastal erosion protection was also significantly damaged. The construction of the new ramp and replacement of gabions was funded by the Environment Agency and work is now complete. The new ramp will offer improved access to the beach for both pedestrians and emergency vehicles, it will allow the Council to undertake vital maintenance works on the beach and it reduces the risk of coastal erosion at this location (Figure 4).



Figure 4 Herd Sands Access Ramp and Gabions

6.3.3 Management Area 3 - Trow

6.3.3.1 Description of Management Area 3

This area consists of a former landfill within a limestone quarry, Trow Quarry, which has been filled and levelled with grass.

Trow Point acts as a control structure to this area. Erosion occurred at the seaward margin of the landfill, exposing material that could be accessed by members of the public. There are two small bays along this margin separated by an eroding rock platform, known as Target Rock.

This area forms the start of the coastal footpath which runs close to the cliff edge and which is maintained by the landowners, The National Trust.

A gun platform, a heritage structure, sits atop of Trow Point rock headland. Trow Quarry is a designated Special Areas of Conservation (SAC) and is part of the Northumbrian Coast Special Protection Areas (SPA) and within the Durham Site of Special Scientific Interest (SSSI).

Policy Unit	Until 2025	2025 to 2055	2055 to 2105
Trow Point (South)	Allow for Retreat	Managed Realignment	Hold the Line on Retreated Alignment
Trow Quarry	Hold the Line	Managed Realignment	Managed Realignment

6.3.3.2 Implications of SMP2

Trow Point is an important control structure, affording protection to the adjacent beaches at Herd Sands South and Graham Sands. Due to its hard geological structure, Trow Point is unlikely to be undermined by coastal erosion in the short-term. The preferred policy is to allow for retreat in the short-term and assess erosion impacts through longer-term monitoring. The plan recognises that Trow Point may be vulnerable to erosion in the medium to long term and therefore proposes a policy of managed realignment.

Trow Quarry

Trow Quarry, owned by the National Trust, was identified in the Council's Coastal Strategy Study (2001) as a site requiring further assessment; similarly, it was identified in the Council's Contaminated Land Strategy as an Area for Further Investigation.

The site has since been the subject of two rounds of intensive ground investigation in 2003 and 2005. This work was conducted to determine if the land should be declared as "Contaminated Land" under Part IIA of the Environmental Protection Act 1990.

The studies concluded that the site should not be classified as contaminated land; however, the need to protect the landfill from further erosion was acknowledged. A study was then commissioned to identify which options were available.

Following a comprehensive assessment of all the options, it was recommended that the Council adopt a contingent based approach. In January 2007, the Council agreed a way forward. With consideration of all the options available a 'toe' rock revetment was chosen as the best option to protect the coastline from further erosion in that area, limiting the pathway

of the infill material being washed out and affecting the surrounding coastline (Figure 5). The revetment was made of Norwegian Granite due to its durability, maximising the lifespan of the protection. The slopes in the area also underwent regrading and stabilisation works to increase their lifespan. They were then planted with local marine species to both aid stability and to return the site visually to the natural surrounding area (Figure 5).

There is also a long-term programme of monitoring, inspection and investigation to address future variables and to ensure that long term planning and management of the site is proportionate to any risk to the site’s maintenance.



Figure 5: Trow Quarry Coastal Protection Scheme

6.3.4 Management Area 4 – Frenchman’s Bay to Lizard Point

6.3.4.1 Description of Management Area 4

This area consists of a massive Magnesian Limestone headland, which extends nearly 5km from Trow Quarry to the headland of Souter Point. Frenchman’s Bay Headland forms a high cliff line with up to 400m of open space, known locally as the Leas.

Marsden Bay to the south forms a longer bay with a steeper cliff line. On the foreshore there are several sea stacks which illustrate the differential erosion rates particular to the area. There are several car parks along this bay and the coastal footpath runs along the cliff line.

Policy Unit	Until 2025	2025 to 2055	2055 to 2105
North of Lizard Point	Allow for Retreat	Allow for Retreat	No Active Intervention
Lizard Point	No Active Intervention	No Active Intervention	No Active Intervention

6.3.4.2 Implications of SMP2

The nature of this coastline is dictated by its geology, and as such the cliffs are subject to differential erosion. Consequently, it is less feasible to defend against erosion.

The implications of this in the medium to long-term may result in a potential loss of assets including the Coast Road, the coastal footpaths and coastal car parks.

The preferred policy for this area therefore is to allow the coast to erode, accepting a loss of recreational space but maintaining the natural character of the area. Additionally the policy recognises the need to plan for realignment of the Coast Road in the short term.

A183 Coast Road

The A183 forms a strategic link between South Shields and Sunderland. Erosion of the cliff, in conjunction with periodic collapses due to jointing, has left little buffer between the road and the cliff top. This has formed a pinch point near to Marsden Lime Kilns.

The pinch point will be classified as a strategic point in the coastal monitoring system. A monitoring programme will establish a baseline for determining erosion rates, will assess the condition of the highway structure, and will ultimately determine the degree of risk.

The Council is considering the options available to it in terms of replacement. The National Trust has been made aware of the issue and will continue to review the cliff condition along the coastline.

The funding for the realignment of the Coast Road will not be eligible under the Defra grant aid for flood and coastal risk management. This project will require funding under the Local Transport Plan (LTP) Scheme.

South Tyneside Council has commissioned a study in partnership with Northumbria University, which will use laser monitoring equipment and bore holes with ground water level equipment to create an accurate report of the localised erosion rates. This will be used to inform further actions such as the realignment plans proposed for the A183 coast road. Current results suggest that further monitoring may be required over a longer period.

Coastal Footpaths

The main footpath runs the length of the coast of South Tyneside and is a valuable recreational resource. It is currently managed by riparian landowners in conjunction with the Council.

The Council and the National Trust regularly inspect their respective sections of footpath. Realignments are undertaken in areas affected by cliff retreat.

Coastal Car Parks

Two coastal car parks have been identified as having the potential to be affected by receding cliff lines. One is privately owned and one is owned by the Council.

The Council has provided advice to the parties responsible for the car parks and will continue to engage with them to advise on future management options.

One other coastal car park has previously had to close due to the receding cliff line.

Works on the car parks are unlikely to require major capital expenditure by the Council, and it is unlikely that a funding submission will be required.

6.3.5 Management Area 5 – Lizard Point to Souter Point

6.3.5.1 Description of Management Area 5

The Lizard Point Headland is comprised of hard rock cliffs, with small bays and an open area of land above. Further along towards Whitburn Coastal Park relatively low cliffs form deeply cut bays which are caved in areas. Behind the cliff line there is a former quarry, which has been levelled and grassed.

Policy Unit	Until 2025	2025 to 2055	2055 to 2105
Harbour Quarry	Hold the Line	Allow Retreat	Allow Retreat
Harbour Quarry to Souter Point	No Active Intervention	No Active Intervention	No Active Intervention

6.3.5.2 Implications of SMP2

The preferred policy recognises the need to minimise the reliance on future defence schemes, while maintaining the recreational use of the foreshore.

In respect of Harbour Quarry, however, the geology lends itself to cave formation. The plan recommends local management measures in the short term to hold the line. Such measures will be determined following investigation of the nature and extent of the former quarry infill, and may require remediation and/or protection, in the long term.

Old Harbour Quarry

The quarry forms part of Whitburn Coastal Park. It is understood that the National Trust is responsible for managing the land on behalf of the Council.

The land has been reclaimed from the former Whitburn Colliery and Old Harbour Quarry. Exact details of the reclamation (by the former Tyne and Wear County Council) are unknown. Some coal was removed from the site but it can be reasonably expected that spoil was used to form the current landscape.

Cave development has been slowed to the south of Souter Lighthouse by using concrete defence structures. There is evidence of rock armour having been used at Potter's Hole and Byer's Hole to minimise wave impact on softer material. In several places the cliff slope has been altered and a geotextile used to encourage stability.

These defensive measures have been affected by erosion and their integrity has reduced. Wave action appears to be undercutting the concrete defences near Souter Lighthouse and the rock armour at Potter's Hole is no longer proving effective. In addition, crown holes have reached the surface from deepening caves near Byer's Hole.

Cave development is a natural process but is approaching the point where work may be required, where it can be justified, to prevent further expansion into the landward fill materials.

Processes here are occurring naturally and do not affect any major assets. Therefore, the only potential risk is via mine material, out-flowing into the sea, if the quarry wall is significantly breached.

A site investigation in 2007 found the site not to be a contaminated land site as defined under part 2A of the Environmental Protection Act 1990. The current state of defences is assessed through coastal monitoring.

6.3.6 Management Area 6 – Souter Point to Whitburn

6.3.6.1 Description of Management Area 6

This area comprises low Magnesian Limestone cliffs underlying relatively thick deposits of glacial till. There is a wide rock platform on the foreshore, with bars and banks of large stones and boulders, most notably, Whitburn Steel.

There are a number of landowners along this section. The proximity of the coastal footpaths to the cliff line will necessitate negotiation over any realignment.

Policy Unit	Until 2025	2025 to 2055	2055 to 2105
Whitburn Cliffs	No Active Intervention	No Active Intervention	No Active Intervention

6.3.6.2 Implications of SMP2

The preferred policy for this area is again to minimise the reliance on defences. The implications of this policy are that Whitburn Cliffs will continue to erode, reducing the width of open ground between the properties and the edge of the cliffs, which may have an effect on the coastal footpaths over time. However, current erosion rate estimates mean that the nearest properties are not at risk of loss over the 100-year life of the plan.

Coastal Footpaths

The footpath is being successfully managed at present and it is expected that the current management programme will continue. The footpaths will be defined as 'strategic points' in the coastal monitoring programme.

There may be a problem of realignment where the footpath passes the boundary of Whitburn Firing Range. Dialogue with the Ministry of Defence is required in this regard.

7.0 Delivery of Part 1 and 2

Section Overview

In this section, we will cover the following:

- Funding
- Flood risk and Coastal Erosion Management delivery
- Environmental/landscape and maintenance

7.1 Funding

It is important that within the local strategy, South Tyneside Council sets out how proposed actions and measures will be funded and resourced within South Tyneside.

This section will look at the funding sources available to pay for flood risk and coastal erosion management measures, and how Government grants are allocated and prioritised.

There have been recent changes in the way flood risk and a coastal erosion management scheme is funded. The Government will no longer fully fund all schemes therefore alternative funding sources will need to be found. Although this can at times put pressure on local communities to find funds, it also gives them the flexibility and ability to have more influence over how flood defences are delivered and managed.

South Tyneside Council can apply to the following funding streams for assistance with flood mitigation measures.

Flood Defence Grant in Aid (FDGiA) - Flood and Coastal Erosion Risk Management schemes are funded by the Government from a main “pot” known as Flood Defence Grant in Aid. It is administered by the Environment Agency on behalf of DEFRA. This funding was implemented following the Pitt Review in 2007, which recommended that a new funding scheme should be made available to allow communities and third party groups to invest in flood risk management schemes.

Some schemes can be fully funded, others only partly, depending on the level of public benefit they provide, e.g. reducing flood risk to homes and vital infrastructure. Any shortfall in the amount required will need to be found elsewhere – this could be local levy (see below).

As a Lead Local Flood Authority, South Tyneside Council applies to the Environment Agency each year for funding towards local flood risk management schemes.

The Local Levy is administered by the Northumbria Regional Flood and Coastal Committee (NRFCC) and is paid by local authorities to the Environment Agency for additional flood risk management schemes that would not otherwise receive funding to allow them to proceed./and go ahead.

The funds can be used to support projects related to any source of flooding and can be used to provide partnership contributions for Grant in Aid funding.

Revenue funding for Lead Local Flood Authorities is a grant, which has been made available to support the delivery of the Flood and Water Management Act 2010. DEFRA provides a grant to LLFA's to help them fulfil their duties under the act. The amount allocated is dependent on the level of risk in the area.

However, although this funding is available at present, there is no commitment that it will continue.

Council Capital Funding comes direct from the Council's capital budget. This funding is invested in local flood and coastal risk management projects that maximise the benefit from the available capital budget. These funds have been used to support and implement flood and coastal projects to minimise flood and coastal risk for the borough.

Water Company contributions from Northumbrian Water can often help fund local flood resilience schemes which may not have been possible otherwise. South Tyneside Council has worked in partnership on many occasions with Northumbrian Water on schemes where joint funding has enabled a scheme to go ahead.

Northumbrian Water has a duty to manage its assets and ensure they are performing correctly. As a result, they are continuously reinvesting in their drainage networks, and it is during works such as these that South Tyneside Council often works in partnership, as a joint approach is often found to be mutually beneficial.

Local fundraising and private contributions can often help fund local schemes. They can come from local communities, businesses or residents groups.

Other sources of funding can be used to contribute towards a scheme due to the nature of the Grant in Aid funding. As a proposed scheme can have a variety of benefits e.g. open space, wildlife habitat, part of new developments etc. it may attract investment from other sources such as local businesses, land owners, developers, habitat grants etc.

7.2 Flood and Coastal Risk Management Delivery

Applying for funding for flood and coastal risk management schemes is not straightforward and can be a lengthy and time consuming process. A number of steps have to be taken, from identification of risk and the requirement for a scheme, through to funding, design and delivery. The table below (Figure 6) gives a brief outline of the steps required to implement a scheme.

Each step in this process can be complex and can require more than one source of funding. It is worth noting that not all mitigation options are feasible and factors such as cost benefit, effectiveness and land availability are amongst other key reasons why a scheme may not go ahead.

When planning a flood or coastal risk scheme, we must not only look at the flood risk at the site, but careful planning needs to be carried out to ensure that the flood risk is not passed elsewhere in the borough as specified in the Flood and Water Management Act 2010.

In order to do this, feasibility studies and modelling are usually carried out on any proposal. This generally involves procuring an external organisation to carry out a study on the area and present possible proposals.

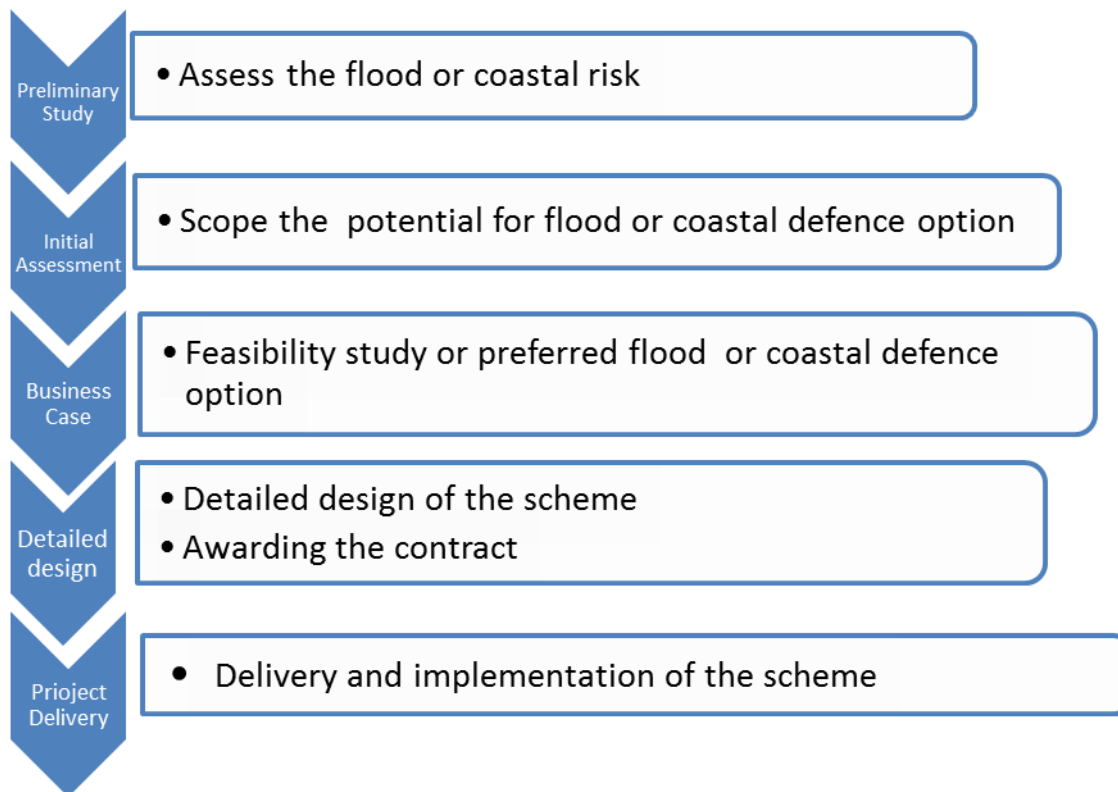


Figure 6: Funding Application Steps

7.3 Residual Risk

There will be instances where it is understood and accepted that there is still a risk of flooding but that the risk is controlled to reduce the impact of an event. This is known as residual risk. It is important that households and businesses have the necessary information to prepare for this, often co-ordinated through emergency planning. Increasing resilience will be important where there is a residual risk. Resilience can be increased through implementation of flood plans and addressing the design of buildings to make them easier to clean after a flood. Another example of this is the installation of property level flood protection measures to a property, where a larger strategy may not be viable, to give added protection.

8.0 Reviewing the Strategy and Next Steps

Section Overview

In this section, we will cover the following:

- When this Strategy will be reviewed
- What are the next steps following this strategy

8.1 Review

As a Lead Local Flood Authority, South Tyneside Council must always have a local strategy. This strategy should be maintained to ensure any actions and objectives are relevant, current and are being delivered.

This strategy covers the next five years taking us up to 2022. It is intended to review the strategy at the end of the five-year period, although earlier review may be necessary if significant changes are required. Action plans will also be updated throughout this period to ensure they remain relevant and on target.

Potential triggers for a review of the Strategy may include:

- Occurrence of a significant and widespread surface water flood event,
- Occurrence of a significant coastal event,
- Significant changes to datasets or information which may alter the understanding of risk within the study area,
- Significant amendments to the legal responsibilities and/or roles and functions of Risk Management Authorities and/or other organisations,
- Annual Monitoring identifies that the Strategy is not achieving its objectives,
- Changes to relevant national legislation, or
- Change in funding availability, which has a significant effect on ability to deliver the Strategy Action Plan.

8.2 Next Steps

South Tyneside Council will continue to monitor actions identified as a result of the surface water management plan, in the hope of finding ways in which to address the outstanding issues. Actions identified as a result of the surface water management plan are outlined in appendix 1. Some actions have already been completed. The Action Plan will also be used to measure and evaluate the progress and performance of flood and coastal risk management in South Tyneside.

South Tyneside Council will also identify and address the issues highlighted by this strategy regarding flood and coastal erosion risk management. This will ensure that South Tyneside Council remains active and at the forefront of protecting the borough from these issues.

Surface Water Management Plan Actions - Appendix 1

ID	Action				Cost		Benefit	Potential Funding Source	Timing		Responsibility		Review	
	What (Generic)	How (Priority Actions)	Location	Priority Ranking	Investigation / feasibility	Capital			Other	Timeframe	Action Type	Lead Organisations	Primary Support	Frequency
CouncilWide														
1	Implement a flood incident log to assist in collecting standardised information	Implement the standardised log. Make all relevant parties within the Council aware of its existence and the information to be recorded. Include: Photos, date, source, extent	Catchment Wide	High			<£5k	Provides improved detail and evidence on historical events to feed into future plans and assist in considering flood risk mitigation works	STC/Defra/EA	Short (Implementation) Long Term (Recording)	Flood Risk Regulations	STC	Drainage, highways and transport departments within Council. Support required from GIS.	
2	Update the uFMfSW map	Use the modelling outputs from the SWMP to provide representative local mapping for the updated Flood Map for Surface Water (uFMfSW)	Catchment Wide	High			<£2k	Flood risk information made more accessible to inform the wider stakeholders	STC/Defra/EA	Short	Flood Risk Regulations	STC	EA	
3	Implement an asset register database	Implement a standardised register of assets which influence and impact flood risk. Guidance and suggested template provided by Defra. Suggested inclusions; culvert sizes, condition, ownership, significance on flood risk	Catchment Wide	High			<£5k	Improved procedures for recording flood risk assets across the area	STC/Defra/EA	Short	Flood and Water Management Act	STC	Drainage, highways departments	
		Educate and engage Council departments in asset register to ensure it is populated and used to record flood risk drainage and surface water management assets	Catchment Wide	High			<£5k	Understanding of assets which influence flood risk across the area	STC/Defra/EA	Medium	Flood and Water Management Act	STC	Drainage, highways departments	
4	Develop and implement a standardised maintenance schedule	Use asset register to produce annual maintenance regime which is joined up between the different departments/parties who may be responsible for drainage assets	Catchment Wide	High			<£5k	Benefits flood risk mitigation, ensuring all assets are in sufficient condition to operate to their design capacity	STC	Short	Flood Risk Reduction	STC	Drainage, highways departments	
		Implement targeted maintenance regime of assets to ensure operational for storm events	Catchment Wide	High			<£15k	Flood risk is not increased through blocked or partially blocked assets; greatest benefit possible provided by assets	STC	Medium	Flood Risk Reduction	STC	Drainage, highways departments	
5	Take forward SWMP actions into LFRMS	Take forward existing and any future SWMP actions into the Local Flood Risk Management Strategy for the South Tyneside administrative area	Catchment Wide	High			<£5k	Coordinated flood risk management, with cost-effective prioritisation of assets with limited budgets	STC	Short	Flood and Water Management Act	STC		
6	Implement and carry out a communication and engagement plan for the areas of significant flood risk	Communicate with a range of stakeholders as identified in the plan to raise awareness of the risks of surface water flooding. Include internal and external stakeholders and the public	Catchment Wide	High			<£5k	Increases awareness of risk from surface water flooding and role of STC as LLFA	STC	Short	Communications	STC	EA	
		Communicate and use findings of SWMP to update local resilience forum community risk registers and update multi-agency flood plans	Catchment Wide	High			<£2k	Increased flood risk adaptation, Emergency response plans include the most up to date information	STC	Medium	Communications	STC	Highways	
7	Engage with and provide information to Planning department to inform development decisions and policy	Use maps and outputs of SWMP, identifying more vulnerable areas of surface water flooding to inform development decisions and update the SFRA	Catchment Wide	Medium			<£5k	More informed development decisions with reduced chance of surface water flooding.	STC	Medium	Policy	STC	Development Control/Planning	
		Use the SWMP outputs to enhance planning policy to promote the use of appropriate SuDS	Catchment Wide	Medium			<£5k	No future increase in surface water flooding and long term reduction in flooding	STC	Medium	Policy	STC	Development Control/Planning	
8	Develop and promote the use of SuDS in existing infrastructure	Promote the implementation of green roofs on existing buildings and permeable paving or shallow storage in car parks, particularly when carrying out improvement or maintenance works	Catchment Wide	Medium			<£5k	Improved awareness of surface water flooding. Attenuation of flows to contribute to long term reduction in flooding	STC	Medium	Flood Risk Reduction	STC		
		Promote the widespread use of water butts for residential properties.	Catchment Wide	High		£15k+	<£5k	Improved community understanding of local flood risk resilience and flood attenuation at source	STC	Short	Flood Risk Reduction	STC	NWL, EA	
		Seek opportunities for retrofitting of SuDS techniques, particularly in large urban buildings and impermeable areas.	Catchment Wide	High			<£5k	Attenuation of flows to contribute to long term reduction in flooding	STC	Short	Flood Risk Reduction	STC	NWL, EA	
9	Review open spaces to consider opportunities for local flood risk mitigation measures	Review open spaces across South Tyneside to consider where practical flood risk management measures can be included such as swales, storage, ponds/wetlands	Catchment Wide	Medium			unknown	Overall cost savings and alignment of aspirations by incorporating flood risk measures in other improvement/maintenance projects	STC	Medium	Flood Risk Reduction	STC	Parks/Recreation within council	

SiteSpecific

Lindisfarne													
10	Consider long term options to reduce surface water flooding at Lindisfarne Roundabout	Carry out detailed appraisal of options to reduce surface water flooding at Lindisfarne Roundabout, engaging with Highways team. Potential option to install offline flood storage or divert flows to the river; funding to be considered.	Lindisfarne A19 Area	High	£30k- £80k	Potentially >£2mill		Flood Mitigation to strategic transport route	STC/Defra/EA	Long	Investigation	STC	Highways, NWL
11	Develop long term options to reduce surface water flooding	Work with NWL to look for joined up opportunities in sewer improvement schemes	Lindisfarne A19 Area	High	£25-£50k			Flood Mitigation to strategic transport route	STC	Long	Investigation	STC	Highways, NWL
12	Develop long term options to reduce surface water flooding	Look for joined up opportunities in highway improvement schemes	Lindisfarne A19 Area	High	£25-£50k			Flood Mitigation to strategic transport route	STC	Long	Investigation	STC	Highways, NWL
13	Localised SuDS in available green space	Carry out localised SUDS options, including storage in roundabout to the east and surrounding green areas to reduce surface water on highways where possible.	Lindisfarne A19 Area	Medium	£10k	£500k-£1,000k		Flood Mitigation to strategic transport route	STC	Long	Flood Risk Reduction	STC	Highways, NWL
14	Mitigate surface water flooding impacts during rainfall events	Discuss SWMP outputs with Highways team and emergency planners to consider implementing measures such as warning signs and traffic management measures	Lindisfarne A19 Area	High			£5k	Impacts on road users and emergency services are reduced during rainfall events	STC	Short	Flood Mitigation	STC	Highways, Emergency Planning
Fellgate													
15	Confirm and manage misconnections into foul network	NWL to proactively work with STC to manage the misconnections	Fellgate	Medium	£10k			Reduction in foul sewers being overloaded during rainfall events	NWL	Medium	Flood Risk Reduction	NWL	STC
16	Investigate funding and implement option to reduce surface water run off	Investigate funding opportunities to install channel to divert flows to nearest watercourse	Fellgate	High	£25-£50k	£1.8 million		within Fellgate area and diverts surface water flows straight to watercourse instead of entering storm sewer	STC/Defra/EA	Medium	Investigation	STC	NWL
17	Collaborate with NWL to mitigate flooding from storm water sewers	NWL to assess storm water flood risk within Fellgate and collaboratively work with STC to consider inclusion of mitigation works with Action 16.	Fellgate	High	£25-£50k	£1.2 million		Flood risk reduction if capital works implemented	STC/Defra/EA	Medium	Investigation	STC	NWL
Cleadow Lea													
18	Flood Storage	Detailed assessment to construct flood embankment with active control at the inlet to storm sewer; releasing surface water run off when capacity in sewers	Cleadow Lea	High	£50-100k	£1.2-1.4 million		Reduction in flood risk for properties around Cleadow Lea	STC/Defra/EA/Landowner	Short	Flood Risk Reduction	STC	NWL , Landowner
Cleadow Sunderland Road													
19	Flood Storage	Detailed assessment to construct flood embankment and new storm sewer with active control at the inlet; releasing surface water run off when capacity in sewers	Cleadow Sunderland Road	Medium	£80-150k	£1.3-2.3 million		Flood risk reduction from surface water run-off, benefit dependent on number of storage areas created	STC/Defra/EA/Landowner	Medium	Investigation	STC	NWL , Landowner
20	Collaborate with NWL to mitigate flooding from storm water sewers	NWL to assess storm water flood risk within Cleadow Sunderland Road and collaboratively work with STC to consider inclusion of mitigation works with Action 19.	Cleadow Sunderland Road	Medium	Within No. 19	Within No. 17		Greater reduction in flood risk through investigation into combined flood risk sources (surface water run-off and sewers)	NWL/STC/Defra/Landowner	Medium	Investigation	NWL	STC, Landowner
Newmarket Walk													
21	Flood Storage	Detailed assessment to improve local open spaces to create series of flood storage areas	New Market Walk	High	£25-50k	£700k		Reduction in flood risk and improvement in amenity area	STC/Defra	High	Flood Risk Reduction	STC	NWL
22	Upgrade storm sewer	Detailed assessment to upgrade section of culvert and construct local flood defence	New Market Walk	High	£25-50k	£300k		Reduction in flood risk for properties	STC/Defra	High	Flood Risk Reduction	combination with No.21)	NWL
Other													
23	Follow up and implement recommendations of other studies	Carry out actions to reduce surface water flood risk as identified from the Monkton Village Flood Alleviation Study	Hebburn	High				Reduction in flood risk for properties	NWL/STC/Defra/EA	Short	Flood Risk Reduction	NWL/STC	EA
24	Follow up and implement recommendations of other studies	As part of the ongoing study at Reay Crescent, Boldon, investigate options to reduce surface water flooding	Reay Crescent, Boldon	Medium				Reduction in flood risk for properties	Defra	Medium	Flood Risk Reduction	EA	STC, NWL
25	Follow up and implement recommendations of other studies	As part of the regeneration scheme at Ocean Road, South Shields include works to mitigate the risk of surface water flooding in the area	Ocean Road, South Shields	Medium				Reduction in flood risk	NWL/STC	Short	Flood Risk Reduction	STC	NWL