West Devon Level 1
Strategic Flood Risk Assessment
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## Glossary

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<td><strong>AEP</strong></td>
<td>Annual Exceedance Probability e.g. 1% AEP is equivalent to 1% probability of occurring in any one year (or, on average, once in every 100 years)</td>
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<tr>
<td><strong>ASTSWF</strong></td>
<td>Areas Susceptible to Surface Water Flooding</td>
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<td><strong>Aquifer</strong></td>
<td>A source of groundwater comprising of water-bearing rock, sand or gravel capable of yielding significant quantities of water.</td>
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<td><strong>Catchment Flood Management Plan</strong></td>
<td>A high-level planning strategy through which the Environment Agency works with their key decision makers within a river catchment to identify and agree policies to secure the long-term sustainable management of flood risk.</td>
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<td><strong>Climate Change</strong></td>
<td>Both natural and human actions causing long term variations in global temperature and weather patterns.</td>
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<td><strong>Culvert</strong></td>
<td>A channel or pipe that carries water below the level of the ground.</td>
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<td><strong>EA</strong></td>
<td>Environment Agency</td>
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<td><strong>Flood Defence</strong></td>
<td>Infrastructure used to protect an area against floods as floodwalls and embankments; they are designed to a specific standard of protection (design standard).</td>
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<td><strong>Flood Map</strong></td>
<td>A map that delineates the areas that have been predicted to be at risk of being flooded during an event of specified probability.</td>
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<td><strong>FmFSW</strong></td>
<td>Flood Map for Surface Water</td>
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<td><strong>Floodplain</strong></td>
<td>Area adjacent to river, coast or estuary that is naturally susceptible to flooding.</td>
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<td><strong>Flood Storage</strong></td>
<td>A temporary area that stores excess runoff or river flow, often ponds or reservoirs.</td>
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<td><strong>FWMA</strong></td>
<td>Floods and Water Management Act 2010</td>
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<td><strong>Fluvial Flooding</strong></td>
<td>Flooding by a river or watercourse</td>
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<td><strong>Functional Floodplain</strong></td>
<td>Land where water has to flow or be stored in times of flood. Identification of Functional Floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. But land which would flood with an annual probability of 1 in 20 (5%) or greater in any year, or is designed to flood in an extreme (0.1%) flood, should provide a starting point for consideration and discussions to identify the Functional Floodplain.</td>
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<td><strong>Groundwater</strong></td>
<td>Water that is in the ground, this is usually referring to water in the saturated zone beneath the water table.</td>
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<td><strong>Habitable Room</strong></td>
<td>A room used as living accommodation within a dwelling but excludes bathrooms, toilets, halls, landings or rooms that are only capable of being used for storage. All other rooms, such as kitchens, living rooms, bedrooms, utility rooms and studies are counted</td>
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<tr>
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<td>High Probability (Zone 3a)</td>
<td>Land having a 1 in 100 or greater annual probability of river flooding; or land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)</td>
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<td>LPA</td>
<td>Local Planning Authority</td>
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<td>Informal Flood Defence</td>
<td>A structure that provides a flood defence function, however has not been built and/or maintained for this purpose (e.g. boundary wall)</td>
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<td>Leat</td>
<td>Leat is the common name in South West England for an artificial watercourse or aqueduct dug into the ground. Common uses for leats include delivery of water to water mills, for mineral washing and concentration, for irrigation, to serve a dye works or other industrial plant, and provision of drinking water to a farm or household or as a catchment cut-off to improve the yield of a reservoir.</td>
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<td>Local Plan</td>
<td>The plan for the future development of the local area, drawn up by the local planning authority in consultation with the community. The requirement is set out in the Planning and Compulsory Purchase Act 2004.</td>
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<tr>
<td>Local Planning Authority Mitigation measure</td>
<td>Body responsible for managing planning and development through the planning system. An element of development design which may be used to manage flood risk or avoid an increase in flood risk elsewhere.</td>
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<td>Low Probability (Zone 1)</td>
<td>Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as ‘clear’ on the Flood Map – all land outside Zones 2 and 3)</td>
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<tr>
<td>Medium Probability (Zone 2)</td>
<td>Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)</td>
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<tr>
<td>Main River</td>
<td>Main rivers are a statutory type of watercourse in England and Wales. These are usually larger streams and rivers, but also include some smaller watercourses. Main rivers are defined as a watercourse marked as such on a main river map, and can include any structure or appliance for controlling or regulating the flow of water in, into or out of a main river.</td>
</tr>
<tr>
<td>NPPF</td>
<td>National Planning Policy Framework</td>
</tr>
<tr>
<td>NPG</td>
<td>National Planning Guidance</td>
</tr>
<tr>
<td>Ordinary watercourse</td>
<td>Watercourse that is not part of a main river and includes rivers, streams, ditches, drains, cuts, culverts, dikes, sluices, sewers (other than public sewers within the meaning of the Water Industry Act 1991) and passages, through which water flows.</td>
</tr>
<tr>
<td>Planning Policy Statement (PPS)</td>
<td>A series of statements issues by the Government, setting out policy guidance on different aspects of planning. They replace Planning Policy Guidance Notes</td>
</tr>
<tr>
<td>Previously Developed (Brownfield) Land</td>
<td>Land which is or was occupied by a building (excluding those used for agriculture and forestry). It also includes land within the</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Residual Risk</td>
<td>A measure of the risk remaining after applying the sequential approach and taking mitigating actions.</td>
</tr>
<tr>
<td>Risk</td>
<td>Combination of the probability of the occurrence with its potential consequences</td>
</tr>
<tr>
<td>SEA</td>
<td>Strategic Environmental Assessment</td>
</tr>
<tr>
<td>Sequential Testing</td>
<td>A risk based approach in to assessing flood risk, which gives priority in ascending order of flood risk, i.e. lowest risk first</td>
</tr>
<tr>
<td>Sewer flooding</td>
<td>Flooding caused by a blockage or overflowing in a sewer or urban drainage system</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>A person or organisation that has interest in, or affected by the decisions made within a site.</td>
</tr>
<tr>
<td>SUDS</td>
<td>Sustainable Drainage System</td>
</tr>
<tr>
<td>Supplementary Planning Document (SPD)</td>
<td>Provides supplementary guidance to policies and proposals contained within Development Plan Documents. They do not form part of the development plan, nor are they subject to independent examination.</td>
</tr>
<tr>
<td>Sustainability Appraisal (SA)</td>
<td>Appraisal of plans, strategies and proposals to test them against broad sustainability objectives.</td>
</tr>
<tr>
<td>Sustainable Development</td>
<td>“Development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (The World Commission on Environment and Development, 1987).</td>
</tr>
<tr>
<td>Technical Guidance to the National Planning Policy Framework (TGNPPF)</td>
<td>Provides additional guidance to local planning authorities to ensure the effective implementation of the planning policy set out in the National Planning Policy Framework on development in areas at risk of flooding and in relation to mineral extraction. The guidance retains key elements of Planning Policy Statement 25 and of the existing minerals policy statements and minerals planning guidance notes which are considered necessary and helpful in relation to these policy areas. The retention of this guidance is an interim measure pending a wider review of guidance to support planning policy.</td>
</tr>
</tbody>
</table>
1 Introduction

1.1 Background

A Level 1 Strategic Flood Risk Assessment’s (SFRA) for West Devon Borough Council was produced in 2008. There have been a number of significant changes since the original SFRA’s Level 1 were publicised. These include the revocation of Regional Spatial Strategies, the introduction of the National Planning Policy Framework (NPPF) and the Flood and Water Management Act (FWMA), the production of a national surface water map Areas Susceptible to Surface Water Flooding (ASTSWF) and Flood Map for Surface Water (FMfSW) and a significant update of the Environment Agency’s Flood Map in 2012.

In addition to the revised policy and guidance documents, many of the data sets used to inform the SFRA’s have since been updated. The introduction of new policy guidance and improved flood risk data sets has prompted the revision the Level 1 SFRA documents which have now been combined.

1.2 Strategic Flood Risk Assessment (SFRA) Approach

The primary objective of the West Devon Strategic Flood Risk Assessment (SFRA) is to inform the emerging Local Plan, known as ‘Our Plan’. The SFRA has a broader purpose however, and in providing a robust depiction of flood risk across the Borough, it can:

- Inform the development of Council policy that will underpin decision making within the Borough, particularly within areas that are affected by (and/or may adversely impact upon) flooding
- Assist the development management process by providing a more informed response to development proposals affected by flooding, influencing the design of future development within the Borough
- Help to identify and implement strategic solutions to flood risk, providing the basis for possible future flood attenuation works
- Support and inform the Council’s emergency planning response to flooding

The Government provides no specific methodology for the SFRA process. Therefore, to meet these broader objectives, the SFRA has been developed in a pragmatic manner in close consultation with both the Council and the Environment Agency.

A considerable amount of knowledge exists with respect to flood risk within the Borough, including information relating both to historical flooding, and the predicted extent of flooding under extreme weather conditions (i.e. as an outcome of detailed flood risk modelling carried out by the Environment Agency). The West Devon SFRA has built upon this existing knowledge, underpinning the delineation of the Borough
into zones of ‘high’, ‘medium’ and ‘low’ probability of flooding, in accordance with NPPF. These zones have then been used to provide a robust and transparent evidence base for the development of flooding related policy, and the allocation of sites for future housing and employment uses.

A summary of the adopted SFRA process is provided in the figure below, outlining the specific tasks undertaken and the corresponding structure of the SFRA report.

It is important to recognise that some of the rivers that affect the Borough flow into, or from, adjoining authorities within Devon and Cornwall. Future development within the Borough, if not carefully managed, can influence the risk of flooding posed to residents within neighbouring areas. Conversely, planning decisions within adjacent districts can also impact adversely upon flooding within the Borough.
1.3 Planning Context
The NPPF and accompanying Technical Guidance emphasise the responsibility of Local Planning Authorities (LPAs) to ensure that flood risk is understood and managed effectively using a risk-based approach throughout all stages of the planning process. The NPPF requires LPAs to undertake SFRAs to support the preparation of their Local Plan.

The NPPF and Technical Guidance were published in March 2012 and replace Planning Policy Statement 25 (PPS25) Development and Flood Risk however they do not supersede the PPS25 Practice Guidance Accordingly, this SFR has been prepared in accordance with the principles set out in the NPPF and supporting guidance.

The NPPF and supporting guidance require LPAs to undertake SFRAs and to use their findings, and those of other studies, to inform strategic land use planning, including the application of the Sequential Test which seeks to steer development towards areas of lowest flood risk prior to consideration of areas of greater risk.

1.4 Study Area
The SFRA study area covers West Devon Borough Council administrative area and includes parts of Dartmoor National Park with respect to land drainage responsibilities.

1.5 West Devon Borough Council Area
West Devon Borough covers an area of 1160 sq km and is sparsely populated. Of the population of approximately 51,000, around one third lives in the main towns of Tavistock, Okehampton and Hatherleigh. Approximately half of the area is part of Dartmoor National Park. The terrain is generally hilly, and includes many small ordinary watercourses originating on the granite plateau of Dartmoor. The Borough is bordered on the west side by the River Tamar, which is within the Tamar Valley Area of Outstanding Natural Beauty (AONB).

- **River Tavy catchment** - The main settlements within this catchment are Peter Tavy, Tavistock. This river originates on Dartmoor feeds Tavistock canal and eventually becomes a tributary to the River Tamar close to Bere Ferrers.

- **River Tamar catchment** – The River Tamar forms the boundary between West Devon Borough Council and the Cornwall Council areas. The whole catchment is large and takes in many of the main rivers and ordinary watercourses within the locality. The Catchment Flood Management Plan details the river sources.

- **East Okement catchment** – The East Okement originates on Dartmoor. The main catchment settlement is Okehampton.
1.6 Dartmoor National Park Area

South Hams District Council, West Devon Borough Council and Teignbridge District Council hold land drainage responsibilities for the areas of Dartmoor National Park which fall within the three Council’s administrative boundaries. Dartmoor National Park Authority is a discreet planning authority and has responsibility for strategic planning and development control within the National Park.

Many of the main rivers and ordinary watercourses which flow through West Devon originate on Dartmoor. The surface water run off from the moor feeds the watercourses which can respond quickly following rainfall. The results of rainfall on the moor can be experienced downstream immediately in some cases, or several days later in others.

Surface water run off from the moor is an issue and can result in property and highway flooding issues.

1.7 Aims and Objectives of the SFRA Update

The aim of this study is to provide an up to date Level 1 SFRA for West Devon Borough Council (WDBC) and the parts of Dartmoor National Park Authority (DNPA) that the Borough Council has land drainage duties. This document will be used to inform planning and development policies within the county in accordance with the NPPF and supporting guidance.

The aim of the Level 1 SFRA update will be met through the following objectives:
• To provide an assessment of the impact of all potential sources of flooding in accordance with NPPF, including an assessment of any future impacts associated with climate change and sea level rise

• Enable planning policies to be identified specific to local flooding issues

• Provide information required to apply the Sequential Test for identification of land suitable for development in line with the principles of the NPPF

• To provide baseline data to inform the Sustainability Appraisal of the Development Plan Documents (DPDs) with regard to catchment-wide flooding issues which affect the Study Area

• Provide sufficient information to allow LPAs within the Study Area to assess the flood risk for specific development proposal sites, thereby setting out the requirements for site specific Flood Risk Assessments (FRAs)

• Provide recommendations of suitable mitigation measures including the objectives of Sustainable Drainage Systems (SuDS)

• Enable each of the LPAs within the Study Area to use the SFRA as a basis for decision making at the planning application stage

• Where necessary, provide technical assessments to demonstrate that development located in flood risk areas are appropriate and in line with the requirements of the exception test

• Present sufficient information to inform each of the LPAs within the Study Area of acceptable flood risk in relation to emergency planning capability

2 Policy Context
Since the 2008 Level 1 SFRA was completed, updates to national planning policy and flood risk have been implemented. This section identifies the main changes and the impacts they have on the SFRA.

2.1 National Policy
The Flood Risk Regulations came into force in December 2009 and set out duties for the Environment Agency (EA) and Lead Local Flood Authorities (LLFAs) in the preparation of a range of reports and mapping outputs.

The Flood Risk Regulations (2009) transpose the EU Floods Directive (2007/60/EC) into UK Law. One of the main impacts on LLFAs in the England and Wales is that they are required to complete Preliminary Flood Risk Assessment (PFRA). Where Flood Risk Areas were defined within the PFRA Flood Risk Maps showing the extents and
hazards of flooding are required to be produced alongside Flood Risk Management Plans.

The LLFA, Devon County Council, prepared a PFRA report for flooding from sources other than that from the sea, main rivers and reservoirs.

This document determines whether, in the opinion of the LLFA, there is:

- A significant flood risk in its area and identify the part of the area, if any, where this risk exists (for sources other than that from sea, main rivers and reservoirs).
- Where LLFA identify a relevant flood risk area there is a requirement to prepare flood hazard and flood risk maps for these areas for publication by the Environment Agency before 22\textsuperscript{nd} December 2013.
- In addition, for these areas, a flood risk management plan must be prepared for publication by the Environment Agency by 22\textsuperscript{nd} December 2015.

2.2 The Flood and Water Management Act (2010)

Following the floods in 2007, which devastated many parts of the country, one of the recommendations from Sir Michael Pitt’s review was that “the role of local authorities should be enhanced so that they take on responsibility for leading the co-ordination of flood risk management in their areas”.

22
The Flood and Water Management Act (FWMA) (2010) brings in new roles and responsibilities for local authorities. The Act defines the role of the LLFA, which in this case is Devon County Council. The LLFA is encouraged to bring together relevant bodies and stakeholders to effectively manage local flood risk.

The new responsibilities that the Act assigns to LLFAs include:

- Coordinated management of flooding from surface water, ground water and ordinary watercourses;
- Development and maintenance and implementation of Flood Risk Management Strategies;
- Investigation and recording of local flood events.
- Establishment and maintenance of a Flood Risk Asset Register.

### 2.3 Consultation on delivering Sustainable Drainage Systems

Public consultation on the approach to deliver effective sustainable drainage systems, ran for 6 weeks from 12 September 2014 to 24 October 2014. The consultation responses were publicised on 18 December 2014.

The consultation sought views and evidence from a wide range of partners on an alternative approach to the one envisaged in the Flood and Water Management Act 2010, specifically to deliver sustainable drainage systems through changes to the current planning system. Through 7 questions, the consultation set out four key areas for discussion: whether the planning system would deliver sustainable drainage systems; local planning authorities’ ability to obtain appropriate expert advice; appropriate thresholds for the proposed policy; and the maintenance of sustainable drainage systems. In this document, a summary of the general themes and concerns raised is provided on the four key areas together with the Government’s response.

### 2.4 House of Commons: Written Statement (HCWS161)

Following the result of the consultation the Secretary of State for Communities and Local Government (Mr Eric Pickles) a written statement was made on 18 December 2014.

The statement set out the Government’s continuing commitment to protect people and property from flood risk. The Department for Environment, Food and Rural Affairs consulted on a proposal to make better use of the planning system to secure sustainable drainage systems. The Government’s expectation is that sustainable drainage systems will be provided in new developments wherever this is appropriate.

Local planning policies and decisions on planning applications relating to major development - developments of 10 dwellings or more; or equivalent non-
residential or mixed development (as set out in Article 2(1) of the Town and Country Planning (Development Management Procedure) (England) Order 2010) - to ensure that sustainable drainage systems for the management of run-off are put in place, unless demonstrated to be inappropriate.

Under these arrangements, in considering planning applications, local planning authorities should consult the relevant lead local flood authority on the management of surface water; satisfy themselves that the proposed minimum standards of operation are appropriate and ensure through the use of planning conditions or planning obligations that there are clear arrangements in place for ongoing maintenance over the lifetime of the development. The sustainable drainage system should be designed to ensure that the maintenance and operation requirements are economically proportionate.

This policy will apply to all developments of 10 homes or more and to major commercial development, but the Government could review these arrangements and make adjustments where necessary. The current requirement in national policy that all new developments in areas at risk of flooding should give priority to the use of sustainable drainage systems will continue to apply.

Implementation of changes will be from 6 April 2015. For avoidance of doubt this statement should be read in conjunction with the policies in the National Planning Policy Framework. Consideration must be given to this policy during the preparation of local and neighbourhood plans, and may be a material consideration in planning decisions.

### 2.5 National Planning Policy Framework (2012)

The National Planning Policy Framework (NPPF) was published in March 2012 together with accompanying Technical Guidance. The NPPF replaces most of the previous Planning Policy Statements (PPS) and Planning Policy Guidance, including PPS25: Development and Flood Risk. However, NPPF does not revoke the PPS25 Practice Guide.

The NPPF is a framework which councils and local people can produce local and neighbourhood plans. These plans are tailored to the needs and priorities of their communities.

Paragraph 103 of the NPPF states that:

“**When determining planning applications, local planning authorities should ensure flood risk is not increased elsewhere and only consider development appropriate in areas at risk of flooding where, informed by a site-specific FRA following the Sequential Test, and if required the Exception Test, it can be demonstrated that:**

- **Within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location**
• Development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including by emergency planning; and it gives priority to the use of sustainable drainage systems.”

The NPPF Technical Guide includes statements on the aims of the policy aims:

“Reduce the overall level of flood risk in the area and beyond through the layout and form of the development:

• Relocate existing development to land with a lower probability of flooding
• Create space for flooding
• Apply appropriate sustainable drainage systems.”

2.6 National Flood and Coastal Erosion Risk Management Strategy (FCERM)
The National Strategy for Flood and Coastal Erosion Risk Management (FCERM) in England was developed by Environment Agency. The strategy provides a framework for the work of all flood and coastal erosion risk management authorities.

The National FCERM Strategy sets out the long-term objectives for managing flood and coastal erosion risks. It informs the production of local flood risk management strategies by LLFAs. The aim is to encourage effective risk management by enabling people, communities, business and the public sector to work together to:

Establish aims and principles for others to be consistent with:

• Establish aims and principles for others to be consistent.
• Ensure a clear understanding of the risks of flooding and coastal erosion, nationally and locally, so that investment in risk management can be prioritised more effectively.
• Set out clear and consistent plans for risk management so that communities and businesses can make informed decisions about the management of the remaining risks.
• Encourage innovative management of risks taking account of the needs of communities and the environment.
• Ensure that emergency responses to flood incidents are effective and that communities are able to respond properly to flood warnings.
• Ensure informed decisions are made on land use planning.

2.7 Catchment Flood Management Plans (CFMP)
A CFMP is a high-level strategic planning document produced by the Environment Agency. This provides an overview of the main sources of flood risk and how these can be managed in a sustainable framework for the next 50 to 100 years. The Agency engages stakeholders within the catchment to produce policies in terms of
sustainable flood management solutions and considers local land use changes and climate change.

CFMPs are used to support and inform planning policies, statutory land use plans and implementation of the Water Framework Directive to ensure that development with the catchment is sustainable in terms of flood risk.

The following policies for the approach to flood risk management are the same across the CFMPs and are as follows:

- **Policy 1** - Areas of little or no flood risk where we will continue to monitor and advise
- **Policy 2** - Areas of low to moderate flood risk where we can generally reduce existing flood risk management action
- **Policy 3** – Areas of low to moderate flood risk where we are generally managing existing flood risk effectively
- **Policy 4** - Areas of low, moderate or high flood risk where we are already managing the flood risk effectively but where we may need to take further actions to keep pace with climate change
- **Policy 5** - Areas of moderate to high flood risk where we can generally take further action to reduce flood risk
- **Policy 6** - Areas of low to moderate flood risk where we will take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits

<table>
<thead>
<tr>
<th>CFMP</th>
<th>Sub Region</th>
<th>Policy</th>
<th>LPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tamar Catchment</td>
<td>Upper Tamar</td>
<td>Policy 6</td>
<td>Torridge District Council, Devon County Council, Cornwall Council, Dartmoor National park Authority</td>
</tr>
<tr>
<td></td>
<td>Tidal Central</td>
<td>Policy 6</td>
<td>West Devon Borough Council, South Hams District Council, Devon County Council</td>
</tr>
<tr>
<td></td>
<td>Plymouth</td>
<td>Policy 5</td>
<td>Plymouth City Council, Cornwall Council, South Hams District Council, Devon County Council</td>
</tr>
<tr>
<td></td>
<td>East Tamar</td>
<td>Policy 4</td>
<td>Devon County Council, West Devon Borough Council, South Hams District Council</td>
</tr>
<tr>
<td></td>
<td>Central Tamar</td>
<td>Policy 3</td>
<td>Torridge District Council, West Devon Borough Council, Cornwall Council, Devon County Council</td>
</tr>
<tr>
<td></td>
<td>West Tamar</td>
<td>Policy 3</td>
<td>Cornwall Council</td>
</tr>
</tbody>
</table>
2.8 **River Basin Management Plans (RBMP)**

South West River Basin Management Plan focuses on the protection, improvement, sustainable use of the water environment and the mitigation of the effects of flooding. River basin management is a continuous process of planning and delivery. The Water Framework Directive introduces a formal series of 6 year cycles. The first cycle will end in 2015 when, following further planning and consultation, this plan will be updated and re-issued.


2.9 **Shoreline Management Plan (SMP)**

The Shoreline Management Plan (SMP) was published in 2011 and provides a large scale assessment of the risks associated with coastal evolution. It includes a framework aimed at addressing risks in a sustainable manner with respect to people and the developed historic and natural environment. Although the SMP does not concentrate on flooding it does identify locations that are susceptible to coastal evolution due to tidal influences. The SMP also identifies the location of natural and man-made coastal defences, and identifies short, medium and long term plans relating to the natural coastal evolution. The document provides strategic planners and development managers with details of the preferred methods of management of coastal evolution.

It is also designed to allow strategic allocation of funding in the short, medium and long term from risk management authorities, in accordance with the coastal definition of “Hold the line”, “Managed retreat” and “no active intervention”.

2.10 **Devon County Council Prefeasibility Flood Risk Assessment (PFRA)**

In May 2011 Devon County Council (DCC) published the Devon wide Prefeasibility Flood Risk Assessment (PFRA) to meet their duties to manage local flood risk and deliver the requirements of the Flood Risk Regulations 2009. The aim of the report was to review the existing flood risk information available from the LLFA and partner organisations. The data consisted of the record of local historic flood events, flood probabilities and harmful consequences of flood events which could impact on the economy, environment and cultural heritage. The data collection exercise enabled the national surface water flood risk models to be verified and to identify areas of flood risk within the area which might not have been captured elsewhere.

The PFRA provides a high level overview of flood risk from local flood sources, including surface water, groundwater, ordinary watercourses and canals.

http://www.devon.gov.uk/devonpfra.pdf
2.11 **Local Flood Risk Management Strategy (LFMS)**
In May 2014 Devon County Council published the Local Flood Risk Management Strategy for the county of Devon. This strategic document outlines the responsibilities of the Risk Management Authorities in Devon and sets out how they work in partnership to coordinate local flood risk management.

2.12 **Emergency Planning**
The Civil Contingencies Act 2004 placed duties on Local Authorities making them Category 1 responders with regard to the preparation of emergency plans, communicating with the general public, promoting business continuity and management, and risk assessment. South Ham District Council and West Devon Borough Council provide support to emergency services and Lead Authorities during major emergencies e.g. severe weather, flooding and coastal erosion. The councils also work with local communities to help them produce and implement community emergency plans to develop community resilience to natural occurrences such as flooding.

3 **Data Collection and Review**
The objectives of the Level 1 SFRA update is to collect collate and review available information relating to flooding in the Study Area. The information is then presented in a format to enable each of the Council’s within the Study Area to apply the NPPF Sequential Test to their preferred sites for future development. The document can be used to identify potential development sites which require the application of the Exception Test through a Level 2 SFRA.

3.1 **Tasks**
In the preparation of the Level 1 SFRA, the following sequence was used:

- Contacted stakeholders requesting data/information
- Collated and reviewed data and populated data register
- Identified data gaps
- Reviewed received data against the SFRA objectives
- Produced flood risk maps based on available data
- Presentation of available relevant information on flood sources and flood risk.

3.2 **Stakeholder Consultation**
In the preparation of this Level 1 SFRA update, the following stakeholders were contacted to provide data and information:

- Devon County Council
3.3 **Data/Information Requested**
Information and data requested from the stakeholders was integrated in a GIS system (GeoStore) to facilitate a review of the datasets. The information and data requested from the identified stakeholders was based on the following categories:

- Terrain Information e.g. LiDAR; Hydrology e.g. the main and ordinary watercourses.
- Flood Defence e.g. flood banks; Areas benefiting from flood defences.
- Flood Storage Areas.
- Flood Warning Areas and Flood Alert Areas.
- Environment Agency Flood Zone Maps and hydraulic models; Geology and groundwater flooding susceptibility.
- Surface water flooding.
- Local Authority Information e.g. Local Development Schemes and allocation sites. Artificial sources e.g. Canal network and reservoirs; Sewer network.
- Historical flood records from all sources of flooding.

4 **Level 1 Strategic Flood Risk Assessment Data**
This section describes the data and methodology used in the SFRA production and mapping.

4.1 **Requirements of National Planning Policy Framework (NPPF)**
NPPF and its accompanying Technical Documents require SFRA’s to present sufficient information on all flood sources. This should enable the LPA’s within the Study Area’s to apply the Sequential Test. To apply the Sequential Test information is required on the probability (High, Medium and Low) of flooding associated with different flood sources.

The assessment of probability should also account for the effects of climate change over the lifetime of any development that would be approved through Council’s emerging Local Plans.

4.2 **Climate Change**
A considerable amount of research is being carried out worldwide in an endeavour to quantify the impacts that climate change is likely to have on flooding in future years. Climate change is perceived to represent an increasing risk to low lying areas...
of England, and it is anticipated that the frequency and severity of flooding will change measurably within our lifetime. PPS25 (Appendix B) states that a 10% increase in the 1% AEP (100 year) river flow can be expected within the next 20 years, increasing to 20% within the next 50 to 100 years. In tidally affected areas within the south west of England, an increasing rate of change in predicted sea levels is to be assumed with time, as summarised in the table below.

<table>
<thead>
<tr>
<th>Recommended Contingency Allowances for Net Sea Level Rise</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990 to 2025</td>
</tr>
<tr>
<td>3.5mm/yr</td>
</tr>
</tbody>
</table>

South West of England (applied to 1990 base sea level) Environment Agency Standing Advice - “Climate change allowances for planners September 2013”

The sea level rise will affect settlements along the River Tamar up to the tidal limit at Gunnislake (Weir Quay and Morwellham) and settlements on the River Tavy up to the tidal limit at Lopwell Dam (Bere Ferrers). By 2057 (50 years time) this could represent 326mm rise above 2007 levels. By 2107 (100 years time) this could represent 967mm rise above 2007 levels.

4.3 Tidal Flooding
There few locations susceptible to tidal flooding within the Borough. Areas at risk are concentrated around the tidal limits of the River Tamar at Bere Ferrers, Weir Quay, Morwellham and Lopwell.

4.4 Fluvial Flooding
The Detailed River Network has been supplied by the Environment Agency to show the locations of all main rivers and other watercourses within the Study Area’s.
## Flood Zone

<table>
<thead>
<tr>
<th>Flood Zone</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flood Zone 1</td>
<td>Low probability – Defined as a zone where there is less than 0.1% Annual Exceedance Probability (AEP) (1 in 1000 year) of flooding in any one year</td>
</tr>
<tr>
<td>Flood Zone 2</td>
<td>Medium probability - Defined as having between 0.1% and 1% Annual Exceedance Probability (AEP) (1 in 1000 year) of fluvial flooding in any year</td>
</tr>
<tr>
<td>Flood Zone 3a</td>
<td>High probability - Defined as having 1% Annual Exceedance Probability (AEP) (1 in 1000 year) of fluvial flooding in any year</td>
</tr>
<tr>
<td>Flood Zone 3b</td>
<td>Functional Floodplain – defined as where water has to be stored in times of flood. Defined as 5% AEP (1 in 20 year) floodplain or an area designated to flood in an extreme (0.1% AEP) flood, or other probability agreed between the LPA and the Environment Agency.</td>
</tr>
</tbody>
</table>

### 4.5 Flood Defences

Flood defences are generally engineered structures designed to limit the impact of flooding. Flood defences may take several forms including bunds/embankments, canalised channels, culverts and flood storage areas.

Information relating to flood defences throughout the Study Area is based on data captured from the National Flood and Coastal Defence Database (NFCDD), which lists details of structures and flood defences.

The location, composition and condition of fluvial and tidal defences are referenced to risk areas:

- The types of asset (i.e. property, infrastructure, environmental) at risk within the risk areas and including those protected by fluvial, tidal and coastal defences

- The extent of floods related to different scenarios (e.g. different return periods and different types of flood event such as overtopping or embankment failure)

The Environment Agency Flood Zone Map defines the extent of flooding ignoring the presence of defences. This approach is used to make an allowance for residual flood risk in the event of a failure or breach/blockage/overtopping. It is envisaged that this conservative approach over time will reduce reliance on flood defences by raising the awareness of flood risk in defended areas.
4.6 **Flood Warning Areas**

West Devon Borough Council has a duty to warn and inform the public under the Civil Contingencies Act.

The Environment Agency has provided details of those areas which benefit from an Environment Agency flood warning system. Community managed flood warning systems have also been implemented in some locations, which do not benefit from the national Floodline system. This information should be used by emergency planners and development planners in conjunction with the Flood Zone maps and defence information to assist in developing plans in flood risk areas.

4.7 **Surface Water Flooding**

The Environment Agency Flood Map for Surface Water (FMfSW) indicates areas across the Study Area’s that are at risk of surface water flooding. The FMfSW maps are not definitive or intended to identify whether a property will flood, but provide information to support local flood risk management where there is no better information available. The FMfSW maps cater for two return periods, 0.5% AEP (1 in 200 year) and the 3.3% AEP (1 in 30 year). When using the FMfSW maps the Environment Agency have stated that planning authorities should not:

- Use the Environment Agency surface water flood maps as sole evidence for any specific planning decision at any scale without further supporting evidence;
- Use the Environment Agency surface water flood maps to identify individual properties at risk of surface water flooding;
- Rely on the Environment Agency surface water flood maps alone to show expected areas of surface water flooding;
- Interpret the Environment Agency surface water flood maps as defining the flood extent for a specific probability;
- Use the Environment Agency surface water flood maps for screening planning applications for consulting with the Environment Agency;

With respect to mapping, the FMfSW layers should only be published or provided externally with an OS base map scale of 1:25,000 or smaller (i.e. 1:50,000 is ok, 1:10,000 is not) and with a zoom scale of 1:10,000 or smaller (i.e. 1:50,000 is ok, 1:5,000 is not).

The mapping has therefore been used solely as an initial high-level overview of pluvial flood risk.

4.8 **Groundwater Flooding**

The SFRA must also consider groundwater flooding, but a quantified assessment of risk from groundwater flooding is difficult to achieve on a strategic scale. There is a lack of groundwater level records, variability in geological conditions, and the few
predictive tools (such as modelling) that can be used to make assessments of groundwater flow and risk of groundwater flooding following rainfall events are unpredictable.

The Environment Agency’s Areas Susceptible to Groundwater Flooding (AStGWF) is a strategic scale map showing groundwater flood areas on a 1km square grid. The Environment Agency has provided information with the data and guidance for using it, which is summarised below.

The AStGWF was prepared as part of the PFRA process. The aim of the AStGWF is to allow LLFAs across England and Wales to gain a broader sense of the wider areas which might be susceptible to groundwater flooding.

The susceptible areas are represented by one of four area categories showing the proportion of each 1km square that is susceptible to groundwater. It does not show the likelihood of groundwater flooding occurring.

The dataset covers a large area, but only isolated locations within the overall susceptible area are actually likely to suffer groundwater flooding. The AStGWF dataset has not been formally assessed as appropriate for any other use than for the PFRA. Data should not be interpreted as identifying areas where groundwater is actually likely to flow or pond, but may be useful in identifying where further studies could be undertaken. The AStGWF should not be used as the sole evidence for any specific flood risk management, land use planning or other decision at any scale.

4.9 Sewer Flooding
Areas at risk from sewer flooding have been determined through review of records on the DG5 register and from data held by South West Water Ltd. In order to fulfil statutory commitments set by OFWAT, water companies must maintain verifiable records of reported sewer flooding, which is achieved through their DG5 registers. Water companies are required to record flooding arising from public foul, combined or surface water sewers and identify where properties have suffered internal or external flooding.

The data has been mapped showing the areas that have been most and least affected by sewer flooding.

The data provided by Water Companies is reliant on complaints made by customers and so in some instances is limited, and does not provide a comprehensive record of sewer flooding events.

4.10 Artificial Sources
Artificial sources include any water bodies not covered by the previous categories. This typically includes canals, lakes, reservoirs etc.
4.11 Reservoirs
South West Water Ltd is the Water Undertaker for Devon and Cornwall and as such has a duty to ensure that reservoirs are managed and maintained in accordance with current UK legislation, The Water Act 2003 amended the Reservoirs Act 1975, requiring the preparation of dedicated Flood Plans for reservoirs. A Flood Plan is a set of documents that describe the arrangements to be put into operation in response to a sudden large release of water from a reservoir that could pose a threat to property and life downstream. A Flood Plan will include an assessment of the impacts of dam failure, a review of the measures that can be taken by the reservoir operator to prevent the catastrophic failure, and an assessment of the emergency response mechanism required to minimise risk to life and property should a failure occur.

4.12 Lakes
Roadford Lake, also known as Roadford Reservoir is a man-made reservoir fed by the River Wolf. It is located to the north-east of Broadwoodwidger, in West Devon and 13 km east of Launceston. It is the largest area of fresh water in the south west. It is operated by South West Water Ltd and directly supplies water for North Devon, Plymouth and South West Devon via releases into the River Tamar for abstraction at Gunnislake.

4.13 Tavistock Canal
Tavistock Canal was constructed early in the 19th century to link the town Tavistock to Morwellham Quay on the River Tamar, for the purpose of transporting goods. It is now used to supply water to hydro-electric system at Morwellham Quay, and forms part of the Cornwall and West Devon Mining Landscape World Heritage Site. The canal is owned by South West Water Ltd who manages the flow rates to Morwellham Quay.

4.14 Leats
The historic leat system was constructed to carry water from a point of extraction on a natural water course to its destination, where the water would be used for industrial, agricultural and domestic purposes. Leats generally follow the natural contours of the landscape ensuring a gentle and manageable flow.

5 West Devon Strategic Flood Risk Assessment
The West Devon study area is defined by the administrative boundary of West Devon Borough Council and includes part of Dartmoor National Park within this boundary and covers an area of approximately 1160 square km.
5.1 Study Area Flood Sources
The main sources of flooding within West Devon are from surface water run off from land and fluvial sources. The main rivers in the study area drain from Dartmoor toward the River Tamar which discharges to Plymouth Sound.

Dartmoor typically has steep gradients. Rivers flow from their catchments eventually reaching the coast, following relatively steep sided valleys with confined floodplains. The underlying hard rock geology and confined nature of the floodplains results short rainfall response times in the upper catchments.

5.2 Fluvial Flood Sources
The Main River catchments within the whole study area are: -

- River Dart
- River Lew
- River Lyd
- River Meavy
- River Tamar
- River Tavy
- River Taw
- River Okement
- River Walkham

5.2.1 River Dart
The River Dart begins as two separate tributaries (the East Dart and West Dart), which join at Dartmeet. The Dart flows southwards, to the east of Buckfast and then Buckfastleigh, continuing on through Totnes (tidal limit) and eventually discharging to the sea at Dartmouth.

The River Mardle, a tributary of the River Dart, flows into Buckfastleigh from the west. The River Ashburn is another tributary of the River Dart and flows into Ashburton from the north.

Venford Reservoir impounds a minor tributary of the River Dart to the south of Dartmeet. Water from Venford is used by South West Water Ltd as a potable water supply source.

5.2.2 River Lew
There are two watercourses within West Devon area named the River Lew. The more northerly of the two rises just south of the village of Beaworthy, and flows east, then turns north to run past Hatherleigh before joining the River Torridge about 1 km north of the town. The more southerly rises on the northwest corner of Dartmoor near Sourton, and flows west and south, through Bridestowe, the Lew Valley past Lewtrenchard and south of Lewdown before joining the River Lyd near Marystow.
5.2.3 **River Lyd**
The source of the River Lyd is at Lyd Head to the north of Woodcock Hill. As the River Lyd flows south it is joined by a number of minor tributaries. Turning west the River Lyd flows to the south of Lydford before entering Lydford Gorge. The River Lyd continues west, eventually joining the River Tamar beyond Lifton.

5.2.4 **River Meavy**
The River Meavy, a tributary of the River Plym, flows in southwest direction to the south of Meavy and then south to join with the River Plym above Bickleigh Vale.

Burrator Reservoir is located in the upper reaches of the River Meavy, to the east of Yelverton, and is used by South West Water Ltd as a potable water supply source.

5.2.5 **River Tamar**
The River Tamar forms the boundary between Devon to the east and Cornwall to the west. The source of the Tamar is less than 6 km from the north Cornish coast and it flows southward toward Plymouth Sound. Tributaries of the river include the rivers Inny, Ottery, Kensey and Lynher on the Cornish side, and the Deer and Tavy on the Devon side.

5.2.6 **River Tavy**
The source of the Tavy is South of Cut Hill. The River Tavy flows within a confined valley, passing between the villages of Peter Tavy and Mary Tavy before continuing on through the centre of Tavistock. Continuing south the River Tavy joins the River Tamar, before discharging to the sea via Plymouth Sound.

The Wheal Jewell (Mary Tavy) Reservoir is located in the headwaters of the River Tavy and supplies the Mary Tavy hydro-generator.

5.2.7 **River Taw**
The source of the River Taw is a spring known as Taw Head. The River Taw flows north to the east of Belstone, before turning east through Sticklepath. The Taw continues north through North Tawton and eventually discharging to the sea on the north coast of Devon. Ramsley Stream, a tributary of the River Taw, flows north through the centre of South Zeal before joining the River Taw approximately 2km downstream.

5.2.8 **River Okement**
The West Okement and East Okement pick up a number of minor tributaries before they meet to form the River Okement in Okehampton. The River Okement flows
north passing the villages of Jacobstowe and Monkokehampton and joins with the River Torridge near Meeth, before eventually discharging to the sea on the north coast of Devon.

Meldon Reservoir is located in the headwaters of the West Okement River.

5.2.9 River Walkham
The River Walkham is a tributary of the River Tavy and rises on Walkham Head. The Walkham flows south within a confined valley before turning west through Horrabridge picking up a number of minor tributaries on route. The River Walkham continues west to join the River Tavy.

5.3 Tidal Flood Sources
The locations most susceptible to tidal flooding are located on the River Tamar estuary at Lopwell, Mowelham Quay, Bere Ferrers and Weir Quay.

5.4 Surface Water Sources
Surface water flow is caused by water that cannot be accommodated in the natural drainage or stormwater system. Surface water flooding can occur anywhere within a catchment, but is most likely to occur where a pathway for runoff is restricted by terrain or man-made obstructions. Low lying areas along the river valleys and along the course of culverted watercourses as well as natural low points can be most susceptible.

There have been a number of historic surface water flooding events within the study area. These are generally caused by a combination of factors such as direct runoff and inadequate or blocked drainage systems. Types of drainage systems identified as being contributing factors to surface water flood events include highway drains, stormwater drains and combined sewers.

5.5 Groundwater Sources
Groundwater flooding tends to occur after longer periods of sustained high rainfall, and the areas at most risk are often low-lying where the water table is likely to be at shallow depth. Groundwater flooding is known to occur in areas underlain by major aquifers, although it can also be associated with localised floodplain sands and gravels.

There have been no reported groundwater flood incidents within the study area.
The nature of the geology within the study area means that groundwater flooding is unlikely to be a significant issue when compared to fluvial, surface water and sewer flooding.

5.6 Strategic Flood Risk Assessment Level 1 – Flood Risk Review
A suitable Level 1 SFRA will collate and review existing information on flood sources and flood risk. This assists the local planning authority in its obligation to consider flood risk in strategic land allocations and developing future policies. This is achieved by providing sufficient information to enable local planning authorities to apply the Sequential Test to allow the determination of suitable sites for development in relation to flood risk and the classification of vulnerability.

Where there are no reasonably available sites in Flood Zone 1, it may be necessary to locate development allocations in Flood Zone 2. Only where there are no reasonably available sites in Flood Zones 1 and 2 should development be considered in Flood Zone 3. If following application of the Sequential Test, it is not possible, consistent with wider sustainability objectives, for development to be located in lower flood risk zones, the Exception Test can be applied. The successful application of the Exception Test will require information specific to those development sites and would be provided in a Level 2 SFRA.

5.7 Main Settlements - West Devon Borough Council Planning Area
There are four main settlements within the Borough. These are the market towns of:

- Tavistock
- Okehampton
- Hatherleigh
- North Tawton

Several development areas have been allocated in and around these towns through the strategic planning process.

5.8 Minor Settlements – West Devon Borough Council Planning Area
Several development areas have been put forward in and around minor settlements through the Neighbourhood Plan process. These locations have been identified by communities as potential areas where development is needed. These locations are:

- Bere Alston
- Bere Ferrers
- Bratton Clovelly
- Bridestowe
- Buckland Monachorum
- Chillaton
- Crapstone
- Exbourne
5.9 Minor Settlements – Dartmoor National Park Authority Planning Area
West Devon Borough Council is the Land Drainage Authority for the area covered by the Borough Planning Authority and part of the area which falls within the Dartmoor National Park Authority planning area. The minor settlements considered within the Boroughs jurisdiction as the Land Drainage Authority and also within the National Park are:

- Chagford
- Horrabridge
- Mary Tavy
- Peter Tavy
- Princetown
- South Zeal
- Sticklepath
- Walkhampton
- Yelverton

These are locations where future development is possible and so have been reviewed from a flood risk perspective.

6 BERE ALSTON
Settlement Profile – Bere Alston
Bere Alston is a small village which sits within the parish of Bere Ferrers. The village lies close to the Bere peninsula, between the rivers Tamar and Tavy. The village grew through a thriving local mining industry and in market gardening.

6.1 Main River
The Rivers Tamar and Tavy are some distance away from Bere Alston. The village sits within Flood Zone 1.
6.2 **Ordinary Watercourses**
A small unnamed watercourse flows through the village from the west. This has been culverted along most of its length and has been the source of flooding issues as a result of blockages. It emerges from the culverted sections on the southwest side of the village and flows in the direction of the wastewater treatment works before finally joining the River Tamar. The watercourse has a “flash” response to rainfall events, responding quickly to rainfall and this has resulted in erosion of the banks in some locations. Issues have arisen between the riparian owners as a result of the culverting works.

6.3 **Surface Water Flooding**
The Station Road, Bere Alston has been subject to flooding as a result of surface water run off and poor maintenance of a nearby, un-named, watercourse.

6.4 **Tidal Flooding**
The village of Bere Alston is not subject to tidal flooding.

6.5 **Sewer Flooding**
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in Bere Alston between 1\textsuperscript{st} January 2000 to 1\textsuperscript{st} August 2014.

6.6 **Highway Flooding**
Surface water run off from land on to the highway combined with blocked gulleys has on occasion contributed to flooding in the village.
6.7 **Ground Water Flooding**
The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree. Percolation rates in the Bere Alston area can be variable. Historic wells have been located in some locations.

6.8 **Flood Mapping**
Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Bere Alston area can be found in Appendix A. These are produced from data provided by the Environment Agency.

7 **BERE FERRERS**

**Settlement Profile – Bere Ferrers**
Bere Ferrers is a small village in the Parish of Bere Ferrers located north of Plymouth and on the west bank of the River Tavy. The village sits within the World Heritage Site and Area of Outstanding Natural Beauty (AOANB).

7.1 **Main River**
Bere Ferrers sits at the confluence of the River Tavy and River Tamar. Both watercourses are tidal at this point and flood risk is largely tidal. The majority of the village sits within Flood Zone 1, but there area few properties on the banks of the River Tavy which sit within Flood Zone 3.

7.2 **Ordinary Watercourses**
There is a small un-named stream which flows in to a low marshy area.

7.3 **Surface Water Flooding**
The area has suffered surface water flooding as a result of run off from agricultural land combined with highway run off.

7.4 **Tidal Flooding**
Parts of Bere Ferrers close to the River Tamar estuary have been subject to tidal flooding.
7.5 **Sewer Flooding**

The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in Bere Ferrers between 1st January 2000 to 1st August 2014.

7.6 **Highway Flooding**

Surface water run off from land on to the highway combined with blocked gulleys has on occasion contributed to flooding in the village.

7.7 **Ground Water Flooding**

The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree. Percolation rates in the Bere Ferrers area can be variable.

7.8 **Flood Mapping**

Maps indicating the predicted extent of fluvial, surface water, tidal and groundwater flooding for the Bere Ferrers area can be found in Appendix A. These are produced from data provided by the Environment Agency.

8 **BRATTON CLOVELLY**

**Settlement Profile – Bratton Clovelly**

Bratton Clovelly is a small village located to the north of the Borough on the outskirts of Okehampton. The village is elevated and sits on high ground above most watercourses.
8.1 **Main River**
The nearest main river is the River Thrushel, which is some distance away from the village, close to the A30.

8.2 **Ordinary Watercourses**
There are issues and sinks which feed minor un-named watercourses to the east of the village. These flow into a tributary of the River Thushel.

8.3 **Surface Water Flooding**
Surface water flooding has resulted from run off from land on to the highway. This has contributed to the flooding issues experienced by a few properties within the village.

8.4 **Tidal Flooding**
The village of Bratton Clovelly is not subject to tidal flooding.

8.5 **Sewer Flooding**
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in Bratton Clovelly between 1st January 2000 to 1st August 2014.

8.6 **Highway Flooding**
Surface water run off from land on to the highway combined with blocked gulleys has on occasion contributed to flooding in the village.
8.7 **Ground Water Flooding**

The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree. Percolation rates in the area are variable.

8.8 **Flood Mapping**

Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Bratton Clovelly area can be found in Appendix A. These are produced from data provided by the Environment Agency.

9 **BRIDESTOWE**

9.1 **Settlement Profile – Bridestowe**

Bridestowe is located beyond Okehampton on the edge of Dartmoor and on the A30 main road. The village sits at the confluence of the River Lew, a tributary of the River Lyd, and Cranford Brook. The main village sits at the bottom of a steep sided valley with the two watercourses at the bottom. Both watercourses converge after the village.

9.2 **Main River**

The River Lew rises on Dartmoor close to Sourton and flows through the northern part of the village. The river is flashy in its nature, responding quickly to rainfall on the Dartmoor catchment. The watercourse is restricted by a highway bridge which crosses the river close to East Bridge Cottages on one side of the road and St Bridget’s Church on the other. There have been several instances of flooding at this location as a result of obstructions under the highway bridge. A wire mesh agricultural fence, which crossed the river, caught debris and obstructed the river, was also the source of flooding to low lying properties.

Development has taken place on low lying land at Town Farm which is close to the River Lew. Properties have been sited in Flood Zone 1.

9.2 **Ordinary Watercourses**

Cranford Brook originates on Dartmoor south of Sourton. The brook flows through the centre of the village to join with the River Lew within the recreation ground area. The watercourse is restricted by a highway bridge which crosses close to the White Hart Public House on one side and the Post Office on the other. On the downstream side of the highway bridge is a small footbridge and a separate access bridge to Bridge Cottage. There have been historic instances of flooding at this location as a result of debris collecting under the bridges.
9.3 **Surface Water Flooding**
Surface water flooding has resulted from run off from land on to the highway. This has contributed to the flooding issues experienced by some properties within the village.

9.4 **Tidal Flooding**
The village of Bridestowe is not subject to tidal flooding.

9.5 **Sewer Flooding**
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

South West Water Ltd has confirmed that sewer flooding has been recorded in some locations in Bridestowe.

9.6 **Highway Flooding**
Highway flooding has occurred as a result of flooding from the River Lew and/or Crandford Brook combined with surface water run off from agricultural land.

9.7 **Ground Water Flooding**
The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree.
9.8 **Flood Mapping**
Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Bridestowe area can be found in Appendix A. These are produced from data provided by the Environment Agency.

10 **BUCKLAND MONACHORUM**

**Settlement Profile – Buckland Monachorum**
The village Buckland Monachorum sits on the western edge of Dartmoor within a moderately steep valley. Two watercourses converge in the village and flow towards the Tamar Valley.

10.1 **Main River**
There are no main rivers identified by the Environment Agency within the village of Buckland Monachorum.

10.2 **Ordinary Watercourses**
The northern stream flows along the rear boundary of the Netherton Estate and through the development known as Chapel Meadows, before joining the southern stream close to St Andrews Primary School. The southern stream flows past St Andrews Church and the Drake Manor Public House before flowing on to meet the northern stream by the Primary School. The combined watercourses flow past the wastewater treatment works and on to eventually discharge into the River Tamar.

The Public House and other low laying properties have suffered flooding as a result of obstruction of the culverted section of the southern stream which flows under the highway. The size of the culverted section been questioned.

An obstruction in the culverted section of the northern stream, under the highway, also resulted in flooding to properties.

10.3 **Surface Water Flooding**
The village has suffered flooding as a result of surface water run off from agricultural land. This has contributed to highway run off resulting in flooding to properties in the lower laying parts of the village.

10.4 **Tidal Flooding**
Buckland Monachorum is not subject to tidal flooding.
10.5 **Sewer Flooding**

The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in Buckland Monachorum between 1st January 2000 to 1st August 2014.

10.6 **Highway Flooding**

A combination of surface water run off from land on to the highway and blocked gullies has contributed to flooding issues experienced by the Public House and properties within the village.

10.7 **Ground Water Flooding**

The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree. Percolation rates in the area are variable.

10.8 **Flood Mapping**

Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Buckland Monachorum area can be found in Appendix A. These are produced from data provided by the Environment Agency.

11 **CHILLATON**

**Settlement Profile – Chillaton**

Chillaton is a small village about 11km north-west of Tavistock. The village sits in a valley on the banks of a small un-named stream, which is a tributary of the River Lyd.
11.1 Main River
The nearest main river to the village of Chillaton is the River Lyd, which is some distance from the village.

11.2 Ordinary Watercourses
Two small streams converge after the village of Chillaton to form a larger un-named watercourse. This watercourse is a tributary of the River Lyd. The western stream which flows through the main village is restricted by a highway bridge opposite the Chichester Arms Public House. Obstruction of this and other sections of the western stream has contributed to flooding issues. Some sections of both watercourses are understood to be culverted.

11.3 Surface Water Flooding
The village has suffered flooding as a result of surface water run off from agricultural land. This has contributed to highway run off resulting in flooding to properties in the lower laying parts of the village.

11.4 Tidal Flooding
The village of Chillaton is not subject to tidal flooding.

11.5 Sewer Flooding
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in Chillaton between 1st January 2000 to 1st August 2014.
11.6 **Highway Flooding**
Challaton sits at the bottom of a steep valley. Highway flooding has been experienced during heavy and prolonged rainfall. This can often also be attributed to debris obstructing gulleys and blocking the highway drainage system.

11.7 **Ground Water Flooding**
The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree.

11.8 **Flood Mapping**
Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Chillaton area can be found in Appendix A. These are produced from data provided by the Environment Agency.

12 **CRAPSTONE**

**Settlement Profile – Crapstone**
Crapstone is a village located on the edge of Dartmoor approximately 2km from the village of Yelverton and on the edge of Roborough Down.

12.1 **Main River**
There are no main rivers identified by the Environment Agency within the village of Crapstone.

12.2 **Ordinary Watercourses**
There are un-named minor watercourses within the village of Crapstone.

12.3 **Surface Water Flooding**
Parts of the village have suffered surface water flooding as a result of run off from moorland on to the highway.

12.4 **Tidal Flooding**
The village of Crapstone is not subject to tidal flooding.
12.5 **Sewer Flooding**
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in Crapstone between 1st January 2000 to 1st August 2014.

12.6 **Highway Flooding**
Highway flooding has been experienced during heavy and prolonged rainfall. This can often also be attributed to debris obstructing gulleys and blocking the highway drainage system.

12.7 **Ground Water Flooding**
The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree. Percolation rates in the Crapstone area are variable and can be poor.

12.8 **Flood Mapping**
Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Crapstone area can be found in Appendix A. These are produced from data provided by the Environment Agency.

13 **EXBOURNE**
**Settlement Profile – Exbourne**
The village of Exbourne is located approximately 8km from Okehampton.
13.1 **Main River**
There are no main rivers identified by the Environment Agency within the village of Exbourne.

13.2 **Ordinary Watercourses**
Issues rise in land at Town Cross End and flow towards Hole Brook. Hole Brook is a tributary of the River Okement which flows from Okehampton towards the River Torridge.

13.3 **Surface Water Flooding**
Few locations have suffered flooding as a result of surface water run off from agricultural land and this has contributed to highway run off and flooding.

13.4 **Tidal Flooding**
The village of Exbourne is not subject to tidal flooding.

13.5 **Sewer Flooding**
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in Exbourne between 1st January 2000 to 1st August 2014.

13.6 **Highway Flooding**
Highway flooding has been experienced during heavy and prolonged rainfall. This can often also be attributed to debris obstructing gulleys and blocking the highway drainage system.
13.7 **Ground Water Flooding**  
The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree.

13.8 **Flood Mapping**  
Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Exbourne area can be found in Appendix A. These are produced from data provided by the Environment Agency.

14 **FOLLY GATE**  
Settlement Profile – Folly Gate  
Folly Gate is a rural settlement situated on the A386 beyond Okehampton.

13.1 **Main River**  
There are no main rivers identified by the Environment Agency within the hamlet of Folly Gate.

13.2 **Ordinary Watercourses**  
Medland Brook sits in river valley to the west of the settlement. The brook is a tributary to the River Lew at Hatherleigh. To the north of the settlement is a tributary to the River Okement.

13.3 **Surface Water Flooding**  
A few locations have suffered flooding as a result of surface water run off from agricultural land and this has contributed to highway run off and flooding.

13.4 **Tidal Flooding**  
The hamlet of Folly Gate is not subject to tidal flooding.

13.5 **Sewer Flooding**  
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.
The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in Folly Gate between 1st January 2000 to 1st August 2014.

13.6 Highway Flooding
Highway flooding has been experienced during heavy and prolonged rainfall. This can often also be attributed to debris obstructing gulleys and blocking the highway drainage system.

13.7 Ground Water Flooding
The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree. Soil percolation rates in the area tend to be variable and in some places poor.

13.8 Flood Mapping
Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Folly Gate area can be found in Appendix A. These are produced from data provided by the Environment Agency.

14 HATHERLEIGH

Settlement Profile – Hatherleigh
The market town of Hatherleigh is situated adjacent to the River Lew, which is a tributary of the River Torridge. The town sits off the A386 beyond Okehampton.

14.1 Main Rivers
Most residential areas in Hatherleigh are situated outside the Flood Zone 2 and 3 but the EA flood maps show the new A386 roundabout, community centre, sports fields
and the fire station in these Flood Zones. The fire station has flooded in the past and is now defended by a bund.

14.2 **Ordinary Watercourses**
An issue rises in the Moor View housing estate close to Veale Close. The watercourse is open channel for some of its length, but culverted under Moor Veiw, the road into the estate and through the numerous gardens of properties in Pearse Close. The culverted sections of the watercourse have been completed in an ad hoc manner which contributes to potential flooding issues.

14.3 **Surface Water Flooding**
Percolation rates in the Hatherleigh area tend to be variable and in some locations poor. This can result in increase surface water run off due to lack of percolation. To overcome percolation issues attenuation and controlled discharge to a watercourse is often required. Attenuation systems can be in the form of above ground ponds or below ground systems and the use of these is intended to prevent surface water flooding as a result of new development.

Other surface water issues are generally as a result of run off on to the highway from undeveloped land.

14.4 **Tidal Flooding**
The town of Hatherleigh is not subject to tidal flooding.

14.5 **Sewer Flooding**
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)
No locations were reported to have suffered DG5 sewer flooding in Hatherleigh between 1st January 2000 to 1st August 2014.

14.6 Highway Flooding
Highway flooding has been experienced on the A3072 and the land fronting Hatherleigh Nursing Home. The overflow from a pond in adjacent land to the highway was believed to be the source of the flood water. The roundabout on the A386 has suffered flooding during periods of prolonged and heavy rainfall, during which levels in the River Lew tend to be high resulting in backing up of highway drains. There have been historic occurrences of flooding to property from the highway as a result of obstructed highways drains. This can occur in any location.

14.7 Ground Water Flooding
The hydrology and percolation rates found within the Hatherleigh area are variable. The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree.

14.8 Flood Mapping
Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Hatherleigh area can be found in Appendix A. These are produced from data provided by the Environment Agency.

15 HIGHAMPTON
Settlement Profile – Highampton
The parish of Highampton extends over almost 6.5km. The village stands on a ridge with Okehampton being approximately 14km away.

15.1 Main River
The village sits within Flood Zone 1. The River Torridge flows some distance to the north.

15.2 Ordinary Watercourses
There are several minor watercourses which form the ditches and streams adjacent to and under the A3072. Pulworthy Brook sites to the south of the village and is tributary to the River Lew and River Torridge. There are several ponds and lakes in the vicinity namely at Legge Farm, Glebe Farm, Horralane and to the rear of Moorview. Wells are also a feature within the area.
15.3 **Surface Water Flooding**
Some locations in the village and the outskirts have suffered flooding as a result of surface water runoff. This generally originates from agricultural land and this has contributed to highway runoff and flooding. Raised groundwater levels can also contribute to the poor percolation in some areas which in turn increase flood risk.

15.4 **Tidal Flooding**
The village of Highampton is not subject to tidal flooding.

15.5 **Sewer Flooding**
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in Highampton between 1st January 2000 to 1st August 2014.

15.6 **Highway Flooding**
Surface water runoff from land on to the highway combined with blocked gulleys has on occasion contributed to flooding in the village.

15.7 **Ground Water Flooding**
The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree. There are a number of wells and ponds within the area which could indicate raised groundwater levels. Soil percolation rates are generally variable and often poor. The use of infiltration systems can be problematic.
15.8 **Flood Mapping**
Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Highampton area can be found in Appendix A. These are produced from data provided by the Environment Agency.

16 **LAMERTON**

*Settlement Profile – Lamerton*
Lamerton is a small village located 5km north-west of Tavistock.

15.1 **Main River**
Lamerton is situated on the River Lumburn which is a tributary of the River Tavy. Road bridges at Green Hill and at Rushford on the A384 restrict the river when levels are high. Obstructions under the bridges have resulted in flooding issues experience by adjacent properties.

15.2 **Ordinary Watercourses**
An un-named stream flows into the River Lumburn from the northeast. The downstream end of the stream is culverted. Properties situated close to the head of the culvert are believed to be in Flood Zone 3b Functional Floodplain.

Most of the village is within Flood Zone 1. Outside the main village properties at Court Barton Mews have been affected by flooding caused by the obstruction of a culverted surface water relief system under the buildings.

15.3 **Surface Water Flooding**
Few locations have suffered flooding as a result of surface water run off from agricultural land and this has contributed to highway run off and flooding.

15.4 **Tidal Flooding**
The village of Lamerton is not subject to tidal flooding.

15.5 **Sewer Flooding**
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.
South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in Lamerton between 1st January 2008 to 1st August 2014.

15.6 **Highway Flooding**
Highway flooding has been experienced during heavy and prolonged rainfall. This can often also be attributed to debris obstructing gulleys and blocking the highway drainage system. Properties at Longcross, to the north of Lamerton, have suffered from highway flooding due to a blocked culvert.

15.7 **Ground Water Flooding**
The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree.

15.8 **Flood Mapping**
Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Lamerton area can be found in Appendix A. These are produced from data provided by the Environment Agency.

16 **LEWDOWN**

**Settlement Profile – Lewdown**
The village of Lewdown is sited on the A30 approximately 16km from Okehampton.

16.1 **Main River**
Lewdown is situated on high ground near to the River Lew, a tributary of the River Lyd. Both rivers are some distance from the main village and the majority of properties are in Flood Zone 1.

Property flooding has occurred at Lewtrenchard, near to the River Lew.
16.2 Ordinary Watercourses
There are numerous minor un-named watercourses in the area which drain in to the River Lew to the south of the village and the River Thrushel to the north. Lewtrenchard Manor has a large lake within its grounds close to the River Lew.

16.3 Surface Water Flooding
Surface water from the old A30 has affected a property at Cannon Barn in Thrushelton, which is north of Lewdown.

16.4 Tidal Flooding
The village of Lewdown is not subject to tidal flooding.

16.5 Sewer Flooding
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in Lewdown between 1st January 2000 to 1st August 2014.

16.6 Highway Flooding
Surface water run off from land on to the highway combined with blocked gulleys has on occasion contributed to flooding in the village.

16.7 Ground Water Flooding
The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree.
16.9 **Flood Mapping**
Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Lewdown area can be found in Appendix A. These are produced from data provided by the Environment Agency.

17 **LIFTON**

**Settlement Profile – Lifton**
Lifton is small village that sits within the Lyd valley close to the Devon/Cornwall boundary at Polson Bridge. There are two small settlements adjacent to the main village, Liftondown to the west and Tinhay to the east. Historically agriculture and mining supported the economy. In 1917 the dairy company Ambrosia opened in Tinhay and this remains an important local employer.

17.1 **Main River**
The River Thrushel separates the main village of Lifton from the small settlement of Tinhay to the east. The River Thushel joins the River Lyd in Tinhay as the Lyd continues through the southern part of the village eventually joining the River Tamar at the Devon/Cornwall boundary west of Lifton.

Flood defences consisting of earth bunds were constructed along the banks of the River Thrushel between 1960 and 1970. These are located close to Tinhay/New Road Bridge, which crosses the River Trushel, and along the river banks protecting properties in Old Tinhay. A low bank has been constructed around the Tinhay Industrial Estate which offers some protection from fluvial flooding originating from the River Thushel.

Historic fluvial flooding has occurred in the area close the Tinhay/New Road Bridge affecting several properties, the highway and the small petrol filling station. The Ambrosia site has also suffered flooding from the River Lyd. Much of Tinhay sits within Flood Zone 3, where as much of Lifton sits within Flood Zone 1.

Low lying properties in the Leat Road area (south of Lifton village) have suffered flooding on several occasions from the River Lyd. Groundwater and surface water run off have also contributed to the flooding issues at this location.

Records indicate flooding from the River Tamar around Polson Bridge affected one cottage, and the highway on the Devon side. Flooding has occurred on the Cornwall side affecting the Rugby Ground, Wastewater Treatment Works and the highway.
17.2 **Ordinary Watercourses**
Several springs rise in the land below North Road, Lifton. These flow towards a ditch which forms the field boundary where the land is generally wet and marshy. Poor maintenance of the ditch resulted in external flooding to adjacent properties close to the car showrooms.

17.3 **Surface Water Flooding**
Surface water flooding has occurred as a result of run off from higher land to the rear of properties at North Road, Lifton.

17.4 **Tidal Flooding**
The village of Lifton is not subject to tidal flooding.

17.5 **Sewer Flooding**
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in Lifton between 1\textsuperscript{st} January 2000 to 1\textsuperscript{st} August 2014.

17.6 **Highway Flooding**
Surface water run off from Duntz Hill has contributed to highway flooding issues along with run off from land adjacent to the Strawberry Fields Farm Shop. Both sources have contributed to historic highway flooding issues affecting properties and the hotels in Lifton village.
17.7 **Ground Water Flooding**
The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree. Indications are that the areas around Leat Road and possibly North Road are especially susceptible.

17.8 **Flood Mapping**
Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Lifton area can be found in Appendix A. These are produced from data provided by the Environment Agency.

18 **MILTON ABBOT**

**Settlement Profile – Milton Abbot**
Milton Abbot is a small village sited on the B362 about 10km from Tavistock.

18.1 **Main River**
The nearest main river to Milton Abbott is the River Tamar some distance to the south of the village.

18.2 **Ordinary Watercourses**
There are numerous minor un-named watercourses in the area which drain in to the River Tamar to the south.

18.3 **Surface Water Flooding**
Few locations have suffered flooding as a result of surface water run off from agricultural land and this has contributed to highway run off and flooding.

18.4 **Tidal Flooding**
The village of Milton Abbot is not subject to tidal flooding.

18.5 **Sewer Flooding**
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.
South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in Milton Abbot between 1st January 2000 to 1st August 2014.

18.6 **Highway Flooding**

Surface water run off from land on to the highway combined with blocked gulleys has on occasion contributed to flooding in the village.

18.7 **Ground Water Flooding**

The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree.

18.8 **Flood Mapping**

Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Milton Abbot area can be found in Appendix A. These are produced from data provided by the Environment Agency.

19 **Milton Combe**

**Settlement Profile – Milton Combe**

Milton Combe is a small village sited approximately 3km from Yelverton and 13km from Plymouth. The majority of the village sits within a steep sided valley with Milton Brook and an un-named watercourse flowing through the village. The village has suffered historic flooding issues as a result of the rapid response of the watercourses and surface water run off. Future development within and upstream of the village should be carefully controlled to ensure that such developments do not adversely contribute to flood flows within Milton Combe.

Some properties have benefitted from grant funding to enable flood protection measures to be implemented.
19.1 **Main River**
Milton Brook is classified as a main river by the Environment Agency. The Brook originates from sinks and springs on Roborough Down close to the village of Crapstone. There are several ponds/fish farm situated on the upper reaches of the brook. Properties close to Milton Brook are identified as being in Flood Zones 2 and 3. There are several locations along the route of the brook where obstructions to the flow occur and works have been undertaken to remove part of the bridge wall section, close to the Public House, to allow flows back into the brook after the highway bridge. The un-named watercourse joins the Milton Brook after this point.

The substation which serves the village sits within Flood Zone 2 and 3.

There are three further points downstream where the highway crosses the watercourse. Beyond this a property is built over Milton Brook and obstructs flow during flood conditions. A section of wall adjacent to the property and the highway has been removed to alleviate the flood risk to the property and allow some flood flows to be discharged on to the highway.

Milton Brook continues through the village into open agricultural land and beyond the wastewater treatment works before finally discharging into the River Tavy at Lopwell.

19.2 **Ordinary Watercourses**
The un-named watercourse rises from springs and issues in higher land to the north east of the village. There are several other minor un-named watercourses in the area which eventually drain into Milton Brook.

19.3 **Surface Water Flooding**
Surface water run off from higher land adjacent to the village contributes to the flood risk and flood flows within Milton Brook and the various un-named watercourses in the area. These flows also contribute to highway flooding.

19.4 **Tidal Flooding**
The village of Milton Combe is not subject to tidal flooding.

19.5 **Sewer Flooding**
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.
South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in Milton Combe between 1st January 2000 to 1st August 2014. A few properties have suffered sewer flooding as a result of fluvial and surface water flooding issues.

19.6 Highway Flooding
Fluvial flooding and surface water run off from land on to the highway combined with blocked gulleys have contributed to highway flooding in the village. In severe flooding the highway has been actively used as a flood flow route to carry flows away from properties.

19.7 Ground Water Flooding
The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree. This has been confirmed by reports of raised groundwater in some location in the village.

19.8 Flood Mapping
Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Milton Combe area can be found in Appendix A. These are produced from data provided by the Environment Agency.

20 NORTHEW
Settlement Profile – Northlew
The isolated village of Northlew is sited about 10Km from Okehampton. The majority of the village sits on high ground, Flood Zone 1, but there are few properties that sit close to the River Lew.

20.1 Main River
The River Lew passes through the eastern part to the village. There are two accesses to the village which cross a main river. One is over the River Lew to the east and the
West Lew to the north at Norley Bridge. The watercourses are restricted at these crossings and flooding has been experienced in these locations affecting the highway.

20.2 **Ordinary Watercourses**
There is an un-named watercourse to the west of the main village. This is restricted by a bridge close to the property named Lowford and again to the south where the watercourse flows under a small un-named lane. These watercourses drain into the River Lew.

20.3 **Surface Water Flooding**
Parts of the village have suffered surface water flooding as a result of run off from agricultural land combined with highway run off.

20.4 **Tidal Flooding**
The village of Northlew is not subject to tidal flooding.

20.5 **Sewer Flooding**
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in Northlew between 1\textsuperscript{st} January 2000 to 1\textsuperscript{st} August 2014.

20.6 **Highway Flooding**
Surface water run off from agricultural land on to the highway combined with blocked gulleys has on occasion contributed to flooding in the village.
20.7  **Ground Water Flooding**

The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree. Percolation rates within the area are variable and can be poor.

20.8  **Flood Mapping**

Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Northlew area can be found in Appendix A. These are produced from data provided by the Environment Agency.

21  **NORTH TAWTON**

**Settlement Profile – North Tawton**

North Tawton is a small market town to the north of Okehampton. The town hosts three significant employers namely Gregory Distribution, Taw Valley Creamery and Vital Pet Supplies.

21.1  **Main River**

North Tawton sits on the east bank of the River Taw, which flows in a northerly direction and is joined by a small tributary from the north east of the town. The tributary is un-named officially but locally is known as the North Tawton Stream.

The River Taw responds quickly after rainfall resulting in water levels rising 2 to 3m in a few hours. Taw Bridge crosses the River Taw and is the main access to North Tawton. The masonry bridge is Grade II Listed and has five arches. During the flooding incident of 2000 the river flood flow backed up behind the bridge resulting in significant flooding to properties in Mill Lane, at North Tawton Rugby Club and the South West Water pumping station.

North Tawton Stream flows under North Street and then follows the lower end of Fore Street to the river. Much of the stream is culverted and historically there have been flooding incidents as a result of this. The implementation of the flood alleviation scheme has lessened the flood risk by improving culverts that were in poor condition, badly laid or blocked.

The Old Woollen Mill site leat takes water from the River Taw approximately 3km upstream of North Tawton. The leat flows through the disused mill site and rejoins the River Taw just upstream of Taw Bridge.
21.2 **North Tawton Flood Alleviation Scheme**
Prior to construction of the North Tawton flood alleviation scheme the frequency of flooding of properties adjacent to the River Taw was approximately 1 in 5 years (a probability of 0.2% in any one year).

The North Tawton flood alleviation scheme was completed in January 2003, and provides flood protection for the River Taw and North Tawton Stream up to a 1 in 100 year standard (a probability of 0.01% in any one year). The scheme has five elements:

- Mill Lane (River Taw)
- North Tawton Rugby Football Club
- Fore Street
- Lakeway
- Devonshire Gardens

21.3 **Mill Lane**
A sheet steel piled retaining wall with concrete columns and capping beams protects properties in Mill Lane from flood flow resulting from the River Taw and Mill Leat. On the dry side of the wall is a filter drain which collects groundwater from property gardens. This is discharged through a flapped valve into Mill Leat below. Highway drainage also discharges through the sheet pile wall and these have non return valves filled. A granular filled road hump protects Mill Lane properties along the boundary with the Old Mill site.

21.4 **North Tawton Rugby Football Club**
Two sections of puddled clay core flood banks and a raised access ramp, from Fore Street, offer flood protection to the North Tawton Rugby Football Club House. The flood banks extend from Taw Bridge to the access track and then from the access track to Taw Vale Avenue.

A number of highway drains discharge in to the River Taw and these are fitted with flap valves. A small pumping station is sited in Fore Street, before Taw Bridge. The pumps pump excess surface water through a highway drain which discharges into the River Taw downstream of Taw Bridge.

21.5 **Fore Street**
There are several culverts which carry the North Tawton Stream from Lakeway to the streams point of discharge in the River Taw at the rugby ground.
21.6 **Lakeway**
A clay core bund sits in the western edge of the field known locally as Lakeway. The bund is tied into a geotextile reinforced clay access track which flow is the southern edge of the field. A 700mm diameter concrete culvert through the bund allows the stream to flow through the structure. Headwalls are installed at the entrance and exit of the culvert and these include trash screens. A flow control device is installed to control of flow thought the bund to a maximum of 0.4 cubic meters per second (cumecs). Flows greater than 0.4 cumecs are retained in the upstream storage area and released at a controlled rate by the flow controller. The maximum volume that can be retained by the flood storage area is 4000m$^3$, but a concrete spillway over the bund crest allows flows from the North Tawton stream to be discharged should the storage area capacity be exceeded. The spillway discharges through an open channel through the garden of No 20 Fore Street before rejoining the main channel 10m downstream.

At the eastern edge of Lakeway, the North Tawton Stream is also diverted through a 1m diameter concrete culvert laid under the access track. The culvert was installed to allow the construction of the access track. A combined sewer overflow also discharges through a 150mm diameter pipe at the entrance to the culvert under the access track.

21.7 **Devonshire Gardens**
A headwall and trash screen is sited at the culverted section of the North Tawton stream to capture debris.

21.8 **Management and Maintenance**
Management and maintenance of the flood alleviation system falls to the Environment Agency, riparian owners and Devon County Council.

21.9 **Ordinary Watercourses**
The River Taw, Mill Leat and North Tawton Stream are classified as main rivers.

21.10 **Surface Water Flooding**
Surface water flooding is generally associated with highway run off. Run off from the track known as Letherens Lane has contributed to highway flooding.

21.11 **Tidal Flooding**
The town and area surrounding North Tawton is not subject to tidal flooding.
21.12 Sewer Flooding

The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in North Tawton between 1st January 2000 to 1st August 2014.

Fore Street and The Square have been subject to historic sewer flooding. South West Water Ltd has undertaken works to alleviate sewer flooding issues within the town.

21.13 Highway Flooding

There have been several instances of highway flooding through the town. These generally form a combination of heavy/prolonged rainfall and obstruction if the highway drainage system. Properties in North Street, Market Street and Fore Street, have been affected by highway run off/flooding to some degree.

Mill Lane suffers flooding from the highway as a result of the run off from Fore Street. In December 2013 properties in Fore Street suffered flooding as a result of highway run off and the failure of the pumps associated with the flood alleviation system.

21.14 Ground Water Flooding

The hydrology found within the North Tawton area is variable and percolation rates tend to be slow (10⁻⁶), due to the generally high clay content of the soil. The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree.
21.15 **Flood Mapping**
Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the North Tawton area can be found in Appendix A. These are produced from data provided by the Environment Agency.

22 **OKEHAMPTON**

**Settlement Profile – Okehampton**
Okehampton is small market town situated at the northern edge of Dartmoor, and has an estimated population of 5,700. The town is seen several major development in recent years on the eastern edge namely around Exeter Road and Crediton Road.

22.1 **Main Rivers**
There are two main rivers that flow into Okehampton. The West and East Okement rivers originate high on Dartmoor, flow into Okehampton where they join to become the Okement. The functional floodplain through the town centre is mostly confined to the river channel, which is deep. Much of the town centre has residential and commercial usage and falls within Flood Zone 2. Okehampton College and North Road industrial estate also fall within Flood Zone 2

A residential area along Castle Lane to the south of the town is Zone 3a High Probability.

22.2 **Ordinary Watercourses**

**Brightley Stream Flood Alleviation Scheme**
Brightley Stream rises in agricultural land above the small balance flow in the watercourse through a weir and spillway system. This arrangement diverts the majority of flow away from the properties at Brightley and directly into the Okement river. Brightley Stream is classified as a critical ordinary watercourse and is quick to respond to rainfall. Prior to the installation of the flood alleviation system several properties in Brightley and the highway were flooded.

22.3 **Wonnacott’s Road Area**
A minor watercourse is culverted through the Wonnacott’s Road, emerging as an open channel at the head of a short cul-de-sac off North Road, behind the Fire Station. The exact route of the culvert is not known, but for part of its length it is within the rear gardens of properties at Wonnacott’s Road. Several blockages have occurred here and this has resulted in external flooding to gardens, the highway and adjacent land.

Upstream of the Wonnacotts’ Estate the watercourse is believed to be combined with surface water and/or highway drainage systems, with the source being fairly high in the catchment.
The Wonnacott’s Road minor watercourse is piped under and along North Road from the junction with the cul-de-sac section at the Fire Station, where the pipe bends to pass between two blocks of houses in Macey’s Terrace and out through rear gardens/allotments to discharge into the Okement river.

22.4 Exeter Road, Crediton Road and North Road Areas
Historic records note that the development of land between Exeter Road and North Road (Eastern side of Okehampton) was first proposed in the Local Plan some years ago. Potential difficulties with the disposal of surface water drainage were identified. Subsequently a series of culverts and open ditches were implemented in the 1980’s.

A piped system serves land adjoining Exeter Road to Crediton Road across land at a lower level to discharge into a minor watercourse, falls over a steep escarpment into the industrial estate at North Road. The diameter of the piped system increases to approximately 450mm along it route and terminates at an outlet which has an energy dissipater. A channel was installed below the pipe outlet and a drop energy dissipater provided at the steep (almost vertical) drop.

The system continues through North Road Industrial Estate into an existing open ditch which was improved as part of the Link Road works undertaken by Devon County Council in the 1990’s. The ditch discharges into a culvert under North Road, finally discharging into the Okement.

The Wannacott’s Road and North Road Industrial Estate systems could be connected but this has not been proven.

22.5 Surface Water Flooding
Surface water run off resulting in flooding has been experienced in Berry Ball Close and originates from higher land at the rear. Poor maintenance of the Exeter Road/Crediton Road culverted watercourse/drainage system could impact on issues experienced at Berry Ball Close.

External property flooding resulted from an obstructed/damaged surface water pipe in the abandoned allotments adjacent to Wannacott’s Road and the cul-de-sac off North Road. The pipe was found to be obstructed by tree roots. The origin of the pipe is unknown, but the surface water drainage from the property drains in to this and the pipe then subsequently flows into the open watercourse, which is culvered under North Road and discharges in the river Okement.

22.6 Tidal Flooding
The Okehampton area is not subject to tidal flooding.
22.7 Sewer Flooding
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

South West Water Ltd has confirmed that sewer flooding has been recorded in some locations in Okehampton.

North Road, Okehampton has been subject to historic sewer flooding originating from the combined sewer. South West Water Ltd has undertaken some sewer rehabilitation works to alleviate sewer flooding issues within the town.

22.8 Highway Flooding
Highway flooding has occurred within North Road Industrial Estate.

22.9 Ground Water Flooding
The hydrology and percolation rates found within the Okehampton area are variable. The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree.

22.10 Flood Mapping
Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Okehampton can be found in Appendix A. These are produced from data provided by the Environment Agency.
23 **SREYTON**

**Settlement Profile – Spreyton**
Spreyton is a small rural village just north of Dartmoor between the villages of Whiddon Down to the South (on the A30), and Bow to the North (on the A3072). At present, the village has a small Primary School (Spreyton County Primary School), serving the village and the surrounding area. The village pub is located on the main street in the village.

23.1 **Main River**
The nearest main river to Spreyton identified by the Environment Agency is the River Yeo some distance from the village.

23.2 **Ordinary Watercourses**
There are several un-named ordinary watercourses situated on the outskirts of the village.

23.3 **Surface Water Flooding**
Parts of the village have suffered surface water flooding as a result of run off from agricultural land combined with highway run off.

23.4 **Tidal Flooding**
The village of Spreyton is not subject to tidal flooding.

23.5 **Sewer Flooding**
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
• other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in Spreyton between 1st January 2000 to 1st August 2014.

23.6 Highway Flooding
Surface water run off from land on to the highway combined with blocked gulleys has on occasion contributed to flooding in the village.

23.7 Ground Water Flooding
The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree. Percolation rates in the area are variable and can be poor.

23.8 Flood Mapping
Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Spreyton area can be found in Appendix A. These are produced from data provided by the Environment Agency.

24 TAVISTOCK
Settlement Profile – Tavistock
Tavistock is a historic market town and is one of the main settlements within West Devon.

24.1 Main Rivers
The River Tavy flows through the town centre before eventually joining the River Tamar. The Tavy has a relatively large channel and the 1% annual probability flow does not extend much beyond this. The functional floodplain within the town is taken to be the channel itself. Tavistock last suffered major flooding from the Tavy in July 1880 and July 1890. In December 2013 after prolonged and heavy rainfall the river level rose significantly and reached a level close to overtopping the channel. No instances of flooding directly from the River Tavy were reported.

The Tiddy Brook joins the Tavy just downstream of the town centre. There is a history of flooding from the Tiddy Brook, sections of which are culverted. The culverts were improved in the late 1980’s in response to flooding of the Bishopsmead housing estate around Oak Road in 1986. Plymouth Road (the A386) crosses the Tiddy Brook at a bridge that is considered to have a 1 in 30 year (3.3% AEP) flow capacity. High flows can bypass the bridge and flow between buildings
along the Plymouth Road, towards the supermarket car park where they flow along the access roads towards the Tavy.

The upper reaches of the Tiddy Brook originate on Whitchurch Down. Surface water run off issues have been experienced by properties at several locations along the Tiddy Brook. These issues are intensified by the topography of the landscape.

River Wallabrook originates close to Kilworthy Cottages. The watercourse flows through Gammerby Wood towards Wilminstone Quarry and Parkwood Road. The channel is culvered under the A386 then discharges into the River Tavy. Flooding has occurred before the A386 as a result of the debris being carried down the watercourse resulting in obstruction of the culvert entrance.

24.2 Tavistock Canal
Tavistock Canal was constructed in the early 19th century to transport minerals to Morwellham Quay. It is now owned and managed by South West Water Ltd and has been incorporated into the Cornwall and West Devon Mining Landscape World Heritage Site. Water levels and flows within the canal are managed and supply water the hydro-electric plant at Morwellham Quay. Tavistock Canal is unlikely to pose a flood risk if levels are managed.

24.3 Ordinary Watercourses
A minor ordinary watercourse flows through the rear gardens of Mohuns Park adjacent to the boundary with Oak Tree Lane. This watercourse originates on Whitchurch Down and flows on through behind the rear gardens of properties in Alder Road, through gardens in Willow Road and behind industrial units in Plymouth Road Industrial Estate. The watercourse is partially culverted along its length in an ad hoc manner and has been the source of flooding to properties.

Issues rise in the rear gardens of Drake Gardens and the gardens of Mohuns Park. Two sources converge and are culverted under the disused railway line and under properties in Grenville Drive. The watercourse eventually discharges to the River Tavy. Flooding has occurred in Drake Gardens and Grenville Drive as a result of obstructions in the watercourse and culverted sections.

Springs and issues rise in the rear gardens of properties in Down Road. The watercourse is open until it reached Whitchurch Road where it is culverted before continuing into Pixon Lane where it is partially culverted and open channel, before discharging into the River Tavy by the skate park. Flooding has occurred as a result of blockages in the culverted sections. This manifests itself as flooded property gardens and highway flooding affecting The Market Inn.

Issues rise within Plymouth Road Industrial Estate to the rear and adjacent to units 1 to 9. The watercourse has been culverted under Plymouth Road, flowing in an open channel behind units in West Devon Business Park, before being culverted under
Brook Lane, and finally discharging into the River Tavy. Flooding has occurred as a result of obstructions to the watercourse and culverted sections.

Boughthayes has suffered historic flooding incidents as result of poor maintenance of a small culverted watercourse in fields north of Crease Lane and Callington Road. The culvert, which is a mixture of materials, carries flows eventually discharging into the River Tavy. There has been much debate about the ownership and therefore responsibility for maintenance of the culvert over a number of years.

The remains of a complex leat and culvert system are within the Parkwood Road and Foundry Mews areas. Much of the system has been abandoned, but part of this is operational and serves as the surface water drainage attenuation system for properties before it discharges into the River Tavy.

24.4 **Surface Water Flooding**

A combination of flooding sources result in risk to the Butcher Park and Bannawell Street area of Tavistock. Surface water run off from land above Roland Bailey Gardens contributes to flows in the watercourse which flow through the estate. There is a small balancing pond and hydro-break arrangement sited in the garden of No 1 Roland Bailey Gardens and this moderates some flows in the small watercourse. Properties upstream have suffered flooding as a result of surface water run off from agricultural land. The watercourse flows through rear garden of properties in The Dell and on through properties in Cole Moore Meadow and Watts Lane. An additional balancing pond is sited in the rear garden of No 11 Cole Moore Meadow. The outlet of the pond is culverted under the Glanville Road and across a corner plot of land. The watercourse continues to be culvered as it flows down through Butcher Park Hill, under the Joiners Shop, down through Lakeside and into Tavistock. The culverted watercourse eventually discharges to the River Tavy by Abbey Bridge. There have been several instances where the balancing pond sited in the garden of No 11 Cole Moore Meadow has been overtopped resulting in flood flows on adjacent land and on the highway at Glanville Road, Butcher Park Hill and Bannawell Street.

Upstream of the joiners’ workshop there is an input into the culverted watercourse. This input carries surface water and highway drainage from the Butcher Park Hill upstream catchment. During heavy and prolonged rainfall this system surcharges contributing to surface water flooding experienced in Butcher Park Hill and Bannawell Street.

A further input into the culverted system originates from the watercourse to the north of the town. This originates in farm land and flows to the rear of Buddle Close and Russell Court. The watercourse forms a natural wildlife pond in open space close to Russell Court. The pond discharges in to a culverted section under the highway at Butcher Park Hill before joining the main culvert under the joiners’ workshop.
Surface water run off issues have been experience at Rix Hill, usually after heavy and prolonged rainfall. One property has suffered external flooding from the combined result of surface water run off from land, the highway and an adjacent watercourse.

24.5 **Tidal Flooding**
The town of Tavistock is not subject to tidal flooding.

24.6 **Sewer Flooding**
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

South West Water Ltd has confirmed that DG5 sewer flooding has been recorded in some locations in Tavistock.

24.7 **Highway Flooding**
There have been historic localised areas of highway flooding in Tavistock. The main location being Butcher Park Hill and Bannawell Street where flooding manifests itself as highway flooding but the source is surface water run off from land. Dolvin Road has historic highway flooding issues, which has resulted in flooding to some properties. The highway system discharges into the River Tavy close to Dolvin Road and it is thought that discharge is restricted when the river level is high, which contributes to flooding.

24.8 **Groundwater Flooding**
The hydrology and percolation rates found within the Tavistock area are variable. The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree. The most notable location that groundwater is noted is at Plymouth Road Cemetery, where the upper part of the cemetery sits along a spring.
Site investigation of the land adjacent to Old Launceston Road found that the site was variable. In some locations percolation rates were very good and no groundwater was found. In other locations percolation rates were poor or there was groundwater rising. Any future development in the vicinity of this location should be subject to extensive ground investigation and groundwater level monitoring before the commencement of development.

24.9 Flood Mapping
Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Tavistock area can be found in Appendix A. These are produced from data provided by the Environment Agency.

25 WEIR QUAY
Settlement Profile – Weir Quay
Weir Quay is a deep-water quay on the Devon bank of the River Tamar approximately 3km from Bere Alston and 4km from Bere Ferrers. Below the quay is a ruined lime kiln with double furnaces, and traces of other old buildings connected with the area’s industrial mining and smelting past. The old quay has become Weir Quay Boatyard with over 100 moorings. The area is classified as an Area of Outstanding Natural Beauty (AONB) and World Heritage Site.

25.1 Main River
Weir Quay sits on the Devon shore of the tidal Tamar estuary. The majority of properties are sited within Flood Zone 1. The highway, properties adjacent to the shoreline and existing Weir Quay Boatyard fall within Flood Zone 2 and 3.

25.2 Ordinary Watercourses
There are several un-named watercourses which rise from issues cost to Gullytown which is on higher ground. These drain into the River Tamar.

25.3 Surface Water Flooding
The area has suffered surface water flooding as a result of run off from agricultural land combined with highway run off.

25.4 Tidal Flooding
The area Weir Quay is subject to tidal flooding.
25.5 Sewer Flooding
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in Weir Quay between 1st January 2000 to 1st August 2014.

25.6 Highway Flooding
Tidal flooding and surface water run off from land on to the highway combined with blocked gulleys and ditches has on occasion contributed to flooding in the area.

25.7 Ground Water Flooding
The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree. Percolation rates in the area are variable and can be poor.

25.8 Flood Mapping
Maps indicating the predicted extent of fluvial, surface water, tidal and groundwater flooding for the Weir Quay area can be found in Appendix A. These are produced from data provided by the Environment Agency.

26 Dartmoor National Park Authority Area
The National Park falls within West Devon Borough, South Hams and Teignbridge District Council boundaries with respect to land drainage. Dartmoor National Park (DNP) is the Planning Authority for the National Park.
26.1 **Study Area Flood Sources**
The main sources of flooding within the study area are from fluvial and surface water run off, there is no tidal influence. There are a number of reservoirs, which may present a potential flood risk in the event of a breach. There are a number of leats present within the study area. The underlying geology is generally hard rock (granite) and this stratum does help to minimise the risk of groundwater flooding.

26.2 **Fluvial Flood Sources**
The Dartmoor study area has typically steep gradients. Rivers flow from their catchments eventually reaching the coast, following relatively steep sided valleys with confined floodplains. The underlying hard rock geology and confined nature of the floodplains results short rainfall response times in the upper catchments.

The main river catchments within this study area are:

- River Avon
- River Dart
- River Erme
- River Lyd
- River Meavy
- River Okement
- River Plym
- River Tamar
- River Tavy
- River Taw
- River Teign
- River Walkham
- River Yealm

26.2.1 **River Avon**
The source of the River Avon is at Avon Head which is an area of bog. The Avon flows southwards, to the west of South Brent, Avonwick and Aveton Gifford (tidal limit) before discharging to the sea at Bantham.

Avon Dam Reservoir is located in the upper reaches of the River Avon catchment.

26.2.2 **River Dart**
The River Dart begins as two separate tributaries (the East Dart and West Dart), which join at Dartmeet. The Dart flows southwards, to the east of Buckfast and then through Buckfastleigh, continuing on through Totnes (tidal limit) and eventually discharging to the sea at Dartmouth.
The River Mardle, a tributary of the River Dart, flows into Buckfastleigh from the west. The River Ashburn is another tributary of the River Dart and flows into Ashburton from the north.

Venford Reservoir impounds a minor tributary of the River Dart to the south of Dartmeet. Water from Venford is used by South West Water Ltd as a potable water supply source.

26.2.3 River Erme
The River Erme’s source is an area of bog known as Plym Head. The Erme flows in a southerly direction within a confined valley into Ivybridge, before continuing south through Ermington and Modbury and discharging to sea at Mothecombe.

26.2.4 River Lyd
The source of the River Lyd is at Lyd Head to the north of Woodcock Hill. As the River Lyd flows south it is joined by a number of minor tributaries. Turning west the River Lyd flows to the south of Lydford before entering Lydford Gorge. The River Lyd continues west, eventually joining the River Tamar beyond Lifton.

26.2.5 River Meavy
The River Meavy a tributary of the River Plym flows in southwest direction, to the south of Meavy and then south to join with the River Plym above Bickleigh Vale.

Burrator Reservoir is located in the upper reaches of the River Meavy, to the east of Yelverton, and is used by South West Water Ltd as a potable water supply source.

26.2.6 River Okement
The West Okement and East Okement pick up a number of minor tributaries before they meet to form the River Okement in Okehampton. The River Okement flows north passing the villages of Jacobstowe and Monkokehampton and joins with the River Torridge near Meeth, before eventually discharging to the sea on the north coast of Devon.

Meldon Reservoir is located in the headwaters of the West Okement River.

26.2.7 River Plym
The River Plym source, like the River Erme, is at Plym Head, which is an area of bog. The River Plym flows in a south westerly direction to the north of Shaugh Prior, then on through the confined valley of Bickleigh Valley, before
flowing to the east of Plymouth and discharging to the sea via Plymouth Sound.

26.2.8 River Tamar
The River Tamar forms the boundary between Devon to the east and Cornwall to the west. The source of the Tamar is less than 6 km from the north Cornish coast and it flows southward toward Plymouth Sound. Tributaries of the river include the Rivers Inny, Ottery, Kensey and Lynher on the Cornish side, and the Deer and Tavy on the Devon side.

26.2.9 River Tavy
The River Tavy originates of Dartmoor and is fed by the Collybrooke, River Burn, River Wallabrooke, River Lumburn and River Walkham along its route to join the River Tamar at Mowellham Quay. The River Tavy flows within a confined valley, passing between the villages of Peter Tavy and Mary Tavy before continuing on through the centre of Tavistock. Continuing south the River Tavy joins the River Tamar, before discharging to the sea via Plymouth Sound.

Water is abstracted from the Tavy to feed a small canal which connects the Stannary Town of Tavistock to Mowellham Quay. The canal supplies water to a hydro-electric power plant at Morwellham Quay.

26.2.10 River Taw
The source of the River Taw is a spring known as Taw Head. The River Taw flows north to the east of Belstone, before turning east through Sticklepath. The Taw continues north through North Tawton and eventually discharging to the sea on the north coast of Devon. Ramsley Stream, is a tributary of the River Taw, which flows North through the centre of South Zeal before joining the River Taw approximately 2 km downstream.

26.2.11 River Teign
The River Teign rises on Dartmoor, near Cranmere Pool. It leaves the moor at its eastern side, flowing close to Castle Drogo in a steep-sided valley then flows southwards at the east edge of the moor. The river becomes tidal at Newton Abbot and reaches the English Channel at Teignmouth.

26.2.12 River Walkham
The River Walkham a tributary of the River Tavy and rises on Walkham Head. The Walkham flows south within a confined valley before tuning west to through Horrabridge picking up a number of minor tributaries on route. The River Walkham continues west to join the River Tavy.
26.2.13 **River Yealm**
The source of the River Yealm is at Yealm Head on the Stall Moor Mires of South Dartmoor. The River Yealm flows south to the east of Cornwood continuing south through Yealmpton, before discharging to sea below Newton Ferrers and Noss Mayo.

26.3 **Tidal Flood Sources**
The areas which fall within the West Devon Borough Council and Dartmoor National Park Planning Authority boundary are not subject to tidal flooding.

26.4 **Surface Water Sources**
Surface water flow is caused by water that has not entered a natural drainage channel or stormwater system. This often occurs when the soil is saturated and natural drainage channels or stormwater systems do not have the capacity to absorb the additional flow. Flooding as a result of surface water can occur anywhere within a catchment, but is most likely to occur in low points in terrain (natural valley bottoms), or where the pathway for runoff is restricted by terrain or man-made obstructions. Low lying areas along the river valleys and along the course of culverted watercourses as well as natural low points can be most susceptible.

There have been a number of historic surface water flooding events within the study area. These are generally caused by a combination of factors, such as, direct runoff and inadequate or blocked drainage systems. Types of drainage systems identified as being contributing factors to surface water flood events include highway drains, stormwater drains and combined sewers.

26.5 **Sewer Flooding**
South West Water is the statutory water undertakers within the study area. The water company are responsible for the public sewer systems, which include surface water, foul and combined sewers. South West Water was consulted during the preparation of this document and has indicated location where sewer flooding has occurred. Flooding from surface water sewers is not related to the capacity, structural or service condition of the sewer, but occurs due to sewer blockages from debris.

Where future development is proposed sewer networks may need to be upgraded to ensure sufficient capacity is maintained. The effects of climate change also places a further burden on sewer systems, especially with the likelihood of milder wetter winters and increased rainfall intensity in summer months. This combination is likely to result in more frequent sewer flooding.
26.6 **Highway Flooding Sources**
Devon County Council Highways are the highway authority covering the study area. Highway flooding occurs as a result of isolated incidents associated with maintenance of the highway drainage system, surface water run off from land inundating the drainage systems and obstructions and blockages within culverted and bridged watercourses. Bridges are often historic and may present restrictions to the flood flows resulting in flooded and impassable roads, although property flooding might not necessarily occur.

26.7 **Groundwater Sources**
Groundwater flooding tends to occur after longer periods of sustained high rainfall, and the areas at most risk are often low-lying where the water table is likely to be at shallow depth. Groundwater flooding is known to occur in areas underlain by major aquifers, although it can also be associated with localised floodplain sands and gravels.

There have been no reported groundwater flood incidents within the study area.

The nature of the geology within the study area means that groundwater flooding is unlikely to be a significant issue when compared to fluvial, surface water and sewer flooding.

26.8 **Artificial Sources - Reservoirs**
The risk of flooding from reservoirs is mainly due to dam/reservoir wall failure and emergency releases into the catchment. The table below provides details of the nine reservoirs located within the study area which fall under the Reservoir Act (volume greater than 25,000 m3).

<table>
<thead>
<tr>
<th>Reservoir</th>
<th>Location</th>
<th>Dam</th>
<th>Capacity (m3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avon</td>
<td>Headwaters of the River Avon 5km from South Brent</td>
<td>Concrete Gravity</td>
<td>1,386,500</td>
</tr>
<tr>
<td>Burrator</td>
<td>Headwaters of River Meavy, 3km east of Yelverton</td>
<td>Masonry Gravity</td>
<td>4,464,000</td>
</tr>
<tr>
<td>Fernworthy</td>
<td>Headwaters of River Teign, 4km south west of Chagford</td>
<td>Concrete Gravity</td>
<td>1,727,300</td>
</tr>
<tr>
<td>Kennick</td>
<td>Headwaters of River Teign, 6km south east of Moretonhampstead</td>
<td>Gravity and Earthfill</td>
<td>882,000</td>
</tr>
<tr>
<td>Tottiford</td>
<td>Headwaters of River Teign, 6km south east of Moretonhampstead</td>
<td>Gravity and Earthfill</td>
<td>468,200</td>
</tr>
<tr>
<td>Trenchford</td>
<td>River Teign minor tributary, 6km south east of Moretonhampstead</td>
<td>Gravity and Earthfill</td>
<td>777,000</td>
</tr>
</tbody>
</table>
Leats are artificial watercourses, designed to convey water from a natural watercourse to a specific destination where there is a water demand. Historically leats within the study area have supplied water for domestic, industrial and agricultural purposes. The names and location of identified leats within the study area which remain in use are identified in the table below.

<table>
<thead>
<tr>
<th>Leat</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sticklepath Leat</td>
<td>River Taw catchment near Finch Foundary</td>
</tr>
<tr>
<td>Grimstone Leat</td>
<td>River Walkham catchment near Grimstone</td>
</tr>
<tr>
<td>Sortridge Leat</td>
<td>River Walkham catchment near Sortridge</td>
</tr>
<tr>
<td>Wheal Friendship Leat</td>
<td>River Tavy catchment near Mary Tavy</td>
</tr>
<tr>
<td>Wheal Jewell Leat</td>
<td>River Tavy catchment near Mary Tavy</td>
</tr>
<tr>
<td>Hamlyn's Leat</td>
<td>River Dart catchment near Holne</td>
</tr>
<tr>
<td>Holne Town Gutter</td>
<td>River Dart catchment near Holne</td>
</tr>
<tr>
<td>Gidleigh Leat</td>
<td>River Teign catchment near Gidleigh</td>
</tr>
<tr>
<td>Devonport Leat</td>
<td>River Meavy catchment near Dousland</td>
</tr>
</tbody>
</table>

There are a small number of reported historic flood events linked to leats within the study area, most notably the Devonport Leat where previous blockages have caused overtopping of the leat causing localised flooding to properties in Dousland. The
majority of the flood incidents reported date back more than 20 years therefore mitigation works may have since been carried to alleviate problem areas identified.

27 CHAGFORD

Settlement Profile – Chagford

Chagford is a small town and civil parish on the north-east edge of Dartmoor, close to the River Teign. The town is located off the A382, about 6km west of Moretonhampstead.

27.1 Main Rivers

The River Teign is the closest main river to Chagford some 3km to the west of the town.

27.2 Ordinary Watercourses

The village has an extensive leat system that formerly supplied Chagford with fresh water. The leats are formed by granite channelling across nearby fields, and in relatively deep gulleys along each of the highways, including across The Square. Many of the leats are now culverted through most of the town, but the system is of significance as a natural resource that helped in the shaping of the town.

Occasional flooding issues have occurred as a result of blockages and damage of the leat system.

27.3 Surface Water Flooding

Few locations have suffered flooding as a result of surface water run off from agricultural land and this has contributed to highway run off and flooding.

27.4 Tidal Flooding

The village of Chagford is not subject to tidal flooding.

27.5 Sewer Flooding

The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.
South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in Chagford between 1st January 2000 to 1st August 2014.

27.6 **Highway Flooding**

Surface water run off from land on to the highway combined with blocked gulleys has on occasion contributed to flooding in the town.

27.7 **Ground Water Flooding**

The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree. Percolation rates in the area are variable and can be poor.

27.8 **Flood Mapping**

Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Chagford area can be found in Appendix B. These are produced from data provided by the Environment Agency.

28 **HORRABRIDGE**

**Settlement Profile – Horrabridge**

Horrabridge is a large village located approximately 19km north of the city of Plymouth, approximately 6km south of Tavistock and within Dartmoor National Park. The village sits on the River Walkham with a 15th century pack-horse bridge which crosses the river providing the only vehicular route from one side of the town to the other.

Until the beginning of the 20th century, the main industry was the mining of copper and tin. This industry has completely disappeared, leaving a legacy of unmapped mineshafts in the town and the surrounding area.
28.1 **Main Rivers**

The River Walkham enters the town from the east within a relatively confined river valley. Springfield Brook and Fillace Park Stream (all of which are designated as main river by the Environment Agency) enter the settlement from the north and south of the town respectively. The combined effect of confined river valleys and steep channel gradients result in catchments that respond rapidly to rainfall, with relatively high velocity flows.

Horrabridge is defended by 430m of flood defence which is designed to a 1 in 20 year standard and sited on the banks of the River Walkham. The defence structures are understood to have been built by the Cornish River board in 1973 and comprise raised masonry walls, banks and a weir. These structures are now managed and maintained by the Environment Agency.

Some development has taken place within the River Walkham floodplain and this has led to a number of properties being at risk of flooding within the settlement. Flooding incidents from a combination of fluvial and surface water (including stormwater systems) have been reported and these include a number of properties within the vicinity of Chapel Lane and Bedford Road (including Springfield Cul-de-sac).

28.2 **Ordinary Watercourses**

A culverted watercourse flows under Bedford Road and Springfield Cottages. The culvert capacity was exceeded in 1979 resulting in flooding. Since then and inlet basin and bypass pipework have been installed to alleviate the flooding issues.

A disused mill leat is located to the south east of Horrabridge near Fillace Park. This is identified but is considered offline because it is not hydraulically connected to another watercourse.

28.3 **Surface Water Flooding**

Surface water flooding has been experienced by properties in the Chichester Court area. During periods of heaver and persistent rainfall surface water drainage from Manor Gardens development, the A386 and Torrbridge Road are believed to contribute to flows in the surface water sewer laid in the rear gardens of properties in Chichester Court. There have been historic flooding issues affecting Chichester Court as a result of obstruction of the surface water sewer which caused surcharging of the system. The surface water sewer eventually discharges into the River Walkham.

Surface water flooding has been noted at Youlden Way. This is thought to as a result of surcharging of a disused mine adit or drainage system.

28.4 **Tidal Flooding**

The village of Horrabridge is not subject to tidal flooding.
28.5 **Sewer Flooding**

The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

One location was reported to have suffered DG5 sewer flooding in Horrabridge between 1st January 2000 to 1st August 2014.

28.6 **Highway Flooding**

Surface water run off from land on to the highway combined with blocked gulleys has on occasion contributed to the flooding in the village.

28.7 **Ground Water Flooding**

Raised groundwater levels and rising springs have been noted in land to the rear of Chichester Court and Copperfields. These sources flow into the field ditch system and eventually for an ordinary watercourse. The watercourse and nearby sinks discharge into the disused Wheal Franco mine.

The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree. Percolation rates in the area are variable and can be poor.

28.8 **Flood Mapping**

Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Horrabridge area can be found in Appendix B. These are produced from data provided by the Environment Agency.
29 MARY TAVY

Settlement Profile – Mary Tavy
The village of Mary Tavy sits on edge of Dartmoor approximately 8km from Tavistock. The village was named after the nearby River Tavy. The village was once a thriving mining community and home to the world's largest copper mine, Wheal Friendship as well as a number of lead and tin mines, namely Wheal Jewell and Wheal Betsy. Wheal Jewell (Mary Tavy) Reservoir is located in the headwaters of the River Tavy and continues to supply the Mary Tavy hydro-generator via the leat system.

The sites of the now closed Blackdown garage which straddle the A386 have been proposed for development. Both sites contain historic mine workings (shafts) and have been subject to surface water drainage issues.

29.1 Main Rivers
Main rivers in the proximity of Mary Tavy are the lower reaches of Cholwell Brook, River Tavy and the River Burn. The majority of properties are sited away from the floodplain.

29.2 Ordinary Watercourses
There are a number of leats which are a remnant of the historic mine workings in the area. Poor maintenance of the leat systems has resulted in surface water flooding experienced by some properties. The main system flows around the base of around Gibbet Hill and Blackdown. This eventually discharges to a deep channel known locally as The Gurgy. The Gurgy discharges into an unnamed watercourse which is culverted under the A386. From here flows discharge into Cholwell Brook and then on to the River Tavy.

The upper reaches of the Cholwell Brook are on Dartmoor. The brook is an ordinary watercourse until it reaches a property named Holditch, but from this point it becomes a main river. Flows from Cholwell Brook continue to the serve the Mary Tavy hydro-generator managed by South West Water Ltd.

29.3 Surface Water Flooding
Parts of Mary Tavy, on the Brentor side of the village, have suffered surface water flooding as a result of run off from moorland. If unmaintained overtopping of the historic leat system can contribute to the surface water flows that affect this part of the village.

29.4 Tidal Flooding
The village of Mary Tavy is not subject to tidal flooding.
29.5 **Sewer flooding**

The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in Mary Tavy between 1st January 2000 to 1st August 2014.

29.6 **Highway Flooding**

Surface water run off from moorland on to the highway combined with blocked gulleys and roadside ditches has on occasion contributed to the flooding around Brentor Road. The A386 has also suffered flooding during heavy and persistent rainfall.

29.7 **Ground Water Flooding**

The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree. Percolation rates in the area are variable and can be poor.

29.8 **Flood Mapping**

Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Mary Tavy area can be found in Appendix B. These are produced from data provided by the Environment Agency.
30 PETER TAVY

Settlement Profile – Peter Tavy
The village of Peter Tavy sits on edge of Dartmoor off the A386 and approximately 6km from Tavistock.

30.1 Main Rivers
The village sits close to two main rivers, namely the Colly Brook, which is a tributary to the River Tavy, and the River Tavy itself. A large proportion of the village sits within Flood Zone 2 and 3. The bridge which crosses the Colly Brook is not quite sufficient to cater for 1 in 100 year flows potentially adding to the flood risk. If flows go out of bank they have historically resulted in flooding to the highway. A bund has been constructed to alleviate this, but over a period of time this has fallen into disrepair.

30.2 Ordinary Watercourses
An unnamed watercourse originates from issues which rise close to the church in the centre of the village. Springs also rise downstream of the village centre and feed into the Colly Brook.

30.3 Surface Water Flooding
The village has suffered surface water flooding as a result of run off from agricultural land combined with highway run off during periods of heaver and persistent rainfall.

30.4 Tidal Flooding
The village of Peter Tavy is not subject to tidal flooding.

30.5 Sewer Flooding
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)
No locations were reported to have suffered DG5 sewer flooding in Peter Tavy between 1st January 2000 to 1st August 2014.

30.6 **Highway Flooding**
Surface water run off from agricultural land on to the highway combined with blocked gulleys and ditches have on occasion contributed to the flooding in the village.

30.7 **Ground Water Flooding**
The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree. Percolation rates in the area are variable and can be poor.

30.8 **Flood Mapping**
Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Peter Tavy area can be found in Appendix B. These are produced from data provided by the Environment Agency.

31 **PRINCETOWN**

**Settlement Profile – Princetown**
Princetown is situated on high ground just off the B3357 within Dartmoor National Park and approximately 14km to the east of Tavistock.

31.1 **Main Rivers**
Blackbrook River sits to the north of Princetown in open moorland. The river flows under B3212 at Oakery Bridge and the B3357.

31.2 **Ordinary Watercourses**
Devonport Leat can also be found on lower ground to the north east side of the town. Devonport Leat originates a short distance to the north of Wistman’s Wood and passes close to Two Bridges before heading towards Princetown. It was constructed in 1790’s to transport drinking water from high ground of Dartmoor to supply the expanding dockyards at Devonport, near Plymouth. The leat is fed by three Dartmoor Rivers, the West Dart, Cowsic and Blackabrook, and supplies Dousland Water Treatment Works initially, with the overflow going to Burrator Reservoir.
Prison Leat and several other un-named ordinary watercourses are situated within and on the outskirts of Princetown.

31.3 **Surface Water Flooding**
Parts of the town have suffered surface water flooding as a result of run off from agricultural land combined with highway run off.

31.4 **Tidal Flooding**
The village of Princetown is not subject to tidal flooding.

31.5 **Sewer Flooding**
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in Princetown between 1st January 2000 to 1st August 2014.

31.6 **Highway Flooding**
Surface water run off from moorland on to the highway combined with blocked gulleys and ditches have on occasion contributed to flooding in the village.

31.7 **Groundwater Flooding**
Rainfall levels around Princetown are generally higher than the lowland areas of Dartmoor. The areas around Princetown have a covering of peaty soil with an underlying layer of granite and so percolation rates around in the area are generally poor.
The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree.

### 31.8 Flood Mapping
Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Princetown area can be found in Appendix B. These are produced from data provided by the Environment Agency.

### 32 SOUTH ZEAL

#### Settlement Profile – South Zeal
South Zeal is a small village situated approximately 9km to the west of Okehampton and on the northern edge of Dartmoor. Ramsley Copper Mine, to the north or the village, was worked from 1860 to 1909. As a result water from Blackaton Brook close to Owlsfoot was diverted to feed the mine and then on through the village before joining the River Taw. The watercourse which once supplied Ramsley Mine is known as Ramsley Stream.

#### 32.1 Main Rivers
The River Taw is the closest main river to the village which is some distance downstream from South Zeal.

#### 32.2 Ordinary Watercourses

**Ramsley Stream**
Ramsley Stream originates on Dartmoor where water is diverted from Blackaton Brook north of Cosdon Hill. The watercourse narrowly missed being categorised as a Critical Ordinary Watercourse (COW) by the Environment Agency. The stream responds quickly to rainfall and flows within the catchment.

From its source the stream travels north toward South Zeal and passes under several minor roads before reaching the village. The stream is culverted as it passes under properties and the main road through the village. The culvert is an ad hoc arrangement of lintels and supporting walls. In some places the watercourse is simply covered over boards.

Lower laying properties close to the culverted section of the stream have suffered flooding. The culvert is obstructed by utility apparatus and there have been several instances where debris has been caught up on the apparatus reducing the capacity of the culvert. Flooding has resulted when the flow has exceeded the capacity of the culvert. There have been several studies undertaken.
Properties have benefited from grant aid which has enabled individual property protection measures to be fitted. The village also benefits from a flood warning system.

Ramsley Leat was taken from the stream to service the mill before flowing down the street to re-join the stream again. Much of this leat has now been abandoned.

An unnamed watercourse rises in land to the rear of Crossways. The watercourse is culverted for part of its length before discharging into Ramsley Stream downstream of the highway bridge.

### 32.3 Surface Water Flooding
Surface water run off from Cousdon Hill and surrounding land contribute to the flooding issues experienced by the low laying properties in the village.

### 32.4 Tidal Flooding
The village of South Zeal is not subject to tidal flooding.

### 32.5 Sewer Flooding
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

Properties in the village have suffered DG5 sewer flooding in South Zeal between 1st January 2000 to 1st August 2014. South West Water has fitted a non-return valve at one location to aid the alleviation of sewer flooding.
32.6 **Highway Flooding**
Highway run off has contributed to flooding issues experience by lower laying properties close to Ramsely Stream. The highway becomes flooded if the stream flows out of bank and if the culvert is obstructed by debris. Blocked highway gulleys and under capacity of the highway drainage system has also contributed to the flooding in low laying parts of the village.

32.7 **Ground Water Flooding**
The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree. Percolation rates in the area are variable and can be poor.

32.8 **Flood Mapping**
Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the South Zeal area can be found in Appendix B. These are produced from data provided by the Environment Agency.

33 **STICKLEPATH**

**Settlement Profile – Sticklepath**
Sticklepath is situated on the old A30 approximately 7km to the south east of Okehampton and on the northern fringes of Dartmoor.

33.1 **Main Rivers**
The River Taw flows close to the village and as a result large proportion of the village sits within Flood Zone 2. The old A30 crosses the river at Sticklepath Bridge. There have several reports of obstructions under the bridge which have resulted in flooding upstream to a varying degree. A weir and fish pass arrangement has been constructed in the river close to The Drying House. There is also an input in to the Old Mill Leat at this point too.

33.2 **Ordinary Watercourses**
The Old Mill Leat is classified as an ordinary watercourse and serves the Finch Foundary and property downstream before rejoining the River Taw just before Sticklepath Bridge. There are two known abstraction licences for the leat. One of these is held by the National Trust who owns the Finch Foundry Museum. Flows through the leat are controlled by a series of manually operated sliding gates. The leat is owned, managed and maintained by the individual riparian owners.
33.3 **Surface Water Flooding**  
Parts of the village have suffered surface water flooding as a result of run off from land combined with highway run off.

33.4 **Tidal Flooding**  
The village of Sticklepath is not subject to tidal flooding.

33.5 **Sewer Flooding**  
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in Sticklepath between 1st January 2000 to 1st August 2014.

33.6 **Highway Flooding**  
Surface water run off from land on to the highway combined with blocked gulleys has on occasion contributed to the flooding in the village. Obstructions under Sticklepath Bridge could also result in flooding to the highway and property.

33.7 **Ground Water Flooding**  
The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree. Percolation rates in the area are variable and can be poor.
33.8 **Flood Mapping**
Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Sticklepath area can be found in Appendix B. These are produced from data provided by the Environment Agency.

34 **WALKHAMPTON**

**Walkhampton - Settlement Profile**
The village lies on the Black Brook, a tributary of the River Walkham, approximately 7 km south east of Tavistock and near Horrabridge, Yelverton and Dousland and Burrator Reservoir, constructed in 1898, to the south east.

34.1 **Main Rivers**
Black Brook is identified on the Environment Agency Maps as being a main river as is the River Walkham. Some properties close to the centre of the village and Black Brook sit within Flood Zone 2 and 3. The Black Brook has been the source of historic flooding events resulting in property flooding. The highway bridge crosses the Black Brook close to the War Memorial in the centre of the village. A flood relief scheme was implemented in the 1980’s and this comprises of a bypass pipe which carries water around the highway bridge in the village centre.

A small footbridge also crosses the Black Brook close to Walkhampton Mill.

34.2 **Ordinary Watercourses**
There are a number of un-named minor watercourses which rise from springs and discharge into the Black Brook. These are mainly located downstream of the village.

There is a historic leat and launder is located above the Black Brook. The launder was used to carry water and extended over a waterwheel which once powered the Old Mill and Wheelwrights shop.

34.3 **Surface Water Flooding**
Parts of the village have suffered surface water flooding as a result of run off from agricultural land combined with highway run off.

34.4 **Tidal Flooding**
The village of Walkampton is not subject to tidal flooding.
34.5 Sewer Flooding
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in Walkhampton between 1st January 2000 to 1st August 2014.

34.6 Highway Flooding
Surface water run off from land on to the highway combined with blocked gulleys has on occasion contributed to flooding in the village.

34.7 Ground Water Flooding
The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree. Percolation rates in the area are variable and can be poor.

34.8 Flood Mapping
Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Walkhampton area can be found in Appendix B. These are produced from data provided by the Environment Agency.

35 YELVERTON
Settlement Profile – Yelverton
Yelverton is a large village sited on the A386 on the south western edge of Dartmoor and close to Roborough Down.
35.1 **Main Rivers**
Yelverton sits within Flood Zone 1. The River Walkham is the closest main river to the village of Yelverton, and is approximately 3Km away.

35.2 **Ordinary Watercourses**
There are several un-named ordinary watercourses situated on the outskirts, but mainly on the north east of the village. These flow toward Horrabridge and form tributaries and eventually contribute to the River Walkham.

Sections of the Devonport Leat and the Plymouth Leat still remain, but both are now redundant.

35.3 **Surface Water Flooding**
Parts of the village have suffered surface water flooding as a result of run off from agricultural land combined with highway run off.

35.4 **Tidal Flooding**
The village of Yelverton is not subject to tidal flooding.

35.5 **Sewer Flooding**
The water companies are required to report their performance each year against performance indicators. These indicators cover the basic service that consumers expect to receive.

The DG5 register is an indicator performance in respect of internal sewer flooding of properties.

South West Water Ltd has provided an assessment of the number of properties at risk of flooding because of overloaded sewers under two categories:

- once in every ten years
- twice or more in every ten years

The company also report on sewer flooding incidents under two causal categories:

- overloaded sewers
- other causes (temporary problems)

No locations were reported to have suffered DG5 sewer flooding in Yelverton between 1\textsuperscript{st} January 2000 to 1\textsuperscript{st} August 2014.
35.6 **Highway Flooding**
Surface water runoff from land on to the highway combined with blocked gulleys has on occasion contributed to the flooding in the village. Harrowbeer Lane has suffered surface water flooding as result of obstructions to surface water pipework.

35.7 **Ground Water Flooding**
The Environment Agency maps indicate that the whole area could be susceptible to groundwater flooding to some degree. Percolation rates in the area are variable and can be poor.

35.8 **Flood Mapping**
Maps indicating the predicted extent of fluvial, surface water and groundwater flooding for the Yelverton area can be found in Appendix B. These are produced from data provided by the Environment Agency.
Appendix A – WDBC Planning Authority Settlement Flood Maps
Appendix B DNPA Planning Authority Settlement Flood Maps