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# **Tunbridge Wells Stage 1 Surface Water Management Plan**

**FINAL Report**

**October 2013**

**Kent County Council  
County Hall  
MAIDSTONE  
Kent  
ME14 1XQ**



## JBA Project Manager

Rachel Huitson-Little MSc CEnv MCIWEM C.WEM  
Aberdeen House  
South Road  
HAYWARDS HEATH  
West Sussex  
UNITED KINGDOM  
RH16 4NG

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## Contract

This report describes work commissioned by Kent County Council, under commission reference LL051. Kent County Councils' representative for the contract was Max Tant of Kent County Council. Margaret Moran and Rachel Huitson Little of JBA Consulting carried out this work.

Prepared by .....Margaret Moran LLM BSc Dip  
Analyst

Reviewed by .....Rachel Huitson-Little MSc CEnv MCIWEM C.WEM  
Principal Analyst

## Purpose

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## Acknowledgements

We would like to acknowledge and thank Tunbridge Wells Borough Council, Romney Marsh IDB Upper Medway IDB, Southern Water, Environment Agency and Kent County Council for all their assistance during this project.

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## Abbreviations and Glossary of Terms

Term	Definition
CFMP	Catchment Flood Management Plan- 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.
CIRIA	Construction Industry Research and Information Association
DA	Drainage Area
DEM	Digital Elevation Model
Drainage Area	Are defined for the purposes of this study using FMfSW (1 in 200 year (deep)), historic flooding records and policy areas as defined by Kent County Council
DTM	Digital Terrain Model
EA	Environment Agency
EU	European Union
Flood defence	Infrastructure used to protect an area against floods as floodwalls and embankments; they are designed to a specific standard of protection (design standard).
Flood Risk Area	An area determined as having a significant risk of flooding in accordance with guidance published by Defra and WAG (Welsh Assembly Government).
Flood Risk Regulations	Transposition of the EU Floods Directive into UK law. The EU Floods Directive is a piece of European Community (EC) legislation to specifically address flood risk by prescribing a common framework for its measurement and management.
Floods and Water Management Act	Part of the UK Government's response to Sir Michael Pitt's Report on the Summer 2007 floods, the aim of which is to clarify the legislative framework for managing surface water flood risk in England.
Fluvial Flooding	Flooding resulting from water levels exceeding the bank level of a main river
FMfSW	Flood Map for Surface Water
IDB	Internal Drainage Board
JBA	Jeremy Benn Associates
KCC	Kent County Council
LLFA	Lead Local Flood Authority - Local Authority responsible for taking the lead on local flood risk management
Main River	A watercourse shown as such on the Main River Map, and for which the Environment Agency has responsibilities and powers
NPPF	National Planning Policy Framework
NRD	National Receptor Dataset – a collection of risk receptors produced by the Environment Agency
Ordinary Watercourse	All watercourses that are not designated Main River. Local Authorities or, where they exist, IDBs have similar permissive powers as the Environment Agency in relation to flood defence work. However, the riparian owner has the responsibility of maintenance.
Pathway	The mechanism or method flood waters are directed to a location/ receptor.
PFRA	Preliminary Flood Risk Assessment
Receptor	The area at risk from receiving flood water
RFCC	Regional Flood & Coastal Committees
Risk	In flood risk management, risk is defined as a product of the probability or likelihood of a flood occurring, and the consequence of the flood.
RMA	Risk Management Authorities
SAB	SuDS Approving Body - responsible for approving, adopting and maintaining drainage plans and SuDS schemes that meet the National Standards for sustainable drainage.
Sewer flooding	Flooding caused by a blockage or overflowing in a sewer or urban drainage system.
SFRA	Strategic Flood Risk Assessment
SHLAA	Strategic Housing Land Availability Assessment - The Strategic Housing Land Availability Assessment (SHLAA) is a technical piece of evidence to support the Core Strategy and Sites & Policies Development Plan Documents (DPDs). Its purpose is to demonstrate that there is a supply of housing land in the District which is suitable and deliverable.
Source	Source of flooding i.e. heavy rainfall
Stakeholder	A person or organisation affected by the problem or solution, or interested in the

Term	Definition
	problem or solution. They can be individuals or organisations, includes the public and communities.
SuDS	Sustainable Drainage Systems - Methods of management practices and control structures that are designed to drain surface water in a more sustainable manner than some conventional techniques
Surface water flooding	Flooding as a result of surface water runoff as a result of high intensity rainfall when water is ponding or flowing over the ground surface before it enters the underground drainage network or watercourse, or cannot enter it because the network is full to capacity, thus causing what is known as pluvial flooding.
SW	Southern Water
SWMP	Surface Water Management Plan - The SWMP plan should outline the preferred surface water management strategy and identify the actions, timescales and responsibilities of each partner. It is the principal output from the SWMP study.
TWBC	Tunbridge Wells Borough Council
UMIDB	Upper Medway Internal Drainage Board
RMIDB	Romney Marsh Internal Drainage Board

# 1 Introduction

## 1.1 What is a Surface Water Management Plan

A Surface Water Management Plan (SWMP) is a study to understand the flood risks that arises from local flooding, which is defined by the Flood and Water Management Act 2010 as flooding from surface runoff, groundwater, and ordinary watercourses.

SWMPs are led by the Lead Local Flood Authority (Kent County Council) in partnership with other flood risk management authorities. In relation to the Stage 1 SWMP, risk management authorities include Kent County Council, Local Authority, Environment Agency, Internal Drainage Boards (IDBs), Southern Water and other relevant authorities. The purpose of a SWMP is to identify what the local flood risk issues are, the effect they have and what options there may be to manage them. These options are presented in an Action Plan which lists the partners who are responsible for taking the options forward. Although the SWMP provides a full flood history for the study area which may include coastal and fluvial flood sources, the action plan only proposes measures to manage local flooding. The Action Plan is agreed by partners and reviewed periodically.

This SWMP is being undertaken by Kent County Council (KCC) to investigate the local flood risks in Tunbridge Wells as part of their remit for strategic oversight of local flood risk management in Kent, conferred on them by the Flood and Water Management Act 2010. Tunbridge Wells has been identified as an area potentially at risk of local flooding in the Preliminary Flood Risk Assessment<sup>1</sup>, which KCC undertook in 2011 for the whole county of Kent. This SWMP will determine whether there are any local flood risks and what further work may be needed. To find out more about KCC's role and other SWMPs they are undertaking, please visit their website:

[www.kent.gov.uk/flooding](http://www.kent.gov.uk/flooding)

## 1.2 Summary of aims and objectives

The main aims and objectives of the Tunbridge Wells Stage 1 SWMP are detailed below:

1. The establishment of a local partnership;
2. The collation of a comprehensive flood history for all relevant local flood risk sources;
3. The identification, collation and mapping of all available flood data and its availability for future use including an assessment of the reliability of the data;
4. The identification, where possible from the available data, of flood prone areas;
5. The identification of areas where existing data may be missing or unreliable, as a consequence of inappropriate local assumptions, additional local features or any other reason, and options to improve our understanding;
6. The identification of areas where the risks are from a combination of sources;
7. Identification of any proposed or allocated development sites and any impacts they may have on local flood risks (where sites are made available);
8. The preparation of source pathway receptor models for all the risks and sources that are identified;
9. The identification of any easy win opportunities that are apparent without further work, which may include planning policies or simple flood defence measures; and
10. A clear plan for further work, which may include:
  - a. What needs to be achieved to reduce flood risk, including next steps;
  - b. The owner of the actions;
  - c. The timeframe for undertaking them; and
  - d. Indicative costs.

## 1.3 Study area

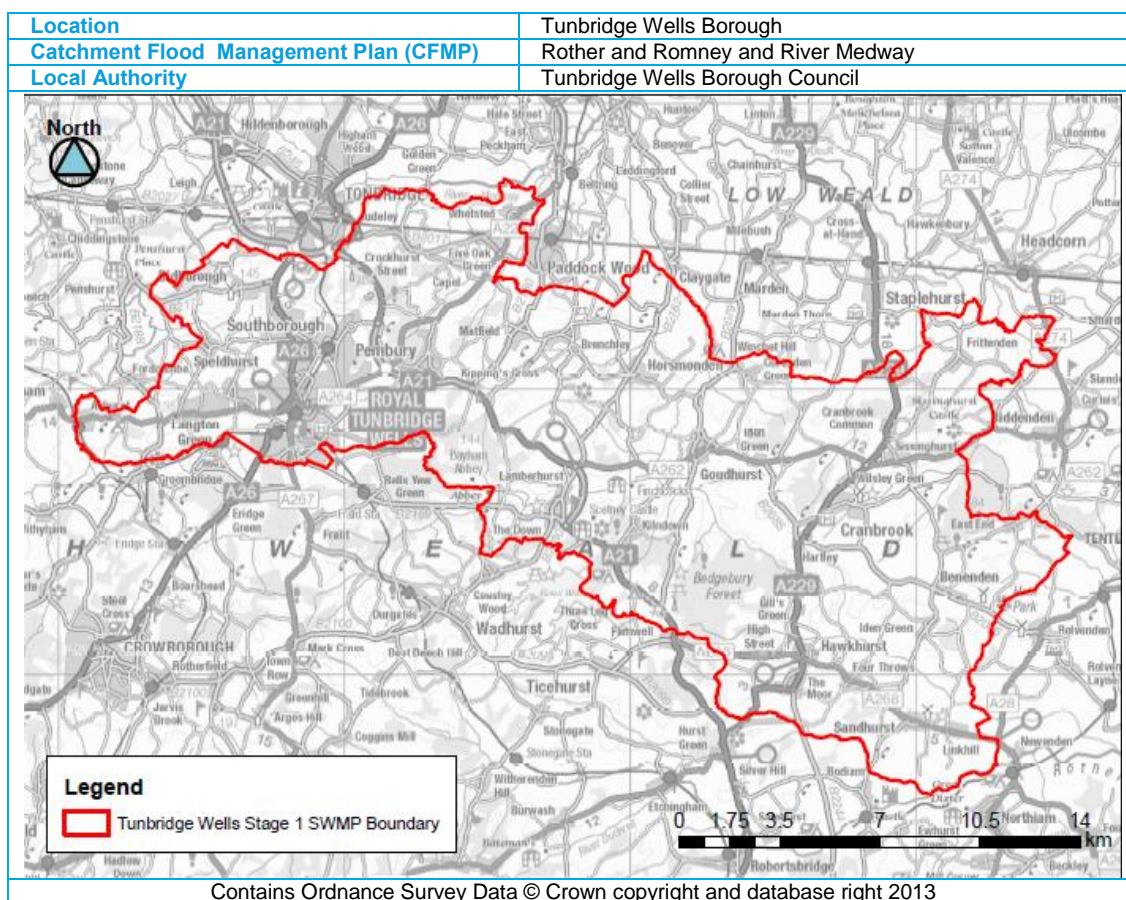
The SWMP study area includes Tunbridge Wells borough but excludes the area of Paddock Wood as this was covered within the Paddock Wood SWMP<sup>2</sup>. Figure 1.1 describes the extent of the study area.

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<sup>1</sup> Kent County Council (2011) Preliminary Flood Risk Assessment available at <http://publications.environment-agency.gov.uk/PDF/FLHO1211BVSI-E-E.pdf>

<sup>2</sup> [Kent County Council \(2011\) - Paddock Wood SWMP](#)





**Figure 1.1 Study Area**

### 1.3.1 Catchment Flood Management Plan (CFMP)

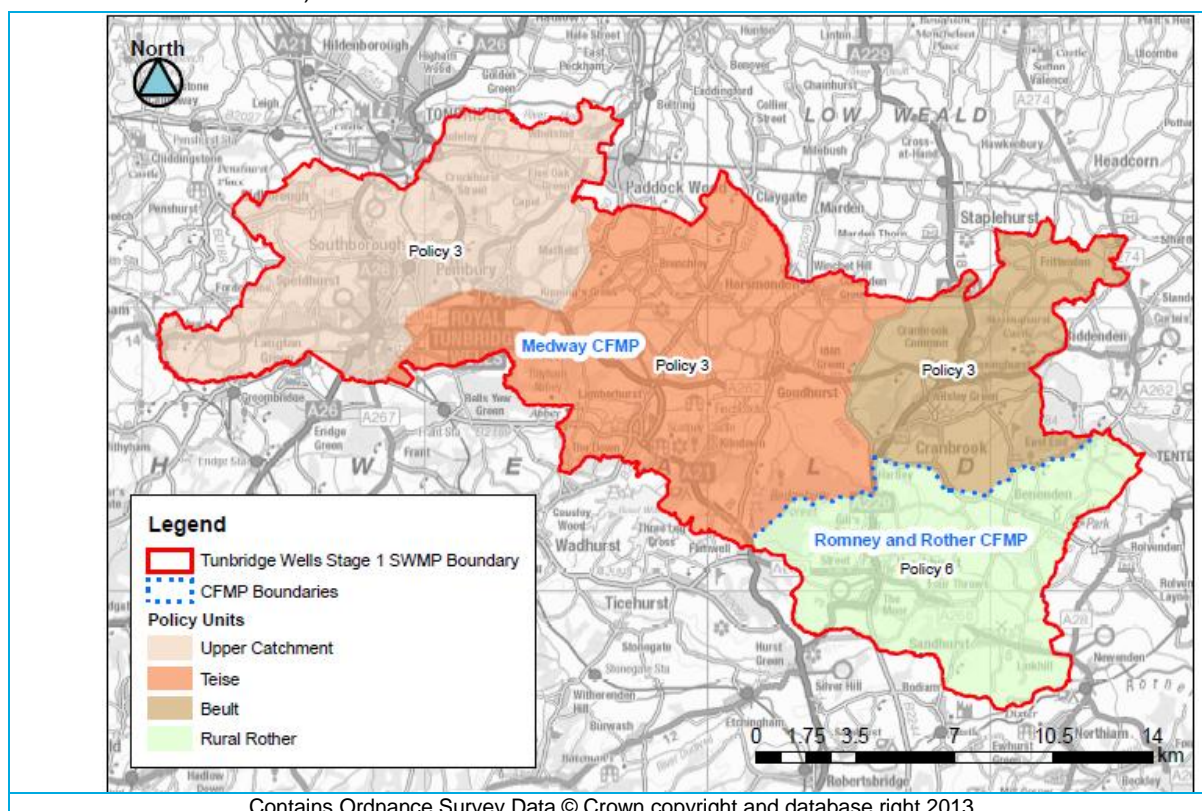
Catchment Flood Management Plans give an overview of the flood risk across each river catchment. They recommend ways of managing those risks now and over the next 50-100 years. They consider all types of inland flooding, and take into account the likely impacts of climate change, the effects of how land is used and managed. Tunbridge Wells borough falls within two river catchments and, as such, two CFMP's as illustrated in Figure 1.2. It is important that work undertaken within the borough is mindful of the flood risk management policies set by these high level strategic plans.

1. Rother and Romney CFMP
2. River Medway CFMP

There are six pre-defined national policies provided in the CFMP guidance and these are applied to specific locations through the identification of 'Policy Units'. These policies are intended to cover the full range of long term flood risk management options in the catchment that can be applied to different locations. Within any CFMP six standard flood risk management policies has been applied to a policy unit. Figure 1.2 illustrates which policy has been applied to each policy unit:

- Policy 1 – No active intervention (including flood warning and maintenance). Continue to monitor and advice.
- Policy 2 – Reduce existing flood risk management actions (accepting that flood risk will increase over time).
- Policy 3 – Continue with existing or alternative actions to manage flood risk at the current level.
- Policy 4 – Take further action to sustain the current level of flood risk into the future (responding to the potential increases in risk from urban development, land use change and climate change).
- Policy 5 – Take further action to reduce flood risk.

- Policy 6 – Take action to increase the frequency of flooding to deliver benefits locally or elsewhere (which may constitute an overall flood risk reduction, e.g. for habitat inundation).



**Figure 1.2 CFMP Policy Units and Applicable Policies<sup>3</sup>**

### 1.3.2 Surface Water

Surface water presents a risk throughout Tunbridge Wells. When there are instances of heavy rainfall and water fails to infiltrate to the ground or enter the drainage system there is an increased risk of surface water flooding. Ponding generally occurs at low points in the topography. Historically there have been events attributed to surface water; however the likelihood of flooding is dependent on not only the rate of runoff but also the condition of the surface water drainage system (surface water sewers, KCC Highways drains and gullies, open channels, ordinary watercourses and SuDS).

There are two sources of information available from the Environment Agency, relating to the identification of potential surface water flood risk in Tunbridge Wells. These are;

- Areas Susceptible to Surface Water Flooding (ASStWF) - Since July 2009, these maps have been available to Local Resilience Forums and Local Planning Authorities, and provided a starting point in understanding the broad areas where surface water flooding is likely to cause problems
- Flood Maps for Surface Water (FMfSW) - these followed on from the ASStWF maps and provide a more realistic representation than the ASStWF maps in many circumstances. The Environment Agency considers this to be the national source of information<sup>4</sup>.

It should be noted that the Environment Agency are currently updating national surface water mapping and will soon be releasing the Updated Flood Map for Surface Water (UFMfSW). The UFMfSW aims to provide an improvement on the representation of surface water flood risk across England and Wales. At the time of writing this report, the UFMfSW was being

<sup>3</sup> Please note, the boundaries of the CFMP Policy Units have been digitised approximately from the relevant CFMP available from <http://www.environment-agency.gov.uk/research/planning/33586.aspx>

<sup>4</sup> Environment Agency (2012) Flooding from Surface Water - available at <http://www.environment-agency.gov.uk/research/planning/109490.aspx>

reviewed by the LLFA. Kent County Council's review period began in December 2012 and ends in June 2013. The UFMfSW are due to be released by the end of 2013. Therefore, for the purposes of this report the FMfSW datasets have been used.

### 1.3.3 Watercourses

#### Main Rivers

'Main River' is a legal term used to classify watercourses that have the potential to cause significant flooding. The Environment Agency has permissive powers to carry out maintenance and improvement on these rivers.. The Stage 1 SWMP makes reference to Main Rivers throughout the report. However, it is important to note the focus of the study is local flooding issues relating to surface water and / or a combination of flooding sources. Table 1-1 describes the list of Main Rivers, which are managed by the Environment Agency within Tunbridge Wells.

**Table 1-1 List of Main Rivers**

CFMP	Watercourse
Rother Romney	River Rother
Medway	River Medway
	Alder Stream
	Somerhill Stream
	River Teise
	Lesser Teise
	River Bewl

#### Ordinary Watercourse

Ordinary watercourses are watercourses that are not designated as Main Rivers, and are usually the smaller tributaries of them. KCC, Tunbridge Wells Borough Council and Internal Drainage Boards<sup>5</sup> have permissive powers to carry out works on ordinary watercourses and also have responsibilities in relation to consenting and enforcement. Figure 1.3 illustrates that there are two Internal Drainage Boards within Tunbridge Wells.

1. Romney Marsh IDB
2. Upper Medway IDB

The flooding mechanism for ordinary watercourses is similar to flooding from rivers. Due to the small nature of ordinary watercourses and the sometimes complex drainage mechanisms they may have (such as sluice gates, weirs and pumps), the risk can be difficult to assess. However, ordinary watercourses are generally considered to be low risk systems that do not pose a flood risk on the same scale as main rivers; however they still pose a local flood risk.

There is a high concentration of ordinary watercourses throughout Tunbridge Wells borough, characterised by a number of managed drains. The drainage is complex and one severe rainfall event can cause flooding on a number of ordinary watercourses simultaneously. A flood event can be exacerbated, especially if it is combined with high levels on Main Rivers.

#### Riparian Owners

If you own land adjoining a watercourse, you have certain rights and responsibilities, and in legal terms you are a 'riparian owner'. Some of your responsibilities include:

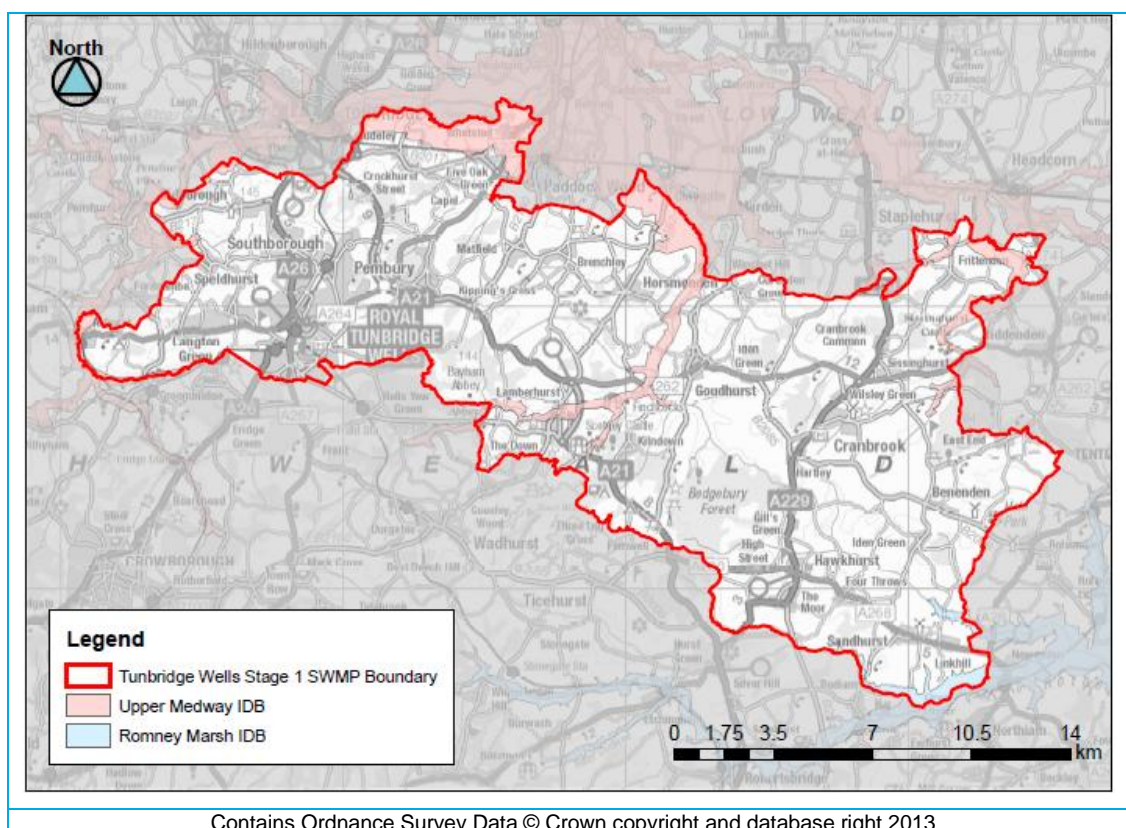
- Maintaining river beds and banks;
- Allowing the flow of water to pass without obstruction; and
- Controlling invasive alien species such as Japanese knotweed.

Riparian owners should read the Environment Agency publication 'Living on the Edge' (2013) to find out more information about their responsibilities<sup>6</sup>.

<sup>5</sup> An Internal Drainage Board's permissive powers pertain to those ordinary watercourses within their boundaries.

<sup>6</sup> [Environment Agency \(2012\) Living on the Edge](#)





**Figure 1.3 Location of IDBs within Tunbridge Wells**

### 1.3.4 Sewers

Southern Water is responsible for the sewers in this area. Data provided shows that there are a various sewer types located within Tunbridge Wells:

- Combined
- Foul
- Treated effluent
- Surface Water

Records show that the majority of sewers within the Tunbridge Wells study area are located in urban areas, such as Tunbridge Town. Predominantly the sewers are classified as combined within Tunbridge Wells Town with some surface water and foul sewers. In rural areas the majority of sewers are foul.

There are sewer models available from Southern Water for Tunbridge Wells borough. The location data was requested but it was not available at the time of writing this report.

## 1.4 Using this report

Use Table 1-2 to find the information that you need.

**Table 1-2 Report layout**

Section	Description of contents
1. Introduction	This section defines objectives of the stage 1 SWMP and describes the background of the study area.
2. Preparation	This section provides a summary of the key partners and consultation, data collected and a brief summary of the historic flooding collected. It introduces the source-pathway-receptor model and outlines how local sources of flood risk have been assessed.
3. Sustainable Drainage	Provides details on the suitability of SuDS within Tunbridge Wells.

Section	Description of contents
4. SWMP Action Plan	Provides details of the generic and location specific Action Plan and potential funding opportunities.
Appendix A Data Review	Provides a list of the data provided by the key partners for use in this project and its applicability to the Stage 1 SWMP.
Appendix B Detailed Summary Sheets and Mapping	The summary sheets give a brief description of the source pathway receptor model within individual drainage areas. The mapping illustrates historical flooding.
Appendix C Flood History Table	A table recording flood history data provided by the key partners, describing : <ul style="list-style-type: none"> <li>- Receptor</li> <li>- Date (Month/ Year) - of the flood event, if provided</li> <li>- Location (Area/Road/ Street etc)</li> <li>- Source - perceived source of flooding</li> <li>- No. of properties affected</li> <li>- Source supplied data (organisation)</li> <li>- Source supplied data (report)</li> <li>- Comments - any additional comments provided within the data</li> </ul>
Addendum 1	KCC Highways Issues - A table of historic records highlighted during the analysis of data received from the key partners that for the most part solely related to KCC Highways. <b>This Addendum is to be included within the report at the discretion of KCC.</b>
Addendum 2	Southern Water Issues - A table of historic records that require further investigation from Southern Water. <b>This Addendum is to be included within the report at the discretion of KCC and Southern Water.</b>

## 2 Preparation

### 2.1 Partnership Approach

Local flooding cannot be managed by a single authority, organisation or partner; all the key organisations and decision-makers must work together to plan and act to manage local flooding across Tunbridge Wells borough. Many organisations have rights and responsibilities for management of local flooding, KCC are the designated Lead Local Flood Authority (LLFA). Although Kent County Council has commissioned this project, the key partners have been consulted with at appropriate stages in the study. Working in partnership encourages co-operation between different agencies and enables all parties to make informed decisions and agree the most cost effective way of managing local flood risk across Tunbridge Wells borough over the long term. The partnership process is also designed to encourage the development of innovative solutions and practices; and improve understanding of local flooding.

#### 2.1.1 Key Partners

Partners are defined as organisations with responsibility for the decision or actions that need to be taken to manage surface water flooding. The key partners involved in this project are:

- Tunbridge Wells Borough Council
- Kent County Council
- Kent County Council - Highways
- Romney Marsh IDB
- Upper Medway IDB
- Environment Agency
- Southern Water

The Stage 1 SWMP was undertaken to determine whether there are any local flood risks within Tunbridge Wells borough that may require further work and / or investigation. In fulfilling this objective, the decision was made only to consult with the key partners noted above. Future studies that may be undertaken at a more local level will seek to widen this consultation to include parish and / or town councils, other community groups or local people. During the course of the study the key partners were involved in the following engagement events:

- Data gathering exercise and one to one meetings with each of the key partners
- Action plan workshop

### 2.2 Data Collation and Review

JBA Consulting met with each key partner, to discuss their knowledge and experience in relation to all sources of flooding across the study area. Data was collected from all key partners and the quality of the data was assessed and uncertainty or perceived weakness described and discussed with the key partners. A table summarising the data collected is located in Appendix A. A vast array of information was made available to inform the SWMP, including:

- The Environment Agency historical flood maps, FMfSW and LIDAR were used to delineate the individual drainage areas and define the receptive receptors within Tunbridge Wells.
- Records of historic flooding from KCC, KCC Highways, TWBC, IDB's and Southern Water (were used to identify areas where actions are required within Tunbridge Wells). It should be noted that many of the historic records, specifically from KCC Highways only went back as far as 2008.
- Tunbridge Wells Local Multi Agency Flood Plan which provided further indication of areas perceived to be at risk from flooding.



- Bedrock geology and superficial soils were informative when delineating individual drainage areas and also used to determine the applicability of SuDS type across the Tunbridge Wells borough.
- The National Receptor Database (NRD) was used and found to be informative when quantifying risk and prioritising potential measures and actions. The NRD was not used to determine numbers potentially affected by flooding but rather to indicate the critical infrastructure that may be impacted by local flooding.
- Other data utilised included the Tunbridge Wells SFRA<sup>7</sup> and anecdotal information collected while meeting with the key partners.

## 2.3 Historical flooding

Each Risk Management Authority (RMA) provided data on incidents of historical flooding. The records begin in 1958 to the present; there are a number of records that do not have a date specified. Historical flooding maps are displayed in Appendix B and the flood history tables are located in Appendix C. These have been compiled to provide further details on each recorded event received from all RMAs.

Historical flooding from Main Rivers has been described within the flood history table and displayed on the historical flooding maps, where key partners have provided records. It should be noted that Main River flooding has been included within this report to determine where a combination of issues (surface water, sewer, and groundwater) require an action. However, if an issue is solely related to Main River flooding, an action has not been prescribed as this is outside the remit of the Stage 1 SWMP. Actions to address flood risk from Main Rivers are considered within the Catchment Flood Management Plans (CFMPs).

A summary of historical flooding is noted below. Although the sources of flooding have been segregated into fluvial, surface water and sewers the issues highlighted within the summary may have originated from a number of sources.

### Fluvial

Within the borough of Tunbridge Wells, it has been highlighted through the flood history that there are issues with insufficient capacity in ordinary watercourses and within their relative culverts, during extreme events have surcharged in the past. Examples of this were experienced in Folly Shaw, Roundabout Wood (Tunbridge Wells Town) and High Street Cranbrook. There have been issues historically with unmaintained watercourses. Blocked trash screens and culverts have been reported to cause flooding problems, specifically within Tunbridge Wells Town.

There are records of the River Medway (Main River) overtopping its banks and defences in 1960, 1968 and 2000. Regular flooding was reported from the River Teise (Main River) at Lamberhurst. The Environment Agency has funded two property level protection (PLP) schemes for properties at risk of flooding from the River Teise (Main River) and the Brewer Stream. Residents rely on the flood warning service to operate them. Records also describe flooding from the River Rother (Main River) due to overtopping of its defences.

The Alder Stream (Main River) flows through Five Oak Green; the catchment of Alder Stream is described as flashy, regular flooding has been recorded from this stream. The railway embankment acts as a dam and makes flooding worse. Roads and property have been described as being affected. In some instance when the water levels are high in the Alder Stream this may cause a knock on affect on highway drains and gullies and local sewer networks.

### Surface Water

The historical records are dispersed throughout the borough. It should be noted that records from KCC Highways are from the period of June 2008 to January 2013. There are limited records of older events from other key partners, the majority of records were provided from Kent County Council Highways.

<sup>7</sup> Tunbridge Wells SFRA (2009) available at <http://www2.tunbridgewells.gov.uk/default.aspx?page=2846>  
2012s6727 - Tunbridge Wells Stage 1 SWMP (v1.0 Oct 2013)

For the most part surface water flooding could be attributed to heavy rainfall overloading carriageways, drains/ gullies. In other instances, the cause of flooding was perceived to be from blocked drains/ gullies or due to high levels in within receiving watercourses impeding free discharge from surface water drains and gullies.

In addition there are recorded issues where a road is regularly affected by flooding due to run off from adjacent fields discharging into a watercourse that does not have sufficient capacity to convey the flows. A specific example of this was described on Whites Lane, Foxhole Lane and Rye Road.

### Sewer

Southern Water provided records of historical flooding within Tunbridge Wells borough from 2008 -2012. The data presented the number of events that occurred within a particular post code. An indication was given within the records as to whether the event flooded properties internally, externally or whether it was within the curtilage of a property.

Where further information was provided upon discussion with the key partners, this was added to the comments within the Flood History Table in Appendix C. Southern Water has been made aware of any specific locations where historic records indicate that a combination of sources may affect sewer flooding.

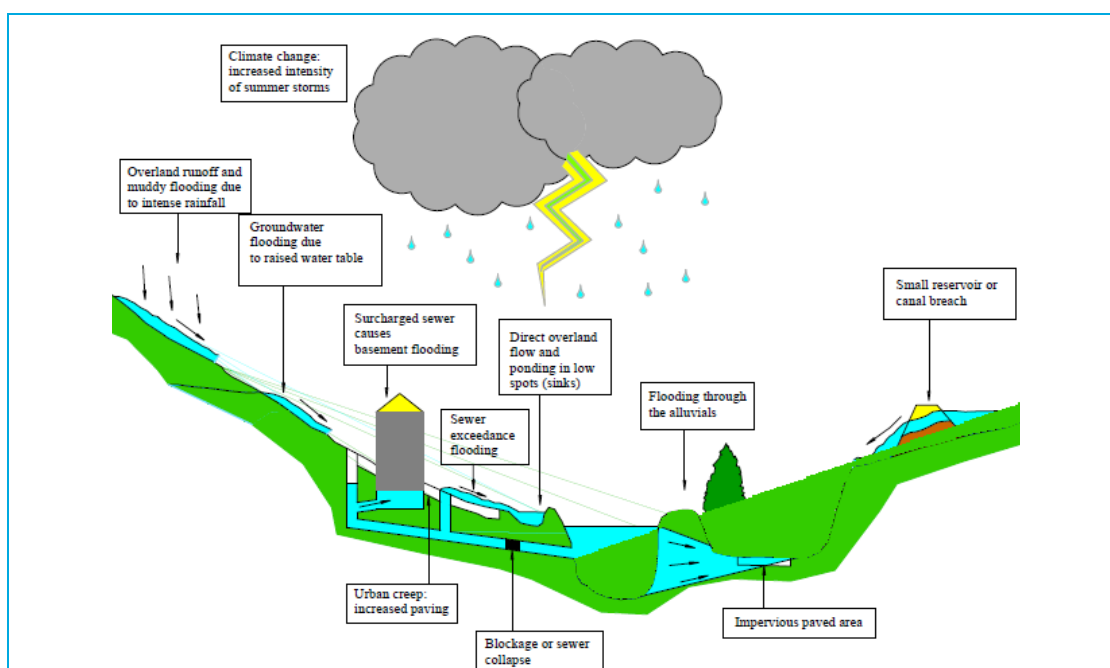
There have been numerous incidents of sewer flooding within Tunbridge Wells town. The Environment Agency explained those watercourses that flow off the Tunbridge Wells Dome are regularly polluted with storm discharge. The EA's Environment Management Team is aware of this issue.

### Other

Records provided describe flooding perceived to be from groundwater sources. However, it should be noted from the data provided and following consultation with the key partners, it is difficult to ascertain if a source of flooding is from groundwater. This is because flood risk may be as a result of a combination of sources, or a culverted watercourse may have been mistaken for a spring or underground stream.

## 2.4 Source Pathway Receptor

The Source-Pathway-Receptor concept can be used to highlight the processes that influence the flood risk in a given area. A simple schematic is illustrated in Figure 2.1.



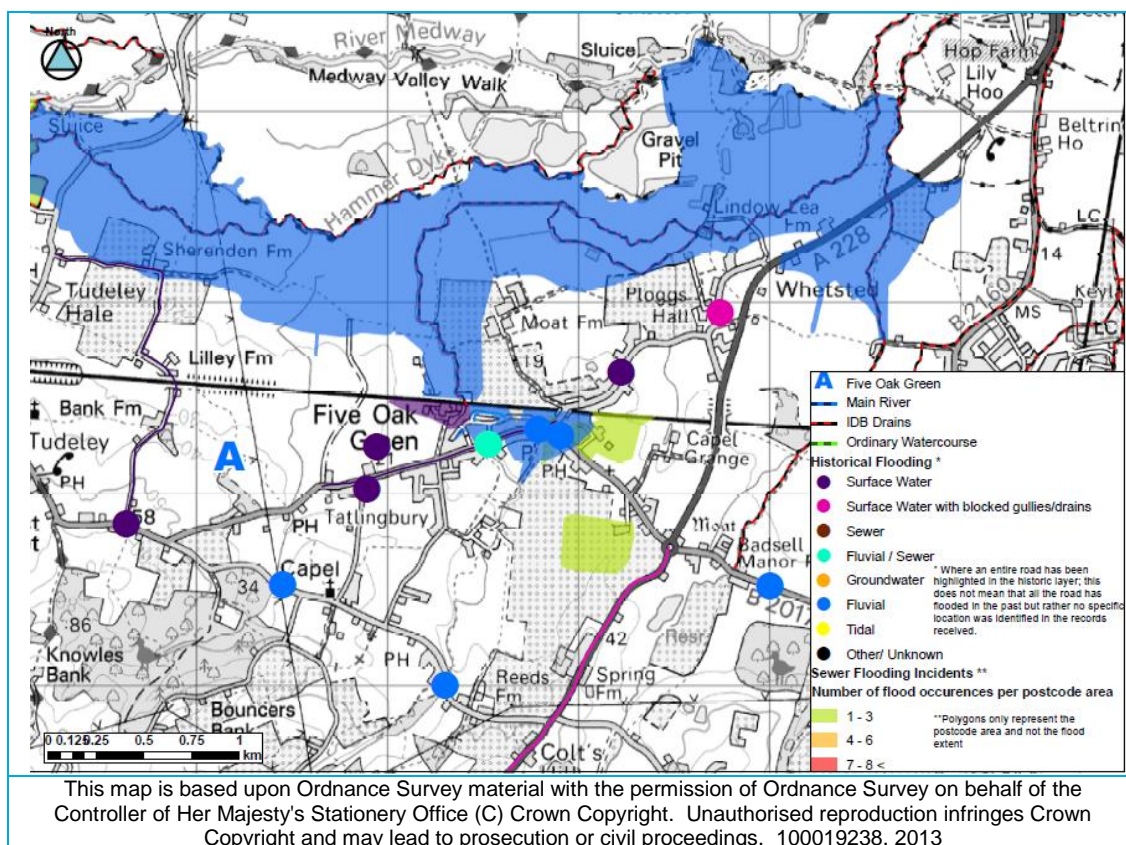
**Figure 2.1 Source-Pathway-Receptor**

The sources of flood water in the study catchment are summarised below:

- Heavy rainfall resulting in surface water runoff and overloaded sewers
- Surface water (blocked drains / gullies)
- Rivers - overtopping of river banks
- Groundwater<sup>8</sup>

The pathways for flooding are the sewer networks, drains and gullies, highways/ roads and river networks within Tunbridge Wells. Further detail on pathways is located in the summary sheets in Appendix B (see section 2.5 for discussion on summary sheets).

Receptors within the Tunbridge Wells study area were highlighted where supplied historic records indicate groupings of flood incidents in particular locations. In addition the FMfSW - 1 in 200 year (deep) was used to indicate where potential receptors may be located. It should be noted that the location of the receptor is not intended to specifically pinpoint an exact location (i.e. house, business or street) as a receptor. Rather, a receptor has been used to highlight an area, such as a settlement, for example, see Figure 2.2.



**Figure 2.2 Example of a Tunbridge Wells Stage 1 SWMP Receptor (Five Oak Green)**

## 2.5 Communicating and mapping the risk

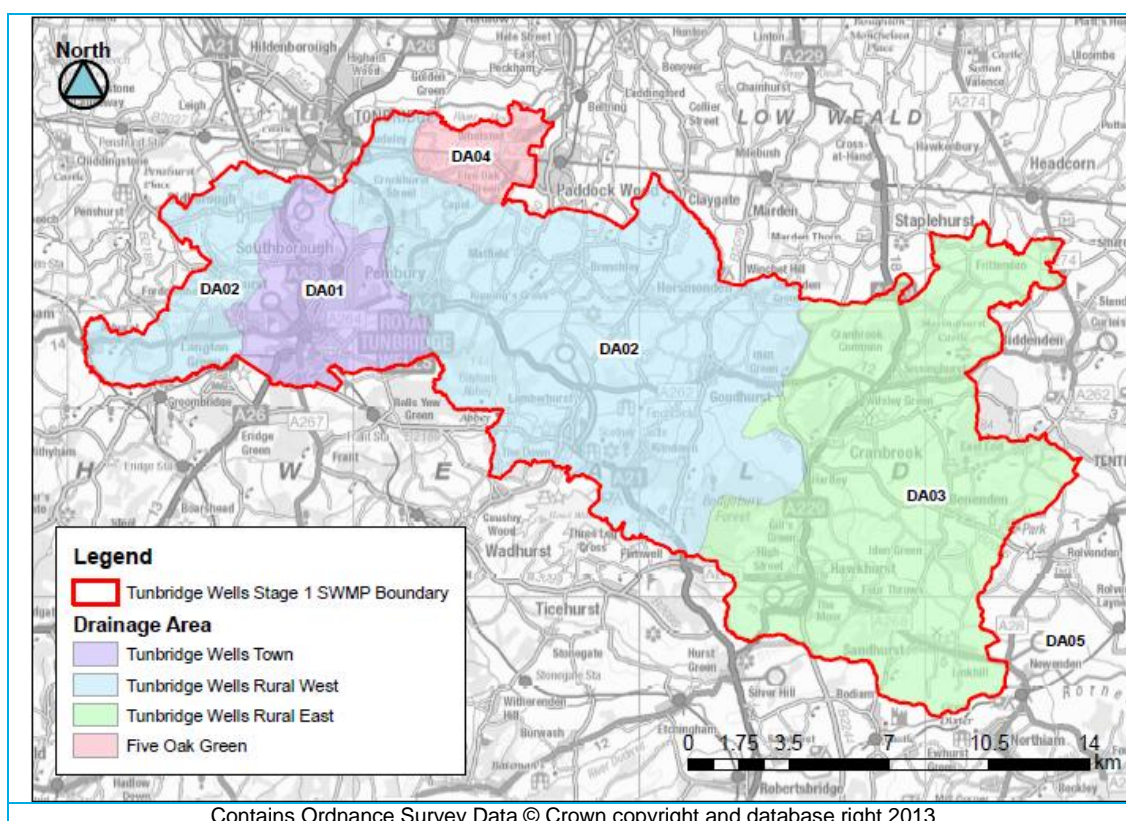
In order to consider the study area in more detail and enable partners and other interested parties to be able to focus in on certain areas of interest (aside from the whole SWMP area), Tunbridge Wells borough has been split into drainage areas, see Table 2-1 and Figure 2.3. The drainage areas have been split using the topography of the landscape, historic events, mapped outlines and Flood Maps for Surface Water (1 in 200-year, deep). In addition to historical records of flooding and the FMfSW, IDB boundaries (which are catchment based) and geological boundaries have also been used. Where appropriate these drainage areas have been used to influence KCCs Local Flood Risk Management Strategy policy units.

<sup>8</sup> It should be noted from the data provided and following consultation with the key partners, it is difficult to ascertain if a source of flooding is from groundwater. This is because flood risk may as a result of a combination of sources, or a culverted watercourse may have been mistaken for a spring or underground stream.



**Table 2-1 Tunbridge Wells Drainage Areas**

Drainage Area	Location
DA01	Tunbridge Wells
DA02	Tunbridge Wells Rural West
DA03	Tunbridge Wells Rural East
DA04	Five Oak Green



**Figure 2.3 Tunbridge Wells Drainage Areas**

Each drainage area has been described in detail in a corresponding summary sheet in Appendix B. Each summary sheet provides an overview of;

- the drainage area;
- its size;
- drainage assets i.e. main river, ordinary watercourse and sewer network;
- highlights the source-pathway-receptor model within each area.

A Historic Flooding map is provided for each Drainage area to accompany the summary sheets. This map details the location of the historic flood data as provided by the key partners and illustrates the location of the IDB Boundaries within Tunbridge Wells borough.

In addition, each drainage area has a corresponding flood history table, which provides details of all recorded historic data, as provided by the key partners. The flood history tables are located in Appendix C, they include details on the:

- Year of the incident
- General location
- Perceived source as per the data provided
- Whether property was recorded as being affected
- Any additional comments provided within the historic datasets

## 2.6 Site Allocations

Tunbridge Wells Borough Council Core Strategy Development Plan Document (DPD), adopted June 2010<sup>9</sup>, describes the core policies for development areas such as Royal Tunbridge Wells. Table 2-2 correlates the core policy area, Drainage Areas and Receptors defined for Tunbridge Wells borough.

Planners and developers should use this table to easily locate a site allocation, its relevance within the adopted Core Strategy and locate relevant data regarding local flood risk within the detailed summary sheets and mapping (Appendix B) and flood history table (Appendix C).

**Table 2-2 Core Policies relating to Development Areas**

Core Policy (June 2010)	Policy Reference (from DPD)	Drainage Area	Receptor	Receptor Name
Sustainable Design and Construction	5	All	All	All
Development in Royal Tunbridge Wells	9	DA01	All	Tunbridge Wells Town
Development in Southborough	10	DA01	A	Southborough
Development in Cranbrook	12	DA03	B	Cranbrook, Sissinghurst, Golford
Development in Hawkhurst	13	DA03	D	Hawkhurst
Development in the Villages and Rural Areas	14	DA02, DA03 and DA04	All	All

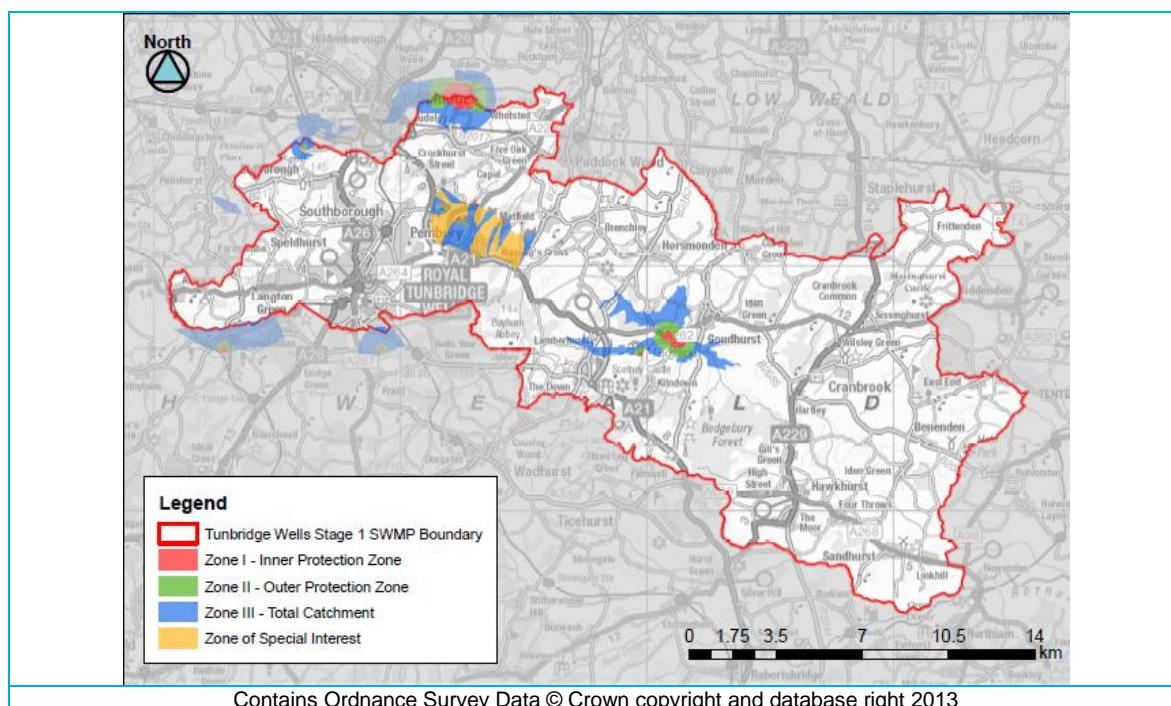
<sup>9</sup> Tunbridge Wells Borough Council Local Development Framework Core Strategy Development Plan Document Adopted June 2010

## 3 Sustainable Drainage Systems

### 3.1.1 Feasibility of SuDS in Tunbridge Wells

The choice of SuDS technique is site-specific, depending on the nature of the proposed development and local conditions. The suitability of areas for different types of SuDS techniques is often determined by existing landuse and in the case of SuDS which involve infiltration, soil type, underlying geology and ground water conditions need also to be considered.

When considering infiltration options, groundwater source protection zones must also be considered. The Environment Agency's website provides a web based resource in order to check the Groundwater Source Protection Zone in their "What's in my backyard" section<sup>10</sup>. Zone I - Inner protection Zones, Zone II - Outer Protection Zones and Zone III Total Catchment are within the Tunbridge Wells study area, see Figure 3.1. The Environment Agency have defined Source Protection Zones (SPZs) for 2000 groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones show the risk of contamination from any activities that might cause pollution in the area. The closer the activity, the greater the risk, Figure 3.1 shows the three main zones (inner, outer and total catchment) and a fourth zone of special interest which may apply to a groundwater source.<sup>11</sup> If a discharge is proposed within a source protection zone then additional information may be required to demonstrate that there is not an unacceptable risk to groundwater and to the surrounding environment. Additional information and advice can be found on the website [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk) and within the document Groundwater protection: Principles and practice (GP3)<sup>12</sup>.



**Figure 3.1 Groundwater Source Protection Zone**

Tunbridge Wells Borough Council recommends that all development should seek to maximise water efficiency. Buildings should be fitted with water efficient fixtures and fittings. Rainwater

<sup>11</sup> <http://www.environment-agency.gov.uk/homeandleisure/37833.aspx> - Please note that the fourth zone SPZ4 or 'Zone of Special Interest' was previously defined for some sources. SPZ4 usually represented a surface water catchment which drains into the aquifer feeding the groundwater supply (i.e. catchment draining to a disappearing stream). In the future this zone will be incorporated into one of the other zones, SPZ 1, 2 or 3, whichever is appropriate in the particular case, or become a safeguard zone.

<sup>12</sup> [Environment Agency \(2013\) Groundwater protection: principles and practice \(GP3\)](#)



harvesting should also be investigated, as a minimum to collect rainwater for use in the garden. New development should also seek to incorporate Sustainable Drainage Systems (SuDS), for example through green roofs and walls, rainwater recycling, permeable paving and soft landscaping to reduce surface water runoff where feasible and appropriate to the size and scale of the development. The hierarchy of surface water disposal is as follows

1. The use of SuDS techniques, appropriate to the location, size and type of development; further details can be found in the SuDS Manual C697 (2007) published by CIRIA.
2. Discharge to watercourse
3. Discharge to surface water sewer
4. Discharge to combined sewer

Further guidance can be found on the Tunbridge Wells Borough Council website in guidance documents such as "Saving Water - A guide for New Developments"<sup>13</sup> and "Water Efficient Homes"<sup>14</sup>. These documents provide a brief description of SuDS to consider within developments and what issues need to be considered. They also provide a list of useful contacts. Developers should also consider and have regard for the Kent Design Guide<sup>15</sup>.

The establishment of a SuDS Approving Body (SAB) is to be set up in county, borough or unitary local authorities. Kent County Council is designated the SuDS approving body (SAB) for Tunbridge Wells Borough Council. It should be noted that a clear timetable for implementation of the new responsibilities for SABs is still pending<sup>16</sup>. The duties of the SAB will be to approve drainage systems for new and redeveloped sites before construction can commence. Additionally the SAB will ensure that proposed drainage systems will meet the new National Standards for design, construction, operation and maintenance. The SAB will then be responsible for approving, adopting and maintaining drainage plans and SuDS schemes that meet the National Standards.

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<sup>13</sup> Tunbridge Wells Borough Council - [Saving Water - A guide for New Developments](#)

<sup>14</sup> [Tunbridge Wells Borough Council - Water Efficient Homes](#)

<sup>15</sup> [The Kent Design Guide](#)

<sup>16</sup> **Please note** a clear timetable for implementation of the new responsibilities for SABs is still pending.  
<https://www.gov.uk/government/policies/reducing-the-threats-of-flooding-and-coastal-change>  
2012s6727 - Tunbridge Wells Stage 1 SWMP (v1.0 Oct 2013)

## 4 SWMP Action Plan

### 4.1 Introduction

The SWMP has identified a range of recommended actions for the reduction of flood risk across the Tunbridge Wells SWMP area. The Action Plan collates all information undertaken and collated as part of this SWMP study and:

- Outlines the actions required and where and how they should be undertaken;
- Sets out which partner or stakeholder is responsible for implementing the actions and who will support them;
- Provides indicative costs; and
- Identifies priorities.

### 4.2 Generic Action Plan

Table 4-1 describes the generic actions to be applied throughout all drainage areas (DA01- DA04).

**Table 4-1 Generic Action Plan**

Ref	Applicable Drainage Areas	Action/Option (What?)	Priority Actions (How?)	Lead Action Owner	Supporting Action Owner(s)*	Priority (When?)**	Indicative Relative Cost
1	All Drainage Areas	Develop and implement a targeted maintenance schedule.  KCC, Tunbridge Wells Borough Council, Upper Medway IDB, Romney Marsh IDB and Southern Water should develop and implement a targeted maintenance schedule so that the highway gullies, drains and other drainage assets (including SuDS), watercourses and sewers operate effectively to their design capacity.	1. Use the Stage 1 SWMP to identify and record where existing drainage infrastructure is, where it drains to and who owns and/or is responsible for maintaining it.  Records of assets should be available to all partners.	KCC	EA TWBC, SW, RMIDB and UMIDB	Quick win	High
		KCC has maintenance schedules and programmes for gullies. As a priority these should be reviewed in consultation with other partners.	2. Partners to develop a coordinated risk based inspection and maintenance schedule using information in the SWMP (i.e. areas at high risk of flooding, natural flow routes, etc). It should be noted that any change in maintenance regime should be supported by evidence.	KCC	EA TWBC, SW, RMIDB and UMIDB	Medium Term	Medium

Ref	Applicable Drainage Areas	Action/Option (What?)	Priority Actions (How?)	Lead Action Owner	Supporting Action Owner(s)*	Priority (When?)**	Indicative Relative Cost
			3. Continue to invest in hydraulic improvements, including de-silting, root removal and minor collapse repair, to reduce the risk of property flooding.	KCC	EA TWBC, SW, RMIDB and UMIDB	Medium Term	Medium
			4. Communicate coordinated maintenance activities to the public to manage expectations.	KCC	EA TWBC, SW, RMIDB and UMIDB	Long Term	Low
2	All Drainage Areas	Raise awareness within the LLFA, partner organisations, developers and the general public regarding the policies for surface water management, specifically SuDS, within existing evidence base documents <sup>17</sup> such as:  Strategic Flood Risk Assessment Level 1 (November 2007)  Strategic Flood Risk Assessment Level 2 (September 2009)  The Core Strategy, adopted on 17 June 2010 - Chapter 4 Environment (4.121)	1. Ensure new developments incorporate SuDS in accordance with the NPPF and the requirements of the SuDS Approving Body (SAB)  2. Liaise with key partners regarding opportunities for surface water management, i.e. green infrastructure, where feasible.	KCC, EA TWBC, SW, RMIDB, and UMIDB		Quick win	High
			3. Ensure new developments do not increase the risk of surcharge of sewer network within their catchment.  4. Stakeholder engagement to inform the public about the benefits of rainwater reuse and recycling.	KCC, EA TWBC, SW and TW	LMIDB & UMIDB	Quick win	High
3	All Drainage Areas	Raise awareness within the borough of the issue caused by illegal connections to sewers.	Stakeholder engagement to inform the public about the consequences of misconnections	KCC, TWBC & SW	EA	Long Term	High
4	All Drainage Areas	Southern Water should endeavour to inform key partners about their sewer models.	Liaise with key partners to determine a method to disseminate information regarding sewer models completed.	SW, KCC	EA	Long Term	Low

<sup>17</sup> Tunbridge Wells Borough Council Evidence Base Documents

Ref	Applicable Drainage Areas	Action/Option (What?)	Priority Actions (How?)	Lead Action Owner	Supporting Action Owner(s)*	Priority (When?)**	Indicative Relative Cost
5	All Drainage Areas	Regulation 17 of the water environment (Water Framework Directive) (England and Wales) Regulations 2003 requires all public bodies, when exercising their functions so far as affecting a river basin district, to have regard for that district's river basin management plan and to any supplementary plans.	All key partners are to be mindful of their obligations under the Regulation 17 of the water environment (Water Framework Directive) (England and Wales) Regulations 2003 and environmental objectives as specified in the relevant River Basin Management Plans when carrying out locations specific actions.	KCC, EA TWBC, SW and TW		Long Term	Low

**\*Priority: Quick win = within 12 months. Short Term = up to 2 years. Medium Term = up to 5 years. Long Term = open ended/indefinite.**

### 4.3 Location Specific Action Plan

Table 4-2 describes the action plan for specific locations. Each action has been defined into its particular drainage area and receptor. Through discussion with the key partners specific actions for this stage of the Surface Water Management Plan were defined.

It should be noted that a specific action has not been defined for every receptor. It should be noted; generally where issues have been solely related to either KCC Highways or Southern Water these have been noted in a separate record/ addendum and passed to the relevant body to investigate and follow up with an action should it be required. Where KCC Highways or Southern Water issues have been discussed with key partners during the Data Validation and Action Plan Workshop and an action has been decided these have been highlighted below within the Location Specific Action Plan.

**Table 4-2 Location Specific Action Plan**

*DA01 - Tunbridge Wells*

DA	Area of benefit	Location of action	Action	Benefits	Next Steps	Action Owner	Supporter	Priority *	Indicative Cost (£) **
DA01	Southborough (A)	Speldhurst Road	<i>This location was highlighted as a drainage hotspot; A spring is thought to be the issue. Regular flooding recorded. Recorded events in 2008, 2009, 2012.</i>  KCC Highways explained that works are planned probably for this financial year to install a French drain to divert water from the spring away from the road	Speldhurst Road	KCC Highways have included this into their programme of works for 2013/2014	KCC Highways		Short Term	Up to 50k
DA01	High Brooms (B)	Southborough	<i>EA described that the industrial estate has many misconnections and there are issues with the culvert running through the estate. A CCTV survey is programmed to be completed.</i>						
			1. Complete CCTV survey to investigate the condition of the culvert in the area.	Improved conveyance and drainage	A study has been included within future schedule of works	KCC , EA and SW	, TWBC,	Short Term	Up to 50k
			2. Discuss with key partners feasible solutions to alleviate any issues identified from the CCTV survey		Include study within future schedule of works	EA and SW	KCC, TWBC,	Medium Term	Up to 50k

### DA02 - Tunbridge Wells Rural West

DA	Area of benefit	Location of action	Action	Benefits	Next Steps	Action Owner	Supporter	Priority *	Indicative Cost (£) **
DA02	Lamberhurst (H)	Pearse Place, Lamberhurst	<i>Areas of Tunbridge Wells Borough where historic surface water flooding incidents have been recorded include Lamberhurst, in the vicinity of Pearse Place resulting from overland flow along the route of a footway.</i>						
			Monitor the situation and should future flooding occur and enforcement action should be considered.		Include study within future schedule of works	KCC, SW, , TWBC	EA	Long Term	Up to £50k

### DA03 - Tunbridge Wells Rural East

DA	Area of benefit	Location of action	Action	Benefits	Next Steps	Action Owner	Supporter	Priority *	Indicative Cost (£) **
DA03	Frittenden (A)	Frittenden Village	<i>The TWBC LMAFP described areas of where historic surface water flooding incidents have been recorded and included Frittenden (in vicinity of Catherine Wheel Cottage).</i>						
			<i>There have also been records of hydraulic overload of foul sewer where the curtilage of one property was affected.</i>		Include study within future schedule of works	UMIDB KCC, SW, TWBC	EA	Long Term	Up to £50k
DA03	Cranbrook, Sissinghurst, Golford (B)	Cranbrook	<i>EA explained that the culverts through Cranbrook are old The culverts are unable to take peak flows and floods occur in the car park and in some commercial properties.</i>						
			Complete an investigation the condition the drainage system and the culverts in the area.	Improved conveyance and drainage	Include study within future schedule of works	, KCC, TWBC	SW	Medium Term	Up to 50k



DA	Area of benefit	Location of action	Action	Benefits	Next Steps	Action Owner	Supporter	Priority *	Indicative Cost (£) **
DA03	Cranbrook, Sissinghurst, Gifford (B)	High Street	<i>In 2011, KCC Highways recorded that property was damaged by flood inundation. KCC have also highlighted this area as a drainage hotspot, there is a need to replace an outlet pipe in the verge of the road. The TWBC SFRA also highlighted that there are issues with flows of a tributary backing up at a culvert under the High Street.</i>						
			Complete an investigation of the condition of the assets in the High Street.	Improved conveyance and drainage	Include study within future schedule of works	EA, KCC, TWBC SW		Medium Term	Up to 50k

#### DA04 - Five Oak Green

DA	Area of benefit	Location of action	Action	Benefits	Next Steps	Action Owner	Supporter	Priority *	Indicative Cost (£) **
DA04	Five Oak Green (E)	Five Oak Green	<i>Records describe the Alder Stream as a flashy catchment; the railway embankment acts as a dam and makes the flooding worse. Records describe sewer flooding in (1958, 1968, 2008 and 2009). TWBC SFRA described that a discharge from a development in Willow Crescent is connected to the Alder Stream. A culvert located here was described as not being able to accommodate flows leading to backing up of the stream. Alder Stream has also been known to back up behind the culvert under the railway. KCC Highways have since fitted a flap valve to this outfall going from Willow Crescent to the Alder Stream to alleviate this problem. We note that the EA has assessed the feasibility of several options to reduce fluvial flood risk from the Alder Stream. The EA are seeking funding to carry out selected options. External contributions will be required and are being sought.</i>						
			Complete a survey of assets within Five Oak Green with a view to future action in partnership with other key organisations such as the Environment Agency, Southern Water and Tunbridge Wells Borough Council	Residents of Five Oak Green	Include study within future schedule of works	KCC, EA, SW, TWBC		Short Term	Up to £50k

\* **Priority:** Quick win = within 12 months. Short Term = up to 2 years. Medium Term = up to 5 years. Long Term = open ended/indefinite.

\*\* **Indicative Cost:** Up to 50k, 50-150k, 150-250k or 250+k

#### 4.4 Review Timeframe and Responsibilities

The project partners have reviewed and commented upon the actions during the Action Plan workshop.

High priority actions identified in the 'Action Plan' are likely to be those addressed first. However, this report can only consider relative priorities *within* Tunbridge Wells. Some partner organisations, Southern Water, Upper Medway IDB, Romney Marsh IDB, Environment Agency and Kent County Council have flood risk management responsibilities beyond the geographic scope of this study, and therefore the priority of actions within Tunbridge Wells will have to be assessed against actions in other areas. Kent County Council is currently embarking upon a number of more strategic-scale SWMPs in a number of other settlements across the county.

Actions leading to capital works will initially require a detailed local study that provides robust estimates of costs and justification (i.e. tangible benefits) of the scheme. If a study demonstrates that a scheme is beneficial funding will need to be obtained before it can be delivered. Applications for funding and the implementation of solutions on the ground, all of the detailed study and availability of funding have the potential to change the findings and recommendations of this report.

It is recommended that an annual review of the High and Medium Priority actions is undertaken. This will allow for forward financial planning in line with external partners and internal budget allocations. Low priority actions should be reviewed on a three-year cycle.

#### 4.5 Sources of funding

Funding for local flood risk management may come from a wide range of sources. In Tunbridge Wells these may include:

- Defra (Flood Defence Grant in Aid)
- Industrial estate owners and businesses
- Kent County Council (highways)
- Tunbridge Wells Borough Council
- IDBs
- Local communities
- Network Rail
- New developments (directly through the developer or through CIL)
- Southern Water
- Local Levy from the southern region Regional Flood & Coastal Committees (RFCC)

It is likely that not all schemes in Tunbridge Wells will not have sufficiently strong cost-benefit ratios to attract 100% funding from Defra Flood Defence Grant in Aid (FDGiA), and would therefore require a portfolio of funding to be developed from various sources, including funding sources available for delivering other objectives such as improvements to highways, public open spaces and bio-diversity.

#### 4.6 Ongoing Monitoring

The partnership arrangements established as part of the SWMP process should continue beyond the completion of the SWMP in order to discuss the implementation of the proposed actions, review opportunities for operational efficiency and to review any legislative changes.

The SWMP Action Plan should be reviewed and updated once every six years as a minimum, but there may be circumstances which might trigger a review and/or an update of the action plan in the interim, for example:

- Occurrence of a surface water flood event;
- Additional data or modelling becoming available, which may alter the understanding of risk within the study area;

- Outcome of investment decisions by partners is different to the preferred option, which may require a revision to the action plan, and;
- Additional (major) development or other changes in the catchment which may affect the surface water flood risk.

The action plan should act as a live document that is updated and amended on a regular basis, and as a minimum this should be as agreed in the Local Flood Risk Management Strategy for Kent, although individual partners may wish to review their actions more regularly.

#### 4.7 Way Forward

Kent County Council has prepared a Local Flood Risk Management Strategy (the Local Strategy), which sets objectives and priorities for the management of local flood risks across the county. The Local Strategy includes an action plan of investigations and works to achieve the objectives and indicates which risk management authority should lead this work. The action plan is updated annually with progress on previous actions and new actions that have been identified. The action plan uses information from studies like this and other sources from across the county to prioritise where further works are needed to help achieve the objectives, this is balanced with the available sources of funding and resources to deliver these actions. The Local Strategy can be found here:

[www.kent.gov.uk/local\\_flood\\_strategy](http://www.kent.gov.uk/local_flood_strategy)

This SWMP and any new information about local flooding in Tunbridge Wells that comes to light will be used as part of the evidence base when setting the Local Strategy action plan annually. Any actions identified to be delivered from this SWMP will be overseen by the SWMP Partnership.



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**SKIPTON**

**North Yorkshire**

**BD23 3AE**

t: +44(0)1756 799919

e: [info@jbaconsulting.com](mailto:info@jbaconsulting.com)

Jeremy Benn Associates Ltd  
**Registered in England 3246693**



Visit our website  
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