



JBA
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Tewkesbury Borough Council Level 2 Strategic Flood Risk Assessment

Addendum Report

August 2018



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Revision History

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Contract

This report describes work commissioned by Matthew Tyas, on behalf of Tewkesbury Borough Council, by an email dated 25th June 2018. Joanne Chillingworth and Lucy Finch of JBA Consulting carried out this work.

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Purpose

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Abbreviations and Glossary of Terms

Term	Definition
1D model	One-dimensional hydraulic model
2D model	Two-dimensional hydraulic model
AEP	Annual Exceedance Probability
CC	Climate change - Long term variations in global temperature and weather patterns caused by natural and human actions.
DTM	Digital Terrain Model
EA	Environment Agency
FEH	Flood Estimation Handbook
FRA	Flood Risk Assessment - A site specific assessment of all forms of flood risk to the site and the impact of development of the site to flood risk in the area.
FZ	Flood Zones
Ha	Hectare
ISIS/ ISIS-TUFLOW	1-dimensional hydraulic modelling software/ 1d-2d hydraulic modelling software
JBA	Jeremy Benn Associates
JCS	Joint Core Strategy
LIDAR	Light Detection and Ranging
m AOD	metres Above Ordnance Datum
Main River	A watercourse shown as such on the Main River Map, and for which the Environment Agency has responsibilities and powers
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.
OS NGR	Ordnance Survey National Grid Reference
Resistance Measures	Measures designed to keep flood water out of properties and businesses; could include flood guards for example.
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.
Return Period	Is an estimate of the interval of time between events of a certain intensity or size, in this instance it refers to flood events. It is a statistical measurement denoting the average recurrence interval over an extended period of time.
SFRA	Strategic Flood Risk Assessment
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.
TUFLOW	2-dimensional hydraulic modelling software
RoFfSW	Risk of Flooding from Surface Water
WFD	Water Framework Directive

1 Introduction

1.1 Context of the Addendum SFRA Level 2 assessment

A Gloucestershire-wide Level 1 SFRA was commissioned in 2007 by Gloucestershire County Council, in partnership with its Local Authorities including Tewkesbury; the reports were published in 2008. Following this, a Level 2 SFRA was published in October 2011 to support the preparation of the Gloucester, Cheltenham and Tewkesbury Joint Core Strategy (JCS) by assessing sites likely to be developed in flood risk areas. A subsequent Level 2 Addendum assessment was then carried out for the JCS in 2012 for additional site options.

JBA Consulting were then commissioned in 2017 to undertake a Level 2 SFRA, which built on the work undertaken in those previous studies, rather than completely replacing it, but is specific only to the borough of Tewkesbury. It involves the site-specific assessment for new site options required as part of the process of exploring the potential of non-strategic sites to accommodate growth in the emerging Borough Local Plan. There were 41 sites assessed in the Level 2 assessment. In addition, since the previous Level 2 SFRA and Addendums were published, there have been updates to national and local planning policy and guidance. This 2017 Level 2 SFRA updated information on surface water management and sustainable drainage systems (SuDS), guidance for site-specific FRAs and opportunities to reduce flood risk to existing communities within the borough of Tewkesbury due to the revisions to national and local planning policy and guidance.

The latest commission in June 2018 seeks to add two additional sites to the assessment, and therefore this report forms an Addendum to the 2017 Level 2 SFRA, which should be read in conjunction with this report.

1.1.1 Policy Updates

It is not the intention for this Addendum to repeat the information set out in the 2017 Level 2 SFRA, but the policy and guidance in the 2017 report is applicable to this assessment.

In addition, since the 2017 SFRA was published, the [National Planning Policy Framework 2 \(NPPF2\)](#) has been released on 24 July 2018. This has no major implications of the sites being assessed as part of this Addendum but should be considered by Tewkesbury Borough Council in relation to the following.

The new guidance mostly involves a change in emphasis with respect to the considerations that are given to flood risk, primarily with respect to climate change and resilience. The most significant introductions for evidence not previously required are:

- The requirement to identify policies and physical measures to provide for resilience to climate change effects.
- The consideration of cumulative impacts in, or affecting, local areas susceptible to flooding.
- The need to consider the introduction of Natural Flood Management measures
- The specific need to evidence the use sustainable drainage systems in FRAs.
- The requirement to prepare emergency plans in FRAs.



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2 Site screening of additional sites

2.1 Introduction

Two additional sites were provided by Tewkesbury Borough Council; one new site, and one extension to a site previously considered in the L2 SFRA in 2017.

These two sites were screened to provide a summary of flood risk to each site, including:

- The proportion of the site in each Flood Zone
- Whether the site is shown to be at risk in the RoFfSW and, if so, the lowest return period from which the site is at surface water flood risk
- Whether the site is within, or partially within, the Environment Agency’s Historic Flood Map.

The screening was undertaken using JBA in-house software called “FRISM”. FRISM is an internal JBA GIS package that computes a range of flood risk metrics based on flood and receptor datasets, giving a clear spatial picture of flood risk. The site boundaries were queried using FRISM against the flood risk information including Flood Zones, surface water and historic flood map.

The results of the screening provide a quick and efficient way of identifying sites that are likely to require a Level 2 Assessment, assisting Tewkesbury Borough Council with Sequential Test decision-making so that flood risk is taken into account when considering allocation options.

The screening also provides an opportunity to identify sites which have an ordinary watercourse flowing through or adjacent to them but for which no Flood Zone information is currently available. Note: although there are no Flood Zone maps available for these watercourses, it does not mean the watercourse does not pose a risk, it just means no modelling has yet been undertaken to identify the risk. The Flood Zones are not provided for specific sites or land where the catchment of the watercourse falls below 3km². For this reason, the Flood Zones are not of a resolution to be used as application evidence to provide the details of possible flooding for individual properties or sites and for any sites with watercourses on, or adjacent to the site. Additional modelling of ordinary watercourses in these instances may be required to fully understand the level of risk to the site. By undertaking this screening, it will determine where additional modelling may be required as part of the Level 2 SFRA to enable identification of the fluvial flood risk from these watercourses to the sites and will allow application of the Exception Test, if required.

2.2 Site screening against flood risk datasets

Table 2-1 summarises the flood risk to the sites.

Screening Information Notes:

***Flood Zone 2 % includes the Flood Zone 3 extent. Flood Zone 2 + Flood Zone 1 should equal 100%.*

Where sites are shown to be in Flood Zone 1, these were then checked against OS mapping for any drains or ordinary watercourses which may pose a risk.

Table 2-1: Site Options Flood Risk Screening

Site name	Development type	Area (ha)	Proportion of site shown to be at risk (%)							
			Flood Zones				Flood Risk from Surface Water dataset			Historic Flood Map (%)
			FZ3b (%)	FZ3a (%)	FZ2 (%)	FZ1 (%)	30yr (%)	100yr (%)	1,000yr (%)	
Shurdington Site 6	Housing	6.7	0	0	0	100	0	2	26	0
Land off Harveys Lane - Winchcombe Site 6	Housing	7.89	1	2	2	98	<1	<1	2	0

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3 Additional sites flood risk assessment

3.1 Site 1 - Shurdington Site 6 - Normansbrook Farm

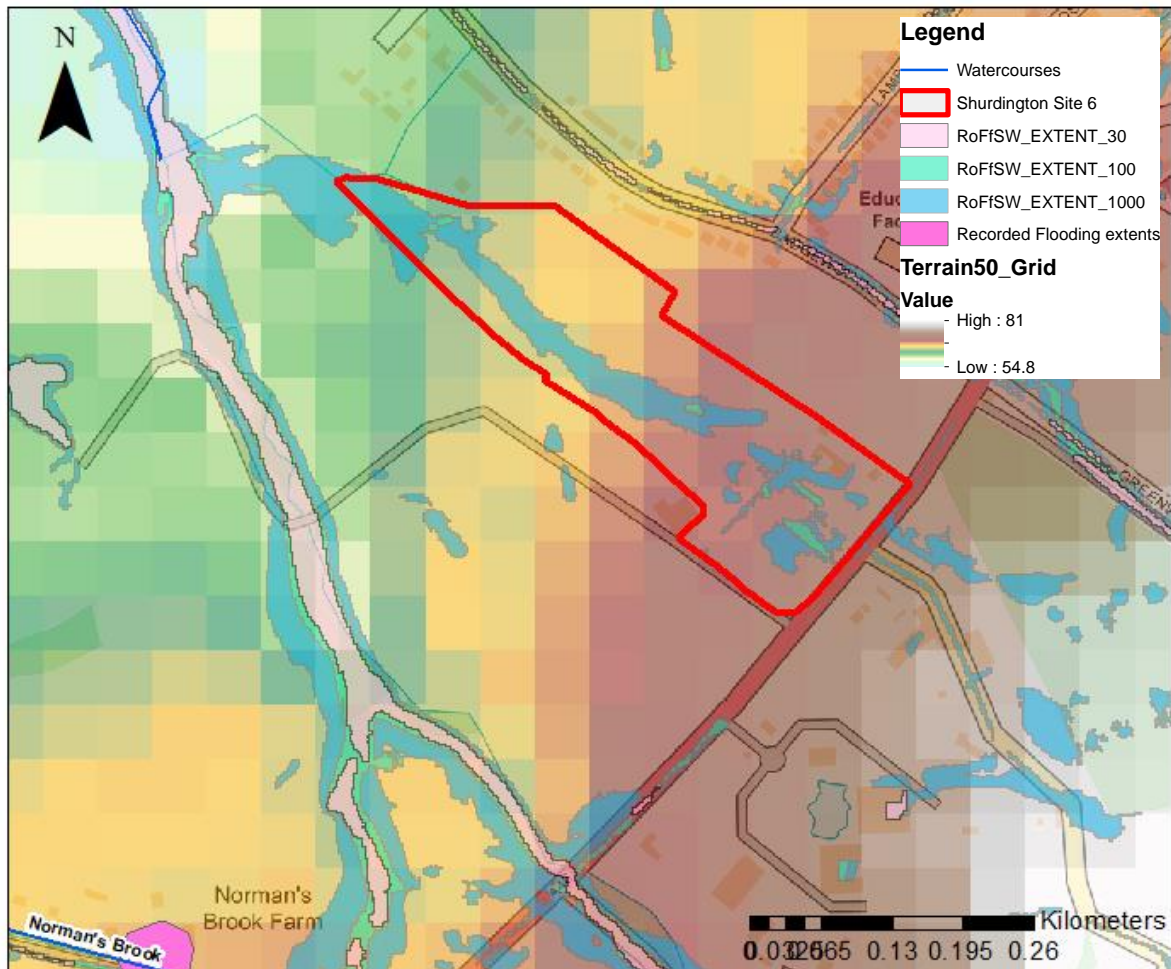
This is a new site identified since the 2017 SFRA, which is being assessed for housing. It has an area of approximately 6.7ha which would produce a capacity of around 110 dwellings (based on 63% developable area and 30dph).

3.1.1 Assessment of flood risk

The site is in currently located Flood Zone 1 on the Environment Agency's Flood Map for Planning map. There is however a large drain to the south of the site which flows in a south-easterly to north-westerly direction (later joining with Norman's Brook) and an ordinary watercourse located to the west and north-west of the site, which shows a low surface water flood risk on the EA's Risk of Flooding from Surface Water map. The larger drain is not represented in the EA's Flood Zones but looking at the surface water mapping and LIDAR topography in the figure below, there is no risk to the site from this drain. The smaller drain to the north/ north-west of the site boundary is too small to be modelled using 2D generalised techniques and is not covered by detailed LIDAR; however, this does not mean that there is no risk posed and this should be confirmed at the site-specific FRA stage, which may require a detailed hydraulic model to be constructed to assess whether flood extents could encroach into the site's north-western boundary.

This site is mostly at risk from surface water flooding, with a flow path shown in the centre of the site, following topography which slopes from higher in the east to lower in the west; however, this appears only in the 1,000-year surface water extent.

Figure 3-1: Shurdington Site 6 flood risk



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3.2 Site 2 - Winchcombe Site 6 - Land off Harvey's Lane

This site is an expanded version of the Winchcombe Site 6 (housing) site previously assessed in 2017. It now includes a field to the south of Harvey's Lane and is termed 'Winchcombe Site 6'. It is 7.89ha and has a capacity of approximately 100 dwellings.

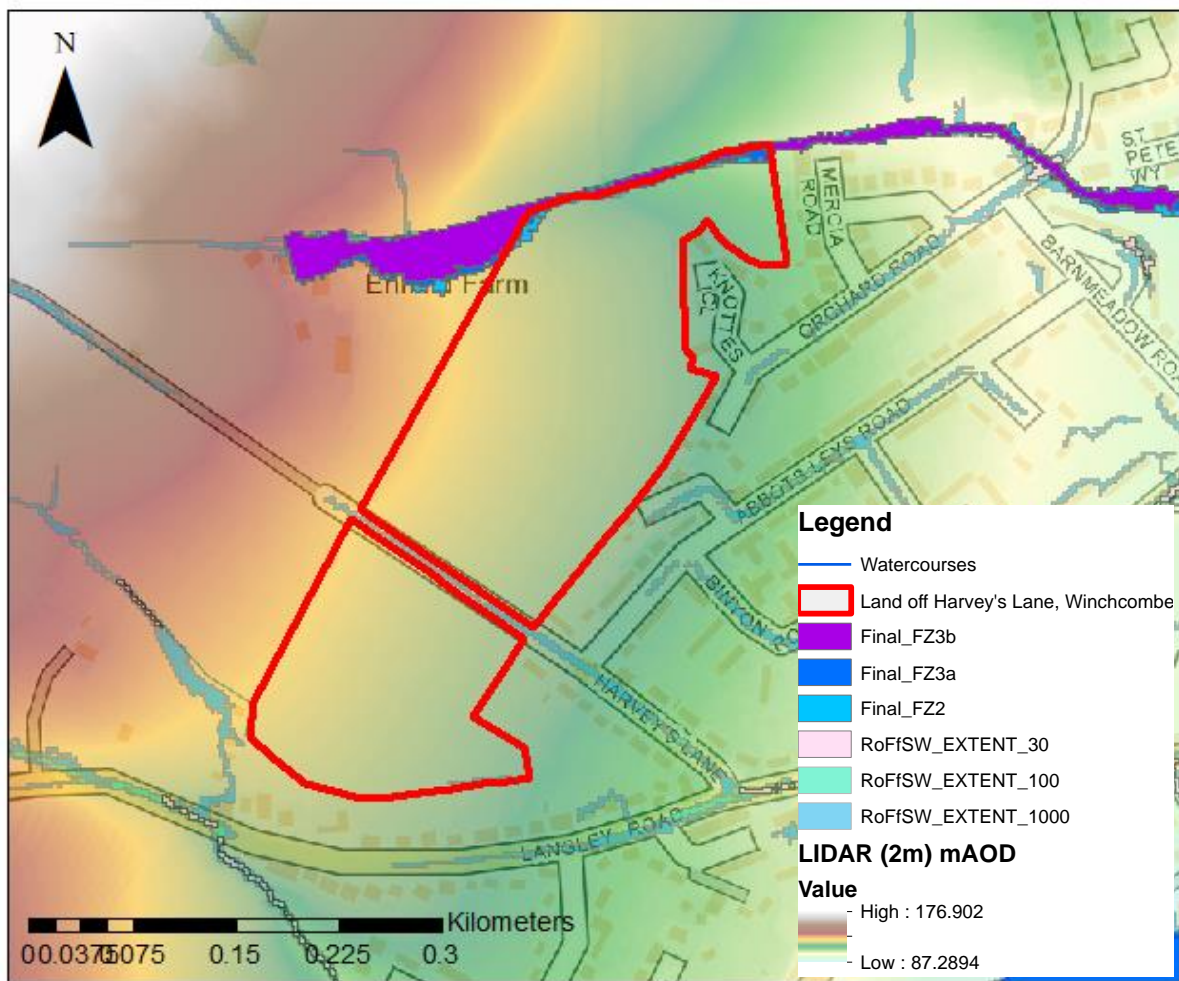
3.2.1 Assessment of flood risk

The northern portion of the site was previously assessed in 2017 and now this site has expanded to include the southern portion of land south of Harvey's Lane.

The southern portion of the site is not shown to be any of the EA's Flood Zones and there is negligible surface water flood risk shown. There is some minor surface water risk along Harvey's Lane.

There is an ordinary watercourse flowing in a south-easterly direction, touching the site's south-western boundary briefly before turning south and into a culvert underneath Langley Road. This drain is too small to be modelled using 2D generalised techniques. Looking at the LIDAR and local topography, it seems unlikely that there would be a significant impact at the site, but there is the potential that the culvert could block and push flood water into the site's southern boundary, as well as the impacts of climate change encroaching into the site's boundary. It is recommended that developers consider the risk that this drain could pose as part of a site-specific Flood Risk Assessment.

Figure 3-2: Winchcombe Site flood risk



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3.3 Site summary tables

As part of the Level 2 SFRA, an existing detailed site summary table has been updated for the Winchcombe site, due to the boundary extension to the south. The summary table can be found in Appendix A.

Shurdington Site 6 was not taken forward to a detailed site summary table assessment as the small drains to the north-west of the site boundary are too small to model using 2D generalised techniques. The assessment above highlights that the risk from these drains should be considered at site-specific FRA level by the developer.

3.3.1 Interactive Geo-PDF mapping

To accompany the site summary table for Winchcombe, there is an Interactive Geo-PDF map, with all the mapped flood risk outputs per site. This is displayed centrally, with easy-to-use 'tick box' layers down the right-hand side and bottom of the mapping, to allow navigation of the data.

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4 Recommendations for further investigation at site-specific level

The recommendations set out in the Level 2 SFRA report published in 2017 should be read in conjunction with this Addendum report and applied to these two additional sites.

Where the small drainage catchments identified near to these two sites are not represented on the FEH CD-ROM in order to derive catchment hydrological inflows, are not included in current LIDAR coverage or they are too small for 2D generalised modelling techniques to be suitable, modelling has not been undertaken. Developers should consider and confirm the flood risk to these sites as part of a site-specific FRA. More detailed site-specific topographic survey data may be required across the site of interest. Detailed hydraulic models may need to be constructed of these drains using newly collected channel topographic survey to confirm the flood risk at the sites. These requirements should be confirmed with the Environment Agency.

Where necessary, blockages of nearby culverts may need to be simulated to confirm residual risk to the sites should impacts encroach into the site boundaries.

As well as confirming fluvial flood risk, the risk to these sites from surface water should be considered. Surface water flood risk at these sites should be considered further as part of a detailed site-specific FRA and outline Surface Water Drainage Strategy.

Since the 2017 SFRA was published, the [National Planning Policy Framework 2 \(NPPF2\)](#) has been released on 24 July 2018. This has no major implications of the sites being assessed as part of this Addendum but should be considered by Tewkesbury Borough Council in relation to the following. The new guidance mostly involves a change in emphasis with respect to the considerations that are given to flood risk, primarily with respect to climate change and resilience. The most significant introductions for evidence not previously required are:

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- The consideration of cumulative impacts in, or affecting, local areas susceptible to flooding.
- The need to consider the introduction of Natural Flood Management measures
- The specific need to evidence the use sustainable drainage systems in FRAs.
- The requirement to prepare emergency plans in FRAs.

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Appendices

A Appendix - Level 2 Assessment

A.1 L2 Site Summary Table - Winchcombe Site 6 update

A.2 Geo-PDF Mapping - Winchcombe Site 6 update

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