

South Worcestershire Councils Level 2 Strategic Flood Risk Assessment: Addendum

Final Report

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**Prepared for: Wychavon District Council,
Malvern District Council and
Worcester City Council**

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Prepared by	Elsa Holm BAEcon (Hons) Assistant Analyst
Reviewed by	Joanne Chillingworth BSc MSc MCIWEM C.WEM Associate Director
Authorised by	George Baker BEng, FCIWEM, C.WEM, CEnv, IEng, AIEMA Project Director

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Contract

JBA Project Manager	Joanne Chillingworth BSc MSc MCIWEM C.WEM
Address	Suite 1B, First Floor (Front Wing), Coleshill House, 1 Station Road, Coleshill, B46 1HT
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This report describes work commissioned by the South Worcestershire Councils (collectively Wychavon District, Malvern District and Worcester City) by an instruction dated 23 July 2025. The Client's representative for the contract was Dan Atiyah of Worcester City Council. Elsa Holm and Joanne Chillingworth of JBA Consulting carried out this work.

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Abbreviations

AEP	Annual Exceedance Probability
EiP	Examination in Public
FMfP	Flood Map for Planning
FRA	Flood Risk Assessment
NaFRA2	National Flood Risk Assessment 2
NCERM	National Coastal Erosion Risk Map
NPPF	National Planning Policy Framework

RoFSW	Risk of Flooding from Surface Water
SFRA	Strategic Flood Risk Assessment
SWPD	South Worcestershire Development Plan
PPG	Planning Practice Guidance

1 Introduction

1.1 Context

JBA Consulting was commissioned by the South Worcestershire Councils (Wychavon District Council, Malvern Hills District Council and Worcester City Council) to undertake a Level 1 Strategic Flood Risk Assessment (SFRA) in 2018-2019, which was followed by a Level 2 SFRA in 2020-2021, and a Level 2 SFRA for 3 Strategic Settlement sites in 2021 (followed by a 4th Strategic Settlement site in 2023). This work was to provide the evidence base for flood risk in support of the South Worcestershire Development Plan (SWDP) Review and Preferred Options.

The SWDP was submitted in September 2023 for Examination, and the Examination in Public (EiP) took place during April-May 2025. Between the Plan submission and the Examination, JBA produced an Addendum to provide a review of the Level 2 small-medium sites selection process undertaken in 2020, in light of the latest changes to the National Planning Policy Framework (NPPF) in July 2021 and Planning Practice Guidance (PPG) in August 2022, to assess whether any additional sites would be recommended for more detailed assessment (considering all sources of risk and any new sites since 2020) and to satisfy the EiP that a robust process has been undertaken. It also addressed the implications of modifications made to the list of sites.

Shortly prior to the Examination in Spring 2025, the Environment Agency published the first outputs of their National Flood Risk Assessment 2 (NaFRA2) and National Coastal Erosion Risk Map (NCERM), updating the national flood mapping for England. Outputs were published in January 2025 (surface water mapping) and end of March 2025 (Flood Map for Planning).

This Addendum provides a short overview of the new NaFRA2 mapping currently available, a summary of the risk shown at the sites assessed within the Level 2 SFRA with the new NaFRA2 mapping, and recommendations for developers or further work. This is in response to the post examination hearings letter from the inspectors, Question 95: *"We are aware that the Environment Agency has recently updated the National Flood Risk Mapping. Would the Councils please advise us of what, if any, are the implications of this for the Plan?"*

1.2 NaFRA2

The Environment Agency updated their [Risk of Flooding from Surface Water \(RoFSW\) dataset \(gov.uk\)](#) on 28 January 2025. This included extents and depths (based on probability bands). Surface water flood risk is subdivided into the following four categories:

- **High risk:** An area has a chance of flooding greater than 3.3% Annual Exceedance Probability (AEP) each year.
- **Medium risk:** An area has a chance of flooding between 1% AEP and 3.3% AEP each year.

- **Low risk:** An area has a chance of flooding between 0.1% AEP and 1% AEP each year.
- **Very Low risk:** An area has a chance of flooding of less than 0.1% AEP each year.

The Environment Agency updated the [Flood Map for Planning \(FMfP\) \(gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/100000/flood_map_for_planning_fmfp.pdf) on 25 March 2025. The FMfP includes the Flood Zones data which shows the extent of land at present day risk of flooding from rivers and the sea. The Flood Zones do not take defences into account. The Flood Zones are:

- **Flood Zone 1 (Low risk):** Less than a 0.1% chance of river and sea flooding in any given year.
- **Flood Zone 2 (Medium risk):** Between a 1% and 0.1% chance of river flooding in any given year or 0.5% and 0.1% chance of sea flooding in any given year.
- **Flood Zone 3 (High risk):** 1% or greater annual probability of flooding from rivers or 0.5% or greater annual probability of flooding from the sea.

The FMfP now shows updated extents for Flood Zone 2 (0.1% AEP) and Flood Zone 3 (1% AEP) which incorporate new national modelling as well as local models where appropriate. In addition to the Flood Zones, the following information is now also provided in the FMfP:

- **Rivers and sea with defences**
 - Mapping for the 3.3% AEP, 1% AEP, and 0.1% AEP events for present day and climate change (using the Central allowance for the 2080s epoch) taking account the presence of flood defences (extents only).
- **Rivers and sea without defences**
 - Mapping for the 3.3% AEP, 1% AEP, and 0.1% AEP events for present day and climate change (using the Central allowance for the 2080s epoch) which ignores the presence and condition of flood defences (extents only).
- **Surface water**
 - Mapping for the 3.3% AEP, 1% AEP, and 0.1% AEP events for the present day only (extents only).

1.3 Recommendations for developers

It is recommended that developers use the Level 2 SFRA and this accompanying Addendum as a starting point to assess the flood risk to their sites. Developers should also identify the requirements for site-specific Flood Risk Assessments (FRAs) and further work that might be required. This [FRA guidance \(gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/100000/flood_map_for_planning_fmfp.pdf) was updated on 10 April 2025 by the Environment Agency. The Environment Agency's online datasets should be referred to for the latest available flood risk data.

It should be noted that the Environment Agency intend to publish further NaFRA2 datasets over the course of the next 12-18 months. This data is expected to include fluvial and surface water depth information, as well as climate change outputs suitable for planning for surface water. Developers should consult with the Environment Agency as early as possible

to understand the requirements for their site-specific FRA and additional assessments they may need to undertake in the interim before publication of the full data.

2 Overview of implications of NaFRA2 on the Level 2 SFRA

Out of the 126 sites provided by the South Worcestershire Councils, 29 sites were originally carried forward to a Level 2 assessment. Since this assessment, four sites have been removed as allocations from the South Worcestershire Development Plan Review.

A Red-Amber-Green system was applied to the sites on the basis, that: red sites needed a Level 2, amber sites did not need a Level 2 due to lower flood risk but were flagged in the Level 2 report for developer considerations, and green sites that had no/ negligible risk.

2.1 Fluvial risk

The Environment Agency published the updated FMfP on the 25 March 2025. A screening exercise was undertaken to assess how the percentage of each site at fluvial flood risk changed between the previous FMfP dataset and the new NaFRA2 FMfP. The results of this exercise are presented in Table 2-1, showing the percentage changes with a brief comment on the change in fluvial risk to the site.

2.1.1 Sites now at fluvial risk, or no longer at risk

One additional site was identified to now be within the Flood Zones; this is because the new FMfP now represents smaller watercourses not previously modelled:

- **CFS0407sc** - Land south of Madresfield Road, Malvern
Flood Zones 2 and 3 run along the entire northern border of the site, covering 8% and 6% of the site respectively. There is an unnamed watercourse leading to Whiteacres Brook, running along the northern boundary of the site. Previously, the surface water datasets would have been used to infer risk where there was no fluvial modelling information.

One site is no longer within Flood Zone 2 and 3 in the updated NaFRA2 FMfP:

- **CFS0483a + CFS0483b** - Land at Hadzor, Droitwich Spa Hadzor (Sites 1 & 2)
A reduction of less than 1%. There are several watercourses and drains around the site, including Gilton Brook in the west, Body Brook in the northwest, and Dean Brook in the south. However, it is anticipated that these watercourses may not pose a risk due to the topography of the site. Worcester and Birmingham Canal also runs between the east and west parcels of the site.

2.1.2 Sites with significant changes (+/-10%) in fluvial risk

Several sites have seen only minor increases/reductions in fluvial flood risk in the updated NaFRA2 mapping. However, a number of sites have seen larger changes (greater than 10%), and are listed below.

Sites where the percentage of the site at risk has increased by 10% or greater:

- **CFS0560** - Land Adjacent to Defford Motors, Main Street, Defford
15% increase in Flood Zone 2.
- **CFS0680** - Land off Sawmills Walk/Briar Close, Evesham
17% increase in Flood Zone 3.
- **CFS0866** - Land adjacent to & west of the Galton Arms, Himbleton
18% increase in Flood Zone 3, 21% increase in Flood Zone 2.
- **CFS0933 + CFS1076** - Land at Navigation Road, Diglis, Worcester
56% increase in Flood Zone 3.
- **SWDP48/6** - Canal Basin (Netherwich)
18% increase in Flood Zone 3, 50% increase in Flood Zone 2.
- **SWDP43/29a** - Chequers Lane / Henwick Road
41% increase in Flood Zone 3.
 - This site boundary has changed, for more details see Section 2.4.4.

Sites where the percentage of the site at risk has reduced by 10% or greater:

- **CFS1181** - Land to the West of Ivy Lane, Bretforton
100% reduction in Flood Zone 2.

Table 2-1: Comparison of the extent of the site at fluvial risk, between the previous FMfP and the new NaFRA2 FMfP.

Site reference	% of site in previous FMfP Flood Zone 3a	% of site in NaFRA2 FMfP Flood Zone 3	% of site in previous FMfP Flood Zone 2	% of site in NaFRA2 FMfP Flood Zone 2	Comment on change in risk from previous FMfP to updated NaFRA2 FMfP
CFS0367 Land off Lingfield Road, Evesham	27.8	29.1	36.9	36.9	Minor increase in the Flood Zone 3 extent (+1%). The coverage of Flood Zone 2 remains the same.
CFS0560 Land Adjacent to Defford Motors, Main Street, Defford	0.0	8.6	2.5	17.7	The site is now in Flood Zone 3 (+9%), along the southern boundary. Flood Zone 2 has increased in its coverage (+15%) and now runs along the entire southern boundary.
CFS0680 Land off Sawmills Walk/Briar Close, Evesham	4.2	21.1	26.3	29.6	Increase (+17%) in the coverage of Flood Zone 3, along the western border of the site. The extent of Flood Zone 2 has increased slightly (+3%) in the west.
CFS0691sc Land off Wyre Road, Pershore	10.0	7.9	19.5	19.5	Minor decrease (-2%) in Flood Zone 3, which runs along the entire southern border of the site. The coverage of Flood Zone 2 remains the same.
CFS0866 Land adjacent to & west of the Galton Arms, Himbleton	0.1	17.5	0.5	21.0	The site was initially only slightly (<1%) at fluvial risk at the northeast boundary, from Harrow Lane. The updated mapping shows large increases (+18/21%) in fluvial risk, with the Flood Zones now covering an area in the east.

Site reference	% of site in previous FMfP Flood Zone 3a	% of site in NaFRA2 FMfP Flood Zone 3	% of site in previous FMfP Flood Zone 2	% of site in NaFRA2 FMfP Flood Zone 2	Comment on change in risk from previous FMfP to updated NaFRA2 FMfP
CFS0925 Two Shires Park, Weston Road, Honeybourne	2.1	0.0	9.1	8.8	The site is no longer in Flood Zone 3 (-2%). There has also been a minor decrease (-<1%) in the portion of the site in Flood Zone 2.
CFS0990SC Land between Broadway Road and the A46	0.0	0.0	0.0	0.0	*The site boundary has changed since the original screening (formerly CFS0143), for more information see Section 2.4.3. This site does not lie within Flood Zones 2 or 3, in the previous or updated mapping. However, consideration should still be given to the potential flood risk from the Bengeworth Brook that flows along the new northern boundary of the site, from east to west. Risk is anticipated to be low and confined along the boundary, but this should be confirmed.
CFS1044 & CFS1044bsc Land at Mitton, East of Bredon Road, Tewkesbury	23.1	19.7	27.0	26.9	Decrease (-3%) in Flood Zone 3, which runs along the southern and eastern part of the site. There has also been a minor decrease (-<1%) in the portion of the site in Flood Zone 2.

Site reference	% of site in previous FMfP Flood Zone 3a	% of site in NaFRA2 FMfP Flood Zone 3	% of site in previous FMfP Flood Zone 2	% of site in NaFRA2 FMfP Flood Zone 2	Comment on change in risk from previous FMfP to updated NaFRA2 FMfP
CFS0933 + CFS1076 Land at Navigation Road, Diglis, Worcester	9.4	65.0	97.7	100.0	Significant increase (+56%) in the extent of Flood Zone 3, which now covers large areas in the centre and north of the site. Flood Zone 2 has increased (+2%), to cover the entirety of the site.
CFS0407sc Land south of Madresfield Road, Malvern	0.0	5.5	0.0	7.5	This site was not previously identified as being at risk of flooding, but it now falls within the updated flood risk mapping (+6/8%). Flood Zones 2 and 3 run along the entire northern border of the site.
CFS1181 Land to the West of Ivy Lane, Bretforton	0.0	0.0	100.0	0.1	Significant reduction in fluvial risk (-100%). The site was previously entirely within Flood Zone 2, but now it only encroaches slightly from the northern boundary. The site is not in Flood Zone 3 in the previous or updated mapping.
SWDP59/19 Land adjacent to Station Road	0.0	9.0	48.1	48.1	The site is now within Flood Zone 3 (+9%), which covers an area in the west of the site. The coverage of Flood Zone 2 remains the same.
SWDP43/29a Chequers Lane / Henwick Road (ORIGINAL)	44.2	81.9	98.5	98.5	<i>*The site boundary has changed since the original screening. See the row below for the risk to the updated site.</i> Significant increase in portion of the site

Site reference	% of site in previous FMfP Flood Zone 3a	% of site in NaFRA2 FMfP Flood Zone 3	% of site in previous FMfP Flood Zone 2	% of site in NaFRA2 FMfP Flood Zone 2	Comment on change in risk from previous FMfP to updated NaFRA2 FMfP
					within Flood Zone 3 (+38%), excluding only areas in the southwest of the site. The coverage of Flood Zone 2 remains the same.
The site below is a change of boundary to the site above. For more information see Section 2.4.4.					
SWDP43/29a Chequers Lane / Henwick Road (REVISED)	-	84.9	-	98.5	Significant portion of the site within Flood Zone 3 (85%), excluding only areas in the southwest of the site. Almost the entire site is within Flood Zone 2 (99%).
SWDP48/6 Canal Basin (Netherwich)	8.4	25.9	11.5	61.9	The extent of Flood Zone 3 has increased (+18%), now covering almost the entire northwestern section of the site and extending further into the northern part of the southern section. Significant increase in Flood Zone 2 (+50%), covering the northwestern section of the site, and the west of the southern section.
CFS0483a + CFS0483b Land at Hadzor, Droitwich Spa Hadzor (Sites 1 & 2)	0.0007	0.0	0.002	0.0	The site is no longer at risk of fluvial flooding (-<1%).

2.2 Surface water risk

The Environment Agency's RoFSW mapping was updated in January 2025 with the publication of NaFRA2.

There are a number of key differences noted with the Environment Agency's updated NaFRA2 RoFSW mapping compared with the previous RoFSW mapping:

- No velocity and hazard information is currently available within the NaFRA2 RoFSW mapping.
- Within the NaFRA2 RoFSW mapping, any areas of surface water risk with a depth of less than 75mm have been removed. In the previous mapping, areas of surface water risk with a hazard of less than 0.575 were removed (which is a factor of both depth and velocity).
- In areas where the new NaFRA2 RoFSW mapping overlaps the Risk of Flooding from Rivers and Sea (areas shown to be at fluvial risk) the flood risk extents have been removed from the RoFSW mapping, i.e. it no longer shows flow paths along any watercourses represented within the fluvial mapping.

Within the Environment Agency's RoFSW, a climate change dataset was also published with the 'Central' allowance for the 2050s epoch applied to the 3.3%, 1%, and 0.1% AEP events. However, as set out in the Environment Agency's climate change guidance (gov.uk), this allowance is only deemed suitable for development with a lifetime up to 2060. This is below the 100-year minimum lifetime for residential set out in Planning Practice Guidance.

Further assessment of the potential impacts of climate change on surface water will need to be considered at the site-specific FRA stage. It should be noted that if the surface water risk to a site has changed considerably, the surface water climate change extents provided as part of the Wychavon District Council Level 2 SFRA may no longer provide a suitable indication of the surface water risk with climate change. Therefore, the developer may need to undertake further surface water modelling as part of a site-specific FRA.

Table 2-2 provides the extent of each site at risk from the 3.3%, 1%, and 0.1% AEP surface water events using both the previous RoFSW mapping and the new NaFRA2 mapping, with a brief comment on the change in risk shown with the NaFRA2 mapping.

This analysis should be used as a starting point to determine areas where the Level 2 SFRA information is likely to be outdated based on the mapping updates. Future assessments should use the updated surface water mapping as a starting point, because the NaFRA2 mapping supersedes the previous surface water mapping.

2.2.1 Sites with significant changes (+/-10%) in surface water risk

Overall, most sites have seen only minor increases/reductions in surface water flood risk in the updated NaFRA2 mapping. However, a number of sites have seen larger changes, and are listed below.

Sites where the percentage of the site at risk has increased by 10% or greater:

- **CFS0866** - Land adjacent to & west of the Galton Arms, Himbleton
Increased risk (15%) in the 0.1% AEP event.
- **CFS0891** - Land south of Vale Park, Evesham
Increased risk (12%) in the 0.1% AEP event.
- **CFS0933 + CFS1076** - Land at Navigation Road, Diglis, Worcester
Increased risk (13%) in the 0.1% AEP event.
- **CFS0120** - Land south of Playing Field at Martley
Increased risk (11%) in the 0.1% AEP event.
- **CFS1144** - Land off Mayfield Road
Increased risk (11%) in the 1% AEP event.
- **CFS0143** - Parcel B - Land adjacent Broadway Road, Wickhamford
Increased risk (between 11% and 24%) in the 3.3%, 1%, and 0.1% AEP events.
 - This site boundary has changed, for more details see Section 2.4.3.
- **SWDP43/29a** - Chequers Lane / Henwick Road
Increased risk (between 9% and 10%) in the 3.3% and 0.1% AEP events.
 - This site boundary has changed, for more details see Section 2.4.4.

Sites where the percentage of the site at risk has reduced by 10% or greater:

- **CFS0367** - Land off Lingfield Road, Evesham
Reduced risk (16%) in the 0.1% AEP event.
- **CFS1124sc** - Land at Millend Racing Stables, Netherton Lane, Elmley Castle
Reduced risk (40%) in the 0.1% AEP event.
- **CFS0028** - Top Croft, Cleeve Road, Middle Littleton
Reduced risk (between 11% and 20%) in the 1% and 0.1% AEP events.
- **SWDP48/6** - Canal Basin (Netherwich)
Reduced risk (16%) in the 0.1% AEP event.

Table 2-2: Comparison of the extent of the site at surface water risk, between the previous RoFSW mapping and the new NaFRA2 surface water mapping.

Site reference	% of site in previous RoFSW 3.3% AEP (High)	% of site in NaFRA2 RoFSW 3.3% AEP (High)	% of site in previous RoFSW 1% AEP (Medium)	% of site in NaFRA2 RoFSW 1% AEP (Medium)	% of site in previous RoFSW 0.1% AEP (Low)	% of site in NaFRA2 RoFSW 0.1% AEP (Low)	Comment on change in risk from previous RoFSW to updated NaFRA2 RoFSW
CFS0143 Parcel B - Land adjacent Broadway Road, Wickhamford* (ORIGINAL)	7.3	18.6	13.9	28.1	47.7	71.2	Increased surface water flood risk (+11/24%) across all events. Extents in the 3.3% and 1% AEP events have expanded in the west of the site, and minorly on the eastern border. The largest increase (+24%) is in the 0.1% AEP event, which now covers almost the entire west of the site, and extending partially into the east.
The site below (CFS0990SC) is a change of boundary to the site above (CFS0143). For more information see Section 2.4.3.							
CFS0990SC Land between Broadway Road and the A46 (REVISED)	-	11.5	-	18.9	-	40.7	In the 3.3% AEP event, there is surface water flood risk (12%) predominantly in the west of the site, along the northern and western boundary. There is also minor ponding in the south. These extents expand slightly (to 19%) in the 1% AEP event, and in the 0.1% AEP event the majority of the west and north of the site is at risk.

Site reference	% of site in previous RoFSW 3.3% AEP (High)	% of site in NaFRA2 RoFSW 3.3% AEP (High)	% of site in previous RoFSW 1% AEP (Medium)	% of site in NaFRA2 RoFSW 1% AEP (Medium)	% of site in previous RoFSW 0.1% AEP (Low)	% of site in NaFRA2 RoFSW 0.1% AEP (Low)	Comment on change in risk from previous RoFSW to updated NaFRA2 RoFSW
CFS0367 Land off Lingfield Road, Evesham	1.3	1.9	9.0	2.2	20.0	4.4	Reduced surface water flood risk (-<1/16%) across all events. The surface water flow path that followed the River Isbourne along the western border of the site is no longer present in the updated mapping. There are new areas of ponding in the north of the site in the 3.3% AEP event, although the net coverage has reduced. The greatest decrease (-16%) is in the 0.1% AEP event.
CFS0400sc Eatons Farm, Church Lane, Tibberton	2.3	5.6	3.9	8.7	9.4	13.4	Increased surface water flood risk (+3/5%) across all events. There is a surface water flow path along the western border parallel to Pershore Lane (A4538) that has extended slightly into the site.
CFS0560 Land Adjacent to Defford Motors, Main Street, Defford	0.0	0.0	0.1	0.0	5.2	0.1	Reduced surface water flood risk (-<1/5%) in the 1% AEP and 0.1% AEP event. The site is now only minorly (<1%) at risk in the 0.1% AEP event, at the northern border by Main Street (A4104).

Site reference	% of site in previous RoFSW 3.3% AEP (High)	% of site in NaFRA2 RoFSW 3.3% AEP (High)	% of site in previous RoFSW 1% AEP (Medium)	% of site in NaFRA2 RoFSW 1% AEP (Medium)	% of site in previous RoFSW 0.1% AEP (Low)	% of site in NaFRA2 RoFSW 0.1% AEP (Low)	Comment on change in risk from previous RoFSW to updated NaFRA2 RoFSW
CFS0680 Land off Sawmills Walk/Briar Close, Evesham	0.0	0.0	0.0	0.1	0.4	0.4	Minor increases (+<1%) in surface water flood risk in the 0.1% AEP event, in the north of the site. The risk remains unchanged in the other events.
CFS0691sc Land off Wyre Road, Pershore	0.008	0.0	0.03	0.0005	0.2	0.2	Minor decreases (-<1%) in surface water flood risk in the 3.3% AEP and 0.1% AEP events. This is due to the surface water flow path that followed the Piddle Brook along the southern border of the site no longer being present in the updated mapping. The site is no longer at risk in the 3.3% AEP event, and the risk remains the same in the 0.1% AEP event.
CFS0866 Land adjacent to & west of the Galton Arms, Himbleton	0.004	3.2	0.1	5.6	2.0	17.1	Increased surface water flood risk (+3/15%) across all events. There are now a number of areas of ponding in the centre of the site, following a banded pattern. The largest change (+15%) is in the 0.1% AEP event. The eastern border is now also at risk in

Site reference	% of site in previous RoFSW 3.3% AEP (High)	% of site in NaFRA2 RoFSW 3.3% AEP (High)	% of site in previous RoFSW 1% AEP (Medium)	% of site in NaFRA2 RoFSW 1% AEP (Medium)	% of site in previous RoFSW 0.1% AEP (Low)	% of site in NaFRA2 RoFSW 0.1% AEP (Low)	Comment on change in risk from previous RoFSW to updated NaFRA2 RoFSW
							the 3.3% AEP event.
CFS0891 Land south of Vale Park, Evesham	2.1	4.1	2.6	8.1	15.3	27.5	Increased surface water flood risk (+2/12%) across all events. These new areas of risk are located predominantly in the north and west of site. A significant flow path encroaches into the site, and has increased in size in the updated mapping, particularly in the 3.3% AEP event.
CFS0925 Two Shires Park, Weston Road, Honeybourne	2.4	6.1	5.6	9.8	20.2	22.5	Increased surface water flood risk (+2/4%) across all events. In the previous mapping, the risk was mostly contained to the east of the site. In the updated mapping, there are several new areas of ponding in the west and south of the site.

Site reference	% of site in previous RoFSW 3.3% AEP (High)	% of site in NaFRA2 RoFSW 3.3% AEP (High)	% of site in previous RoFSW 1% AEP (Medium)	% of site in NaFRA2 RoFSW 1% AEP (Medium)	% of site in previous RoFSW 0.1% AEP (Low)	% of site in NaFRA2 RoFSW 0.1% AEP (Low)	Comment on change in risk from previous RoFSW to updated NaFRA2 RoFSW
CFS1044 & CFS1044bs c Land at Mitton, East of Bredon Road, Tewkesbury	5.6	5.2	8.6	6.4	13.1	10.6	Decreased surface water flood risk (-<1/3%) across all events. The risk is largely contained to the same area along the southern and eastern boundary, with changes in the distribution of the different extents.
CFS0933 + CFS1076 Land at Navigation Road, Diglis, Worcester	0.1	1.6	0.8	5.0	4.9	18.1	Increased surface water flood risk (+2/13%) across all events. There are several new isolated areas of ponding across the site, particularly in the 0.1% AEP event (+13%).
CFS0120 Land south of Playing Field at Martley	0.8	4.6	1.2	6.1	3.5	14.8	Increased surface water flood risk (+4/11%) across all events. The area of pooling in the northeast of the site has increased in size, and there is a new and smaller area of ponding in the north. There is a larger area of pooling in the 0.1% AEP event, which extends from the east, across the site to the southern boundary.
CFS0407sc	2.7	1.7	4.5	2.6	8.9	4.9	Decreased surface water flood risk (-

Site reference	% of site in previous RoFSW 3.3% AEP (High)	% of site in NaFRA2 RoFSW 3.3% AEP (High)	% of site in previous RoFSW 1% AEP (Medium)	% of site in NaFRA2 RoFSW 1% AEP (Medium)	% of site in previous RoFSW 0.1% AEP (Low)	% of site in NaFRA2 RoFSW 0.1% AEP (Low)	Comment on change in risk from previous RoFSW to updated NaFRA2 RoFSW
Land south of Madresfield Road, Malvern							<1/4%) across all events. A flow path that followed the northern boundary does no longer cover the northeast in the updated mapping.
CFS1124sc Land at Millend Racing Stables, Netherton Lane, Elmley Castle	3.7	0.1	4.7	0.4	43.2	3.0	Decreased surface water flood risk (-3/40%) across all events. Previously the 0.1% AEP event covered most of the south of the site, and there was a flow path in the 3.3% and 1% AEP event parallel to the eastern boundary. In the updated mapping, there is only an area of ponding centrally in the 0.1% AEP event, and there is a new flow path along a watercourse that encroaches into the north of the site.
CFS1181 Land to the West of Ivy Lane, Bretforton	0.0	0.7	0.0	1.8	2.6	6.7	Increased surface water flood risk (+<1/4%) across all events. The site is now at risk in the 3.3% and 1% AEP events. The risk is contained to an area of isolated ponding in the centre of the site.

Site reference	% of site in previous RoFSW 3.3% AEP (High)	% of site in NaFRA2 RoFSW 3.3% AEP (High)	% of site in previous RoFSW 1% AEP (Medium)	% of site in NaFRA2 RoFSW 1% AEP (Medium)	% of site in previous RoFSW 0.1% AEP (Low)	% of site in NaFRA2 RoFSW 0.1% AEP (Low)	Comment on change in risk from previous RoFSW to updated NaFRA2 RoFSW
CFS0028 Top Croft, Cleeve Road, Middle Littleton	5.3	0.0	11.0	0.0	29.2	8.6	Decreased surface water flood risk (-5/20%) across all events. The site is no longer at risk in the 3.3% and 1% AEP events. There is a flow path that horizontally bisected the site that has reduced in size and is only present in the site in the 0.1% AEP event.
CFS1144 Land off Mayfield Road	1.8	5.4	8.5	19.7	56.7	61.4	Increased surface water flood risk (+4/11%) across all events. Risk is in the southern portion of the site, and in the updated mapping there are more areas of ponding particularly in the 3.3% and 1% AEP events.
SWDP59/1 9 Land adjacent to Station Road	0.0	0.1	0.001	0.2	8.2	0.6	Increased surface water risk (+<1%) in the 3.3% and 1% AEP events, and reduced risk (-8%) in the 0.1% AEP event. The risk in the 3.3% and 1% AEP events is contained to areas along the northern and southern boundary. The risk in the 0.1% AEP is located in a small area in the north of the site.
SWDP44/3	0.0	5.8	2.4	9.0	12.1	19.6	Increased surface water flood risk

Site reference	% of site in previous RoFSW 3.3% AEP (High)	% of site in NaFRA2 RoFSW 3.3% AEP (High)	% of site in previous RoFSW 1% AEP (Medium)	% of site in NaFRA2 RoFSW 1% AEP (Medium)	% of site in previous RoFSW 0.1% AEP (Low)	% of site in NaFRA2 RoFSW 0.1% AEP (Low)	Comment on change in risk from previous RoFSW to updated NaFRA2 RoFSW
Trinity House / Cornmarket							(+6/8%) across all events. The site is now at risk in the 3.3% AEP event, with flood extents in the south and centre of the site. The greatest increase is in the 0.1% AEP event, with new areas of ponding in the north around Silver Street, and in the southeast.
SWDP43/2 9a Chequers Lane / Henwick Road	1.4	14.4	7.3	18.9	18.9	30.9	*The site boundary has changed since the original screening. See the row below for the risk to the updated site. Increased surface water flood risk (+12/13%) across all events. Several areas of ponding from the previous mapping have increased in size. The largest area of risk is now situated in the southeast of the site, at the University of Worcester Arena.
The site below is a change of boundary to the site above. For more information see Section 2.4.4.							

Site reference	% of site in previous RoFSW 3.3% AEP (High)	% of site in NaFRA2 RoFSW 3.3% AEP (High)	% of site in previous RoFSW 1% AEP (Medium)	% of site in NaFRA2 RoFSW 1% AEP (Medium)	% of site in previous RoFSW 0.1% AEP (Low)	% of site in NaFRA2 RoFSW 0.1% AEP (Low)	Comment on change in risk from previous RoFSW to updated NaFRA2 RoFSW
SWDP43/2 9a Chequers Lane / Henwick Road	-	12.5	-	16.7	-	28.5	There are several areas of ponding across the site, mostly contained to roads in the north and centre. However, the largest area of risk is in the southeast of the site, at the University of Worcester Arena.
SWDP48/6 Canal Basin (Netherwich)	1.1	1.3	4.5	3.3	23.6	7.3	The surface water flood risk in the 3.3% AEP event has increased slightly in the west of the site. The risk has reduced in the 1% and 0.1% AEP events, with areas of ponding in the south of the site no longer present in the updated mapping.
CFS0483a + CFS0483b Land at Hadzor, Droitwich Spa Hadzor (Sites 1 & 2)	0.4	1.8	0.9	2.7	5.0	6.7	Slight increased surface water flood risk (+1/2%) across all events. There are new areas of ponding across the site, including by the eastern border and in the southern portion of the site.

Re-running the analysis of site area within the previous RoFSW produced slightly different values for a small number of sites, likely due to earlier processing differences. Updated figures are shown in the table.

2.3 Strategic Settlement sites

2.3.1 Background

Following on from the Level 2 SFRA on the small-medium sites in 2020, JBA were commissioned to undertake a Level 2 SFRA at 3 Strategic Settlement Sites in 2020-2021. These were Rushwick (south-west of Worcester), Worcestershire Parkway (east of Worcester) and Throckmorton (north of Pershore). In 2023, a fourth settlement was added at Mitton (on the border with Tewkesbury Borough).

For settlement sites of such sizes, and the need for joined up catchment-based thinking between the stakeholders, new hydraulic modelling was required to inform the Level 2 assessment. For all sites except Mitton, new detailed channel survey, hydrology and 1D-2D hydraulic modelling was undertaken, reviewed and signed off by the EA, offering more detailed fluvial flood risk information than that available on the Flood Map for Planning at that time. The new model outputs provided information needed for the strategic assessment: flood extents to inform the Flood Zones, flood depth, velocity and hazard data, and climate change flood extents for the 2080s epoch River Severn basin.

It may be that in future these models are made available to developers from the Councils (or for Throckmorton from BWB Consulting, with permission from their client Pinnacle International), for use in site-specific Flood Risk Assessments. It should be noted that whilst new detailed baseline models were produced to EA standard, their intended purpose was to inform the requirements of a L2 SFRA. Site-specific assessments should seek to refine these models using site topographic survey, survey of any smaller watercourses not included in the model, any updates to hydrological approaches or use of latest data, as necessary.

For assessing surface water risk, the Risk of Flooding from Surface Water (RoFSW) dataset was used, which would be comparable against new NaFRA2 RoFSW data.

The following sections summarise the general fluvial modelling approaches and compare the 'old' vs. NaFRA2 surface water datasets.

2.3.2 Rushwick

2.3.2.1 Fluvial modelling context

During the scoping stage with the South Worcestershire Councils and Rushwick Stakeholder Working Group, it was confirmed by the Environment Agency that there was no existing detailed hydraulic modelling available anywhere in the site for the small watercourses. There were existing EA hydraulic models for the River Teme: a 1D-only ISIS model up to the railway embankment, and a more recent 1D-2D Teme-Severn confluence model. The existing Flood Zones for the watercourse, where available, were therefore based on older national 2D generalised modelling.

The new modelling required the collection of new channel topographic survey, a hydrological assessment to derive flood hydrographs for a range of flood return period events, and construction of a new baseline 1D-2D ESTRY-TUFLOW hydraulic model, to simulate fluvial flood risk across the settlement site. The new modelling was limited to the vicinity on the site boundary and was linked with the River Teme at the downstream end to ensure interactions between the watercourses where the Teme is more dominant is captured.

2.3.2.2 Fluvial risk comparison

In the previous FMfP, the fluvial risk to the site is contained to an area by the southern boundary, up to the downstream side of the rail embankment. In the updated FMfP, the representation of this watercourse in the Flood Zones extends further upstream into the centre of the site to Bransford Road.

In the detailed modelling for the SFRA, there is representation of the watercourses from the upstream side of the north-western boundary. Modelled Flood Zones are more refined, showing very minimal flooding within this area of the site. The flood extents are largely in-bank with isolated spots out of bank. Downstream of the railway line, water is shown out of bank in the 100-year and 1,000-year events upstream of the pond in the green space of the 'triangle' floodplain, and also just downstream of the pond on the right bank. The River Teme floodplain also extends into this triangular area, but with a much-reduced flood extent to the FMfP.

2.3.2.3 Surface Water risk comparison

Overall, there is little difference between the previous and new RoFSW datasets around the ponds and residential areas of Rushwick. The main area of difference is to low risk along the watercourse and ponds leading down to the Teme, though this reach is covered by fluvial risk.

2.3.3 Worcestershire Parkway

2.3.3.1 Fluvial modelling context

During the scoping stage with the South Worcestershire Councils and Parkway Stakeholder Working Group, it was confirmed by the Environment Agency that there was no existing detailed hydraulic modelling available anywhere in the site. The existing Flood Zones for the watercourse were therefore based on older national 2D generalised modelling.

The new modelling required the collection of new channel topographic survey, with LIDAR data representing the floodplain. A hydrological assessment was undertaken to derive flood hydrographs for a range of flood return period events, and construction of a new baseline 1D-2D ESTRY-TUFLOW hydraulic model, to simulate fluvial flood risk across the settlement site. The new modelling was limited to the vicinity on the site boundary, with an appropriate reach upstream to the M5 and

downstream of Hawbridge to ensure all flood risk is accounted for at the site. A small 2D-only ESTRY-TUFLOW model was also constructed for the 'Norton Drain', which drains in the opposite direction towards Kempsey. Limited survey data was available here; the 2D model was extended south of here to the M5 but is based purely on LIDAR topographic data and for the purposes of a sensible model downstream boundary.

2.3.3.2 Fluvial risk comparison

In the previous FMfP, Flood Zones 2 and 3 closely follow the watercourse that vertically bisects the site. In the updated FMfP, the Flood Zones are similar, expanding slightly in some areas around the watercourse and becoming more refined in others. In the updated FMfP, more of the watercourse has been modelled north of the site, resulting in a new area in Flood Zone 2 by the northwest boundary, and there is a small additional reach of the tributary south-west of Hawbridge represented in the new Flood Zones.

The detailed hydraulic modelling for the SFRA shows a similar, though refined, extent along the main watercourse, but adds representation of the small tributaries through the site, not shown in either FMfP. For example, the area around Worcestershire Parkway station, and a much longer extension to the tributaries leading into Hawbridge.

2.3.3.3 Surface Water risk comparison

Due to the fluvial component being removed from the latest RoFSW mapping, there is a larger reduction in surface water risk shown along the floodplain of the main watercourse and its more significant tributaries, particularly at the two rail embankments where ponding was previously significant.

There are areas of additional risk in the new mapping, more in the form of isolated spots across the site.

Areas where extents remain similar, are in the north-wester corners of the site, around Worcester Parkway station, tributaries flowing from the east into the main watercourse, and the tributaries west of Hawbridge.

2.3.4 Throckmorton

2.3.4.1 Fluvial modelling context

During the scoping stage with the South Worcestershire Councils and Throckmorton Stakeholder Working Group, it was confirmed by the Environment Agency that there is no existing detailed hydraulic modelling available anywhere in the site. The existing Flood Zones for the watercourse are therefore based on older national 2D generalised modelling.

BWB Consulting undertook the survey in December 2020, hydrology, hydraulic modelling and mapping of the Piddle Brook and its unnamed tributaries in the vicinity of the site. The new modelling required the collection of new channel topographic survey, a hydrological assessment to derive flood hydrographs for a range of flood return period events, and construction of a new baseline 1D-2D ESTRY-TUFLOW hydraulic model, to simulate fluvial flood risk across the settlement site.

The watercourses modelled by BWB Consulting for this study are built into a 1D model domain. Other smaller drainage ditches and channels were not surveyed but are partially included within the wider 2D model domain. Peak flood level information was extracted from the River Avon 2010 model, to inform the downstream boundary conditions in the Piddle Brook model.

2.3.4.2 Fluvial risk comparison

In the previous FMfP, the Flood Zones follow the Piddle Brook that flows along the west of the site, as well as partially surrounding a tributary to the Piddle Brook along the northern boundary. In the updated FMfP, the fluvial extents expand slightly into the site, particularly Flood Zone 2. There is also a slightly increased representation of Flood Zones along the tributary by Long Lane Farm.

In the detailed hydraulic modelling, the Piddle Brook Flood Zone 2 better matches the latest NaFRA2 extent. There is additional representation of the tributary from the Orchards, flowing west to Piddle Brook, and additional representation of the tributary by Long Lane Farm, around Throckmorton. This shows an area of increased fluvial risk in a large area in the northeast of the site, extending away from the tributaries and ponding around buildings and the fields that surround. The pattern of this flood extent appears to follow field drainage routes in the topography.

2.3.4.3 Surface Water risk comparison

The new RoFSW shows more areas at higher surface water risk in the site, which is a combination of isolated spots and following the alignment of small drainage ditches. This is more pronounced in the eastern half of the site.

A reduction in risk is shown along the Piddle Brook floodplain and main tributaries, as the fluvial element has been removed from the RoFSW.

2.3.5 Mitton

2.3.5.1 Fluvial modelling context

Fluvial modelling for the site was based on the Tewkesbury Confluence 1D-2D hydraulic model that covers this section of the Carrant Brook. The 3.3% AEP event extent represents Flood Zone 3b (the functional floodplain), with the 1% and 0.1% AEP event flood extents representing Flood Zones 3a and 2 respectively. These models were updated for climate change for the purposes of this SFRA.

Updated fluvial modelling was undertaken for the Tewkesbury Confluence model domain. This 2D model covers the Avon and the section of the Carrant Brook that runs parallel to the site. This modelling provides a more accurate representation of actual flood risk within the settlement than the Environment Agency's Flood Map for Planning.

2.3.5.2 Fluvial risk comparison

The previous FMfP and the new FMfP are very similar. Flood Zone 3 and 2 are closely aligned along the floodplain of the Carrant Brook, following the site's eastern/southern boundary. In the wider vicinity, there are some minor local refinements in the latest FMfP but overall are largely the same.

In the Carrant Brook modelled flood extents, Flood Zone 3 encroaches slightly further into the site in the southern half of the site, but Flood Zone 2 is slightly reduced in comparison to the FMfP. There are some more pronounced differences away from the site to the south, but overall, the old and new FMfP, along with the detailed modelling, all present very similar extents within the site due to the well-defined floodplain topography.

2.3.5.3 Surface Water risk comparison

Overall, there is little difference between the previous and new RoFSW datasets. The new dataset presents a few additional isolated spots of low risk in the northern half of the site, and a slight reduction around the area of ponding in the southern portion of the site, but overall the footprint seems relatively similar.

2.4 Further mitigation/ considerations

2.4.1 CFS0933 + CFS1076 - Land at Navigation Road

In the previous site screening, this site was 98% in Flood Zone 2 and 9% in Flood Zone 3. The site assessment recommended that residential development should be steered away from Flood Zone 3, and the least vulnerable development placed where Flood Zone 2 extends. As almost the entire site falls Flood Zone 2, careful consideration is required to determine suitable locations for different types of development and how safe access and egress will be achieved.

In the new NaFRA2 mapping, Flood Zone 3 largely covers the site as well (65%), presenting significant challenges to the site for development and access. The increase in Flood Zone 3 in the surrounding area is also significant.

The Environment Agency was contacted in August 2025 to clarify the source of model data used in NaFRA2, given the differences from the 2021 study and the awareness of the ongoing updated Severn modelling. The Severn modelling is not yet finalised and is therefore not included in NaFRA2.

The Environment Agency responded that the current NaFRA2 FMfP along the Severn is only informed by the New National Model, which is generalised modelling that often overestimates risk. They are working to get local modelling represented in the FMfP. However, until the new model has been delivered, they recommend usage of the 'current' local model (which was used in the original 2021 assessment) for planning within this area.

It is likely this new detailed Environment Agency modelling would show an improved picture of flood risk at the site. Once available, this data should be obtained for any future assessments and mitigation. This data will also have depth, velocity and hazard outputs, helping to better inform where development should be placed and the provision of safe access and egress.

In terms of surface water risk, there is a slightly increased footprint in the new NaFRA2 mapping, particularly in the northern corner and centre of the site. However, these areas are still presenting as isolated areas of ponding, rather than a new flow path.

2.4.2 SWDP48/6 - Canal Basin

In the previous site screening, the larger site parcel was predominantly unaffected by the fluvial Flood Zones, with the risk contained along the site's northern boundary. The smaller parcel showed much higher risk, attributed to a combination of fluvial flooding and overtopping from the canal basin along the eastern border. There are links and interactions between this and the Droitwich Canal to the north of the smaller parcel.

In the new NaFRA2 mapping, there is a significant increase in Flood Zone 2 (+50%), covering the western half of the larger parcel. The smaller parcel is entirely covered by Flood Zone 3 and 2.

Mixed use developments should consider the highest level of vulnerability. Development should be steered away from fluvial flood zones as part of a sequential approach, placing the 'More Vulnerable' residential development in Flood Zone 1, where possible. Residential development will therefore need to be steered away from Flood Zone 3 and areas at highest risk near the River Salwarpe and the canal. Areas in Flood Zone 2 should be used for the least vulnerable parts of the development.

There are limitations for development to be placed in the small parcel of the site, because it is covered by the Flood Zones. Access and egress will also need to be demonstrated, as there is currently no unimpeded route via Kidderminster Road.

Any development on the western side of the site will need raised floor levels. Finished floor levels should be raised above the expected height of flooding in line with the EA's guidance and any raising of ground levels should ensure that flood risk is not increased elsewhere.

Residual risk should be considered from the Droitwich Canal and nearby culverts on the River Salwarpe. Providing specific advice for the site is challenging due to the absence of flood depth data. This should be considered in a site-specific FRA.

In terms of surface water mapping, the footprint is slightly improved in the new NaFRA2, with a reduction in risk in the central portion of the site and much reduced extent in the smaller parcel.

2.4.3 CFS0143 - Parcel B - Land adjacent Broadway Road

This is a revised site boundary and hence a new picture of flood risk. The site is still within the SWDPR but is now part of a larger employment allocation to the north (CFS0990sc).

Neither the previous site nor the new site lies within Flood Zones 2 or 3 and is entirely within Flood Zone 1. Flood risk at this new site is associated predominantly with surface water. However, consideration should be given to the potential flood risk from the Bengeworth Brook that flows along the site's northern boundary, from east to west. This watercourse is not modelled, but there would be flood risk associated with it. It is likely this risk would be low and contained around the northern boundary, but this should be confirmed as part of a site-specific FRA.

In terms of surface water risk, this is largely confined to the western and northern portions of the site, with a flow path flowing from southwest, along the western boundary to meet the Bengeworth Brook. In the latest NaFRA2 mapping, the footprint is largely the same, but more of the extent is now showing as high risk.

Development should be steered away from the northern boundary, where there is some surface water and anticipated fluvial risk, as well as the western boundary, due to surface water risk.

2.4.4 SWDP43/29a - Chequers Lane / Henwick Road

There has only been a minor revision to the site boundary from the previous assessment, encapsulating more land adjacent to the A443.

The Level 2 site assessment is largely still valid, and states:

"Flood Zone data shows this site to be almost entirely within Fluvial Flood Zone 2, apart from a very small area of the south-western corner, nearest Henwick Road.

Flood Zone 3a encroaches into the site along significant portions of the eastern boundary as this is the undefended 100-year flood extent. It also traverses the southern boundary here between the site border and the railway embankment. In reality, the flood defences may prevent the defended 100-year from reaching the site, but there is residual risk to consider.

Flood Zone 3a also encroaches in the centre of the eastern boundary along the access road off Hylton Road and flows around the central building into the car park at its rear.

The railway embankment forms an impoundment along the southern site boundary, along with the raised levels at Henwick Road, meaning the site is located in a low topographic triangle bound by higher ground impoundments and the River Severn."

The main difference is that the new NaFRA2 flood map shows a more significant proportion of the site in Flood Zone 3. However, as stated for the Navigation Road site in Section 2.4.1, the current NaFRA2 FMfP along the Severn is only informed by the New National Model. This is generalised modelling that often overestimates risk. The Environment Agency are working to get local modelling represented in the FMfP. However, until the new model has been delivered, they recommend usage of the 'current' local model (which was used in the original 2021 assessment) for planning within this area.

University buildings fall under 'Education', which are considered 'More Vulnerable'. The site is protected by flood defences, but the residual risk needs considering alongside the vulnerability of the development and its users. The site may need an Emergency Plan given its educational use and location immediately adjacent to the Hylton Road flood defences.

Residual risk from potential overtopping or breach needs to be considered in a site-specific assessment. When the new Severn model is available, depths, velocities and hazard at the site should be analysed to ascertain safe access, effects of climate change, and residual scenarios.

In the new NaFRA2 mapping, the surface water footprint is largely the same. However, the areas of high risk have expanded through the areas at risk in the centre of the site.

This site is now being built out.

A Fluvial risk comparison (Flood Zone 2 and Flood Zone 3)

B Surface water risk comparison (RoFSW vs. NaFRA2 SW Mapping)

C Strategic settlement sites (surface water comparison)

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1 Broughton Park
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North Yorkshire
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United Kingdom

+44(0)1756 799919
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