

Product 4 (Detailed Flood Risk) for FURLONG ROAD, BOURNE END, SL8 5AG

Our Ref: THM261905

Product 4 is designed for developers where Flood Risk Standing Advice FRA (Flood Risk Assessment) Guidance Note 3 Applies. This is:

- i) "all applications in Flood Zone 3, other than non-domestic extensions less than 250 sq metres; and all domestic extensions", and
- ii) "all applications with a site area greater than 1 ha" in Flood Zone 2.

Product 4 includes the following information:

Ordnance Survey 1:25k colour raster base mapping;
Flood Zone 2 and Flood Zone 3;
Relevant model node locations and unique identifiers (for cross referencing to the water levels, depths and flows table);
Model extents showing *defended* scenarios;
FRA site boundary (where a suitable GIS layer is supplied);
Flood defence locations (where available/relevant) and unique identifiers; (supplied separately)
Flood Map areas benefiting from defences (where available/relevant);
Flood Map flood storage areas (where available/relevant);
Historic flood events outlines (where available/relevant, not the Historic Flood Map) and unique identifiers;
Statutory (Sealed) Main River (where available within map extents);

A table showing:

- i) Model node X/Y coordinate locations, unique identifiers, and levels and flows for *defended* scenarios.
- ii) Flood defence locations unique identifiers and attributes; (supplied separately)
- iii) Historic flood events outlines unique identifiers and attributes; and
- iv) Local flood history data (where available/relevant).

Please note:

If you will be carrying out computer modelling as part of your Flood Risk Assessment, please request our guidance which sets out the requirements and best practice for computer river modelling.

This information is based on that currently available as of the date of this letter. You may feel it is appropriate to contact our office at regular intervals, to check whether any amendments/ improvements have been made. Should you re-contact us after a period of time, please quote the above reference in order to help us deal with your query.

This information is provided subject to the enclosed notice which you should read.

This letter is not a Flood Risk Assessment. The information supplied can be used to form part of your Flood Risk Assessment. Further advice and guidance regarding Flood Risk Assessments can be found on our website at:

<https://www.gov.uk/guidance/flood-risk-assessment-local-planning-authorities>

If you would like advice from us regarding your development proposals you can complete our pre application enquiry form which can be found at:

<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

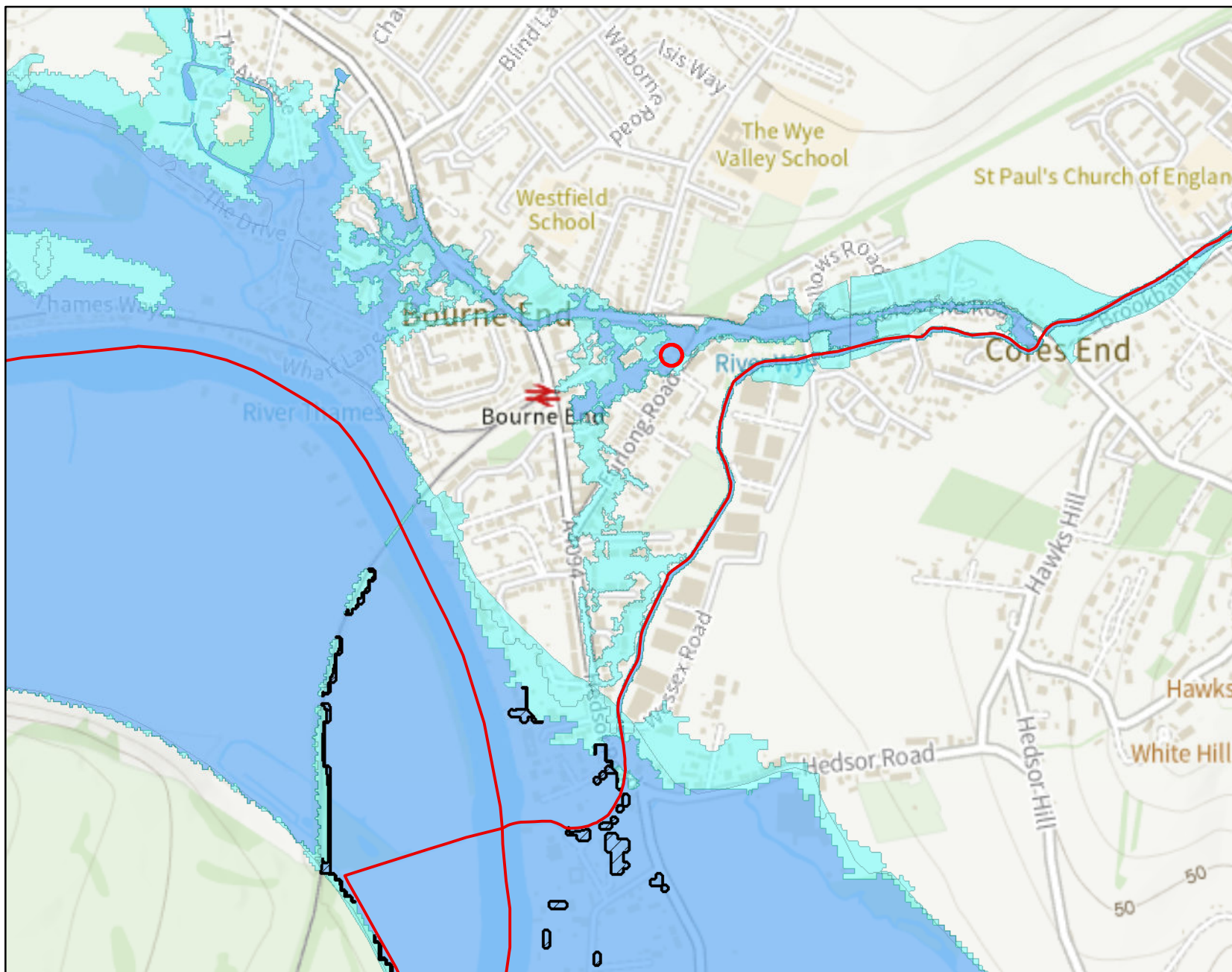
Defence information

Defence Location:

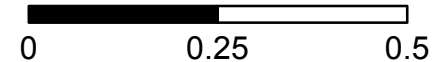
Description: This location is not currently protected by any formal defences and we do not currently have any flood alleviation works planned for the area. However we continue to maintain certain watercourses and the schedule of these can be found on our internet pages.

Flood Map for Planning centred on FURLONG ROAD, BOURNE END, SL8 5AG

Created on 11/05/2022 REF: THM261905



Kilometres



Legend

- Main River
- Flood defences
- ▨ Areas benefiting from flood defences
- Flooding from rivers or sea (FZ3)
- Extent of extreme flood (FZ2)
- ▤ Flood Map - flood storage areas

Flooding from rivers or sea without defences (Flood Zone 3) shows the area that could be affected by flooding:
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

The Extent of an extreme flood (Flood Zone 2) shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

Model information

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Model: Wye (including Hughenden Stream) 2018

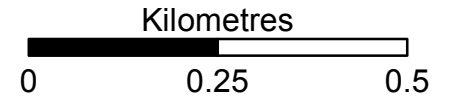
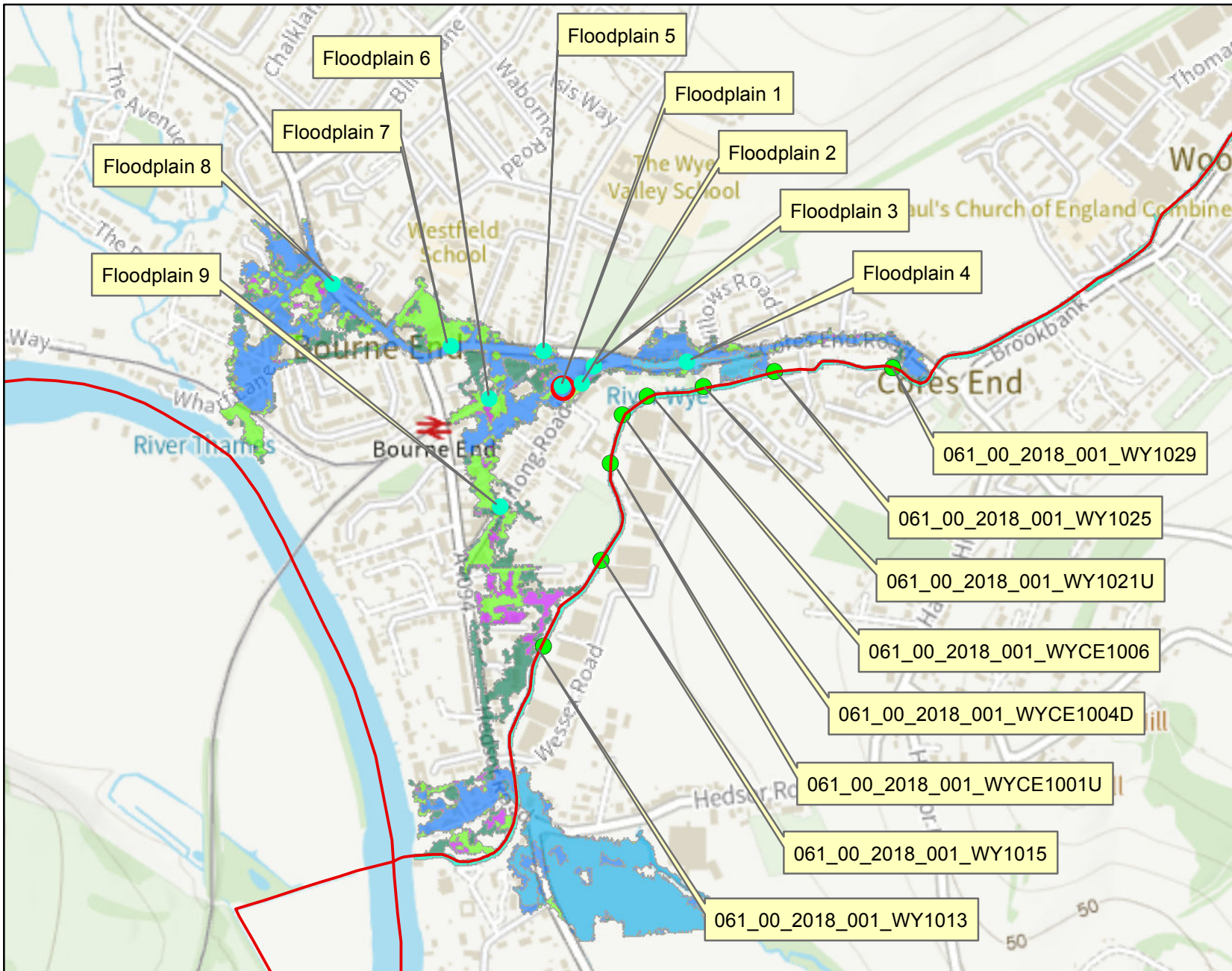
Description: The information provided is taken from the River Wye and Hughenden Stream modelling study in May 2018. The study was carried out using Flood Modeller ESTRY-TUFLOW software. This data supersedes the 2002 model.

Model design runs and Mapped Outputs:

- 1 in 5 / 20% AEP
- 1 in 20 / 5% AEP
- 1 in 30 / 3.3% AEP
- 1 in 75 / 1.33% AEP
- 1 in 100 / 1% AEP
- 1 in 100+15% / 1% AEP with 15% AEP climate change allowance
- 1 in 100+25% / 1% AEP with 25% AEP climate change allowance
- 1 in 100+35% / 1% AEP with 35% AEP climate change allowance
- 1 in 100+70% / 1% AEP with 70% AEP climate change allowance
- 1 in 1000 / 0.1% AEP

Detailed FRA Map centred on FURLONG ROAD, BOURNE END, SL8 5AG

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Legend

- Main River
- THM Model Node Data
- 20% AEP Flood Outline
- 5% AEP Flood Outline
- 1% AEP Flood Outline
- 1%+25% CC AEP Flood Outline
- 1%+35% CC AEP Flood Outline
- 1%+70% CC AEP Flood Outline
- 0.1% AEP Flood Outline

AEP = Annual Exceedance Probability
The probability of a flood of a particular magnitude, or greater, occurring in any given year

Where available climate change extents have been calculated with an additional flow added to an AEP event. An example of how this is written is 1%+20% AEP.

Modelled in-channel flood flows and levels

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The modelled flood levels and flows for the closest most appropriate model node points for your site that are within the river channel are provided below:

Node label	Model	Easting	Northing	Flood Levels (mAOD)						
				20% AEP	5% AEP	1% AEP	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP
061_00_2018_001_WY1029	Wye (including Hughenden Stream) 2018	490269	187358	31.05	31.15	31.24	31.28	31.29	31.33	31.25
061_00_2018_001_WY1025	Wye (including Hughenden Stream) 2018	490060	187350	29.86	29.94	30.02	30.05	30.05	30.07	30.02
061_00_2018_001_WY1021U	Wye (including Hughenden Stream) 2018	489934	187324	29.48	29.58	29.66	29.69	29.70	29.72	29.67
061_00_2018_001_WYCE1006	Wye (including Hughenden Stream) 2018	489834	187307	29.38	29.49	29.57	29.60	29.61	29.63	29.58
061_00_2018_001_WYCE1004D	Wye (including Hughenden Stream) 2018	489790	187274	29.32	29.43	29.51	29.54	29.55	29.57	29.52
061_00_2018_001_WYCE1001U	Wye (including Hughenden Stream) 2018	489769	187189	28.57	28.65	28.71	28.73	28.73	28.75	28.71
061_00_2018_001_WY1015	Wye (including Hughenden Stream) 2018	489753	187016	28.03	28.11	28.18	28.20	28.21	28.22	28.18
061_00_2018_001_WY1013	Wye (including Hughenden Stream) 2018	489650	186865	27.43	27.53	27.61	27.64	27.65	27.67	27.62

Node label	Model	Easting	Northing	Flood Flows (m3/s)						
				20% AEP	5% AEP	1% AEP	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP
061_00_2018_001_WY1029	Wye (including Hughenden Stream) 2018	490269	187358	3.70	4.79	5.99	6.44	6.54	7.27	6.24
061_00_2018_001_WY1025	Wye (including Hughenden Stream) 2018	490060	187350	3.87	5.04	6.36	6.93	7.07	7.64	6.45
061_00_2018_001_WY1021U	Wye (including Hughenden Stream) 2018	489934	187324	3.87	5.00	6.01	6.37	6.46	6.74	6.07
061_00_2018_001_WYCE1006	Wye (including Hughenden Stream) 2018	489834	187307	3.87	5.00	6.01	6.37	6.46	6.74	6.07
061_00_2018_001_WYCE1004D	Wye (including Hughenden Stream) 2018	489790	187274	3.87	5.00	6.01	6.37	6.46	6.74	6.07
061_00_2018_001_WYCE1001U	Wye (including Hughenden Stream) 2018	489769	187189	3.87	5.00	6.01	6.37	6.46	6.74	6.07
061_00_2018_001_WY1015	Wye (including Hughenden Stream) 2018	489753	187016	3.87	5.00	6.00	6.37	6.46	6.74	6.07
061_00_2018_001_WY1013	Wye (including Hughenden Stream) 2018	489650	186865	3.87	5.00	6.00	6.37	6.46	6.74	6.07

Note:
Due to changes in guidance on the allowances for climate change, the percentage increase in river flows above should no longer be used for development design purposes. The data included in this Product can be used for interpolation of levels as part of an intermediate level assessment.

For further advice on the new allowances please visit
<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

Modelled floodplain flood levels

The modelled flood levels for the closest most appropriate model grid cells for your site are provided below:

2D grid cell reference	Model	Easting	Northing	flood levels (mAOD)						
				20% AEP	5% AEP	1% AEP	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP
Floodplain 1	Wye (including Hughenden Stream) 2018	489,685	187,329	No Data	No Data	29.48	29.54	29.55	29.59	59.59
Floodplain 2	Wye (including Hughenden Stream) 2019	489,716	187,332	No Data	No Data	29.48	29.54	59.55	29.59	29.59
Floodplain 3	Wye (including Hughenden Stream) 2020	489,740	187,361	No Data	No Data	29.49	29.55	29.56	29.61	29.61
Floodplain 4	Wye (including Hughenden Stream) 2021	489,904	187,369	No Data	29.13	29.50	29.57	29.58	29.65	29.65
Floodplain 5	Wye (including Hughenden Stream) 2022	489,647	187,385	No Data	No Data	29.06	29.09	29.09	29.12	29.12
Floodplain 6	Wye (including Hughenden Stream) 2023	489,555	187,305	No Data	No Data	No Data	No Data	29.24	29.28	29.28
Floodplain 7	Wye (including Hughenden Stream) 2024	489,486	187,398	No Data	No Data	29.53	29.59	29.59	29.62	29.61
Floodplain 8	Wye (including Hughenden Stream) 2025	489,274	187,509	No Data	No Data	27.70	27.77	27.78	27.82	27.82
Floodplain 9	Wye (including Hughenden Stream) 2026	489,576	187,110	No Data	No Data	No Data	28.75	28.76	28.79	28.79

This flood model has represented the floodplain as a grid.
The flood water levels have been calculated for each grid cell.

Note:

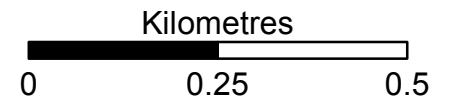
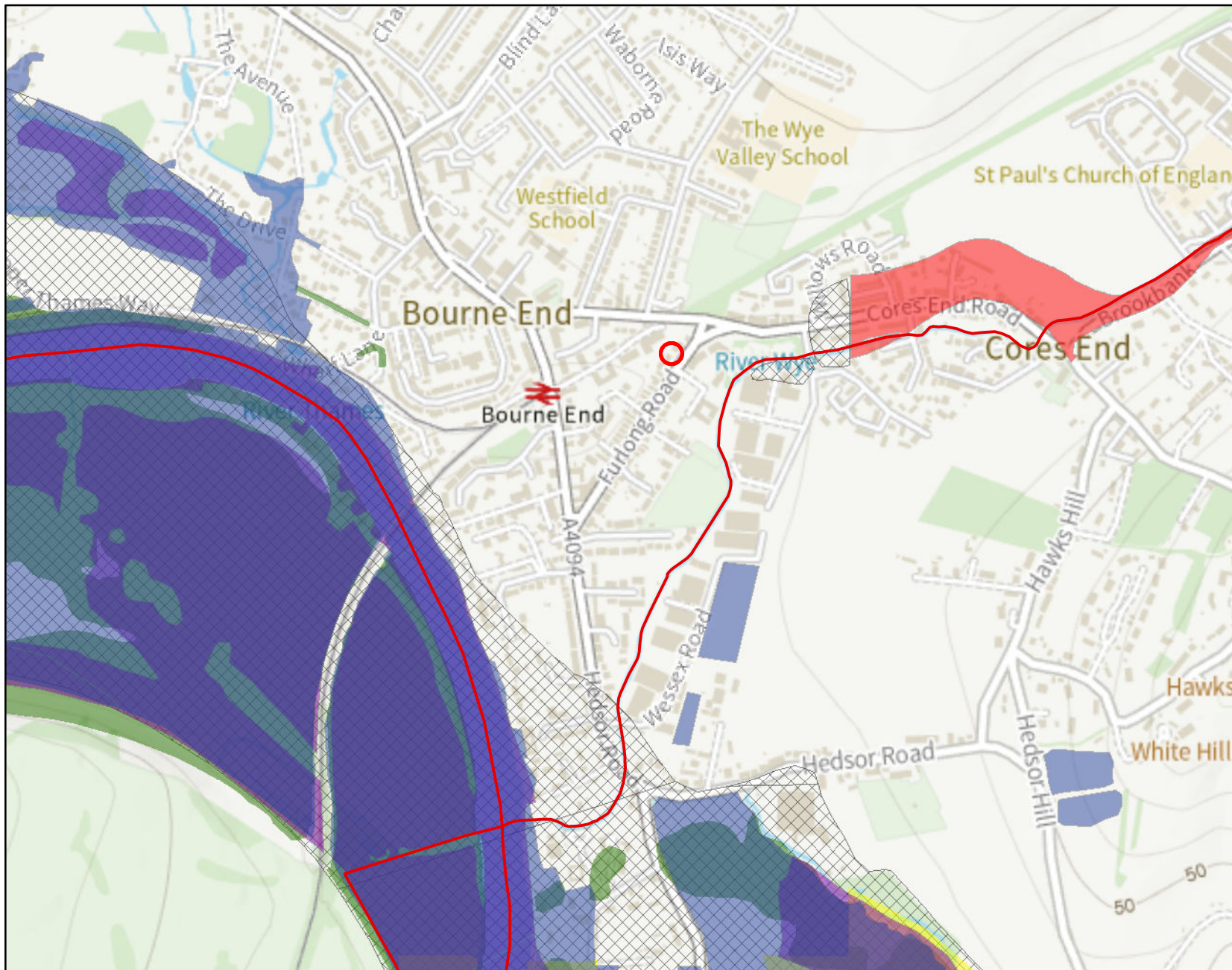
Due to changes in guidance on the allowances for climate change, the percentage increase in river flows above should no longer to be used for development design purposes. The data included in this Product can be used for interpolation of levels as part of an intermediate level assessment.

For further advice on the new allowances please visit

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Historic Flood Map centred on FURLONG ROAD, BOURNE END, SL8 5AG







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Legend

— Main River

year

-  1947
-  1974
-  1981
-  1990
-  2000
-  2002

Flooding from rivers or sea without defences (Flood Zone 3) shows the area that could be affected by flooding:
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

The Extent of an extreme flood (Flood Zone 2) shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

Historic flood data

THM261905

Our records show that the area of your site has been affected by flooding.
Information on the floods that have affected your site is provided in the table below:

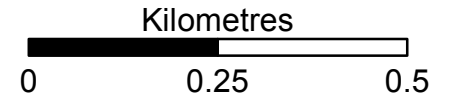
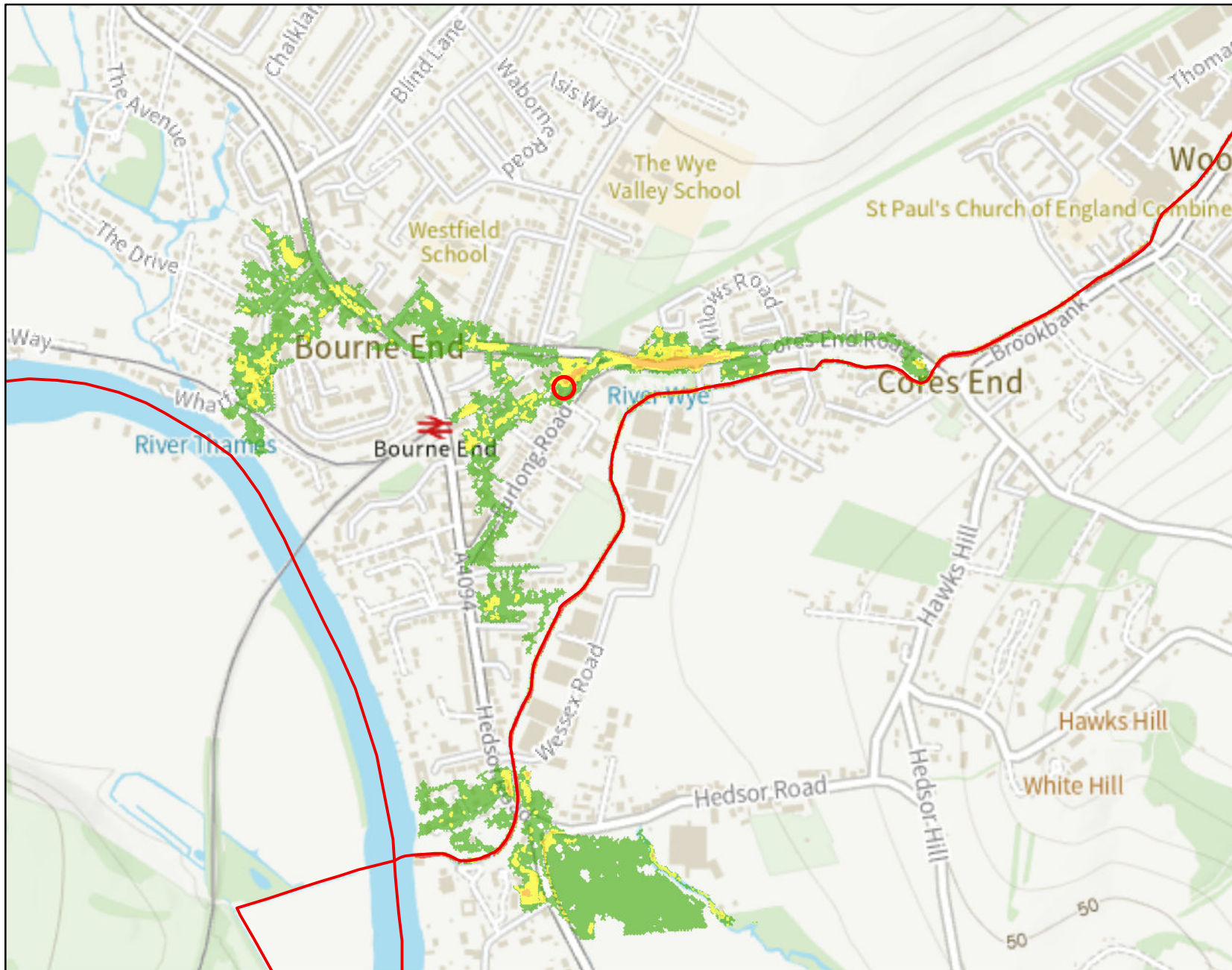
Flood Event Code	Flood Event Name	Start Date	End Date	Source of Flooding	Cause of Flooding
EA0619470300431	06MarchSpring1947	01/01/1947	12/12/1947	main river	channel capacity exceeded (no raised defences)
EA0619741100428	06NovemberAutumn1974	01/01/1974	12/12/1974	main river	channel capacity exceeded (no raised defences)
EA0619811200005	06DecemberWinter1981	01/01/1981	12/12/1981	main river	channel capacity exceeded (no raised defences)
EA0619900200262j	06FebruaryWinter1990	01/01/1990	12/12/1990	main river	channel capacity exceeded (no raised defences)
EA0620001200086	06DecemberWinter2000	01/01/2000	12/12/2000	main river	channel capacity exceeded (no raised defences)
EA0620030100990	06JanuaryNewYear2003	23/12/2002	12/01/2003	main river	channel capacity exceeded (no raised defences)

Please note the Environment Agency maps flooding to land not individual properties. Floodplain extents are an indication of the geographical extent of a historic flood. They do not provide information regarding levels of individual properties, nor do they imply that a property has flooded internally.

Start and End Dates shown above may represent a wider range where the exact dates are not available.

Hazard Map centred on FURLONG ROAD, BOURNE END, SL8 5AG

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Legend

- Main River
- Low hazard
- Hazard to some
- Hazard for most
- Hazard to all

For hazard and debris factor we used HR Wallingford and Environment Agency (May 2008) supplementary note on flood hazard ratings and thresholds for development planning and control purpose. The following calculation is used:

$$HR = d \times (v+0.5) + DF$$

HR = flood hazard rating
d = depth of flooding (m)
v = velocity of floodwaters (m/sec)
DF = debris factor calculated (0, 0.5, 1 depending on probability that debris will lead to a hazard)

Hazard Mapping (for the 1%+35% climate change scenario)

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Hazard Mapping methodology:

To calculate flood hazard with the debris factor we have used the supplementary note to Flood Risk to People Methodology (see below).

The following calculation is used:

$$HR = d \times (v+0.5) + DF$$

Where HR = flood hazard rating

d = depth of flooding (m)

v = velocity of floodwaters (m/sec)

DF = debris factor calculated (0, 0.5, 1 depending on probability that debris will lead to a hazard)

The resultant hazard rating is then classified according to:

Flood Hazard	Colour	Hazard to People Classification
Less than 0.75	Green	Very low hazard - Caution
0.75 to 1.25	Yellow	Danger for some - includes children, the elderly and the infirm
1.25 to 2.0	Orange	Danger for most - includes the general public
More than 2.0	Red	Danger for all - includes the emergency services

REF: HR Wallingford and Environment Agency (May 2008) Supplementary note of flood hazard ratings and thresholds for development planning and control purpose – Clarification of the Table 113.1 of FD2320/TR2 and Figure 3.2 of FD2321/TR1