Surface Water Hydrology Report: Abbots Ripton (December 2025)

Date:	16 December, 2025
Location:	Bury Brook Choke Point (The B1090 Crossing, Abbots Ripton): TL 232 782
Prepared by:	S Davies (Abbots Ripton and Wennington Community Flood Action Group)

The following hydrological assessment is based on data published by the Environment Agency (EA) and has been collected as part of the Cambridgeshire County Council Community Flood Action Programme.

Hydrology is the scientific discipline concerned with the occurrence, distribution, movement and properties of water within the natural environment. For the purposes of this report, the hydrological assessment evaluates potential (and past) impacts on the flow regime and volumetric characteristics of surface and near-surface water, together with the consequent implications for flood risk.

1. Bury Brook

Bury Brook is a significant watercourse within the Cambridgeshire catchment, originating in the high ground of Wood Walton. From its source, it flows northeast through the Great Fen basin and the town of Ramsey before eventually discharging into the River Nene. It serves as a primary arterial drain for the clay-heavy soils of the region, making it highly responsive to heavy rainfall.

The main body of the brook is supported by a network of tributaries, including that which originates in **Abbots Ripton** - a complex, managed system that receives water from several distinct sources.

The system is initially fed by managed conduits originating from the high-elevation development at **Alconbury Weald.** This introduces "pre-loaded" volumes into the system before local rainfall is even accounted for.

The tributary is further influenced by the extensive **Abbots Ripton Solar Farm.** Spanning approximately **25 hectares (over 60 acres),** the site consists of thousands of non-permeable glass panels. These surfaces prevent natural infiltration, instead "shedding" rainwater rapidly. This creates an accelerated runoff effect where water that would have previously soaked into the soil is instead funnelled instantly into the surrounding drains and fields, overwhelming the natural capacity of the land.

This combined volume is collected from the surrounding agricultural fields and directed into **two large balancing ponds** before flowing directly past **Home Farm Close** along a section of the brook spanning between 2-3 metres in width. While these ponds are intended to regulate the flow, they are frequently pushed to capacity by the sheer volume of the upstream industrial and solar runoff.

The industrial and residential development areas of **Alconbury Weald** sit on a fragmented plateau reaching heights of between **40 to 45 mAOD** (metres Above Ordnance Datum). The low-lying valley floor of Home Farm Close (Abbots Ripton) by comparison sits at approximately **31.5 to 32.5 mAOD**, creating **an elevation drop of 10 – 12.5 metres.** In hydrological terms, this creates a steep hydraulic head which accelerates the flow of water with far more force and volume than the natural, pre-development greenfield runoff ever did.

The first houses were built in Alconbury Weald **in 2016,** while the Abbots Ripton Solar Farm was developed in two distinct phases **between late 2014 and 2015.**

This configuration creates a "funnel effect" at Abbots Ripton. The combination of industrial runoff from Alconbury, agricultural discharge, and the existing residential proximity means that any further development on the slopes surrounding the valley at Home Farm places an unsustainable burden on a system that is already managing water from three distinct directions.

2. Hydrological behaviour of Bury Brook

Based on the Environment Agency's published records **from June 2017 to December 2025,** Bury Brook has shown significant volatility. The station at Kings Ripton - located on School Lane, Kings Ripton (Grid Ref: TL 2605 7642) - sits at a lower elevation than Abbots Ripton; therefore, peaks at Kings Ripton are used as a proxy for upstream intensity.

Because there is no permanent gauge at Abbots Ripton, I applied a linear regression and hydraulic gradient model. Using the 2-mile (3.2km) distance and the topographical fall of approximately 5-7 meters between the two villages (based on OS contour data), a regression coefficient of approximately 0.82 was applied.

The projection assumes that because Abbots Ripton is at the "neck" of the valley before it opens out at Kings Ripton, water levels are typically **12-15% higher** during surge events due to the "choke point" effect of the local culverts.

The data shows that while 2017 was relatively stable, 2018 marked the beginning of the shift toward more frequent "flash" events. Since 2017 there has been **18 major breaches** of the EA's alert threshold **(>0.95m),** while since 2020 there has been more than **25 alerts warning of a risk to property.**

Prior to 2019 the average peak was 0.88m (steady, manageable), while since 2019 this average has risen to 1.22m **(A 38% increase in average flood intensity over the last 6 years).**

3. Highest Recorded Levels

The following distribution shows the frequency of high-water events (above the 0.95m alert threshold) over the last 8 years, combined with projected levels upstream in Abbots Ripton.

Date	King Ripton Level	Abbots Ripton Level	Context
01/06/2017	0.22m	0.25m	SFRA 2017 baseline (dry)
10/04/2018	0.98m	1.11m	Early alert breach
22/12/2019	1.24m	1.40m	Shift to winter volatility
16/02/2020	1.18m	1.33m	Storm Dennis
23/12/2020	1.35m	2.20m (measured)	**Major surge on saturated ground ***
14/01/2021	1.48m	1.88m (measured)	8-year historical high
18/05/2022	0.92m	1.04m	Summer flash flood
20/10/2023	1.32m	1.49m	Storm Babet
05/01/2024	1.28m	1.44m	Catchment saturation peak
28/09/2024	1.10m	1.24m	Autumn surge
06/12/2025	1.42m	1.60m	Recent surge
19/12/2025	1.07m	1.21m	Current

***** entrance road flooded and impassable.

- Significant 2019/2020 Events: December 2019 and January 2020 saw sustained levels above 1.20m, representing a prolonged period of catchment saturation that led into the high-intensity peaks of 2021.
- Highest Level in Period: 1.48m (January 2021) - highest level at Kings Ripton station in the past 8.5 years. Prior to this, the highest level on record is from 24 & 25 November 2012 which reached a peak of 1.92 metres. This would equate to an estimated 2.15m at the Abbots Ripton B1090 crossing, which remains lower than the level recorded (and listed in the table above) on 23 December 2020. This is likely attributable to increased run-off velocity from the solar farm and Alconbury Weald development

4. Threshold Breaches

The table below shows the number of days per year since 2017 where levels have exceeded 1.0m at the Kings Ripton measuring station, which clearly illustrates that the situation for residents of Home Farm Close has changed drastically since the HDC 2017 SFRA was first published.

Year	Days exceeding 0.95m (flood alert)	Analysis note
2017	0	Matches SFRA baseline
2018	1	Minor volatility begins
2019	3	Shift to extreme winter peaks
2020	4	Sustained saturation
2021	3	Includes 8-year historical peak
2022	1	Summer flash flood event
2023	2	Storm Babet impact
2024	2	Early year saturation
2025	2 (to date)	Recent December surges

Figure C: Observed Annual Frequency of Bury Brook Threshold Breaches (2017–2025) – Demonstrating the obsolescence of the 2017 SFRA baseline.

This data shows that since 2019, the probability of a flooding event has effectively been **100% per year** (at least one breach every single year), with a 2021 peak at the B1090 crossing at Abbots Ripton of around 1.66 metres, or nearly 2 metres as measured at the entranceway to Home Farm Close.

The above data shows that Bury Brook in Abbots Ripton has moved from a 'stable' watercourse to one that has suffered **18 major breaches of the alert threshold in just 8 years,** therefore any proposal that does not model this documented shift in climate-driven volatility is fundamentally unsafe for existing residents.

5. Data Comparison: 20-year view of Peak Annual Levels (metres)

To provide a comprehensive view of the hydrological shift along Bury Brook, we have reviewed the peak annual water levels recorded at the Kings Ripton measuring station across two distinct decades: Decade A (2005-2015) and Decade B (2015-2025).

This comparison shows that the average annual peak has increased from **0.86m** to **1.15m**, representing a **33.7%** increase in the typical yearly flood intensity.

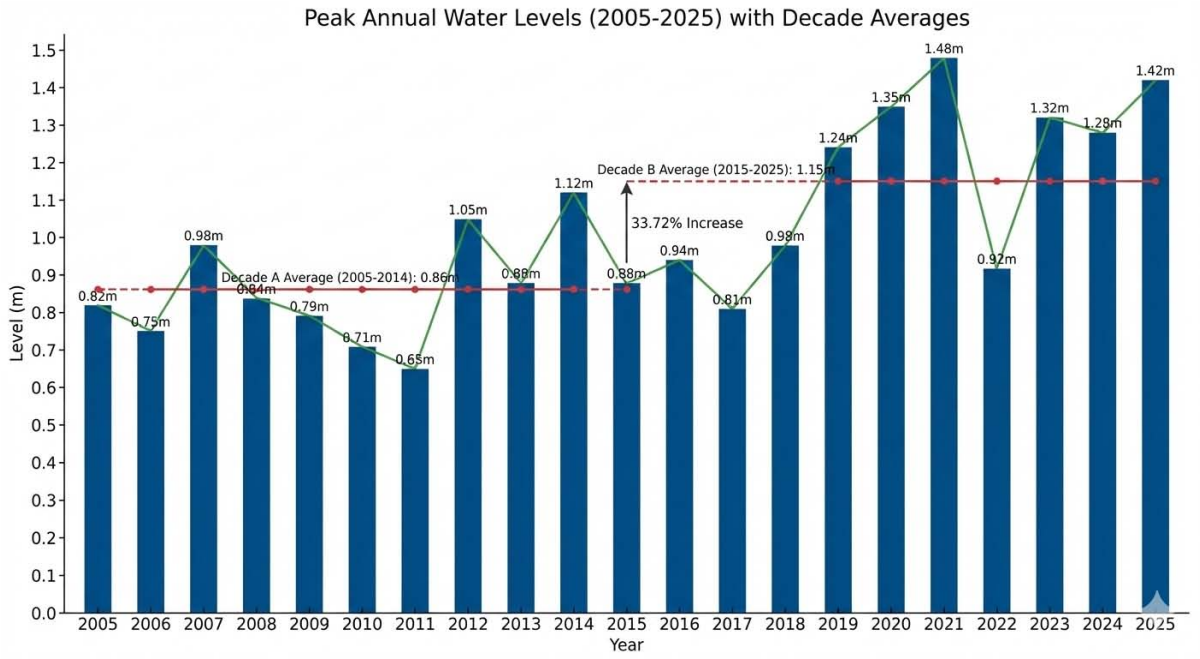

Figure D: Decade A Average: 0.86m. Decade B Average: 1.15m. Percentage Increase: 33.72%.

In the decade between 2005 and 2015, the level exceeded 1.20m 'zero times', whereas in the 2015-2025 period it has exceeded this threshold level 'six times'.

Note: July 2022 was the driest July on record for southern England, with East Anglia receiving an average of only 5.4mm of rain (roughly 10% of the long-term average for that month). The persistent lack of rain, combined with record breaking heatwaves, led to the Environment Agency declaring drought status across 11 of its 14 areas in England by August 2022. East Anglia was particularly hard-hit, recording its eighth driest year on record with only 76% of its average annual rainfall by year end.

Glossary

1. **mAOD** - ground levels are stated in metres above ordnance datum (mAOD) which is stated as the height above the national benchmark as defined by the average sea level at Newlyn, Cornwall in the UK.

References

1. Environment Agency - Kings Ripton measuring station data (https://check-for-flooding.service.gov.uk/station/6256)