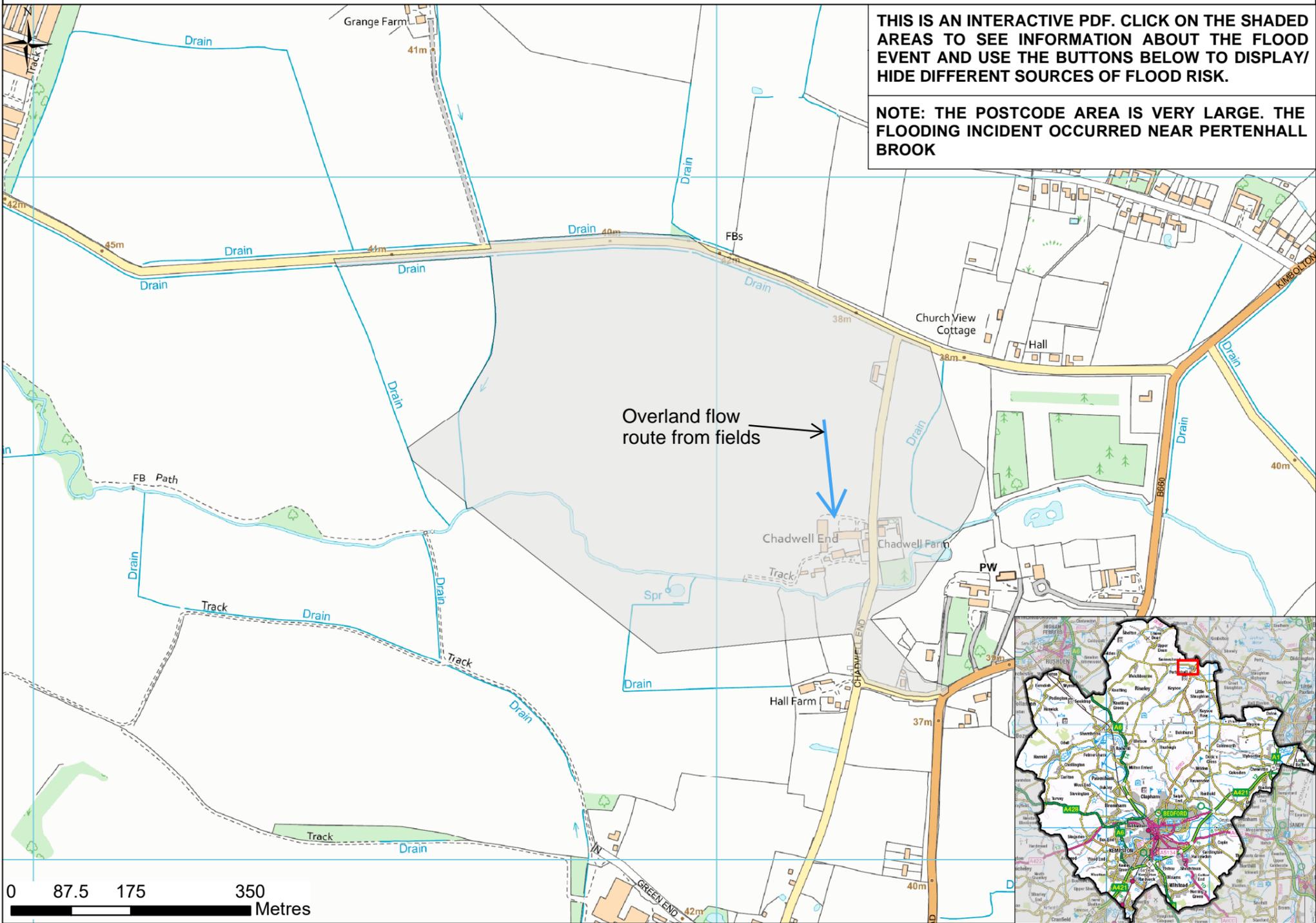


The village of Pertenhall surrounding the Pertenhall Brook suffered flooding in December 2020. Under the Flood and Water Management Act 2010, Bedford Borough Council as the Lead Local Flood Authority (LLFA) has the duty to investigate the flood event. The scope of this flood investigation is to identify the source, cause and impact of flooding from available information, identify actions completed by relevant Risk Management Authorities (RMAs) in response to the flood event, and consider actions to better understand and manage the risk of flooding in the affected area.



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Legend

- Postcode Boundary
- Flood Zone 3
- Flood Zone 2
- Flood Warning Areas
- Areas benefitting from flood defences

Flood Map for Planning

Risk of Flooding from Surface Water

- High risk of flooding (3.3% AEP)
- Medium risk of flooding (1% AEP)
- Low risk of flooding (0.1% AEP)

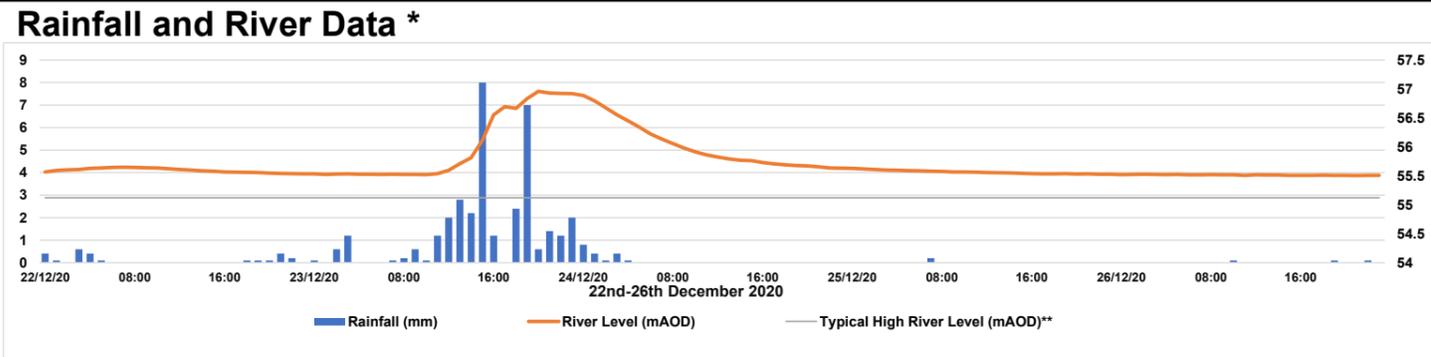
CLICK ON THESE BUTTONS

FLOOD MAP FOR PLANNING

RISK OF FLOODING FROM SURFACE WATER

FLOOD WARNING AREAS

BACKGROUND MAP



Rainfall and River Gauges

Nearest Rain Gauge	Thurleigh
Distance to Gauge	6.59 km
Nearest River Gauge	Riseley
Distance to Gauge	4.64 km

*Rainfall and River data was obtained from the Environment Agency (May 2021)
 **River levels below this level 90% of the time.

Rainfall and River Data Interpretation

The graph identifies that the main rainfall event at the nearest rainfall gauge to Pertenhall occurred between 08:00 on December 23rd and 04:00 on December 24th. The total rainfall volume is recorded as 34.7mm with a peak rainfall intensity of 8mm/hour. This single event saw more than half of the 55mm of rainfall which is expected for the whole month of December on average.

The Pertenhall Brook runs through Pertenhall, discharging into the River Kym approximately 3.5km further downstream. The nearest river gauge is located upstream along the Pertenhall Brook in Riseley and the river levels at that gauge are shown on the graph to provide context. The graphs shows that the peak of the river levels occurred between 13:00 on December 23rd and 14:00 on December 24th. However, the graph also shows that the river levels were above the 'typical high river level' from before December 22nd and remained elevated beyond December 26th. The 'typical high river level' at the nearest gauge station is identified as 55.1m Above Ordnance Datum (AOD), and river levels above this are only expected to be recorded 5% of the time.

SOURCE OF FLOODING: Main River (Fluvial)

FLOOD EVENT & CAUSE

One residential property reported internal flooding on December 23rd from the Pertenhall Brook, with water encroaching from under the floor and through the doors reaching depths of up to 100mm. Water also reportedly entered the property from the fields to the north. The property is reported to have flooded three times since 1960 and a bund which was constructed after the 1998 flood event was exceeded during the December 2020 flood.

The reported flooding is consistent with the Environment Agency Flood Map for Planning¹, which shows that the property is located in Flood Zone 2. Flood Zone 2 are areas where the chance of river flooding is between 0.1% and 1% in any given year. The Environment Agency Flood Warning was only issued after flooding in the area was reported to the Fire Service.

December 2020 was a very wet month with an average rainfall of 108mm across East Anglia, which is 95% higher than the December average². The three months leading up to December also saw higher than average rainfall such that by December 23rd the ground was already saturated. This, combined with the rainfall recorded during the dates in question, meant that surface water was less able to infiltrate into the ground and more likely to run off into the Pertenhall Brook and form overland flood flow routes.

In conclusion, it is thought that this prolonged period of heavy rainfall and saturated ground conditions overwhelmed the capacity of the Pertenhall Brook, causing it to overtop its banks. The heavy rainfall is also thought to have caused overland flow routes on the fields to the north, which are likely to have contributed to the flooding experienced.

FLOOD WARNINGS & IMMEDIATE RESPONSE

- **23/12/2020 14:48:** Environment Agency Flood Alert River Kym in Cambridgeshire and Riseley Brook in Bedford Borough issued.
- **23/12/2020 15:45 – 17:20:** Fire service responds to call for help from occupants stranded in 2 no. vehicles. Occupants were rescued by a passing tractor driver and the police.
- **23/12/2020 15:58:** Fire service provides flooding advice to residents in the area.
- **23/12/2020 19:04:** Environment Agency Flood Warning Riseley Brook at Riseley and Pertenhall issued.
- **25/12/2020 14:30:** Flooding experienced in the wider area declared a major incident by Bedford Borough Council.
- **28/12/2020:** Lead Local Flood Authority (LLFA), Bedford Flood Response Team, and volunteers from the Council visited properties to carry out impact assessment to help with recovery and clean up.

ACTIONS

Timescale	Action	Responsible Party
Inspections short term (1-6 months) Remedial works as required	Inspect Main River assets (sluices, weirs, gates, locks and river banks) and identify the requirement for remedial works. Over 5,000 checks are already complete across East Anglia (95% of relevant assets), with 22 assets identified as being in need of remedial works in the wider area ³ .	Environment Agency
Medium term (6-12 months)	Investigate improvements to the Flood Warning system. This warning is already included as medium priority in the Flood Warning Improvement Plan.	Environment Agency
Long term (2-4 years)	Investigate a potential scheme to alter land levels in between Pertenhall Brook and the residential property to reduce the risk of flooding.	Environment Agency / Landowner

ORIGINATED: Nora Balboni CEng C.WEM MCIWEM, Senior Engineer, 21/07/2021

CHECKED/VERIFIED: Matt Tandy C.WEM MCIWEM MInstLM, Principal Engineer, 23/07/2021



¹ Environment Agency Flood Map for Planning, <https://flood-map-for-planning.service.gov.uk/>. [accessed June 2021].

² Environment Agency, December 2020 Flooding Great Ouse Catchment Summary.

³ Environment Agency, May 2021. Harrold Winter Flooding Briefing.