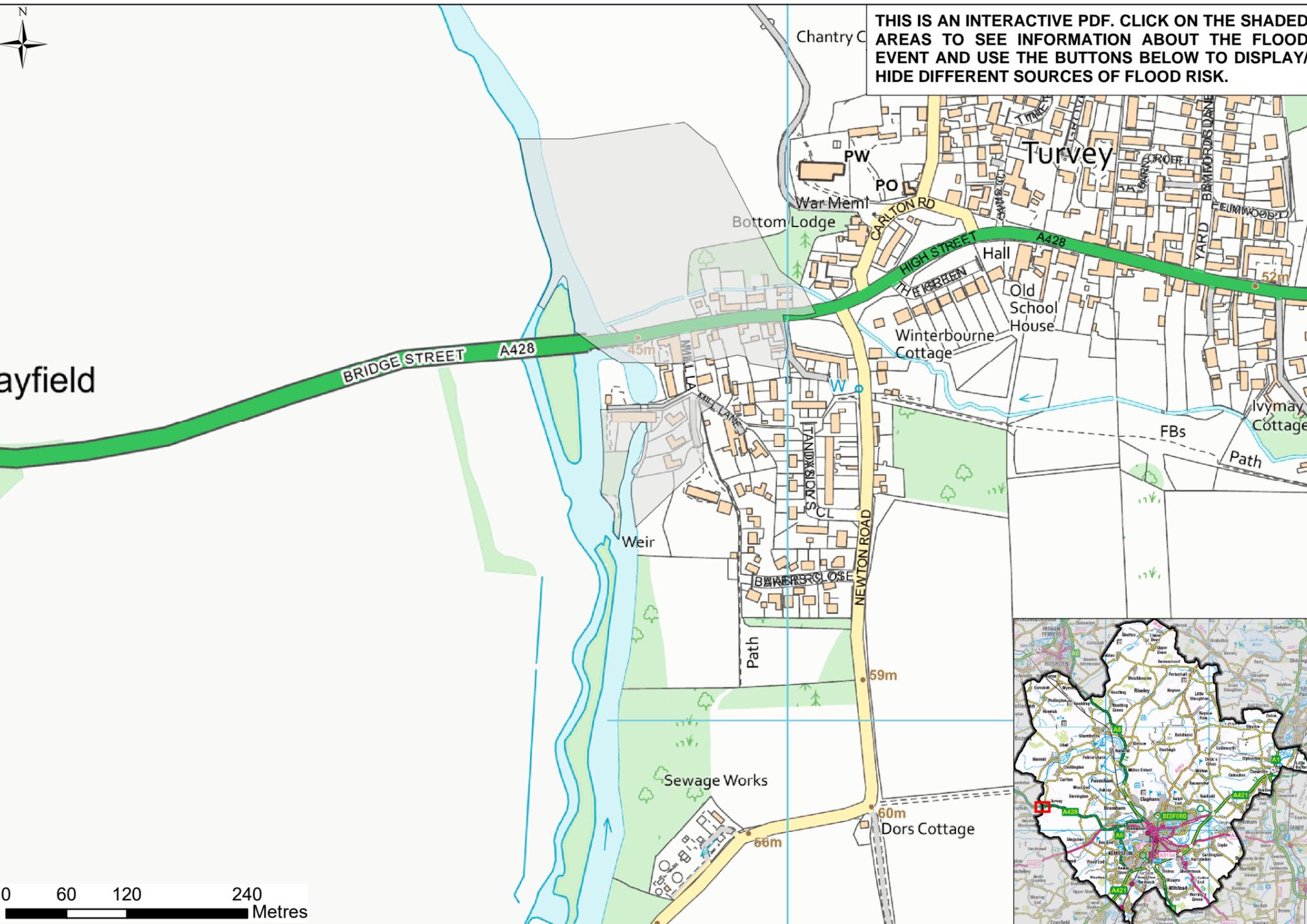


The village of Turvey suffered flooding in December 2020. Under the Flood and Water Management Act 2010, Bedford Borough Council as the Lead Local Flood Authority (LLFA) has the duty to investigate the flood event. The scope of this flood investigation is to identify the source, cause and impact of flooding 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
- EA Flood Warning Areas
- Flood Warning Areas
- Areas benefitting from flood defences

Flood Map for Planning

- Flood Zone 3
- Flood Zone 2

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)

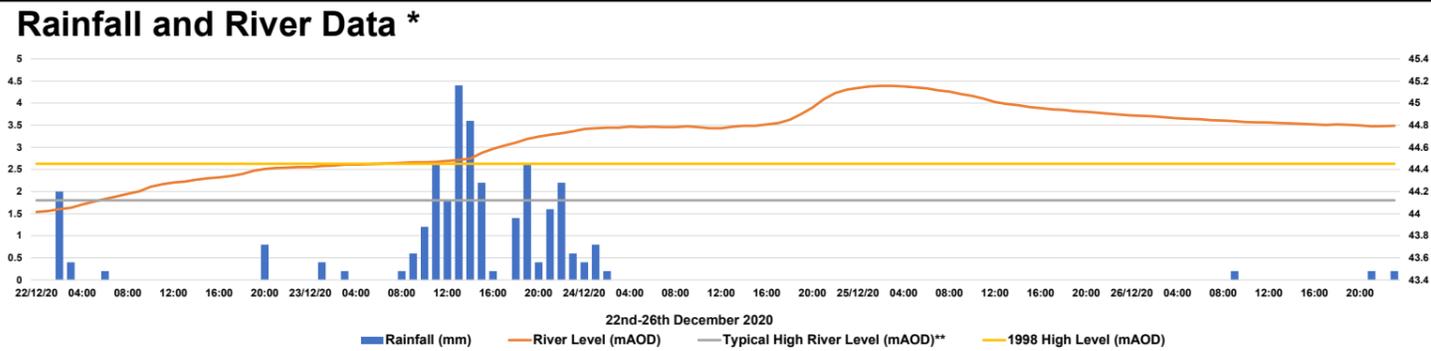
CLICK ON THESE BUTTONS

FLOOD MAP FOR PLANNING

RISK OF FLOODING FROM SURFACE WATER

FLOOD WARNING AREAS

BACKGROUND MAP



Rainfall and River Gauges

Nearest Rain Gauge	Olney
Distance to Gauge	5.17 km
Nearest River Gauge	Turvey
Distance to Gauge	0.12 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 Turvey occurred between 08:00 on December 23rd and 03:00 on December 24th. The total rainfall volume is recorded as 27mm with a peak rainfall intensity of 4.4mm/hour. This single event saw just under half of the 55mm of rainfall which is expected for the whole month of December on average.

The graph shows that the river levels in the Great Ouse were elevated above the 'typical high river level' from the early hours of December 22nd and stayed above this level until beyond December 26th. The 'typical high river level' at the nearest gauge station is identified as 44.1m Above Ordnance Datum (AOD). River levels above this are only expected to be recorded 5% of the time. For context, the 1998 peak flood level is included, which was recorded at 44.45m AOD, and the graph shows that the December 2020 river levels exceeded the 1998 level from approximately 02:00 on December 23rd.

SOURCE OF FLOODING: Main River (Fluvial)

FLOOD EVENT & CAUSE

One commercial property and two residential properties reported internal flooding in the evening of December 24th from the River Great Ouse and a tributary overtopping their banks at Turvey. The tributary crosses beneath Newton Road/High Street and discharges into the River Great Ouse to the north of High Street. Bridge Street in Turvey was reported to be impassable due to the floodwater. The Environment Agency Flood Warning was issued the same evening that the flooding was experienced, providing little time for residents to prepare.

The commercial property is located in the Environment Agency's Flood Zone 2¹, which means that the chance of river flooding is between 0.1% and 1% in any given year. The property experienced water ingress into the cellar. The British Geological Survey (BGS) mapping² shows that the underlying geology is a designated aquifer, which means that there is the potential that water seeped through the walls from an elevated groundwater table in addition to river water at the ground level.

The two residential properties are located in Environment Agency Flood Zone 3, which means that the chance of river flooding is greater than 1% in any given year. One property utilised a flood barrier at the front door and experienced a slight amount of water ingress in the hallway. The other property utilised eight aquasacs but reported 25mm of flooding in the house and more extensive flooding in the garage and moved into a hotel due to the flooding.

December 2020 was a very wet month with an average rainfall of 108mm across East Anglia, which is 95% higher than the December average³. The three months leading up to December also saw higher than average rainfall such that by December 24th 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 watercourses and form overland flood flow routes. In conclusion, this prolonged period of heavy rainfall and saturated ground conditions is thought to have contributed to the River Great Ouse overtopping its banks. In addition, the high water levels in the River Great Ouse would have prevented the tributary from discharging freely, pushing water upstream and exacerbating the flooding experienced.

FLOOD WARNINGS & IMMEDIATE RESPONSE

- **22/12/2020 08:57:** Environment Agency Flood Alert Middle River Great Ouse in Milton Keynes, Bedford Borough and Central Bedfordshire issued.
- **24/12/2020 18:27:** Environment Agency Flood Warning River Great Ouse at Turvey issued.
- **24/12/2020 19:30:** Turvey village hall set up as place of refuge.
- **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 ⁴ .	Environment Agency
Short term (1-6 months)	Investigate the river crossing beneath Mill Lane to understand if there are any constrictions to the river flow. Liaise with landowners to discuss findings and agree next steps.	Environment Agency / Riparian owner
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
Medium term (6-12 months)	Investigate the suitability of flood protection measures for affected properties (e.g. tanking of basements, flood barriers, waterproof wall sealant, non-return valves, etc.). Specialist advice should be sought from a Property Flood Resilience (PFR) surveyor.	Homeowner / Landowner
Medium term (6-12 months)	Investigate the potential benefits and local appetite for a community flood group. The flood group should enable access to flood kits, flood action plans, and information about flood warnings/alerts and Property Flood Resilience (PFR).	Lead Local Flood Authority

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

² Aquifer Designation Map, <https://magic.defra.gov.uk/magicmap.aspx>. [accessed June 2021].

³ Environment Agency, December 2020 Flooding Great Ouse Catchment Summary.

⁴ Environment Agency, May 2021. Harrold Winter Flooding Briefing.