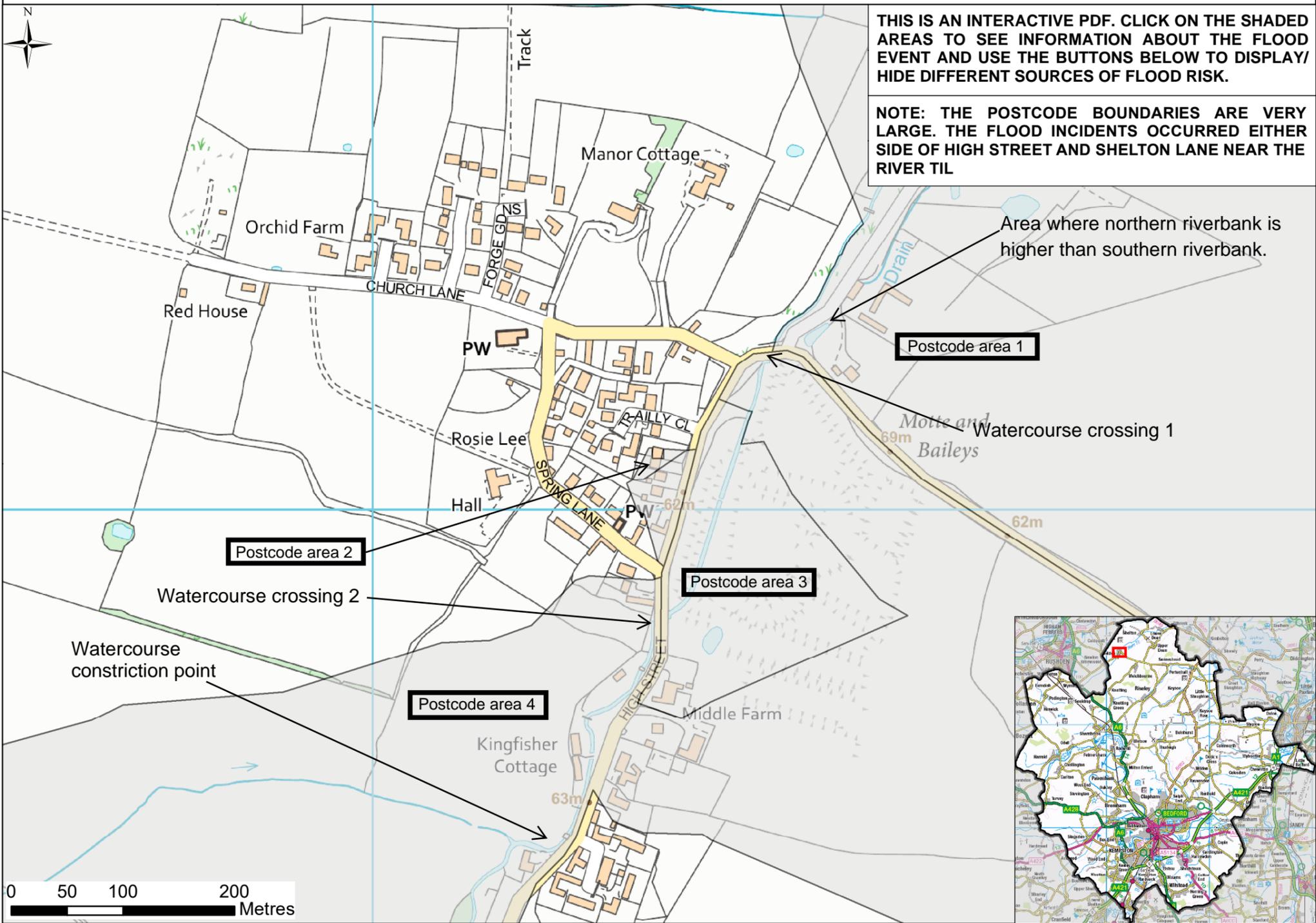


The village of Yelden suffered flooding in December 2020. Under the Flood and Water Management Act 2010, Bedford Borough Council as the Lead Local Flood Authority (LLFA) has the duty to investigate the flood event. The scope of this flood investigation is to identify the source, cause and impact of flooding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



THIS IS AN INTERACTIVE PDF. CLICK ON THE SHADED AREAS TO SEE INFORMATION ABOUT THE FLOOD EVENT AND USE THE BUTTONS BELOW TO DISPLAY/HIDE DIFFERENT SOURCES OF FLOOD RISK.

NOTE: THE POSTCODE BOUNDARIES ARE VERY LARGE. THE FLOOD INCIDENTS OCCURRED EITHER SIDE OF HIGH STREET AND SHELTON LANE NEAR THE RIVER TIL

Area where northern riverbank is higher than southern riverbank.

Postcode area 1

Watercourse crossing 1

Postcode area 2

Watercourse crossing 2

Postcode area 3

Postcode area 4

Watercourse constriction point

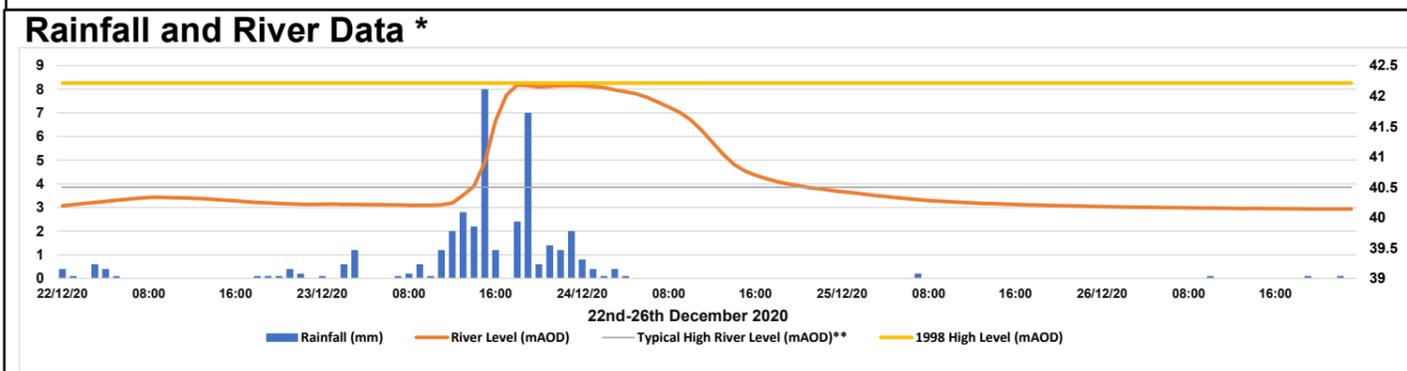
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Legend

	Postcode Boundary	Flood Map for Planning		Flood Zone 3	Risk of Flooding from Surface Water		High risk of flooding (3.3% AEP)
	EA Flood Warning Areas		Flood Zone 2		Medium risk of flooding (1% AEP)		Low risk of flooding (0.1% AEP)
	Flood Warning Areas		Areas benefitting from flood defences				

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	7.9 km
Nearest River Gauge	Covington
Distance to Gauge	5.03 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 Yelden 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 River Til runs through Yelden. It becomes a Main River approximately 4.5km further downstream at Lower Dean. The graph shows that the water levels in the River Til at the nearest gauge to Yelden rose above the 'typical high river level' at 14:00 on December 23rd and stayed above this level until 20:00 on December 24th. The 'typical high river level' at the nearest gauge station is identified as 40.5m 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 as 42.2m AOD, and the graph shows that the December 2020 river levels reached to just below the 1998 level between 17:00 on December 23rd and 02:00 on December 24th.

SOURCE OF FLOODING: Watercourse

FLOOD EVENT & CAUSE

Five residential properties reported internal flooding from the River Til on December 23rd with varying flood depths of up to 250mm across the ground floors, causing damage to floors, furniture, and plaster. One of the properties only received a small amount of water that residents were able to partially control with towels. High Street in Yelden was reported to be impassable due to the floodwater. The affected properties are located either side of High Street and Shelton Lane in proximity to the River Til. It was reported that the northern riverbank towards the northern end of Yelden (see map annotation) has been artificially built up so that it is significantly higher than the southern riverbank, causing water to overtop in this location. The Environment Agency Flood Map for Planning¹ identifies the properties to be in Flood Zone 3, which means that the chance of river flooding is greater than 1% in any given year. There are a number of potential constrictions on the River Til in Yelden (see map annotation) which could have raised water levels and exacerbated overtopping in the immediate vicinity.

A number of improvements have been undertaken following the 2016 flooding in Yelden. These included constructing non-return valves at the outfalls to highway drains, replacement of highway grips with gullies, and pipe/gully replacements. These measures are likely to have improved drainage of the road and prevented water from the river backing up through the highway drains. It appears however that the volume of water within the river system exceeded its capacity, regardless of the condition of local highway drainage or watercourse crossing points. A blocked gully was reported to Bedford Highways in January 2021, however it is unclear whether this blocked before or after the flood event.

In conclusion, 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 river and form overland flood flow routes. It is thought that this prolonged period of heavy rainfall and saturated ground conditions contributed to the River Til overtopping its banks.

FLOOD WARNINGS & IMMEDIATE RESPONSE

- **23/12/2020:** Lead Local Flood Authority (LLFA) monitored/assessed locations based on conditions and forecast predicted.
- **23/12/2020 14:48:** Environment Agency Flood Alert River Kym (known as the River Til in its upper reaches) in Cambridgeshire and Riseley Brook in Bedford Borough issued.
- **23/12/2020 16:57:** Environment Agency Flood Warning River Til at Yelden, Upper Dean and Lower Dean issued.
- **23/12/2020 19:47:** Fire service provided flooding advice to residents.
- **23/12/2020:** LLFA, Bedford Highways, and Bedfordshire Local Emergency Volunteers Executive Committee³ (BLEVEC) assist on the ground.
- **24/12/2020 daytime:** LLFA officers visited those who flooded on December 23rd to gain information on the damage caused by the flooding and offer assistance.
- **25/12/2020 14:30:** Flooding experienced in the wider area declared a major incident by Bedford Borough Council.
- **28/12/2020:** 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
Complete	Gullies along High Street, Church Lane, and Spring Lane were cleared of siltation and blockages in March 2021.	Bedford Highways
Complete	Undertake a flooding debrief/community visit with the flood group to identify improvements to the community flood plan and identify measures that need action following the flood event with other RMAs and/or riparian owners.	Lead Local Flood Authority
Ongoing	Continued engagement with and support of the 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
Short term (1-6 months)	Investigate the riverbank levels at the northern end of Yelden. The investigation should look at the potential benefits of reducing the amount of rising on the northern riverbank to natural levels and/or re-instating the riverbank to the south, to try to reduce the amount of water that overtops to the south.	Lead Local Flood Authority / Riparian Owner
Medium term (6-12 months)	Undertake a capacity assessment of the watercourse crossings to identify the potential for improvement works.	Lead Local Flood Authority / Bedford Highways
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 the potential benefits of Natural Flood Management (NFM) in the form of a flood storage area in the field to the west of High Street by lowering the western bank of the River Till in this location. Investigate the potential benefits of an additional NFM scheme upstream of Yelden, at one or both of the branches of the watercourse, which could be considered alongside a scheme in Upper Dean.	Lead Local Flood Authority

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

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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 BLEVEC is the voluntary sector of the Bedfordshire Local Resilience Forum, consisting of the Bedfordshire Community Emergency Response Team (CERT) and other organisations such as Midshires Search and Rescue, the British Red Cross, Beds and Cambs 4x4 Recovery, and the Royal Voluntary Service.