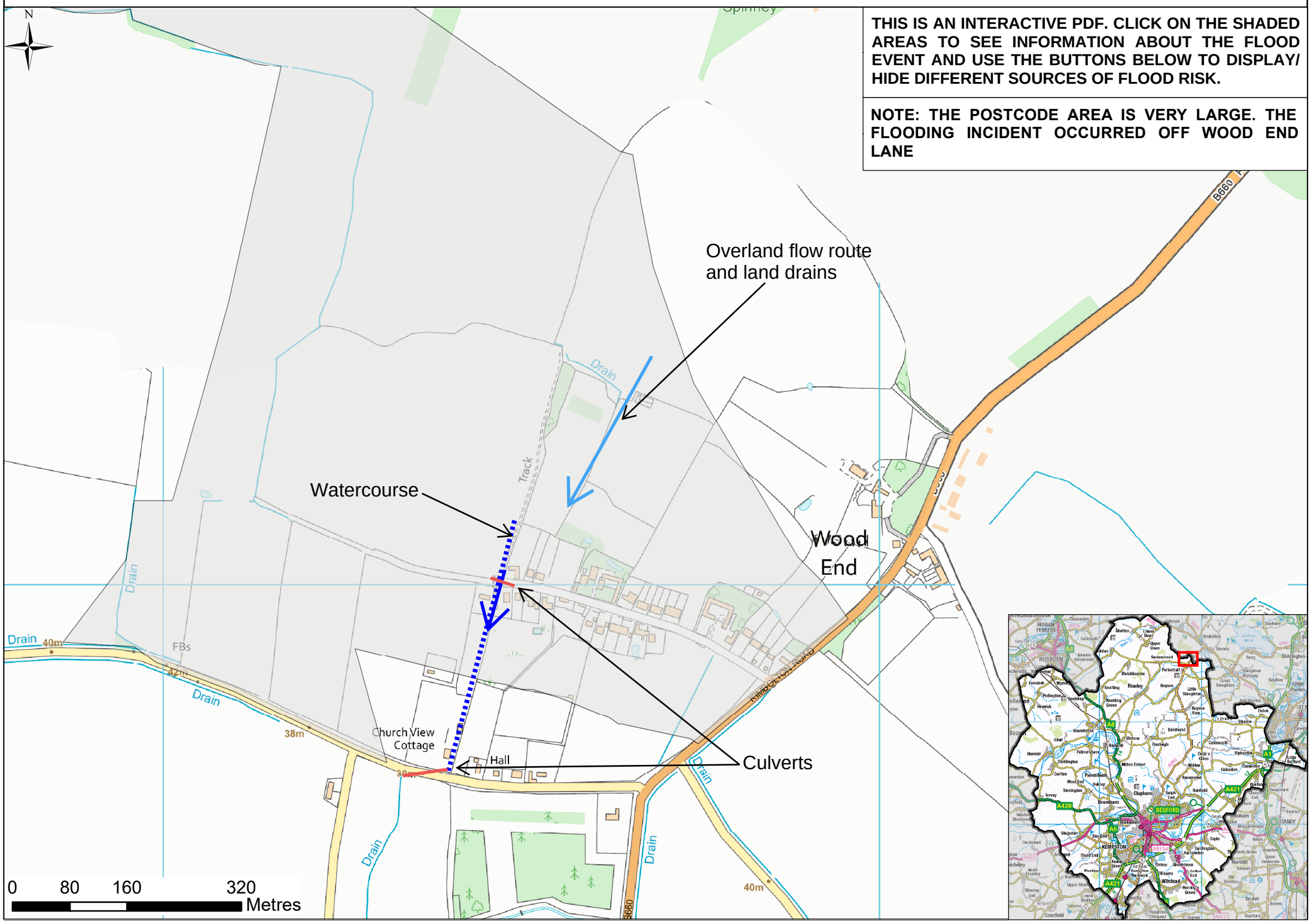
Section 19 Flood Investigation Report: Pertenhall - Wood End Lane

The Wood End Lane area in the village of Pertenhall 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 AREA IS VERY LARGE. THE FLOODING INCIDENT OCCURRED OFF WOOD END LANE



Legend

- Postcode Boundary

EA Flood Warning Areas

- Flood Warning Areas

Flood Map for Planning

- Flood Zone 3
- Flood Zone 2
- Areas benefitting from flood defences

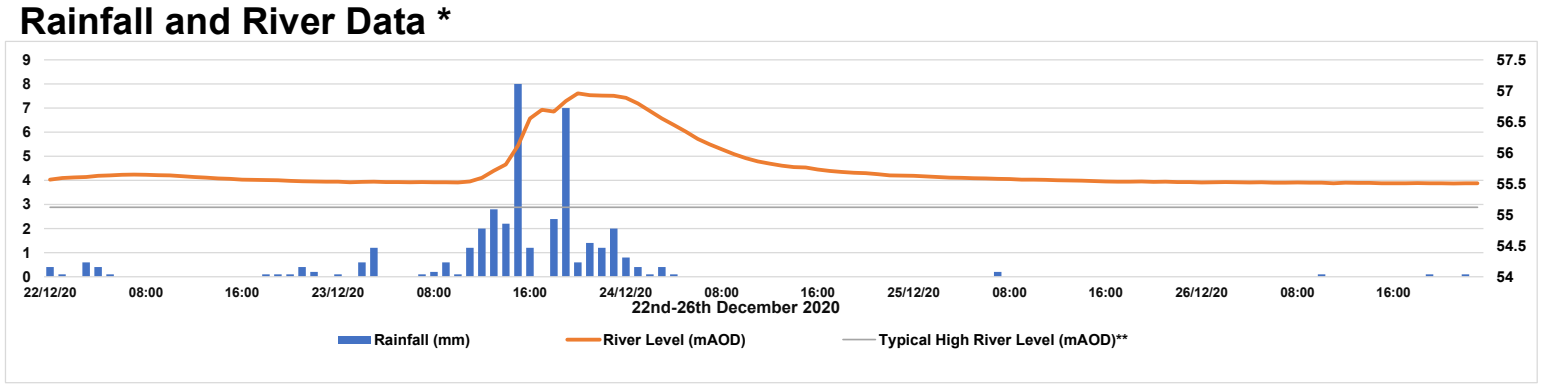
Risk of Flooding from Surface Water

- 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 Data *



Rainfall and River Gauges

Nearest Rain Gauge	Thurleigh
Distance to Gauge	7.23 km
Nearest River Gauge	Riseley
Distance to Gauge	4.44 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.

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SOURCE OF FLOODING: Watercourse / Surface Water

FLOOD EVENT & CAUSE

One residential property on Wood End Lane reported internal flooding due to runoff from the fields to the north and an adjacent watercourse on December 23rd. It was reported that the utility room flooded up to estimated 900mm despite having made a temporary defence out of scaffold boards, but the rest of the house was protected by flood barriers which had been erected at the door. Wood End Lane was also reported to be impassable due to the floodwater.

The reported flooding is consistent with the Environment Agency Flood Risk from Surface Water mapping[1], which identifies the property to be at 'high' risk of surface water flooding. This means that the chance of flooding is greater than 3.3% in any given year. The watercourse adjacent to the property receives flows from the fields to the north via overland flow routes and land drains. The watercourse is culverted beneath Wood End Lane and Swineshead Road before discharging into the Pertenhall Brook further south. The condition of the culverts beneath the roads prior to the flood event is not known but would have exacerbated flooding if unmaintained.

December 2020 was a very wet month with an average rainfall of 108mm across East Anglia, which is 95% higher than the December average[2]. 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 watercourse and form overland flow routes. In conclusion, it is thought that the heavy rainfall and overland flow routes from the fields to the north overwhelmed the capacity of the watercourse. In addition, the high river levels in the Pertenhall Brook could have prevented the watercourse from discharging freely. Any maintenance issues with the watercourse or culverts would have worsened the flooding experienced.

FLOOD WARNINGS & INITIAL RESPONSE

- **23/12/2020**: Lead Local Flood Authority (LLFA) officers monitored/assessed locations based on the conditions and forecast predicted.
- **23/12/2020 16:03**: Fire service provided flooding advice to residents.
- **24/12/2020 daytime**: LLFA officers visited those flooded on December 23rd to gain information on damage caused 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	Investigate the culvert beneath the Wood End Lane and Swineshead Road and clear debris where present.	Bedford Highways
Short term (1-6 months)	Liaise with landowners to ensure ditches in the fields to the north of Wood End Lane are maintained to maximise their capacity, setting a suitable inspection and maintenance regime as necessary.	Lead Local Flood Authority
Medium term (6-12 months)	Liaise with landowners to identify opportunities for land drainage improvements.	Lead Local Flood Authority
Medium term (6-12 months)	Investigate the suitability of flood resilience measures (e.g. flood barriers, waterproof wall sealant, non-return valves, etc.) for the utility room and develop a flood action plan. Specialist advice should be sought from a Property Flood Resilience (PFR) surveyor.	Property owner
Medium term (6-12 months)	Investigate the culverts beneath Wood End Lane and Swineshead Road to set a suitable inspection and maintenance regime as necessary.	Bedford Highways

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[1] Environment Agency Flood Risk from Surface Water map, https://flood-warning-information.service.gov.uk/, [accessed June 2021].
[2] Environment Agency, December 2020 Flooding Great Ouse Catchment Summary.