

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 SANDYE LANE AND OFF SWINESHEAD ROAD

Swineshead watercourse

Overland flood flow routes

Culverts

Sewage Works

Swineshead

High Street

Sandy Lane

Manor Farm

Home Farm

Brook Farm

Brook Farm Bungalow

Meadow Cottage

Green End Farm

Potential balancing pond related to the watercourse

0 75 150 300 Metres

Map of the Swineshead area showing flood risk and infrastructure. The map includes labels for Swineshead watercourse, Overland flood flow routes, Culverts, Sewage Works, Swineshead, High Street, Sandy Lane, Manor Farm, Home Farm, Brook Farm, Brook Farm Bungalow, Meadow Cottage, Green End Farm, and a Potential balancing pond related to the watercourse. A scale bar indicates distances up to 300 metres. An inset map shows the location of Swineshead within a larger regional context.

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Flood Map for Planning

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

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

BACKGROUND

22nd-26th December 2020

Legend: Rainfall (mm), River Level (mAOD), Typical High River Level (mAOD)**

Date/Time	Rainfall (mm)	River Level (mAOD)
22/12/20 00:00	0.2	55.5
22/12/20 08:00	0.5	55.5
22/12/20 16:00	0.1	55.5
23/12/20 00:00	0.1	55.5
23/12/20 08:00	0.2	55.5
23/12/20 16:00	8.0	56.5
24/12/20 00:00	7.0	57.2
24/12/20 08:00	1.2	57.0
24/12/20 16:00	0.5	56.0
25/12/20 00:00	0.1	55.5
25/12/20 08:00	0.1	55.5
25/12/20 16:00	0.1	55.5
26/12/20 00:00	0.1	55.5
26/12/20 08:00	0.1	55.5
26/12/20 16:00	0.1	55.5

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

Nearest Rain Gauge	Thurleigh
Distance to Gauge	6.2 km
Nearest River Gauge	Riseley
Distance to Gauge	3.67 km

The graph identifies that the main rainfall event at the nearest rainfall gauge to Swineshead 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 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: Surface Water / Watercourse

FLOOD EVENT & CAUSE

Two residential properties located off Sandye Lane and Swineshead Road respectively, reported internal flooding on December 23rd. In addition, High Street in Swineshead was reported to be impassable due to the floodwater.

There is a watercourse which runs through Swineshead to the north of High Street, which discharges into the Pertenhall Brook (Main River) approximately 450m to the east of Swineshead Road. The watercourse conveys runoff from a catchment area of approximately 120ha¹ and it is thought that the flow in the watercourse is closely related and responsive to rainfall. The Swineshead watercourse runs adjacent to the northern side of High Street in part, before turning northwards and following field boundaries towards Sandye Lane. The watercourse is thought to receive land drainage and overland flows from land to the north. The watercourse is then culverted beneath Sandye Lane and Swineshead Road.

The reported flooding is consistent with the Environment Agency Flood Risk from Surface Water mapping², which identifies where water would likely flow and pond during rainfall events. The mapping shows that overland flow routes are expected through fields and onto Sandye Lane and further downstream onto Swineshead Road. Both affected properties are shown to be at 'high risk' of surface water flooding, which means that the chance of flooding is greater than 3.3% in any given year. Blocked gullies were reported to Bedford Highways along High Street in January 2021, which could have contributed to the flooding experienced although it is unknown when these blockages occurred. There were no reports of maintenance issues related to the culverts prior to 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 average³. 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. It is thought that the heavy rainfall and overland flow routes from the fields to the north caused the watercourse to overtop its banks, creating the overland flow routes throughout Swineshead. Any maintenance issues with the highway drainage, culverts, and watercourse would have exacerbated 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 15:10 – 16:00:** Fire service inspected property and 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 highway drainage and culverts in the area and clear any blockages. This was complete for the length of High Street and Green Lane in May 2021.	Bedford Highways
Short term (1-6 months)	Liaise with landowners to ensure ditches in the fields to the north of High Street are clear to maximise their capacity, setting a suitable inspection and maintenance regime as necessary.	Lead Local Flood Authority
Short term (1-6 months)	Investigate the condition and capacity of the Swineshead watercourse, balancing pond, and culverts to set a suitable inspection and maintenance regime as necessary.	Lead Local Flood Authority.
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
Long term (2-4 years)	Investigate the potential for a Natural Flood Management (NFM) scheme upstream of Swineshead to reduce the amount of water that enters the village in a flood event.	Lead Local Flood Authority

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¹ Flood Estimation Handbook (FEH) web service, <https://fehweb.ceh.ac.uk/> [accessed June 2021].

² Environment Agency Flood Risk from Surface Water map, <https://flood-warning-information.service.gov.uk/>, [accessed June 2021].

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