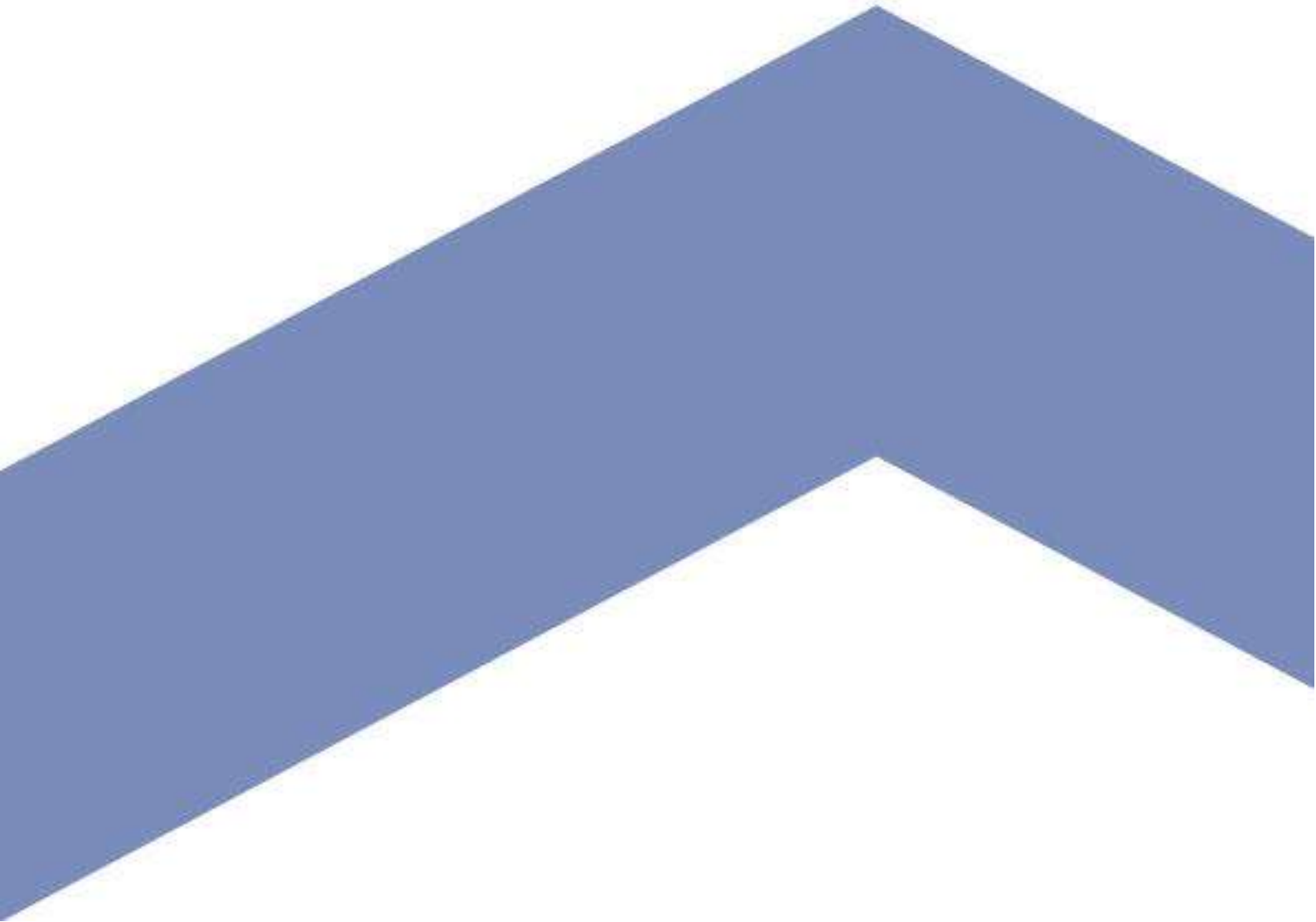
Staffordshire County Council

Flooding in Slindon, Staffordshire

January 2024

Investigation under Section 19
of the Flood and Water Management Act 2010



Version Control

This report has been prepared by Staffordshire County Council as Lead Local Flood Authority for Staffordshire County, under Section 19 of the Flood and Water Management Act 2010, with the assistance of the Highway Authority and the Sow and Penk Internal Drainage Board.

This report is based on the information available at the time of preparation. Consequently, there is potential for further information to become available, which may lead to future alterations to the conclusions drawn in this report for which Staffordshire County Council cannot be held responsible.

Staffordshire County Council

Contents

Staffordshire County Council

Table of Figures

Table of Tables

1 Executive Summary

This Section 19 Flood Investigation Report has been prepared in response to the flood event that occurred in Slindon, Staffordshire, during Storm Henk on 2nd January 2024, also considering the history of flooding in the area. The purpose of this report is to investigate the causes, impacts, and responses to this flood event and to provide recommendations to mitigate future flood risks. Slindon has previously been affected by flooding on several occasions, particularly in recent years, where flooding has become more frequent.

The flooding at Slindon results from a combination of factors, including the natural topography, drainage systems, maintenance, risk of blockages, and rainfall patterns.

During Storm Henk the rainfall runoff return period was between 1 in 5 and 1 in 10 years. This occurred during a wetter-than-average winter, when catchments were saturated and drainage ditch networks at elevated base-flow levels.

Slindon lies in a topographic 'saddle', with higher ground to the north west and south east and very slight falls to Meece Brook to the north east and Brockton Brook to the south west. The flat gradient limits the capacity of the drainage routes, which can be overwhelmed by heavy or persistent rainfall.

This has caused significant flooding of homes and businesses, roads and vehicles.

The Risk Management Authorities (RMAs) with relevant flood risk management functions are:

- **The Highway Authority** (Staffordshire County Council) – responsible for the highway gullies and drains within the highway.
- **Sow and Penk Internal Drainage Board** – responsible for supervision of land drainage and ordinary watercourses within the IDB district.
- **Lead Local Flood Authority** (Staffordshire County Council) – responsible for investigation and reporting of flooding, supervision of ordinary watercourses outside the IDB district.

Each RMA was notified of the flooding and asked to investigate and report on the status of assets under their responsibility, and whether they have taken or are proposing to undertake actions to mitigate the risk of future flooding.

Some actions have been completed and further actions are in progress or recommended for the future. These are summarised at the end of the report.

2 Legislative Context

Under Section 19 of the Flood and Water Management Act 2010, Lead Local Flood Authorities (LLFAs) are required to investigate flood incidents in their area (Figure 1). This investigation aims to determine the causes of the flooding, the responsible authorities, and the actions taken to manage the risk and impact of the flooding.

Flood and Water Management Act 2010

19 Local authorities: investigations

(1) On becoming aware of a flood in its area, a lead local flood authority must, to the extent that it considers it necessary or appropriate, investigate—

(a) which risk management authorities have relevant flood risk management functions, and

(b) whether each of those risk management authorities has exercised, or is proposing to exercise, those functions in response to the flood.

(2) Where an authority carries out an investigation under subsection (1) it must—

(a) publish the results of its investigation, and

(b) notify any relevant risk management authorities.

Figure 1: Flood and Water Management Act 2010 - Section 19

2.1 Staffordshire County Council Flood Investigation Policy

Staffordshire County Council will undertake/coordinate a Flood Investigation in accordance with Section 19 of the Flood and Water Management Act (2010) when one or more of the following thresholds are exceeded:

- Five or more residential properties are reported to have been internally flooded during a single flood event in one location; or
- Two or more business properties are reported to have been internally flooded during a single flood event in one location; or
- One or more items of critical infrastructure are reported to have been adversely affected during a single flood event in one location; or
- One or more residential properties in the same location are reported to have been internally flooded more than once during a 5-year period.

SCC may investigate flooding outside these categories, but only when all outstanding issues with a higher priority have been considered. These guidelines set numerical thresholds, however, in recognition of the fact that all floods will be different; a certain amount of discretion will be required in order to implement this policy effectively.

This report describes the flooding that occurred in Slindon during Storm Henk on the 2nd January 2024, providing an overview of the flood event, data and analysis, risk management authorities with relevant functions, and the actions taken or proposed.

This data is the best currently available and is being verified and quality checked for accuracy.

It should be noted that this investigation does not oblige the LLFA or other risk management authorities to resolve the flooding issues investigated herein, nor is it possible for the LLFA to enforce others to undertake any of the recommended actions.

3 Incident Overview

3.1 Location Description

Slindon is a small village and Civil Parish in Staffordshire. It is situated approximately 10km northwest of Stafford and 3km north of Eccleshall (Figure 2).

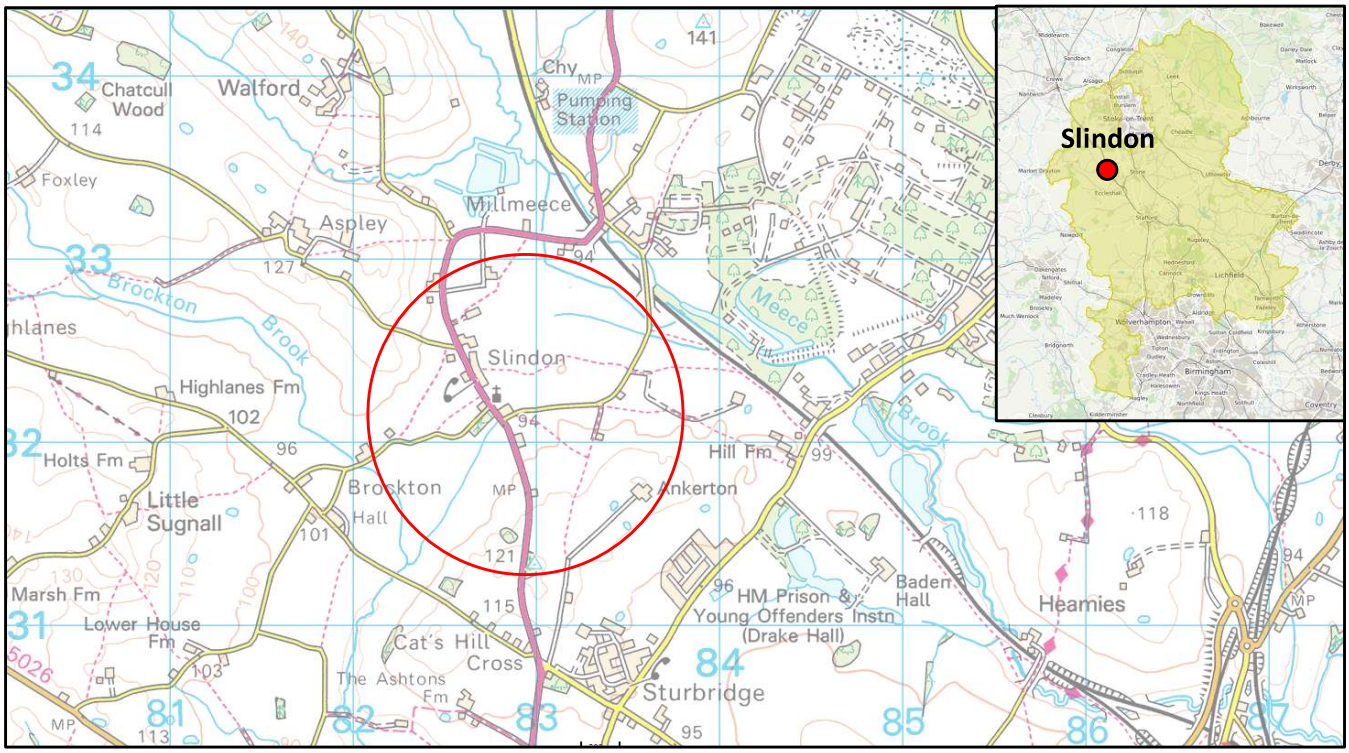


Figure 2: Location of Slindon within Staffordshire

3.2 Event Background – Storm Henk

Flooding occurred at Slindon on numerous occasions throughout the Autumn/Winter of 2023-2024. This report focuses specifically on the events that occurred on 2nd January 2024 as a result of Storm Henk, but also draws on information provided by residents for the months leading up to this event.

In the weeks preceding the flood event, the MET Office issued several national Yellow and Amber warnings, in addition to Yellow Rain warnings. Specifically, a prolonged spell of wet weather led to average daily totals of 10mm of rainfall across the UK for more than 5 days between the 26th December 2023 to 4th January 2024.

On the morning of 2nd January 2024, the MET Office named an area of low pressure crossing southern UK as Storm Henk[1]. Warnings issued on 2nd January 2024 (Figure 3) listed the West Midlands Authorities and neighbouring authorities as potential areas that may be affected.

[1] Storm Henk, 2nd January 2024. Met Office: Microsoft Word - 2024_01_storm_henk_v1.docx (metoffice.gov.uk)

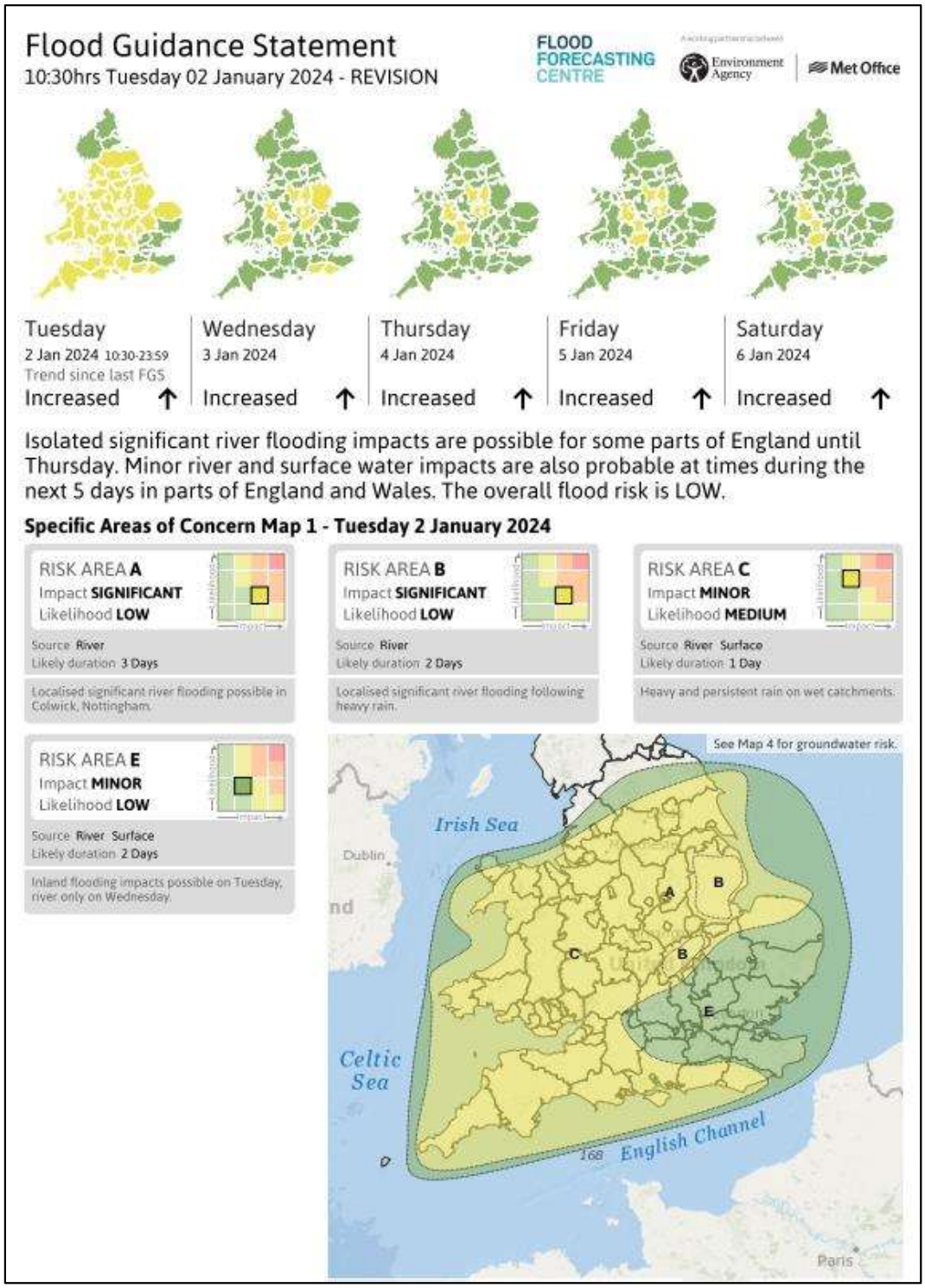


Figure 3: Extract from MET Office Flood Guidance Statement 2nd January 2024

Storm Henk formed the eighth named storm of the 2023-2024 storm season, bringing damaging winds and heavy rain to Scotland and central and southern parts of England and Wales. By the time storm Henk arrived, several locations across the UK experienced significant flooding problems in areas that had already been impacted by the wet weather during autumn 2023, with Slindon being no exception.

Figure 4 shows the Met Office rainfall-radar image at 12:00UTC on 2nd January 2024. This shows heavy rain across central England from weather fronts associated with storm Henk.

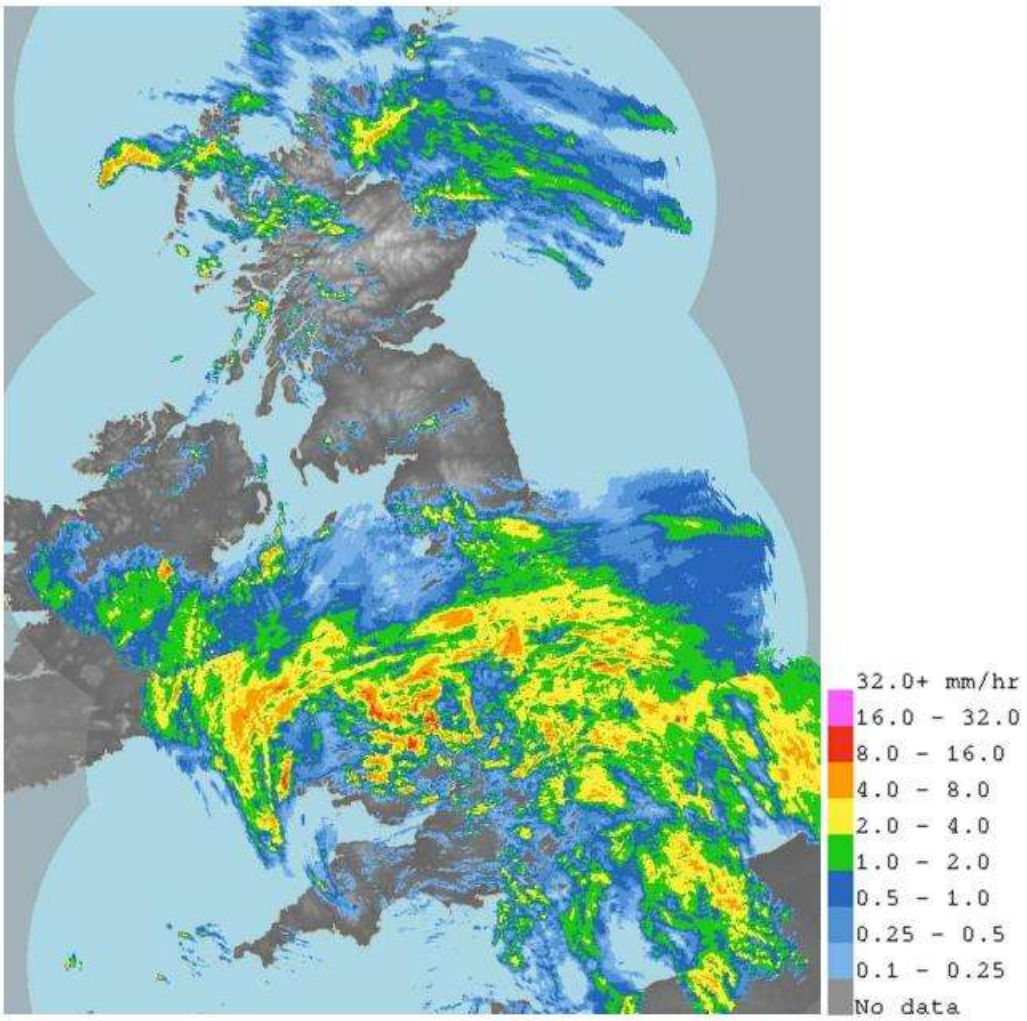


Figure 4: Rain-radar images at 12:00UTC on 2nd January 2024 showing the heavy rain associated with Storm Henk across central and southern England and Wales (Source: MET Office)

Figure 5 overleaf shows the accumulated rainfall total for the first two days of January. Within the first two days of the month, 30mm of rainfall fell widely across much of the Midlands. In the first four days of January (Figure 6), most of England and Wales and parts of eastern Scotland had received 30-50mm of rainfall. By the 5th January, many parts of central England had received two-thirds or more of the whole-month average rainfall. The January rainfall total for England was 85mm which represents 106% of the 1961 to 1990 LTA for the time of year[2]. Whilst this was a reduction in comparison to previous months, this was still above average for many locations within the UK. In addition, soil moisture deficits across the midlands remained at or close to zero meaning there was generally little to no capacity within soils to drain or infiltrate rainfall.

[2] Environment Agency – Monthly Water Situation Report: England – Summary January 2024 (Water situation report England January 2024 (publishing.service.gov.uk))

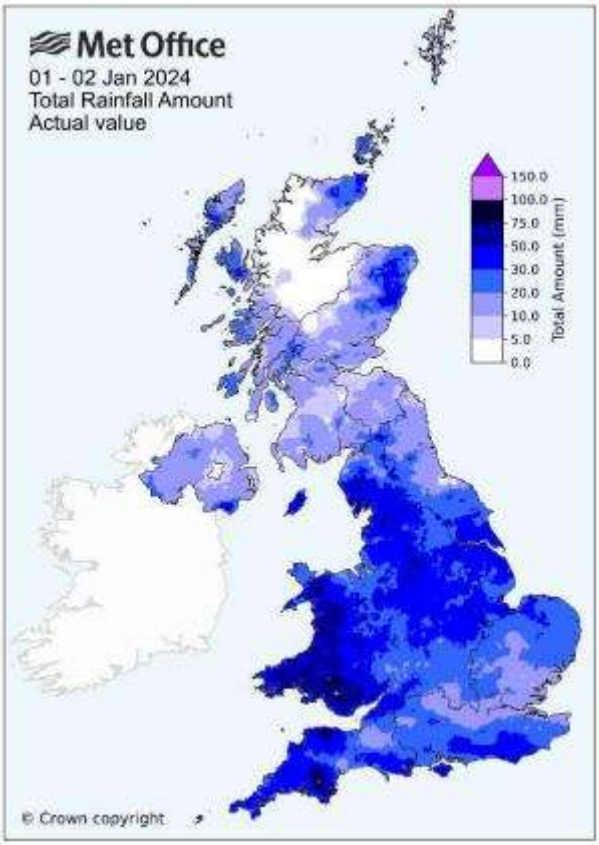


Figure 5: Total rainfall amount (mm) 1st to 2nd January 2024

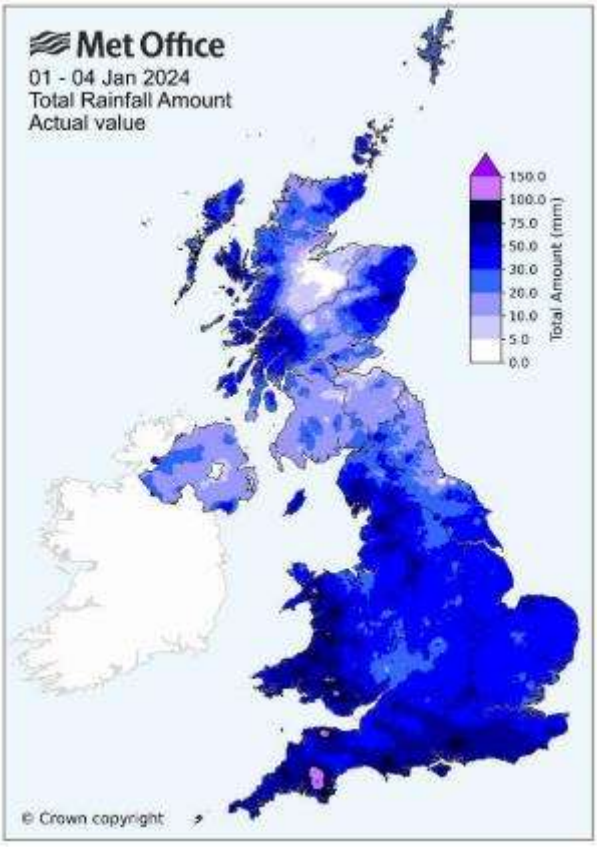


Figure 6: Total rainfall amount (mm) for the first four days of January 2024

The resulting impacts of Storm Henk were significant at several locations across the UK. With watercourses full and the ground already saturated from the persistent rain throughout December, the additional rainfall from Henk resulted in further flooding across Staffordshire. At Slindon, 2 residential properties experienced internal flooding, with further flooding reported to gardens, outbuildings, highways and surrounding agricultural land.

4 Data and Analysis

4.1 Catchment Characteristics

Slindon is predominantly rural in nature, surrounded by pasture and arable land. The majority of residential properties are located along the A519 which runs from north to south through the centre of the village. The village is situated between two watercourses, Meece Brook, approximately 1km to the east; and, Brockton Brook, approximately 800m to the southwest (Figure 7). Whilst these watercourses do not flow through the village itself, they play a fundamental role in conveying surface water flows from the village.

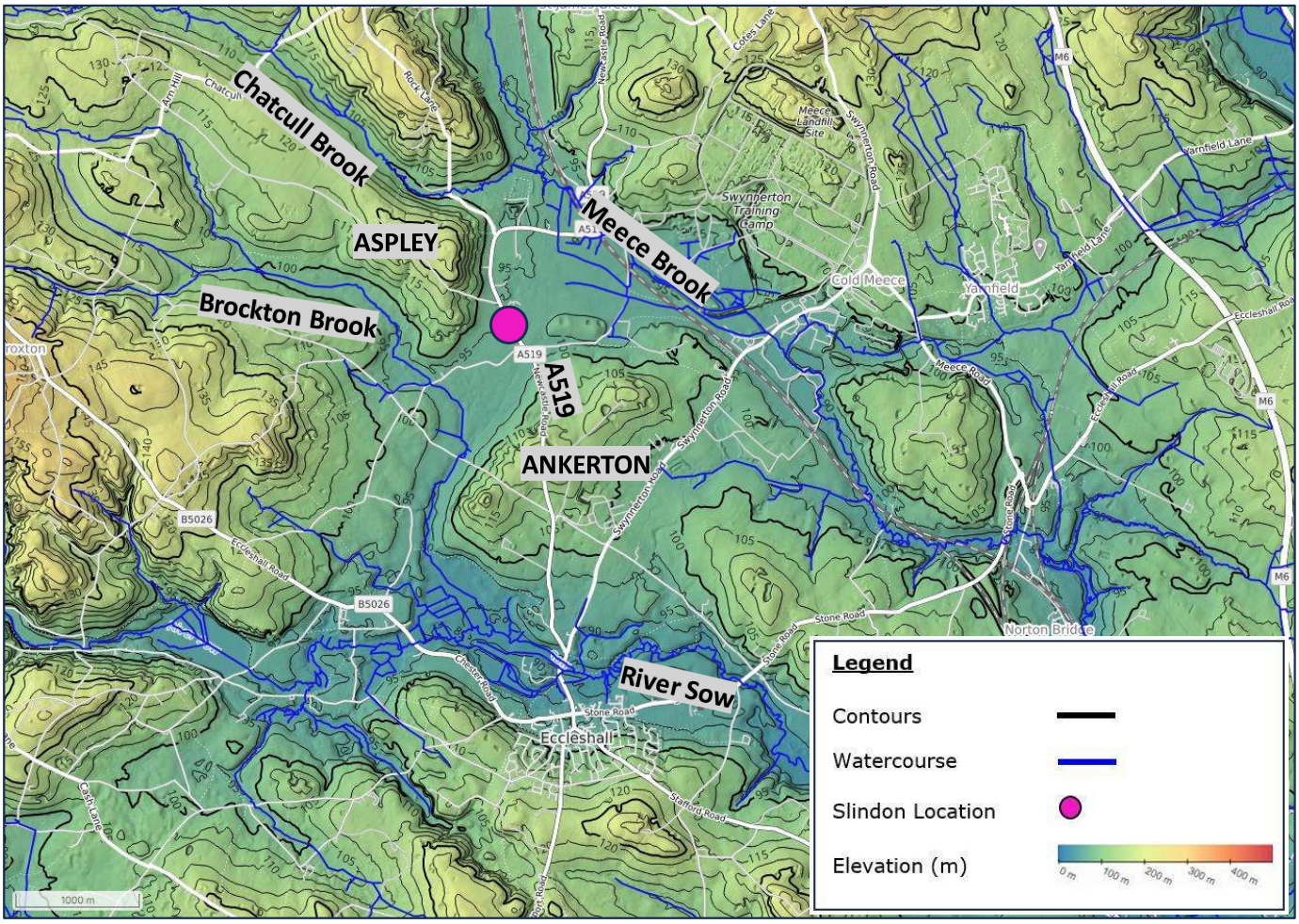
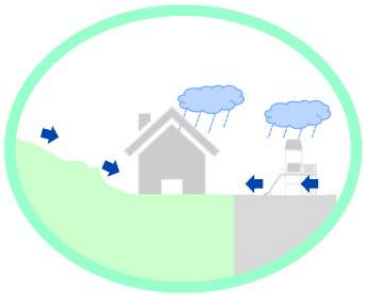


Figure 7: Slindon and surrounding area elevation data (Source: SCALGOLive, accessed 2024)

The village lies in a topographic 'saddle', with higher ground to the north west at Aspley (elevation 130mAOD) and south east at Ankerton (elevation 120mAOD). Review of topography data shows very slight falls to Meece Brook to the north east and Brockton Brook to the south west, with little change in gradient along the A519 between Aspley Lane at the northern extent of the village (94.8mAOD) and Sytch Lane to the south (94.3mAOD).

4.2 Local Watercourses and Drainage Networks

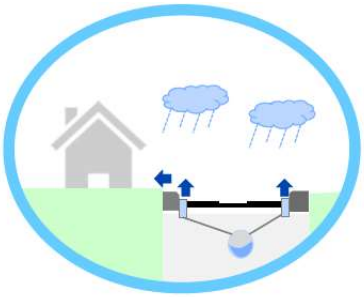
The various elements of the drainage network at Slindon are illustrated below (Figure 8) and described in more detail in the following sections:



Surface Water

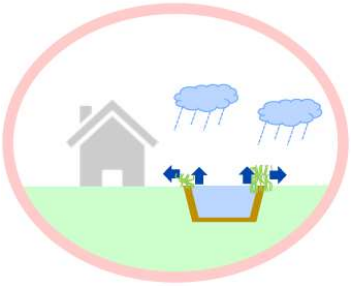
Soft surfaces, known as *permeable surfaces*, allow water to soak (infiltrate) into the ground. These are typically in the form of gardens, parks, fields, and green spaces.

***Hard surfaces*,** known as *impermeable surfaces*, do not allow any rainfall to soak into the ground and this rainfall will become (surface water) runoff. Runoff is usually very quick too. These are typically in the form of highways and roads, roofs, car parks and public squares.



Highway Drainage

Highway drainage consists of gullies, drainage channels and other features which collect and drain rainfall away from the highway. These features are typically located on one, or both, side(s) of the highway where they connect to an underground highway drainage system which ultimately connects to the public sewer infrastructure.



River Channels

Main rivers are usually larger rivers and streams.
Other rivers are called **ordinary watercourses**.
River flooding occurs when the amount of water in a river channel exceeds its capacity. This causes the water level in the river channel to rise above the riverbanks, where water flows from the channel into the surrounding area.

Figure 8: Elements of the drainage network at Slindon

4.2.1 Natural Drainage Catchments

Mapping software called SCALGO has been used in conjunction with site observations and information obtained from discussion with local residents and relevant RMAs to identify watershed boundaries and determine the predominant surface water flow routes within the village. Figure 9 shows the two main watershed boundaries. The catchment shaded in pink conveys surface water runoff from Aspley Hill in the north west to Meece Brook in the east. The catchment shaded in green conveys runoff from Sytch Lane to Brockton Brook in the south (Figure 9).

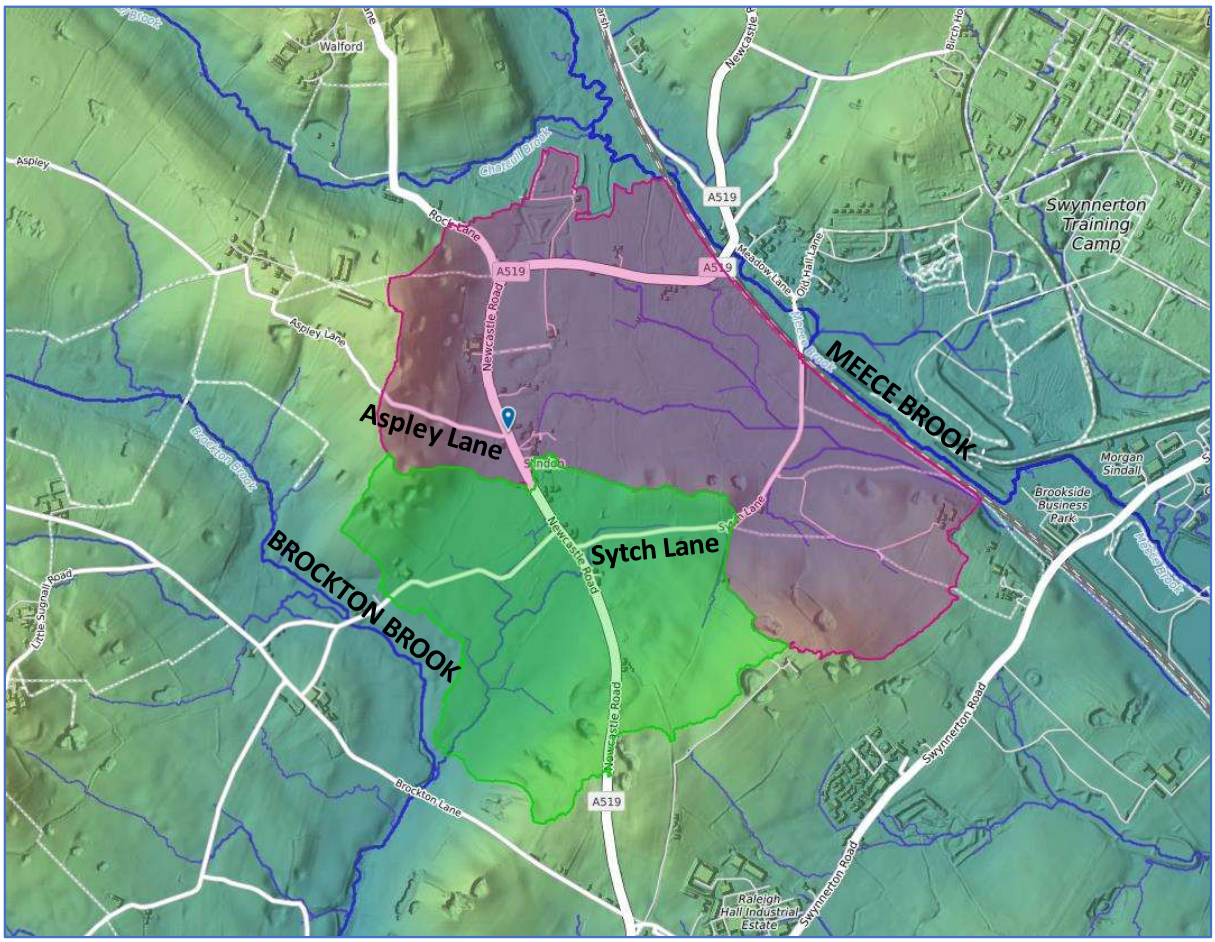


Figure 9: Watershed boundaries in Slindon showing ordinary watercourse from Aspley Lane (Pink) draining to Meece Brook and watershed from Sytch Lane (green) draining to Brockton Brook. Estimated surface water flow routes shown in blue (Source SCALGO Live)

4.2.2 Engineered Drainage Routes

The natural drainage catchments are intersected by the A519, requiring surface water to be piped across and along the highway. The main drainage routes are illustrated in Figure 10.

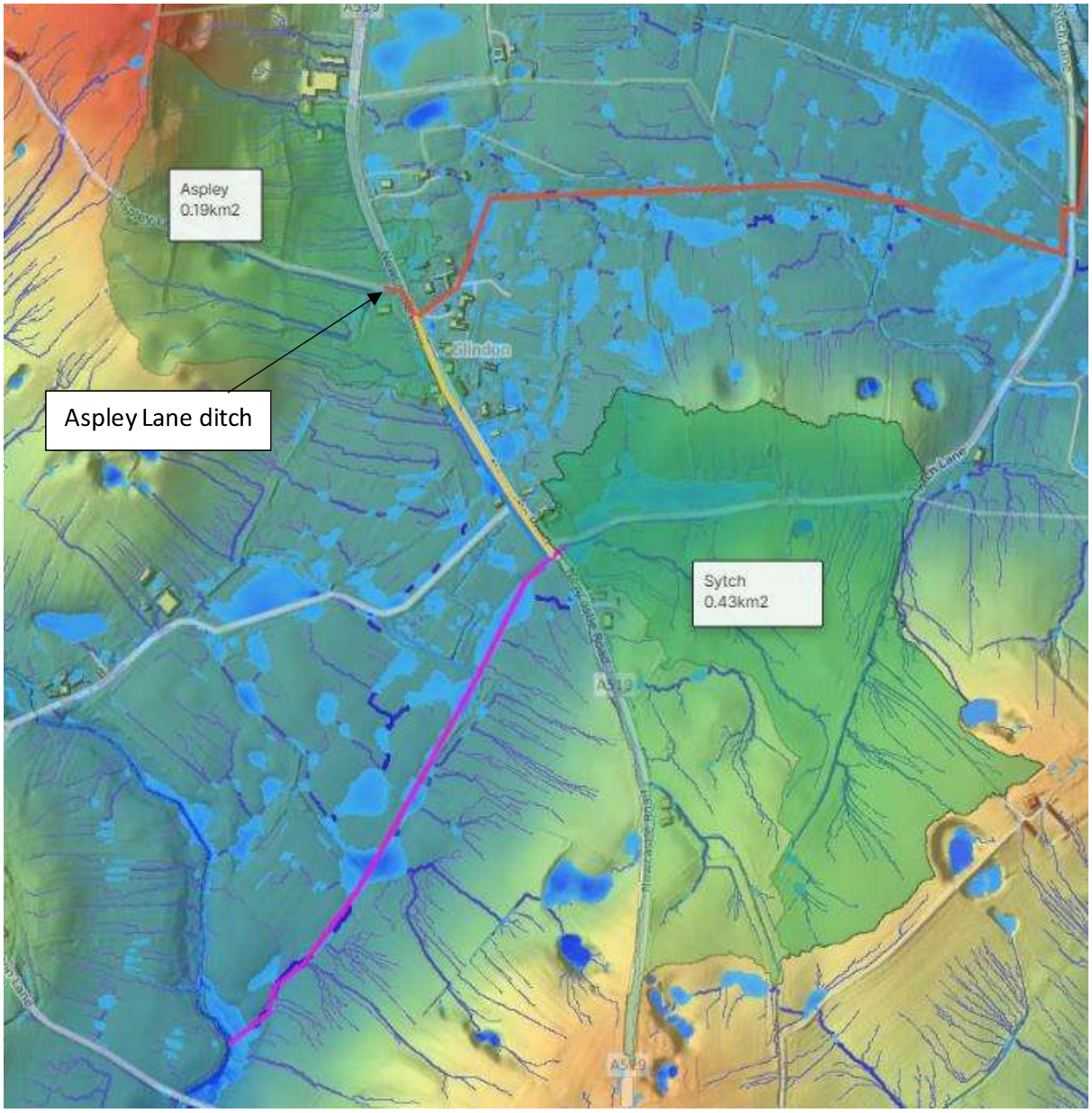


Figure 10: Engineered drainage routes

Aspley catchment

The primary drainage route for the Aspley catchment follows the red line (Figure 10). Surface water runoff from Aspley Hill drains to a roadside ditch which flows adjacent to Aspley Lane. The ditch is piped beneath the A519 in a 225mm diameter pipe with the inlet protected by a trash screen (Figure 11) which is owned and maintained by SCC highways department. The pipe follows a route along Villa Farm Lane for approximately 700m before discharging into an open ditch, and ultimately discharging into Meece Brook approximately 1km to the east.

Figure 11: Trash screen on inlet to Aspley Lane pipe

Figure 12: Weir in manhole at top of Villa Farm Lane

Both the pipe and downstream ditch channel fall under the ownership of the riparian landowner. Figure 13 presents the location of the piped Ordinary Watercourse (red line with manholes) and open sections of ditch as understood by the IDB from previous investigations.

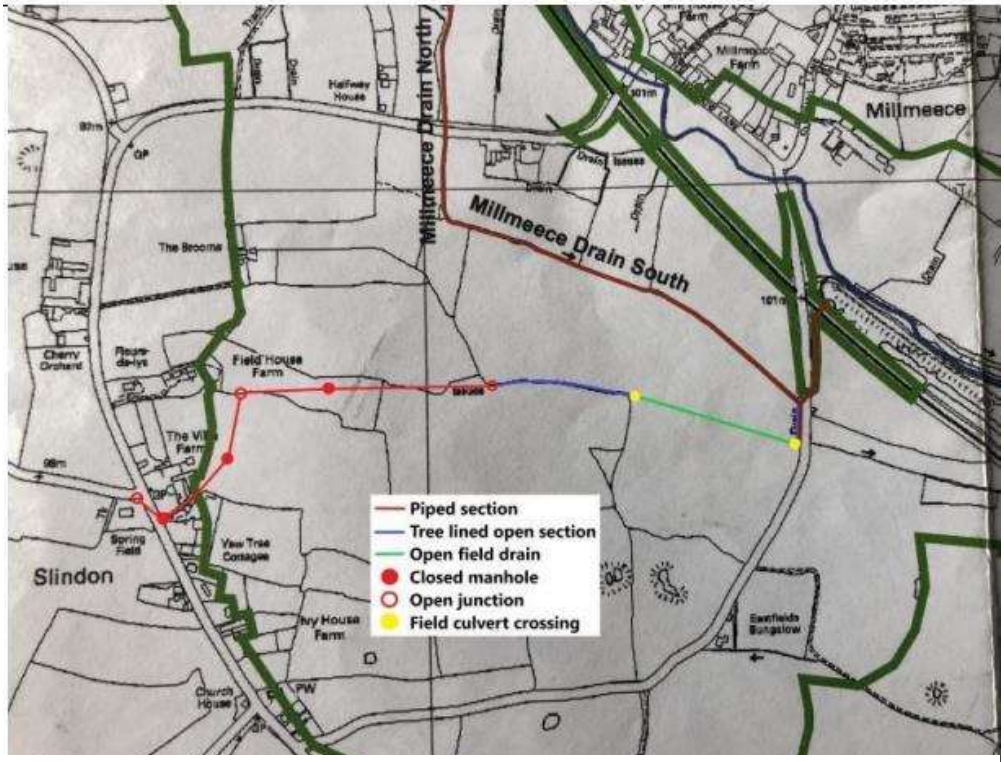


Figure 13: Approximate location of piped Ordinary Watercourse (red line with manholes) and open sections of ditch as understood by the IDB from previous investigations (Source: Sow and Penk IDB)

At the junction of the A519 and Villa Farm Lane, the Aspley Lane pipe passes through a manhole chamber with a weir (Figure 12). Under high flow conditions, once the capacity of the pipe from Aspley Lane has been exceeded, water will flow over the weir and enter the highway drainage network (Figure 10, yellow drainage route) which conveys surface water flows from the A519.

Sytch Lane catchment

The main drainage route for the Sytch catchment follows the pink line (Figure 10). A series of land drainage ditches are located adjacent to Sytch Lane which flow in a westerly direction towards the A519. At the junction of Sytch Lane and the A519, the ditch is piped beneath the road through a 600mm diameter pipe. Inspection of a surface water manhole opposite Sytch Lane, indicates that at this point, surface water flows from the highway drainage network connect into the pipe, which continues in a south westerly direction, before discharging into Brockton Brook approximately 700m to the south west.

Highway Drainage

Surface water that flows onto the highway is collected via the highway drainage network, comprising traditional highway gullies and connections into 300mm diameter clay pipes that run down the A519 (Figure 10, yellow line). The highway drains discharge into a culverted ordinary watercourse, situated at the southern end of the village opposite Sytch Lane. This forms a 600mm diameter pipe, which continues in a south westerly direction across fields, before discharging into Brockton Brook. Staffordshire County Council highways department are responsible for the maintenance of this network of highway gullies and connections to the point at which they discharge into the culverted ordinary watercourse.

4.2.3 Properties

Properties within Slindon are served by their own private drainage systems, predominantly discharging to septic tanks and soakaways.

4.3 Predicted Flood Risk

Information predicting the long term flood risk for an area is publicly available to view using the following Gov.UK link:

https://flood-warning-information.service.gov.uk/long-term-flood-risk/postcode

It should be noted that this information informs as to the long-term risk for an area, the possible causes of flooding and how to manage flood risk from rivers and the sea, surface water, reservoirs and groundwater. It does not inform how likely it is that an individual property will flood or flood risk from sources such as blocked drains and burst pipes.

4.3.1 Flooding from Rivers and the Sea

Slindon is located within Flood Zone 1 of the Environment Agency's flood map for rivers and the sea (Figure 14).

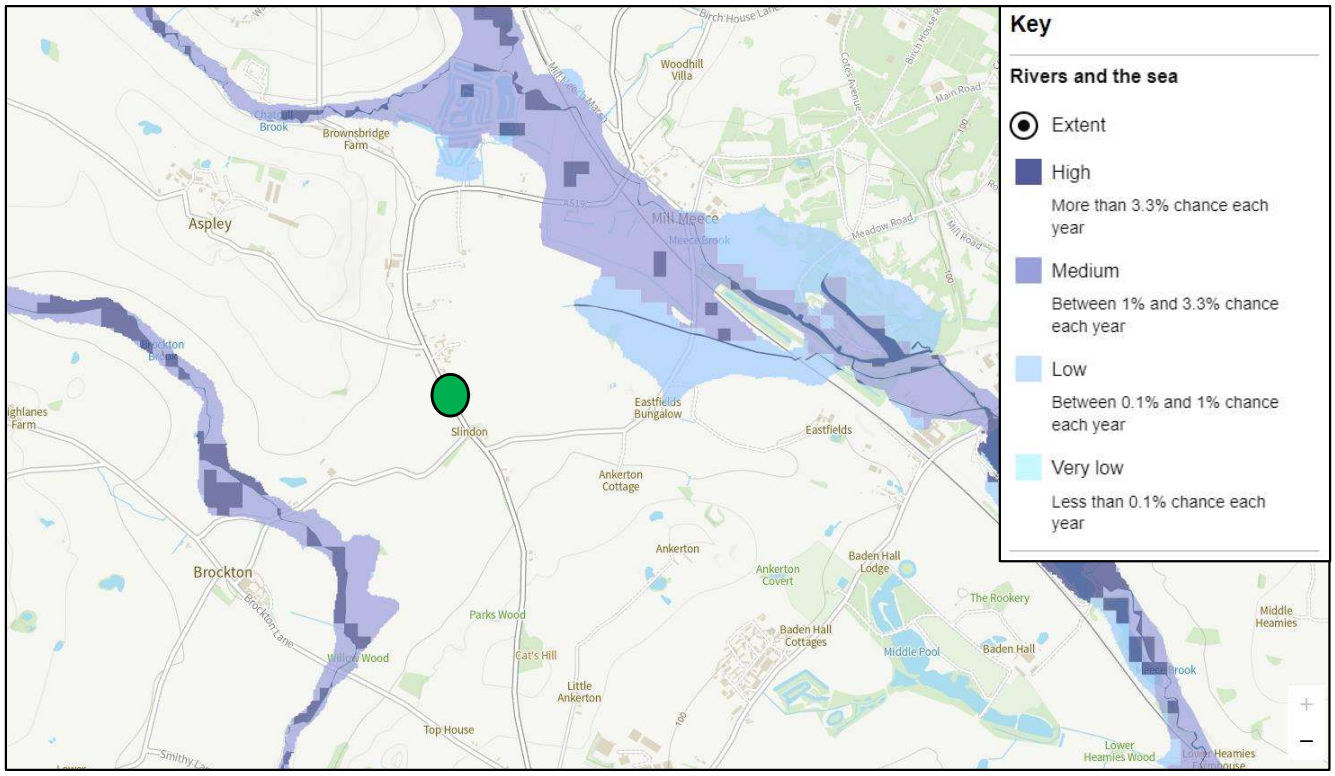


Figure 14: Environment Agency rivers and sea flood risk map. Flood location shown by green circle.

The Environment Agency defines the yearly chance of flooding from rivers and the sea as 'Very low' for Slindon. This means that there is less than a 0.1% chance of flooding from the rivers or sea each year.

4.3.2 Flooding from Surface Water

Surface water flood risk maps from the Environment Agency are presented in Figure 15. In general, the maps show a low risk of surface water flooding throughout much of the village. This means that there is between a 0.1% and 1% chance of surface water flooding each year. Areas of high risk are predominantly along the A519 and southern parts of the village in the fields to the north of Sytch Lane.

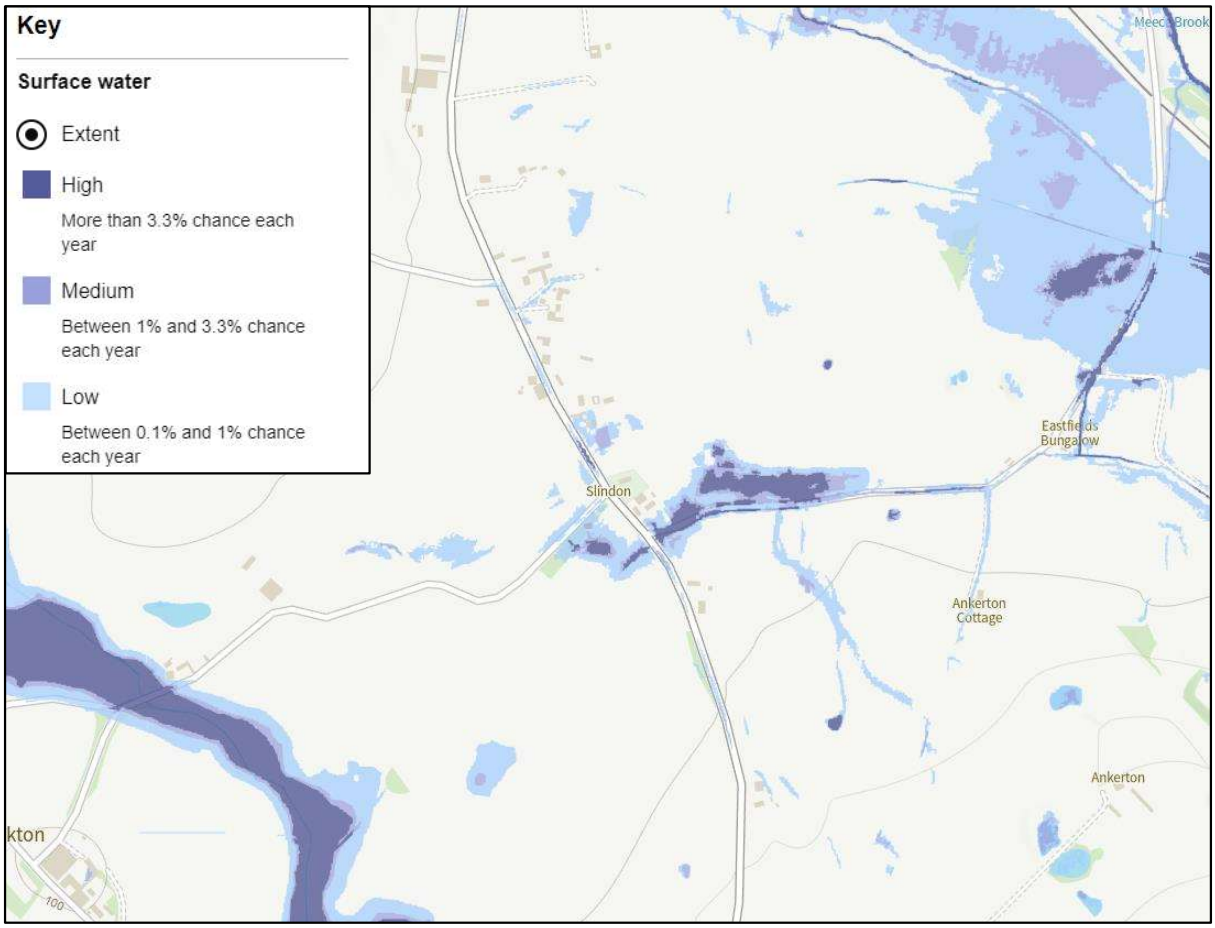


Figure 15: Environment Agency risk of flooding from surface water map for Slindon

4.4 Previous Flood Events

Slindon has previously flooded on several occasions, particularly in recent years, where flooding has become more frequent. A summary of historic flooding was provided by residents as part of this investigation. Table 1 demonstrates that internal flooding to property has occurred seven times in the period 2007 to 2021.

Table 1: Summary of recent flooding to property at Slindon 2007-2021

DATE	NO. PROPERTIES INTERNAL FLOODING	NO. PROPERTIES EXTERNAL FLOODING
2007	1	3
2012	1	3
26/10/2019	1	3
16/02/2020	2	3
24/02/2020	2	3
August 2020	1	3
January 2021	3	5

Records indicate that the mechanism of flooding has been similar in recent flood events and is caused by a combination of factors. Residents describe how water spills from the roadside ditch at Aspley Lane and accumulates in the highway at the junction of Aspley Lane and the A519. Once the highway drains reach capacity, surface water then flows in a southerly direction along the A519, accumulating on both sides of the road, before flowing towards properties.

Prior to the January 2024 event, the most significant event occurred in January 2021 with significant flooding at Aspley Lane, Villa Farm Lane and along the A519. Flooding along the A519 is exacerbated by bow waves from traffic pushing water to properties. In January 2021, three properties reported internal flooding along the A519, with residents having to move out of their property, spending significant amounts of time living in temporary accommodation. Residents have described how surface water flooding has a significant impact along the main routes into and out of the village. The combined impacts of the flooding and the increase in frequency of flooding have been particularly stressful for residents.

4.5 Previous Investigations

4.5.1 Staffordshire County Council

There has been significant investment by SCC Highways to investigate the flooding issues at Slindon. Following the 2021 flood event, a CCTV inspection of the highway drainage network was undertaken which identified a blockage in the 225mm diameter pipe beneath the private driveway leading to Villa Farm. This was removed and CCTV survey confirmed that the pipe network was in a reasonable condition. Removal of tree roots was undertaken in the highway network along the A519 opposite the church. The downstream channel receiving flows from Aspley Lane was also inspected and found to be in a reasonable condition. At this time, SCC held discussions with the riparian landowner with regards to continued maintenance of the downstream channel.

Additional work was also undertaken to improve highway drainage along the A519 adjacent to the old telephone box. This included the installation of a section Aco/Berco along the entrance to some properties and additional gullies to direct surface water flows back into the highway drainage network during periods of heavy rainfall. Discussion with residents as part of this Section 19 Investigation has indicated that whilst this has had some positive effect during smaller rainfall events, flooding was still being experienced during the longer duration events with water observed to be coming back up through the drain and flowing towards properties situated adjacent to the road. Flooding here continues to be further exacerbated by bow waves from passing traffic.

4.5.2 Sow and Penk Internal Drainage Board (IDB)

The Sow and Penk Internal Drainage Board (IDB) has confirmed that they were first made aware of flooding issues at Slindon in 2022. At this time, the IDB undertook an investigation into the issues. The findings were that the pipeline from Newcastle Road had been previously CCTV'd and jetted by SCC Highways and that the Riparian owner/occupier of the open watercourse downstream of the Aspley Lane pipe agreed to cleanse / maintain the watercourse. The IDB concluded that the main contributing factor was the amount of rainfall during a short duration falling on the wider catchment outside of the Drainage District.

4.6 Rainfall Analysis

Rainfall data has been obtained from various sources to obtain a better understanding of the January 2024 event. Figure 16 shows 5-minute HydroMaster rainfall data for Slindon between 01/01/2024 and 03/01/2024.

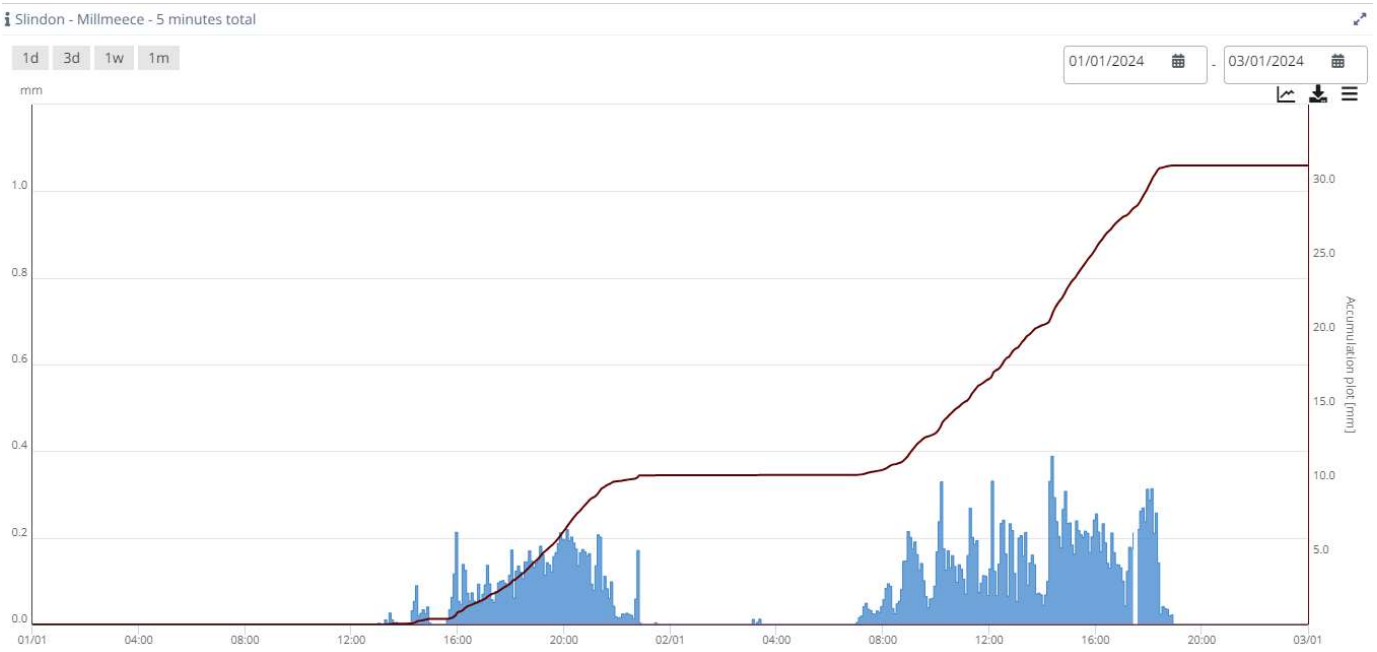


Figure 16: 5-minute recorded rainfall and accumulation for Slindon 1st to 2nd January 2024 (Source: HydroMaster)

HydroMaster rainfall data identified two distinct periods of rainfall during the January 2024 flood event. The first occurred on 01/01/2024 between 15:45 and 21:45, with 9.4mm of rainfall falling over a 6 hour period. The second occurred on 2nd January between 07:00 and 18:55, with 20.1mm of rainfall falling over a 10 hour time period. This shows a prolonged period of moderate intensity rainfall, with several periods of higher intensity rainfall from late morning and into the late afternoon. Within a 29 hour time period, HydroMaster recorded a total of 29.8mm of rainfall.

Similar rainfall totals for the same period were record by DEFRA Environment Agency rain gauges within the area. The closest gauge, Stone (5km from Slindon), recorded daily (24 hour) rainfall totals as 13.4mm on the 1st January 2024 and 21.0mm on 2nd January 2024, with a total of 34.4mm over the two day period (Figure 17).

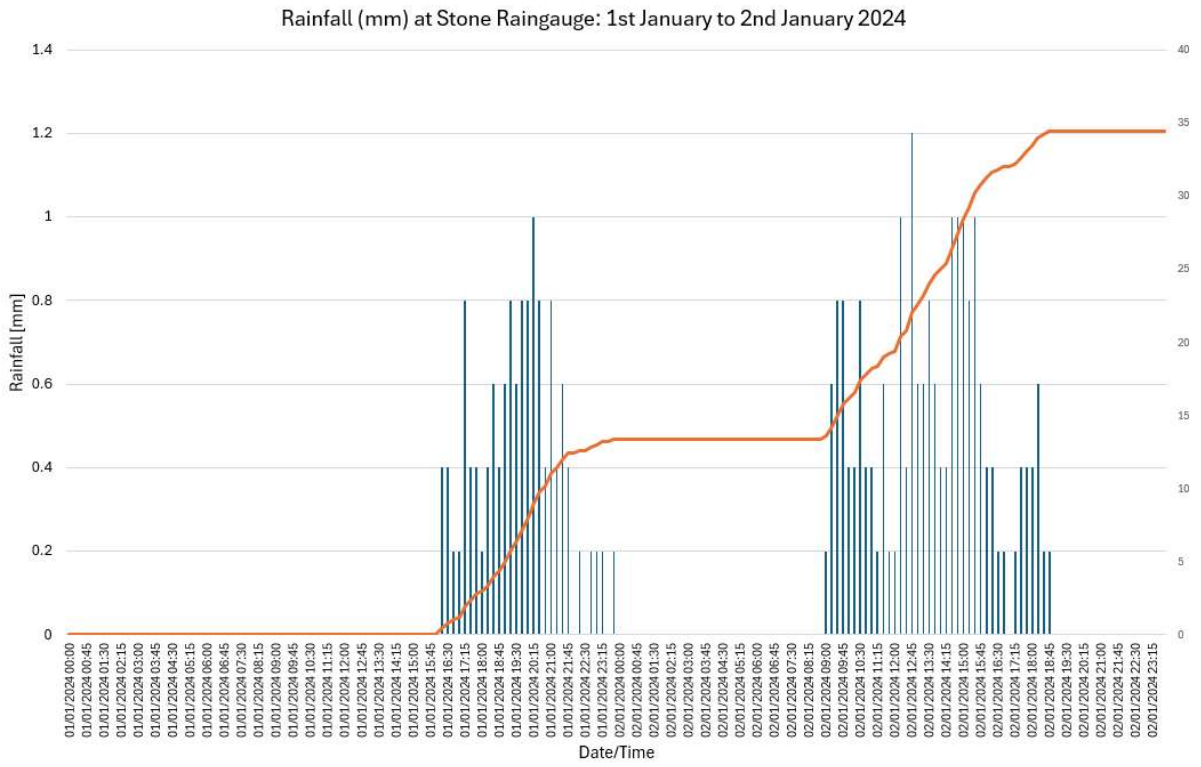


Figure 17: Recorded rainfall at Stone rainfall gauge, the closest gauging station to Slindon

HydroMaster software has identified the rainfall return period that fell over Slindon as less than a 2-year rainfall event for the 24-hour and 48-hour storm durations (Figure 18).

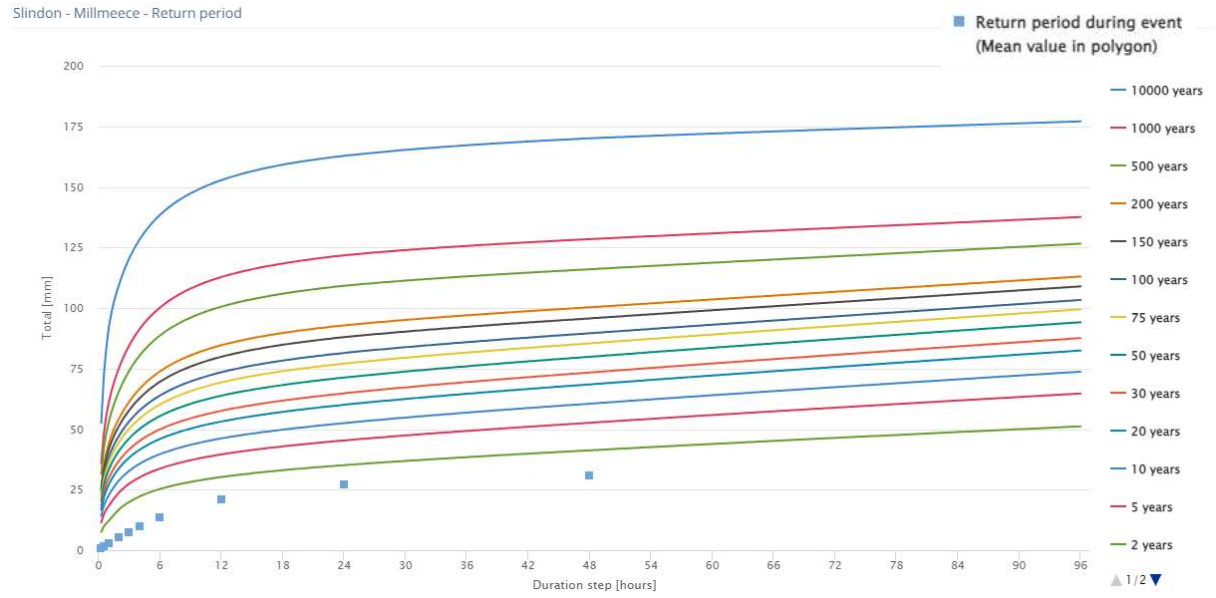


Figure 18: HydroMaster return periods for different storm durations during Storm Henk in Slindon

Rainfall modelling from FEH has further identified the rainfall return period as a 1.4-year rainfall event for the entire storm duration (29.8mm of rainfall during a 28.5 hour period). Figure 19 shows the amount of rainfall that correlates to specific return periods for the Slindon catchment, identifying that 29.8mm of rainfall in 28.5hours from 1st January to 2nd January 2024 is less than a 10-year return period.

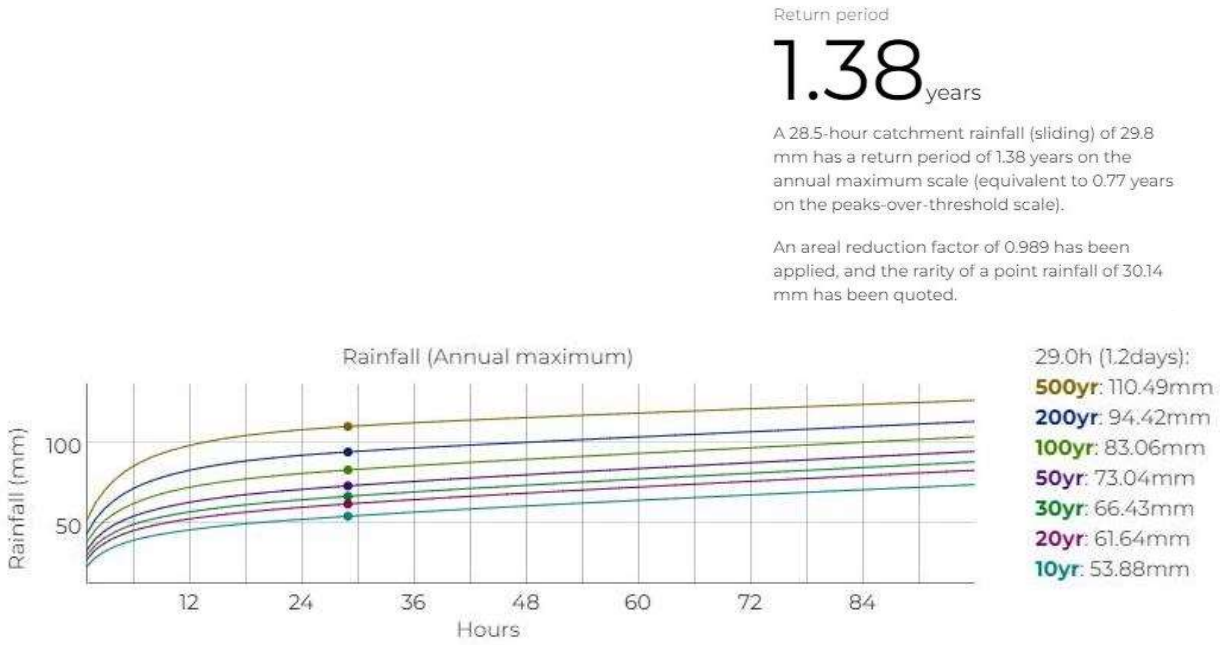


Figure 19: FEH rainfall return period for the Slindon catchment estimated as 1.38 years for the 29.8mm of rainfall that was recorded during the entire event (28.5 hours). The graph indicates rainfall values for the return periods from 10-years upwards.

ReFH (Revitalised Flood Hydrograph) software has been used to create a hydrograph from the observed rainfall and catchment characteristics, along with a series of uncalibrated modelled hydrographs for design storms of different return periods. Comparison of the peak flows enabled the rainfall runoff return period to be estimated. Figures 20 and 21 show the modelled hydrographs for the Aspley and Sytch catchments respectively, demonstrating that for Storm Henk, the peak runoff was equivalent to an event with a return period of between a 1 in 5 and 1 in 10 years.

The higher estimated runoff return period can be explained by the ground saturation at the time of the event. Storm Henk occurred during a wetter-than-average winter, when catchments were saturated and drainage ditch networks were at elevated base-flow levels. Whilst not particularly extreme volumes of rainfall on their own, the combined total of 30.9mm, fell on already saturated ground.

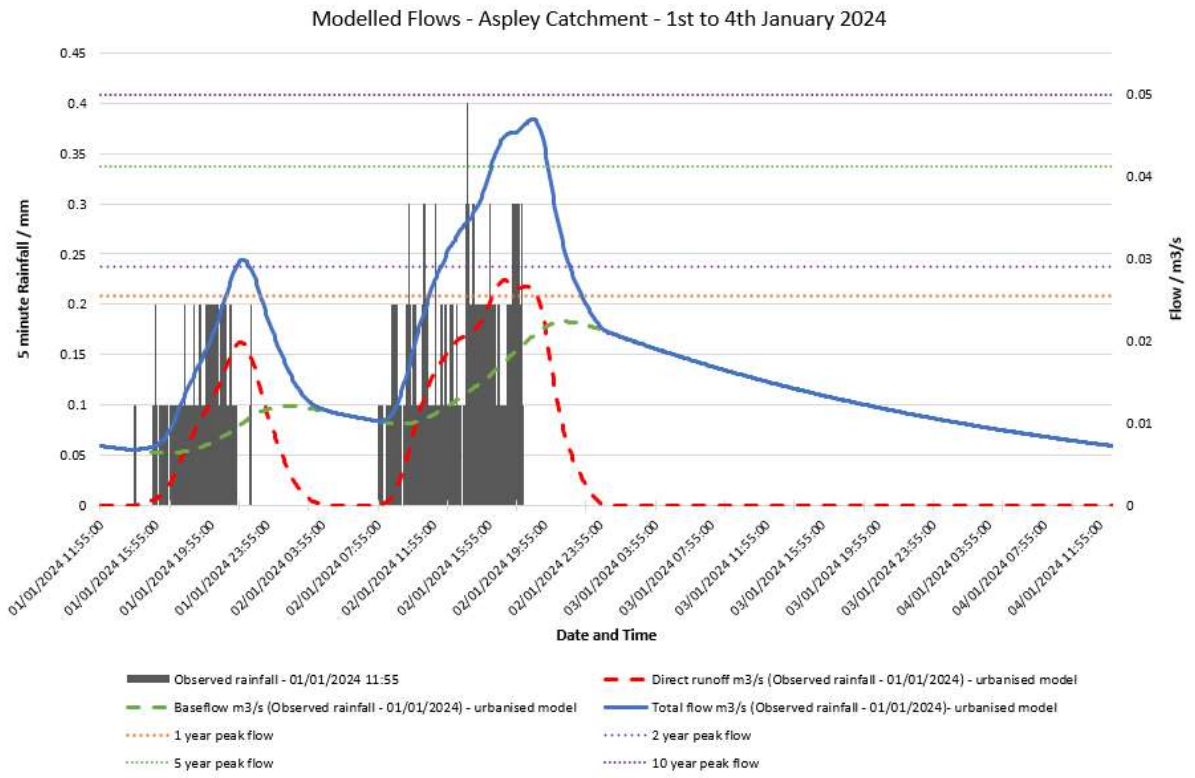


Figure 20: ReFH design flood hydrograph for Aspley Catchment, Slindon following Storm Henk rainfall event on 1st and 2nd January 2024

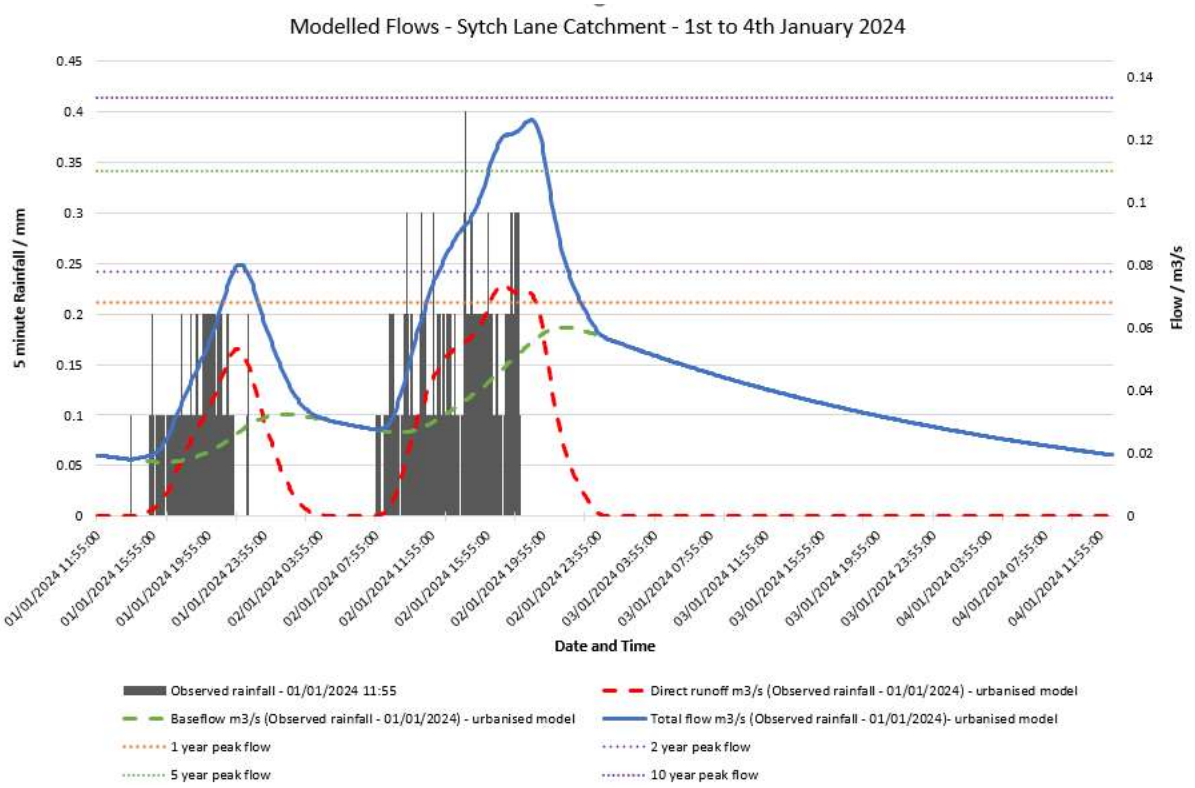


Figure 21: ReFH design flood hydrograph for Sytch Lane catchment, Slindon, following Storm Henk rainfall event on 1st and 2nd January 2024

4.7 Description of Flooding - 2nd January 2024

The flooding mechanism reported on 2nd January was similar to that experienced in previous flood events. Figure 22 presents the predominant flow routes observed by residents.

Figure 22: Surface water flow routes observed by residents on 2nd January 2024

Floodwater initially began to accumulate in the highway at the junction of Aspley Lane and the A519 (Figure 23). Residents reported that the trash screen at the Aspley Lane pipe inlet was blocked with debris and silt washed from the upstream catchment (Figure 24). Topographical data shows that there is very little gradient in the ordinary watercourse and as a consequence, silt has been deposited over time which has significantly reduced the capacity of the channel to convey surface water flows from the village to Meece Brook. This resulted in the ditch quickly reaching capacity and spilling onto the highway. As the volume of water increased, this led to the lane becoming impassable and SCC Highways attended site to close the road.

Figure 23: Surface water accumulating at the junction of Aspley Lane and the A519 (Photo provided by resident)

Figure 24: Blocked trash screen at Aspley Lane pipe inlet (Photo provided by resident)

Surface water then began to quickly accumulate on both sides of the A519, and as the volume of water increased, the local highway drainage network became overwhelmed, with water following the prevailing topography, flowing in a southerly direction along the A519 (Figure 25).

Figure 25: Surface water beginning to accumulate at junction of Aspley Lane and A519 and starting to flow in a southerly direction (blue arrow) down the A519 (Photo looking in a northerly direction) (Photo provided by resident)

At around 14:00 external flooding to property was reported along the western side of the highway (Location 3, Figure 22). Reports from residents describe how flood water reached a depth of approximately 1 foot, surrounding the property. On this occasion, residents managed to prevent water entering the property by pumping water back onto the highway.

Surface water flows then continued to flow down the A519, impacting properties on the eastern side of the highway at around 14:30-15:00 (Location 4, Figure 22 and Figure 26). Residents reported that the highway drainage network became overwhelmed, with water observed to be bubbling out of the drain adjacent to the old telephone box. Surface water then flowed from the highway towards properties which are situated at a lower level than the highway. The flooding was exacerbated by bow waves from passing cars pushing water towards properties. Two properties reporting internal flooding to depths of between 4 and 5 inches, in addition to significant flooding to gardens and outbuildings.

Figure 26: Surface water along the A519, looking in a southerly direction (Photo provided by resident)

Figure 27: Surface water flowing onto western side of A519 and into adjacent field (Photo provided by resident)

Surface water flows continued to then follow the prevailing topography along the A519 in a southerly direction and flowing across the highway into the fields on the western side of the A519 (Location 5, Figure 22; and Figure 27).

At the northern extent of the village, flooding was also experienced along Villa Farm Lane (Location 6, Figure 22). Residents described how water emerged rapidly from a manhole cover situated along the private lane. Since the lane is below the main A519 road surface level, water accumulated along the lane (Figure 28). As the volume of water on the A519 increased, this also flowed onto the lane, resulting in floodwater reaching depths of approximately 30cm. Whilst no internal flooding to property was reported, access to property was significantly restricted, with some residents also reporting issues with sceptic tanks and private drainage.

Figure 28: Flooding along Villa Farm Lane (Photo provided by resident)

4.7.1 Immediate Response

Records indicate that officers from SCC Highways Officers attended site following reports of flooding on 2nd January 2024. Whilst on site, Aspley Lane was closed at the junction with the A519 due to the volume of flood water.

Following reports of flooding by residents, flood questionnaires were issued at the location to help understand the extent of the flooding impacts. This work was undertaken in conjunction with the Flood Recovery Framework programme that was announced by the Government on 6th January 2024. SCC subsequently conducted a review of all available data and undertook site visits to gather further information. The LLFA liaised directly with relevant RMAs and affected residents.

4.7.2 National Flood Recovery Framework (FRF):

The Flood Recovery Framework (FRF) to help communities recover from the impacts of Storm Henk was announced by the UK Government on 6th January 2024[3]. This was a national scheme which was made available to eligible areas in England that experienced exceptional localised flooding.

Following an initial survey to gather information on potential impacted residents and businesses across the County, Stafford Borough Council and Staffordshire County Council worked in partnership to contact affected residents and establish whether they were eligible to access the funding, that required properties to be internally inundated or for residents to be without access or services for

[3] Government payments for communities affected by flooding - GOV.UK (www.gov.uk)

24/48-hours during the Storm Henk event (between 2nd and 12th January 2024). All properties that reported internal flooding in Slindon and made an application received the FRF grant funding and council tax or business rates relief for 3-months to help with immediate costs.

Residents and businesses were also invited to submit an Expression of Interest to apply for a Property Flood Resilience (PFR) Repair Grant Scheme. This grant was made available to help improve the flood resilience of the property and to allow residents to recover more quickly from future flooding[4]. The application process closed on 15th July 2024 and at the time of publishing this report SCC are engaging with approved contractors to undertake property surveys and any subsequent recommended PFR installation works. Where works have already been undertaken, these will be reimbursed up to the maximum allowance under the grant scheme.

4.7.3 Site visits and observations

On **22nd February 2024**, Flood Risk Officers attended site following reports of flooding from residents at the junction of Aspley Lane and the A519, and, along the A519 through the village. On the day of the visit, heavy rainfall had occurred overnight and into the morning. Flood risk officers arrived on site around midday, by which point, SCC Highways Officers were already in attendance to implement a road closure along Aspley Lane.

Site inspection found the roadside ditch at Aspley Lane was at capacity, and water was spilling from the ditch on to the highway (Figure 29). Surface water runoff was also observed flowing from adjacent fields onto the highway along Aspley Lane and into the ditch (Figure 30). Whilst the inlet pipe at the downstream end of the ditch was submerged, it was evident that some water was still flowing through the pipe following clearance of debris by SCC Highways. On site it was noted that at around 13:00 the rainfall had eased and water within the ditch at Aspley Lane had started to clear.

Discussion with SCC Highways on site and subsequent photographs received from residents confirmed that water had spilled onto Aspley Lane from the roadside ditch and continued to flow along the A519 in a southerly direction, accumulating in the highway adjacent to properties on both the western and eastern side of the road. No internal flooding to property was reported to SCC LLFA on this occasion.

[4] Get Help After Storm Henk Flooding - Staffordshire County Council

Figure 29: Ditch and pipe inlet at junction of Aspley Lane and A519, observed on 22nd February 2024.

Figure 30: Surface water runoff from fields adjacent to Aspley Lane, observed on 22nd February 2024

Flooding was also observed along Villa Farm Lane (Figure 31). Discussion with residents on site confirmed that water initially spilled from the manhole at the entrance to the drive before accumulating along the private road, restricting access to property along the road. No internal flooding to property was reported along Villa Farm Lane on this occasion.

Figure 31: Photographs of floodwater along Villa Farm Lane as observed on 22nd February 2024

Site meeting with residents – 10th April 2024

On 10th April 2024, SCC Flood Risk Officers and a Community Liaison Officer from the LLFA met with residents to discuss both recent and historic flooding issues within the village. An inspection of the locations directly impacted by the flooding during Storm Henk was undertaken along with a walk over of the wider catchment.

The inlet pipe at the junction of Aspley Lane and the A519 was inspected. It was observed that SCC Highways had installed a new two-stage trash screen at the inlet to the pipe and undertaken general maintenance work within the ditch channel (refer to Section 5.1). Water was within the channel banks at the time of the visit and debris was observed on both trash screens. Residents described how the ditch is still quickly reaching capacity despite the completion of the works and debris such as leaves and sticks often accumulates on the trash screen and requires frequent clearance.

A walkover of the riparian owned ditch from Aspley Lane was undertaken from the point at which the pipe enters the open channel to the point at which it enters the Millmeece Drain South. The channel was found to be heavily silted with significant vegetation growth in several places. The outlet pipe from the Aspley Lane was found to be submerged, and the water level in the channel was almost at bank full in several places (Figure 32 and Figure 33).

Figure 32: Discharge point of Aspley Lane pipe into open ditch to east of Slindon (Photograph taken 10th April 2024)

Figure 33: Open watercourse leading to Millmeece Drain South (Photograph taken 10th April 2024)

Several of the fields surrounding the village were observed to have a significant amount of standing water on them, indicating that the ground was still heavily saturated following the exceptionally wet Autumn/Winter and many of the ditch channels were still full with capacity reduced.

A full walkover of Sytch Lane was also undertaken from the A519 to the point at which Mill Meece drain south flows beneath the highway. Despite the dry weather on the day of the site visit, a significant amount of standing water was observed along the highway and several of the roadside ditches were at capacity. Again, ditches were found to be heavily silted with significant vegetation growth in places.

5 Risk Management Authority Functions

The Risk Management Authorities (RMAs) with relevant flood risk management functions at Slindon are:

- **The Highway Authority** (Staffordshire County Council) - responsible for the highway gullies and drains within the highway.
- **Sow and Penk Internal Drainage Board (IDB)** – responsible for the regulation of ordinary watercourses within their operation area.
- **Lead Local Flood Authority** (Staffordshire County Council) – responsible for investigation and reporting of flooding, supervision of ordinary watercourses outside the IDB district.

Following the flood event, each RMA was notified of the flooding and asked to investigate and report on the status of assets under their responsibility, and whether they have taken or are proposing to undertake actions to mitigate the risk of future flooding. Responses and further discussion are set out below.

5.1 SCC Highway Authority

A meeting was held with SCC's Highway Authority to gather information on the flooding issues within the village and determine any previous actions taken and proposed future actions. Previous investigations and actions undertaken by SCC Highway Authority prior to Storm Henk are summarised in Section 4.5.1.

Following Storm Henk, SCC Highways attended site to investigate the flooding. SCC Highways reported that debris had been removed from the trash screen at the Aspley Lane pipe inlet and gully clearance undertaken at Aspley Lane, Villa Farm Lane and along the A519. In addition, the pipe from Aspley Lane was jetted along the private driveway leading to Villa Farm to remove silt that had built up within the pipe. This was left running clear following the cleansing works.

SCC Highways confirmed a number of works were already proposed within the village to improve the highway drainage network prior to the January 2024 flood event. These included the installation of a two stage trash screen at the Aspley Lane / A519 pipe inlet (Figure 34 and Figure 35) and the incorporation of an additional gully adjacent to the roadside ditch on Aspley Lane (Figure 36 and Figure 37). Following the flooding, these works were escalated, and SCC Highways officers confirmed that the works were completed in March 2024. Clearance of the roadside ditch was also undertaken at this time.

Site observations have shown that both trash screens have been working effectively in preventing debris washing from the upstream catchment and entering or blocking the pipe inlet. However, residents have reported that during heavy rainfall events, the roadside ditch continues to reach capacity quickly with downstream flow restricted. This is likely due to the condition of the downstream channel and potential build-up of silt within the pipe as observed during site inspections.

Figure 34: Two-stage trash screen installed along roadside ditch pipe inlet at Aspley Lane/A519 in February 2024

Figure 35: Aspley Lane inlet pipe and new trash screen following heavy rainfall February 2024.

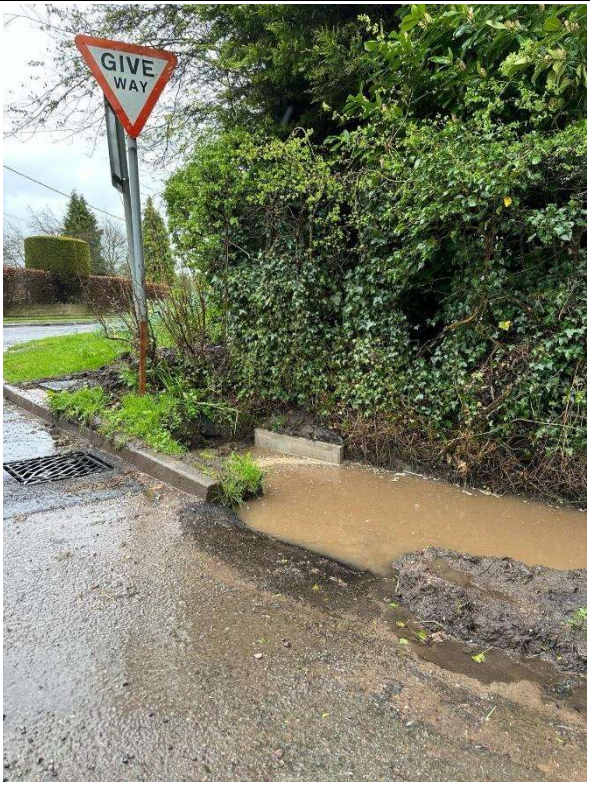


Figure 36: Roadside ditch at capacity following rainfall experienced April 2024

Figure 37: Gully adjacent to Aspley Lane ditch almost at capacity following rainfall April 2024

Further highway drainage works have also been completed along the A519 to increase the capacity of the highway drainage network along the A519. This has included the installation of an additional 300mm diameter pipe along the western side of the highway between The Old Post Office and Sytch Lane and additional gully connections to direct surface water into the drainage network. Consultation with Highways confirmed that these works were completed on 9th August 2024. Discussion with SCC Highways has stressed that the effectiveness of any increase in the capacity within the highway drainage network will be dependent upon the condition of the downstream watercourses that the systems discharge in to.

All highway gullies within the village are on an annual cleansing cycle.

5.2 Sow and Penk Internal Drainage Board (IDB)

The Sow and Penk Internal Drainage Board were contacted following Storm Henk to notify them of the flooding and to ask them to investigate and report on the status of any assets under their responsibility, and whether they have taken or are proposing to undertake actions to mitigate the risk of future flooding.

Figure 38 presents the plan of assets within the IDB area (area shaded light green) as provided by the IDB. This shows IDB maintained watercourses (red), EA Main River (blue), Aspley Lane riparian owned watercourse (purple). All other assets between Newcastle Road and Sytch Lane are the responsibility of the Riparian Owner Occupiers who own the land above or adjacent the asset and the IDB does not hold details of Riparian Assets.

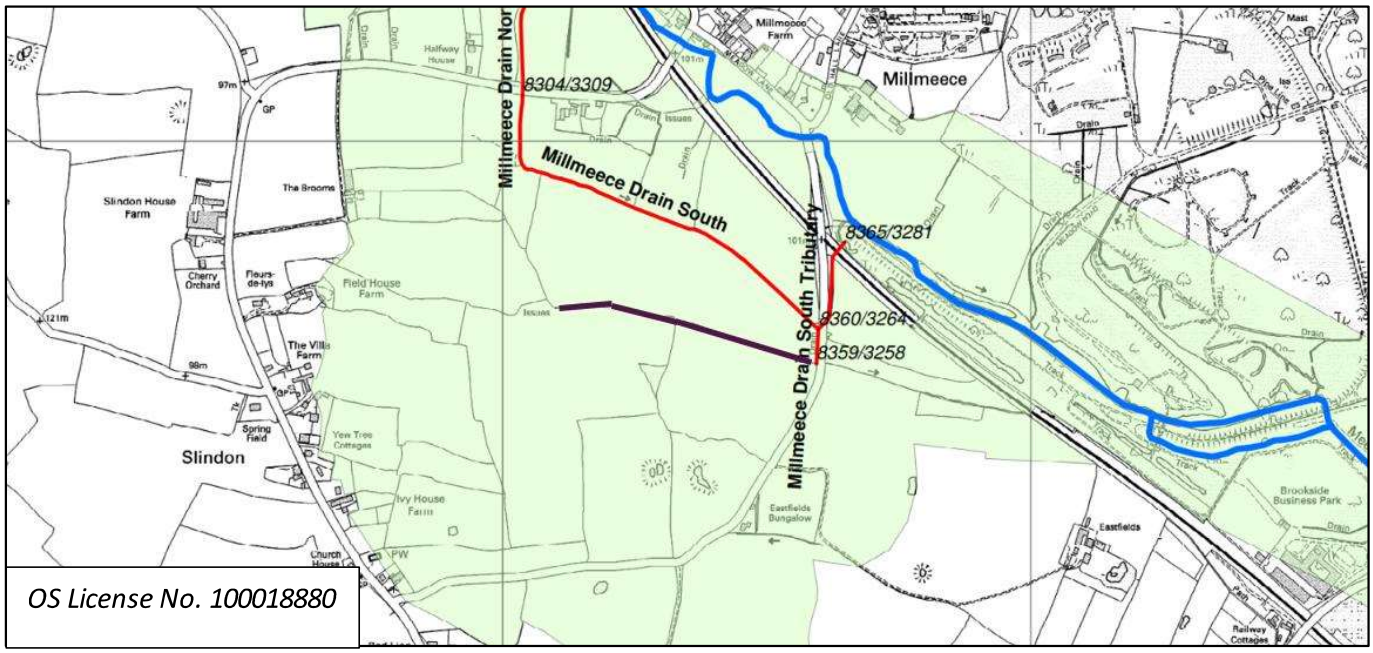


Figure 38: Plan of watercourses and ownership as provided by Sow and Penk IDB

The IDB confirmed that they were made aware of the January 2024 flooding through the LLFA and residents, which was also reported to the Board on 28th May 2024. The following actions were taken by the IDB upon becoming aware of the flooding:

- The IDB were notified through DEFRA and the EA of a new fund for Storm Recovery and Asset Improvement which required Expressions of Interest to be submitted in June.

- The IDB has further investigated on site and submitted an Expression of Interest to the Asset Improvement Fund on 28th June to Desilt, Flail and undertake tree work downstream of the Riparian pipeline to Sytch Lane, and then along Sytch Lane to permit flow into the IDB maintained watercourse 'Millmeece Drain South'.

At the time of publishing this report (March 2025), the IDB confirmed that their initial Expression of Interest to the Asset Improvement Fund had been unsuccessful. However, the Government has agreed to fund more works under Tranche 2B of the Storm Recovery and Asset Improvement Fund. The IDB resubmitted their application to apply for funding for work on 31st January 2025. The outcome of the application is expected by the end of March 2025 with the works to be delivered by 31st March 2026.

The IDB have indicated that if not successful in obtaining National Funding, alternative routes to a resolution for the downstream watercourse will be required which may include:

1. as the watercourses and piped watercourses are not vested under the control of the IDB, any injured party has the right to obtain an Order from the First-tier Tribunal (Property Chamber) which is a free submission: Form TALD711: Notice of Application for an Order under the Land Drainage Act 1991 - GOV.UK (www.gov.uk)
2. the IDB may consider serving Notice on the Riparian Owner Occupier downstream, however, there will be less certainty in timescales and legal costs.

The IDB stated within their response that it should be noted that:

"the proposed works only cleanse and permit flow downstream of the Riparian Pipeline. To our knowledge, the pipeline is good order with no known obstructions to flow. An up-to-date CCTV of the pipeline from Newcastle Road may be considered through Highways if not already completed.

The wider catchment rainfall issues outside the Drainage District are of most concern and we would recommend a wider Catchment Study is needed to understand the rainfall experienced, flow rates, flow routes and capacity of the systems currently in place. It is likely that upstream catchment storage or attenuation to slow-the-flow into the pipeline and the Drainage District is required."

6 Conclusions

Slindon had been affected by flooding on several occasions, particularly in recent years, where flooding has become more frequent.

During Storm Henk on 2nd January 2024, the rainfall runoff return period was estimated between 1 in 5 and 1 in 10 years. The rainfall event occurred during a wetter-than-average winter, when catchments were saturated and drainage ditch networks at elevated base-flow levels. This resulted in two properties experiencing internal flooding with further external flooding significantly impacting homes, businesses and highways within the village.

Residents and business owners reported flooding and completed Flood Surveys as part of the Flood Recovery Framework. Officers from Staffordshire County Council met with residents to discuss the flooding issues and walkover the flood locations. This provided information about the causes and impacts of the flooding.

Investigations have determined that the flooding at Slindon results from a combination of factors, including the natural topography, drainage systems, maintenance, risk of blockages, and rainfall patterns. Despite significant investment by SCC in recent years, flooding has continued to impact the village.

The Risk Management Authorities (RMAs) with relevant flood risk management functions are the Highway Authority and the Sow and Penk Internal Drainage Board (IDB). Each RMA was notified of the flooding and asked to investigate and report on the status of assets under their responsibility, and whether they have taken or are proposing to undertake actions to mitigate the risk of future flooding.

The Highway Authority attended site and carried out inspection and cleansing of the gullies in the affected areas. The pipe from Aspley Lane was jetted along the private driveway leading to Villa Farm and a two-stage trash screen and additional gully connection incorporated at the Aspley Lane pipe inlet to help reduce the risk of blockage at the pipe inlet. In addition, the capacity of the highway drainage network along the A519 has been increased.

The Sow and Penk IDB investigated on site and submitted and Expression of Interest to the Defra Asset Improvement Fund to undertake maintenance works in the channel downstream of the riparian pipeline from Aspley Lane to Sytch Lane. In November 2024, the IDB were informed their application for funding had been unsuccessful, however, the IDB have resubmitted their application under Tranche 2B of the Storm Recovery and Asset Improvement Fund. The IDB have indicated that if not successful in obtaining National Funding, alternative routes to a resolution for the downstream watercourse will be required.

Whilst highway improvement works have increased the overall capacity of the highway drainage network, the ability of the surface water network, both natural and engineered, is limited by the flat topography, pipe diameter downstream and condition of the receiving watercourses.

The actions taken to date by the Risk Management Authorities, and further recommended actions are summarised in section 7.

7 Recommended Actions

As part of this flood investigation in addition to determining what contributed to flood event, a set of recommended actions have been proposed that may help to alleviate flooding in the future or at least reduce risk to properties.

Table 2 below sets out relevant Risk Management Authorities (RMAs) and other interested parties, actions that have been taken to date since the flood event on 2nd January 2024, and, those actions proposed for the future, with the relevant RMA who will lead.

Table 2: Risk Management Authorities and recommendations and actions

RMA	Actions to date	Further Actions
SCC Highways	Jetted and cleansed gullies. Installation of two stage trash screen at inlet to Aspley Lane/A519 pipe, Completed 15/03/2024. Capital Scheme to upgrade capacity of highway drainage along A519, completed 09/08/2024.	Review highway maintenance schedules and explore opportunities to increase frequency, particularly prior to and following periods of heavy rainfall. Continued monitoring of the highway drainage works to determine their effectiveness.
Sow and Penk IDB	Site investigation following reported flooding. Expression of Interest submitted to Defra Asset Improvement Fund 28/06/2024 to undertake channel maintenance works downstream of riparian pipeline from Aspley Lane.	Application for funding resubmitted on 31/01/2025 to undertake channel maintenance works downstream of Aspley Lane riparian pipeline. Outcome of funding application expected end of March 2025. Subject to outcome of Defra Asset Improvement Fund application, completion of channel maintenance works on Ordinary Watercourse downstream of riparian pipeline to Sytch Lane (Target before 31st March 2026). Continued inspection of ordinary watercourses within the IDB area. Liaison with landowners and enforcement where required.
SCC as Lead Local Flood Authority	S19 investigation completed, RMAs notified. Worked with SBC on implementation of the Flood Recovery Framework (FRF) for Staffordshire residents affected by internal flooding.	Continued administration of PFR aspect of the FRF for properties that submitted an Expression of Interest.

RMA	Actions to date	Further Actions
Stafford Borough Council	Through their planning role consideration of the impact of future development on flood risk through the planning application process. Worked with SCC on implementation of the Flood Recovery Framework (FRF) for Staffordshire residents affected by internal flooding.	Flood risk challenges within the catchment should be communicated to SBC planners to ensure appropriate consideration when assessing future development within Slindon. (Timescale: On-going)