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## 7. Trent Lower and Erewash Catchment

### 7.1 Trent Lower and Erewash Event Hydrology

This section describes the hydrological conditions that were experienced across the Trent Lower and Erewash sub-catchment during Storm Babet, including rainfall and river patterns and their rarity. The Hydrology Technical Appendix provides more details on the event hydrology within Derbyshire leading up to and during Storm Babet.

#### 7.1.1 Catchment Characteristics

Only a small part of the total River Trent catchment is located within Derbyshire and included in the Trent Lower and Erewash sub-catchment referred to in this report. The Lower Trent catchment is in the south of Derbyshire while the Erewash catchment is to the east.

The total of the River Trent included in this sub-catchment extends from the Trent's confluence with the River Dove near Burton-on-Trent to the Trent's confluence with the River Derwent, south of Derby. The River Trent passes through Willington, Twyford, Barrow upon Trent and Aston-on-Trent.

The River Erewash flows south from Kirkby in Ashfield, through Pinxton, Langley Mill, Ilkeston, Sandiacre and Long Eaton before entering the Attenborough Nature Reserve. The lakes at this nature reserve outflow to the River Trent. The main tributaries include Nethergreen, Bailey, Nut and Gilt Brooks.

Figure 7-1 indicates the sub-catchment extent in respect of the Derbyshire area, in addition to showing the location of the rainfall, river flow and level gauges within or near the sub-catchment.

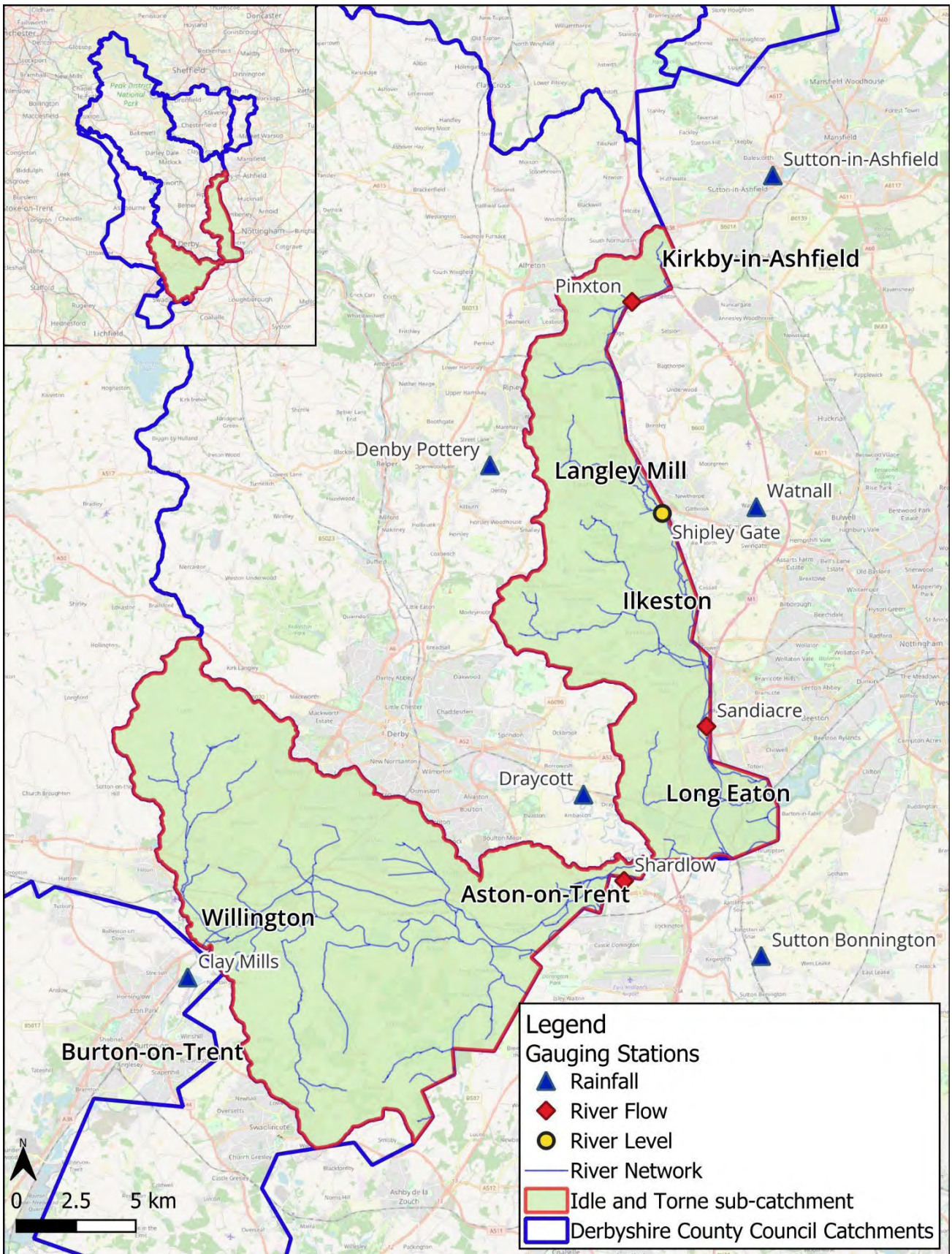


Figure 7-1: Catchment extent and rainfall, river flow and river level gauges.

## 7.1.2 Hydrological Summary

### 7.1.2.1 A Reminder on Probability

The chance of something happening is often expressed as a probability. If something has a small probability of occurring it is a rare event, meaning that the chance of it happening within a certain timeframe is small. Within the context of this report, a rare event is also a more extreme event, for example a more extreme



weather event. Conversely, if something has a higher probability of occurring then the chance of it happening in a certain timeframe is higher. Again, within the context of this report, a more frequent event is also a less extreme event, for example a less extreme weather event.

More specifically, this section of the report refers to the probability of high rainfall and river flow events using the term “annual exceedance probability” (AEP). This indicates the severity or rarity of an event at a particular location. AEP refers to the chance that a specific hydrological condition, for example 100mm of rain falling during a storm, is exceeded in a one-year period. In this context to exceed means a rarer, or extreme, weather event.

An example of a severe and rare event would be a 1% AEP event. This is an extreme weather condition that has only a one in a hundred chance of being exceeded in any given year. An example of a less extreme, but still intense, event would be a 25% AEP event. This has a one in four chance of being exceeded in any given year. As indicated by these examples, the smaller the percentage AEP stated, the more rare or extreme an event is.

### **7.1.2.2 Rainfall**

During Storm Babet, heavy rainfall lasted from the 18th to 21st of October 2023 across the Trent Lower and Erewash sub-catchment, peaking early on the 20th of October from 3:45am to 5:45am. Heavier, more extreme rainfall was recorded within the Erewash part of the sub-catchment in the east and north near Langley Mill and Kirkby-in-Ashfield. All stations surrounding the River Erewash recorded rainfall equating to 0.9% to 3.6% AEP. Less extreme rainfall was recorded within the Trent Lower part of the sub-catchment, near Willington, Burton-on-Trent and just outside of the sub-catchment in Sutton Bonnington. These stations recorded rainfall equating 9.5% to 15.4% AEP.

### **7.1.2.3 Rivers**

Shorter and earlier river responses to heavy rainfall were recorded upstream on the River Erewash near Pinxton and Eastwood. Later, longer responses to heavy rainfall were recorded downstream on the River Erewash near Sandiacre and on the River Trent near Shardlow. The shortest lag time between peak rainfall and peak flow was recorded at Pinxton on the River Erewash, being 13 hours, while the longest was recorded at Shardlow on the River Trent, being 27 hours.

Stations at Pinxton, Sandiacre and near Eastwood produced the highest ranked flows or levels on record in response to Storm Babet. Shardlow station on the River Trent produced the 5th highest ranked flow on record.

### **7.1.2.4 Communities**

Rainfall conditions severity at each local community within the Trent and Erewash sub-catchment are listed below. Event rarity was estimated from the nearest rainfall gauging station to each community:

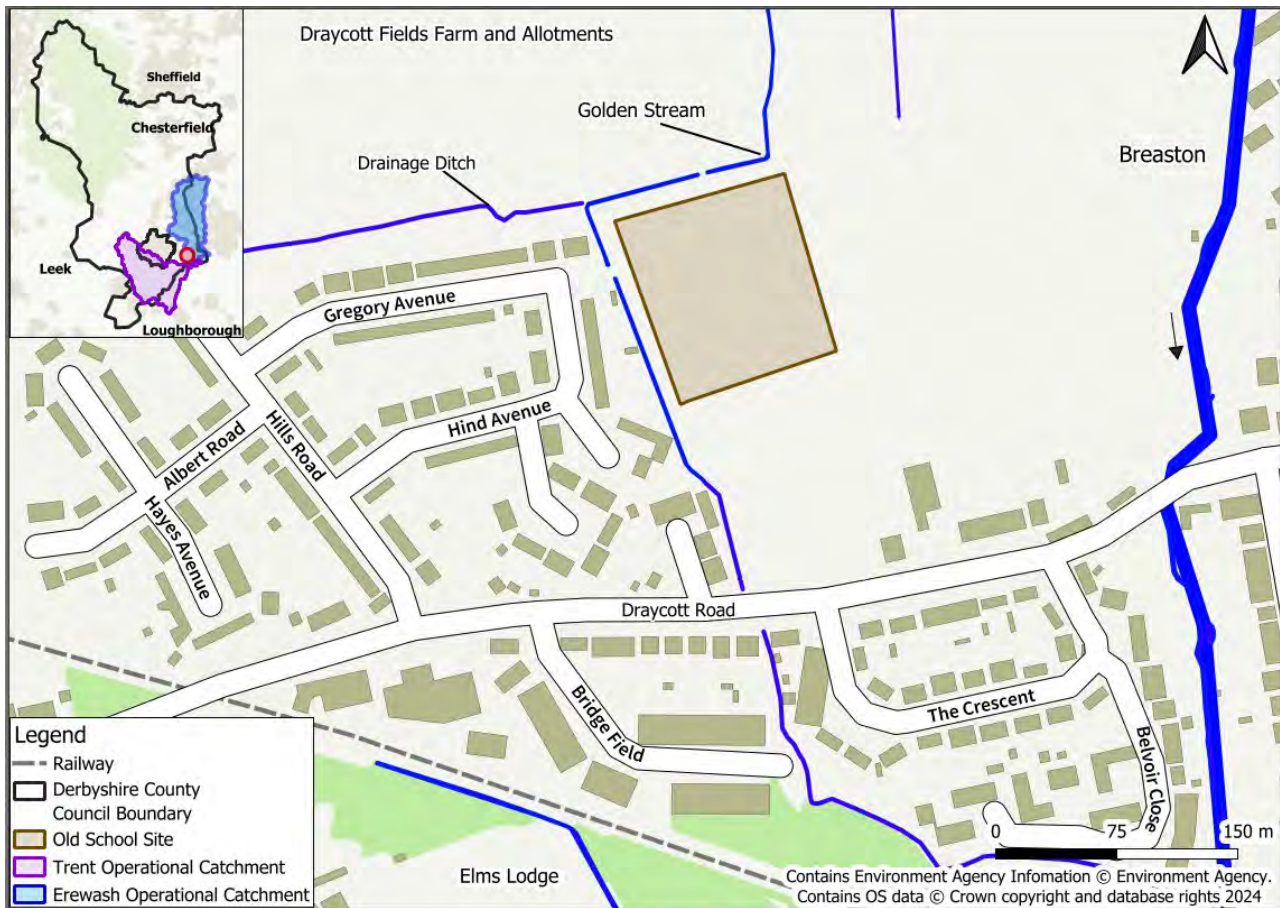
- 0.9% AEP: Ironville, Pinxton
- 1.1% AEP: Ilkeston, Sandiacre, Langley Mill
- 2.4% AEP: Draycott
- 15.4% AEP: Long Eaton, Aston-on-Trent

For access to the nearest gauging station to each community, please see the Government’s Check for Flooding Service at <https://check-for-flooding.service.gov.uk/river-and-sea-levels>.

## **7.2 Community Impacts – Breaston**

### **7.2.1 Location Characteristics**

Forty-nine residential properties and two non-residential properties located in the west of Breaston suffered internal flooding as a result of Storm Babet. The area flooded is next to Golden Stream, which is a main river, and a drainage ditch which flows between the properties and Johnson’s Meadow, as shown in Figure 7-2. These watercourses flow southwards through the community and then eastwards into Golden Brook and onwards through Long Eaton. Golden Brook outfalls to the River Erewash, immediately upstream of its confluence with the River Trent.



**Figure 7-2: Overview of the Breaston community.**

The community is primarily residential, with mainly semi-detached homes and bungalows. Critical infrastructure within the area includes the A6005 (Draycott Road), which connects Breaston to the A52 and the Midlands Main Line railway, a major railway line running between London and Sheffield. The railway line also flooded during Storm Babet. There are no known vulnerable groups within the community.

The community is located on the floodplain of the Golden Stream and Golden Brook. The local topography is flat and relatively low-lying compared to its surroundings to the north. The community sits at a similar elevation to that of the Golden Stream and Golden Brook floodplain, with the land gradually sloping southwards. Local geology consists of a mixture of sand and gravel alluvium superficial deposits and mudstone bedrock.

The Environment Agency Historic Flood Map indicates that the properties flooded as a result of Storm Babet have flooded previously in 2000, 2019 and 2020.

The Flood Map for Planning (<https://flood-map-for-planning.service.gov.uk/>) shows that all of the flooded homes within this community are at least in Flood Zone 2. Areas in Flood Zone 2 have between a 1% and 0.1% AEP of river flooding. Forty-two homes within the community, and four non-residential properties, are located within Flood Zone 3, see Figure 7-3. Flood Zone 3 means the properties are within the floodplain and have a greater than 1% AEP of flooding from rivers.

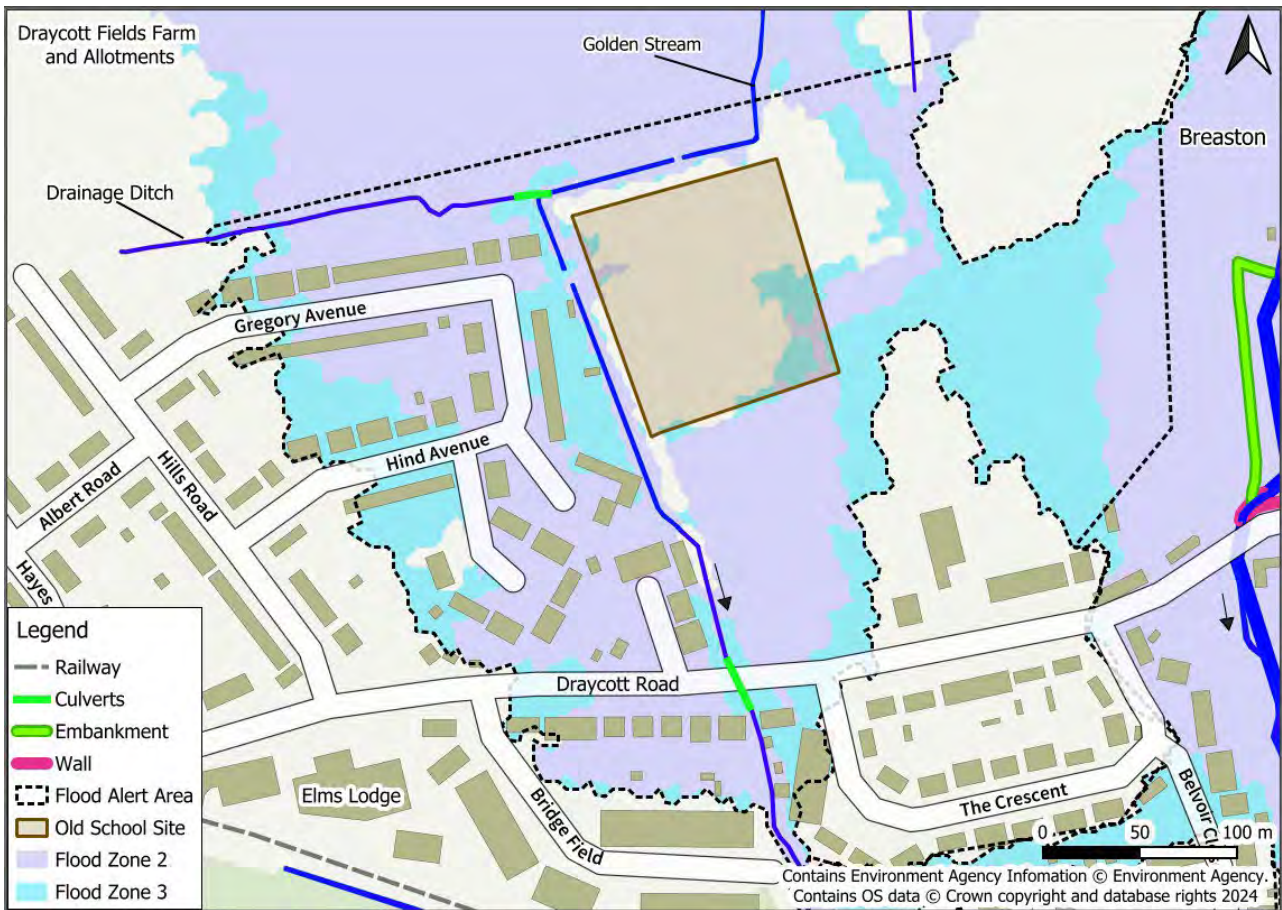


Figure 7-3: Local flood risk management assets, river flooding flow routes and Flood Zones at the Breaston community.

Additionally, the majority of homes have a high risk of surface water flooding, based on the Long Term Flood Risk Map (<https://check-long-term-flood-risk.service.gov.uk/postcode>). High risk is defined as greater than 3.3% AEP of flooding. Figure 7-4 shows the surface water flood risk for the community based on the national mapping referred to above.



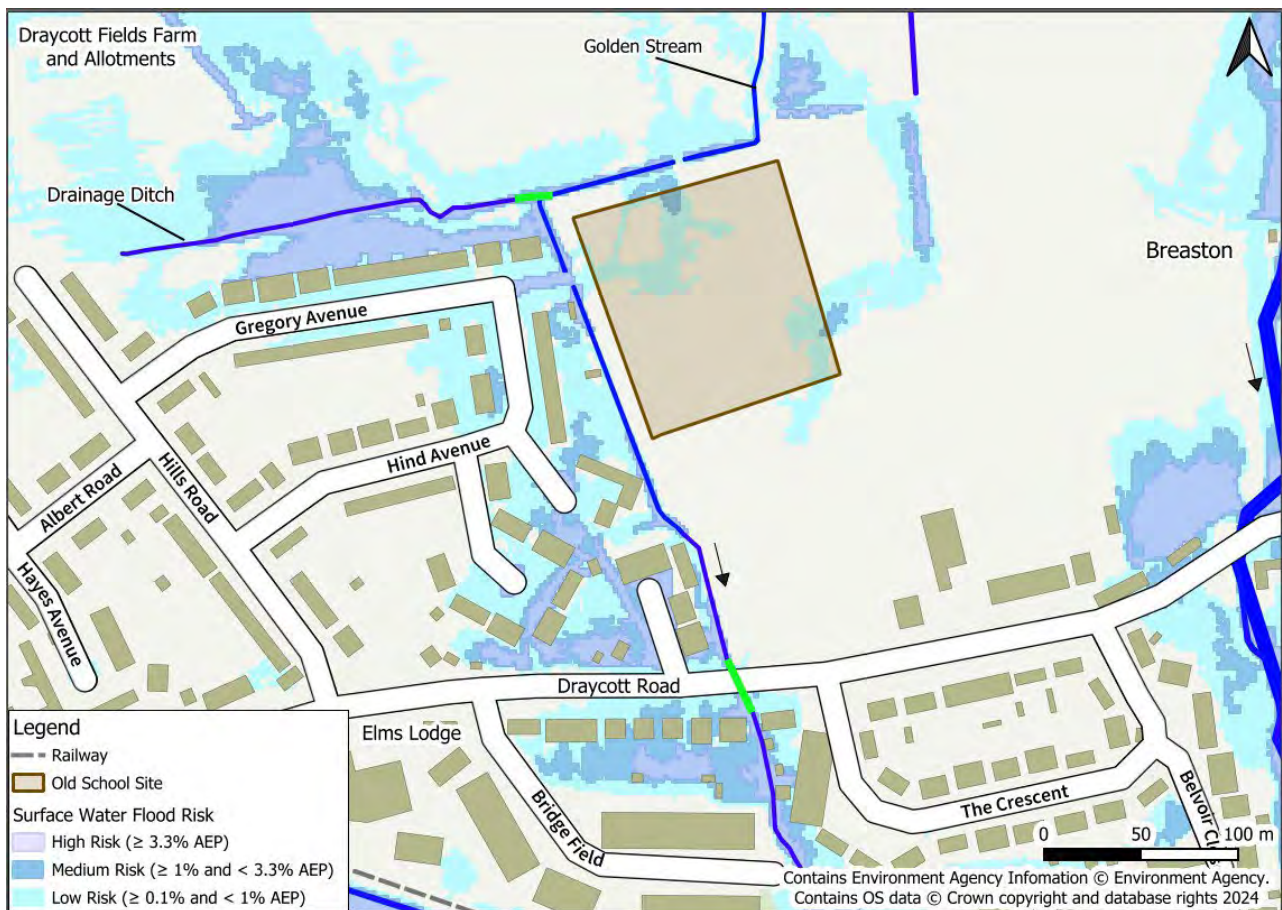


Figure 7-4: Map showing the chance in any given year of flooding from surface water at Breaston (Source: Long Term Flood Risk Map).

Breaston is not located within or nearby to any nationally designated environmental sites.

## 7.2.2 Current Flood Risk Management Arrangements

All properties flooded within this community are located within the 'River Erewash Tributaries in Derbyshire and Nottinghamshire' Flood Alert Area. The properties within this community are also located within the 'Golden Brook and Golden Stream at Breaston' Flood Warning Area. On anticipation of a potential flood event, residents who are signed up to alerts and warnings are informed when flooding is likely to occur.

The only assets maintained by the Environment Agency on Golden Stream are two debris screens, one located immediately upstream of the A6005 (Draycott Road) and another 70m to the north called Spring Close Screen. There have been no reports of damage to assets maintained by the Environment Agency.

## 7.2.3 Storm Babet Incident Details

A Flood Alert was issued to the 'River Erewash Tributaries in Derbyshire and Nottinghamshire' on the 19th of October 2023 at 1:13am and a Flood Warning at 7:13pm on this same date. Internal flooding of properties is understood to have taken place on the 20th of October.

The forty-nine homes which flooded internally included seventeen residential properties located along Gregory Avenue, four on Hind Avenue, thirteen on Festival Avenue, two on Spring Close and thirteen on the A6005 (Draycott Road). Two non-residential properties reported flooding at the eastern end of Gregory Avenue.

## 7.2.4 Flood Mechanisms, Extent and Impacts

The primary source of flooding affecting all properties within this community was from a drainage ditch and Golden Stream. Golden Stream does not have any gauging stations located along it. There is however a gauging station located along the neighbouring Golden Brook, approximately 400m east of the community. Hydrology data shows that on the 20th of October, the peak level recorded at the Long Eaton Breaston

Homes Road gauge reached 1.85m; the highest level ever recorded.

Photographs taken on Gregory Avenue indicate that floodwater depths reached 0.8m, which in an urban area represents a significant flood hazard, with danger to all. Residents along Draycott Road reported passing traffic driving through floodwater and pushing it into front gardens and properties.

Residents have reported a lack of maintenance along the drainage ditch between Gregory Avenue and Johnson's Meadow, and along Golden Stream. It was reported that maintenance has not occurred for numerous years prior to Storm Babet. The riparian zone, stream banks and in-channel area in these stretches of watercourse became extensively overgrown with vegetation, see Figure 7-5. The stream collects runoff from fields to the north. During Storm Babet, the ability of the ditch to convey water is likely to have been restricted by this vegetation. Together with the high flows, this resulted in the overtopping of banks of the Golden Stream and the flooding of back gardens of neighbouring houses.



Figure 7-5: Location of features which exacerbated flooding within the Breaston community.

A box culvert on the Golden Stream located east of the east end of Gregory Avenue has been identified as receiving irregular maintenance. Maintenance along Golden Stream would include the removal of vegetation and debris to ensure the channel is clear for water flow. In addition to this, a pipe across the channel obstructs flow, see Figure 7-5. When combined with overgrown vegetation, the culvert became obstructed, causing the back-up of flow, resulting in the overtopping of banks. This water ended up in the road and flowed southwards. Videos provided from residents show this water flowing from Gregory Avenue, into Hind Avenue, and then into both Spring Close and Festival Avenue.

A resident of Festival Avenue reported water rising up through manholes, and that the surface water had nowhere to go due to blocked drains. However, Severn Trent only received reports of one surcharging manhole which was linked to a blockage on the household lateral connection. The runoff reached the driveways of these properties, which are located on a downwards slope away from the road, causing internal flooding.

## 7.2.5 Actions by Public Bodies

This section outlines the actions undertaken by public bodies immediately and in the aftermath of the flood event which are specific to this community. Please refer to section 8.1 of this report for a summary of actions that were implemented at all communities.

Public bodies that have been involved in the flood-event response at this community include:

- Derbyshire County Council
- Breaston Parish Council
- Erewash Borough Council
- Environment Agency

The Environment Agency issued a Flood Alert to the River Erewash Tributaries in Derbyshire and Nottinghamshire on the 19th of October 2023 at 1:13am and a Flood Warning at 7:13pm on this same date.

Severn Trent attended reports of flooding along Festival Avenue and identified one blocked manhole which had been surcharging.

Derbyshire County Council arranged a meeting with a riparian landowner to discuss ownership. It was confirmed that the contractors would attend the site to clear access in January 2024. Derbyshire County Council were also invited to attend.

Community information officers from the Environment Agency visited Breaston on the 7th of November 2023 to speak with residents and report on their concerns.

On the 16th of February 2024, a public drop in was held at the community to provide support and guidance to those affected.

Post Storm Babet liaisons between Breaston Parish Council and Erewash Borough Council occurred to discuss future sandbag allocations. On the 1st of November 2023 Erewash Borough Council directed residents to the local Town Hall for empty sandbag collection, and the Council offered to deliver filled sandbags.

Flood recovery assistance was provided by the Erewash Borough Council to residents on most streets impacted. This involved the removal of household items which were damaged by Storm Babet.

## **7.3 Community Impacts – Ilkeston**

### **7.3.1 Location Characteristics**

Fifty-three residential and fourteen non-residential properties in Ilkeston suffered internal flooding as a result of Storm Babet. The area that flooded is adjacent to the River Erewash, which flows south through this community and is a tributary of the River Trent. The Erewash Canal is also located approximately 150m west of the River Erewash, and approximately 250m from Wentworth Street where the properties were impacted. The Erewash Canal flows southwards, starting in Langley Mill and continuing until it joins the River Trent, south of Long Eaton, see Figure 7-6.



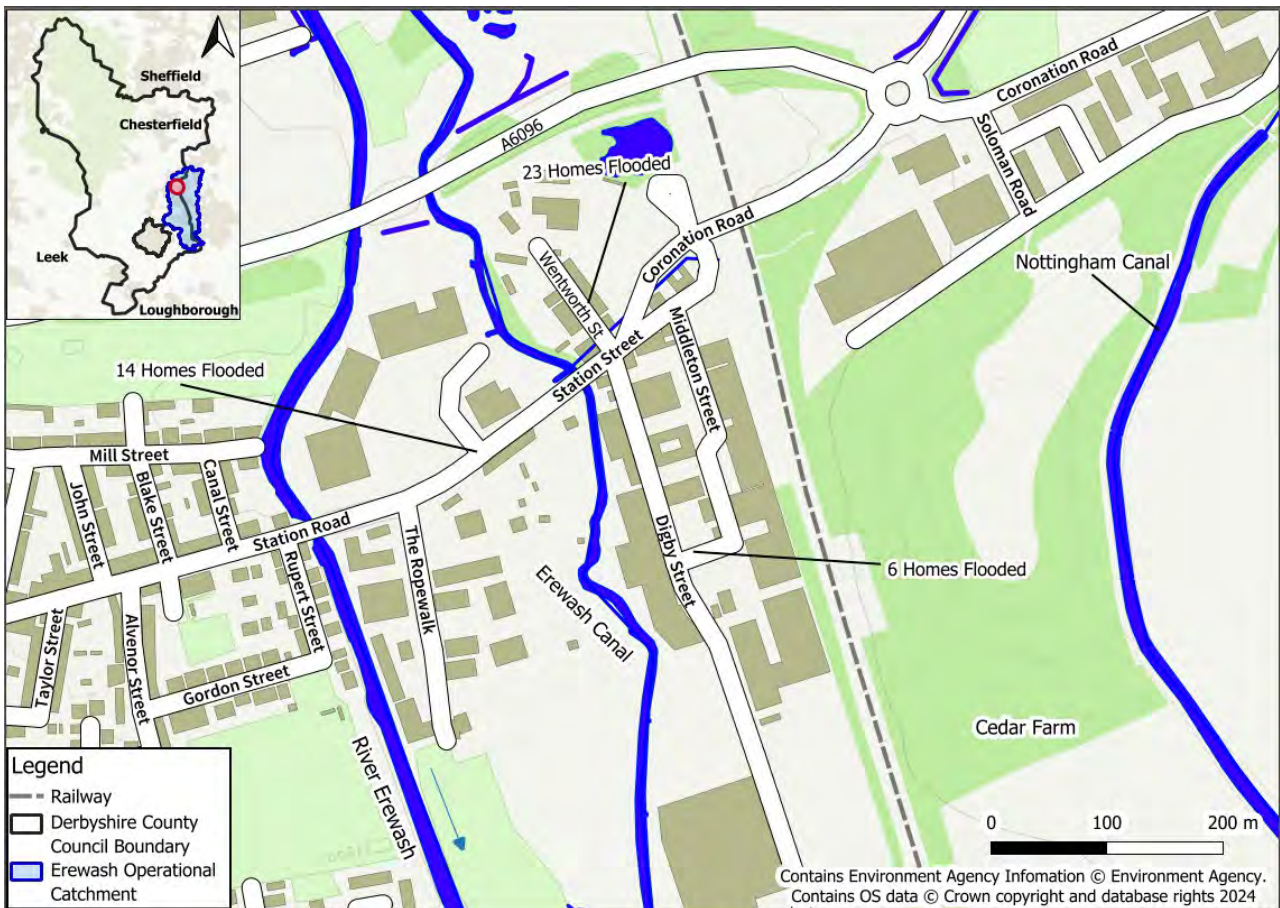


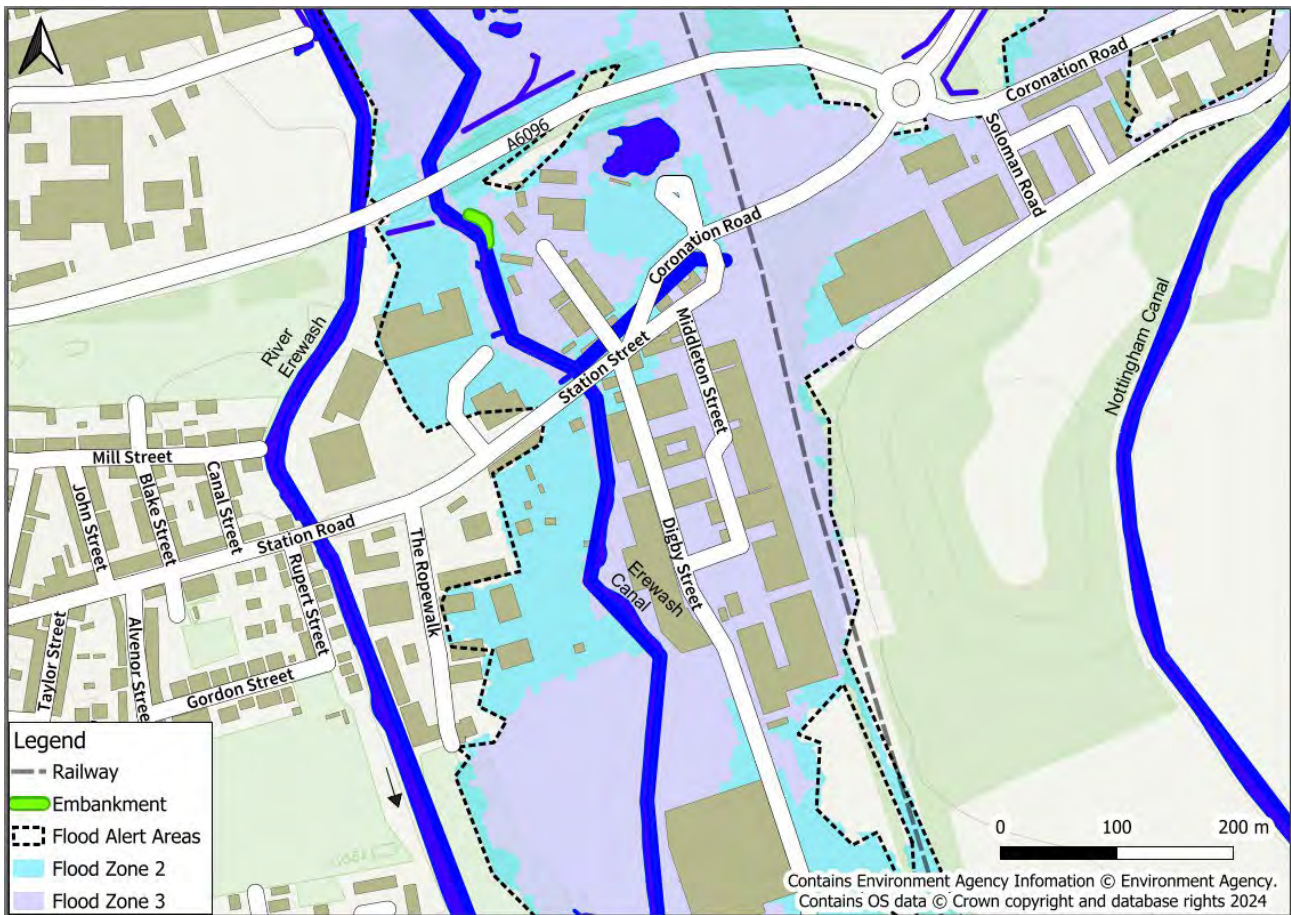
Figure 7-6: Overview map of Ilkeston community.

The community is a mixture of residential properties and business parks. The residential properties consist of two-story terraced and semi-detached homes. Critical infrastructure within this area includes the Main Midland Railway, which stops at the nearby Ilkeston railway station and the A6096.

The community is located on the floodplain of the River Erewash. The local topography is flat and relatively low-lying compared to its surroundings in central Ilkeston to the west and agricultural land to the east. The community sits at a similar elevation to that of the Erewash, with a gradual sloping of the land towards the river.

The local superficial geology is alluvium, including clay, silt, sand, and gravel.

The Environment Agency Historic Flood Map indicates that some properties located along Digby Street, Station Street and Wentworth Street that flooded during Storm Babet have flooded previously. The Flood Map for Planning (<https://flood-map-for-planning.service.gov.uk/>) shows that all of the flooded homes within this community, aside from those along Station Road, are at least in Flood Zone 2. Areas in Flood Zone 2 have between a 1% and 0.1% AEP of river flooding. However, the majority of properties within the community are located within Flood Zone 3, see Figure 7-7. Flood Zone 3 means the properties have a greater than 1% AEP of flooding from rivers.



**Figure 7-7: Local Flood Risk Management Assets and Flood Zones.**

All properties have a low risk of surface water flooding, with the exception of those along Station Road, based on the Long Term Flood Risk Map (<https://check-long-term-flood-risk.service.gov.uk/postcode>). Low risk is defined as between a 1% and 0.1% AEP of flooding. Some properties at the northern end of Wentworth Street, properties along Middleton Street, including Lower Street and those at the eastern end of Station Street have a high risk of surface water flooding. High risk is defined as greater than 3.3% AEP of flooding. Figure 7-8 shows the surface water flood risk for the community based on the national mapping referred to above.



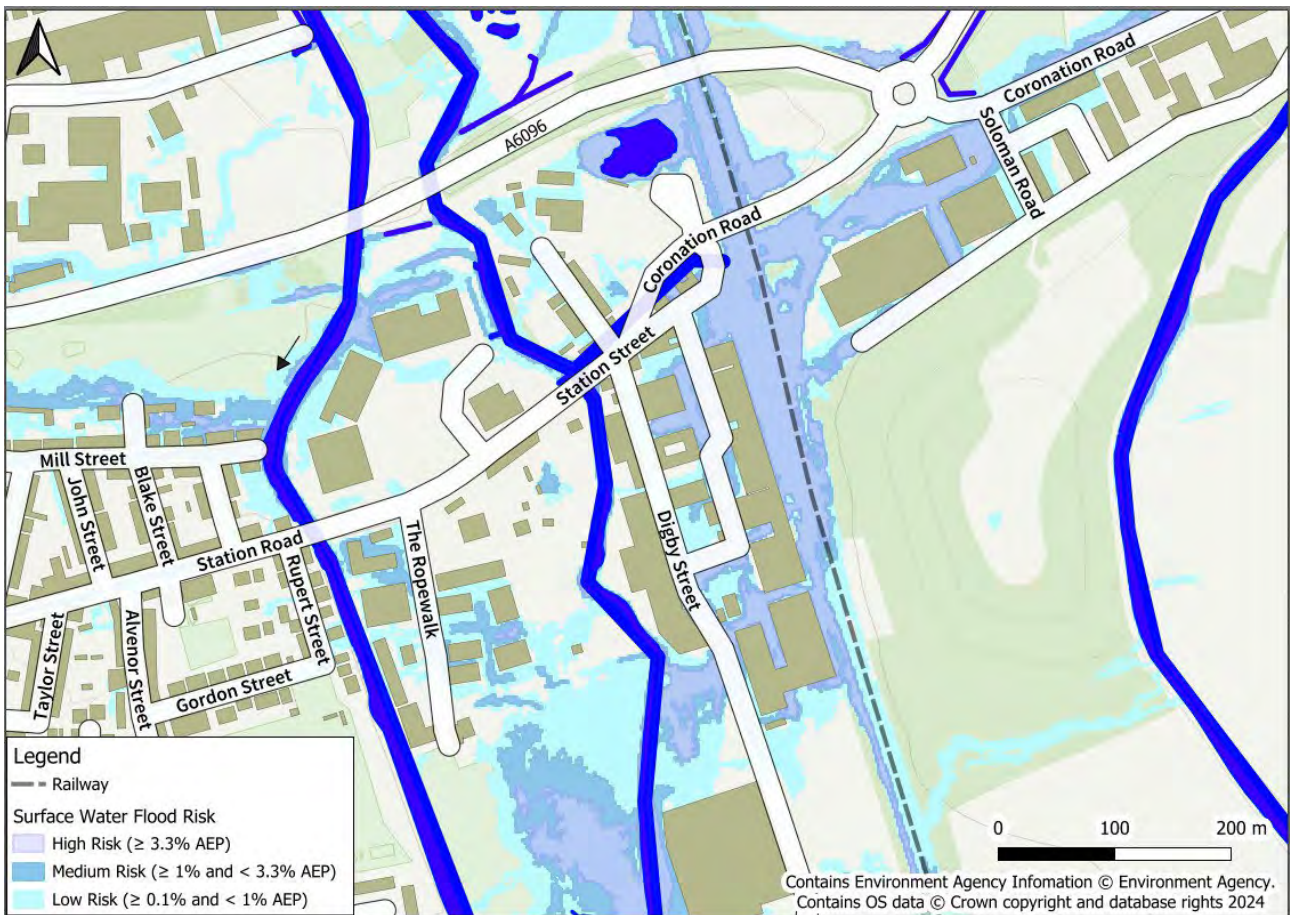


Figure 7-8: Map showing the chance in any given year of flooding from surface water at Ilkeston (Source: Long Term Flood Risk Map).

The community is not located within or nearby to any nationally designated environmental sites.

### 7.3.2 Current Flood Risk Management Arrangements

All properties within this community, with the exception of those located along Station Road, are located within the 'River Erewash in Derbyshire and Nottinghamshire' Alert Area, and the 'River Erewash at Ilkeston' Flood Warning Area. On anticipation of a potential flood event, residents who are signed up to alerts and warnings are informed when flooding is likely to occur.

The Environment Agency's Asset Information and Maintenance Programme (<https://environment.data.gov.uk/asset-management/>) shows a 41m long embankment is located on the east bank of the River Erewash, reducing flooding to properties on Wentworth Street. The embankment is maintained by the Environment Agency.

Figure 7-7 shows the local flood risk management assets within the Ilkeston community.

### 7.3.3 Storm Babet Incident Details

A Flood Alert was issued to the 'River Erewash in Derbyshire and Nottinghamshire' Flood Alert Area on the 19th of October at 1:13am. A Flood Warning was issued to the 'River Erewash at Ilkeston Flood Warning Area' on the 20th of October at 7:22am. The properties along Station Road did not receive this Flood Warning as they are located outside of the flood warning area.

The fifty-three homes which flooded internally include twenty-three properties located along Wentworth Street, ten on Station Street, fourteen on Station Road, six in total on Digby Street, Middleton Street and Lower Middleton Street. There were fourteen non-residential properties which reported flooding within the community.

### 7.3.4 Flood Mechanisms, Extent and Impacts

The primary sources of flooding affecting all properties within this community were from the River Erewash



and surface water. The canal was the conduit for fluvial flood water from the river and not the source.

Hydrology data has been taken for the Shipley Gate river level gauge on the River Erewash. The gauge is located approximately 3km upstream of the affected community and is the closest upstream gauge. The gauge reading peaked on the 20th of October 2023 at 6:45pm at 3.25m; the highest level ever recorded at this gauge.

There were initial reports of flood depths reaching up to 0.9m, which in an urban area represents a significant flood hazard, with danger to all. Videos taken by residents show severe flooding across Ilkeston.

Station Street, Wentworth Street and Digby Street all experienced surface water flooding. Figure 7-9 shows that these streets are situated at a lower elevation than the rest of the community, with neighbouring fields sloping towards Digby Street. This flooding caused impacts to the road network and the internal flooding of businesses and homes. There were complaints issued that street gullies were not clear for flow. Residents believe that blocked drains were the cause for flooding along Digby Street, although this has not been substantiated as the cause of the flooding. The properties on Station Road, experienced flooding to their basements, and there were anecdotal reports of floodwater coming up through the floor of properties and rising up through drains. Severn Trent received reports of flooding along Station Road due to the River Erewash overflowing but did not receive reports of manholes surcharging.



Figure 7-9: Topography at Ilkeston.

Ilkeston railway station was impacted, and the railway lines flooded. A drain located between the railway station and the River Erewash was unable to freely discharge. Hallam Fields Sewage Treatment Works, approximately 2.5km south of the community, was also impacted by the River Erewash overtopping its banks. The impacts of this were resolved a few days later and the works resumed to their normal operations.

There have been no reports of damage to embankment maintained by the Environment Agency.

### 7.3.5 Actions by Public Bodies

This section outlines the actions undertaken by public bodies immediately and in the aftermath of the flood event which are specific to this community. Please refer to section 8.1 of this report for a summary of actions that were implemented at all communities.

Public bodies that have been involved in the flood-event response at this community include:

- Derbyshire County Council
- Breaston Parish Council
- Severn Trent
- Erewash Borough Council
- Environment Agency

The Environment Agency issued a Flood Alert to the 'River Erewash in Derbyshire and Nottinghamshire Flood Alert Area' on the 19th of October at 1:13am. A Flood Warning was issued to the 'River Erewash at Ilkeston Flood Warning Area' on the 20th of October at 7:22am.

Flood recovery assistance was provided by Erewash Borough Council to residents along Station Street and Wentworth Street. This involved the removal of household items which were damaged by Storm Babet.

The Environment Agency organised a public drop in at Ilkeston on the 30th of January 2014. Risk Management Authorities also in attendance included Derbyshire County Council, Severn Trent Water and Amber Valley Borough Council.

During the S19 investigation, Severn Trent were made aware of issues at this location and so are investigating this issue further.

## 7.4 Community Impacts – Sandiacre

### 7.4.1 Location Characteristics

129 properties in the town of Sandiacre, Derbyshire, suffered internal flooding as a result of Storm Babet. Figure 7-10 below shows the community affected. The properties are situated in between the River Erewash to the east and the Erewash Valley Canal to the west. The River Erewash is a tributary of the River Trent.

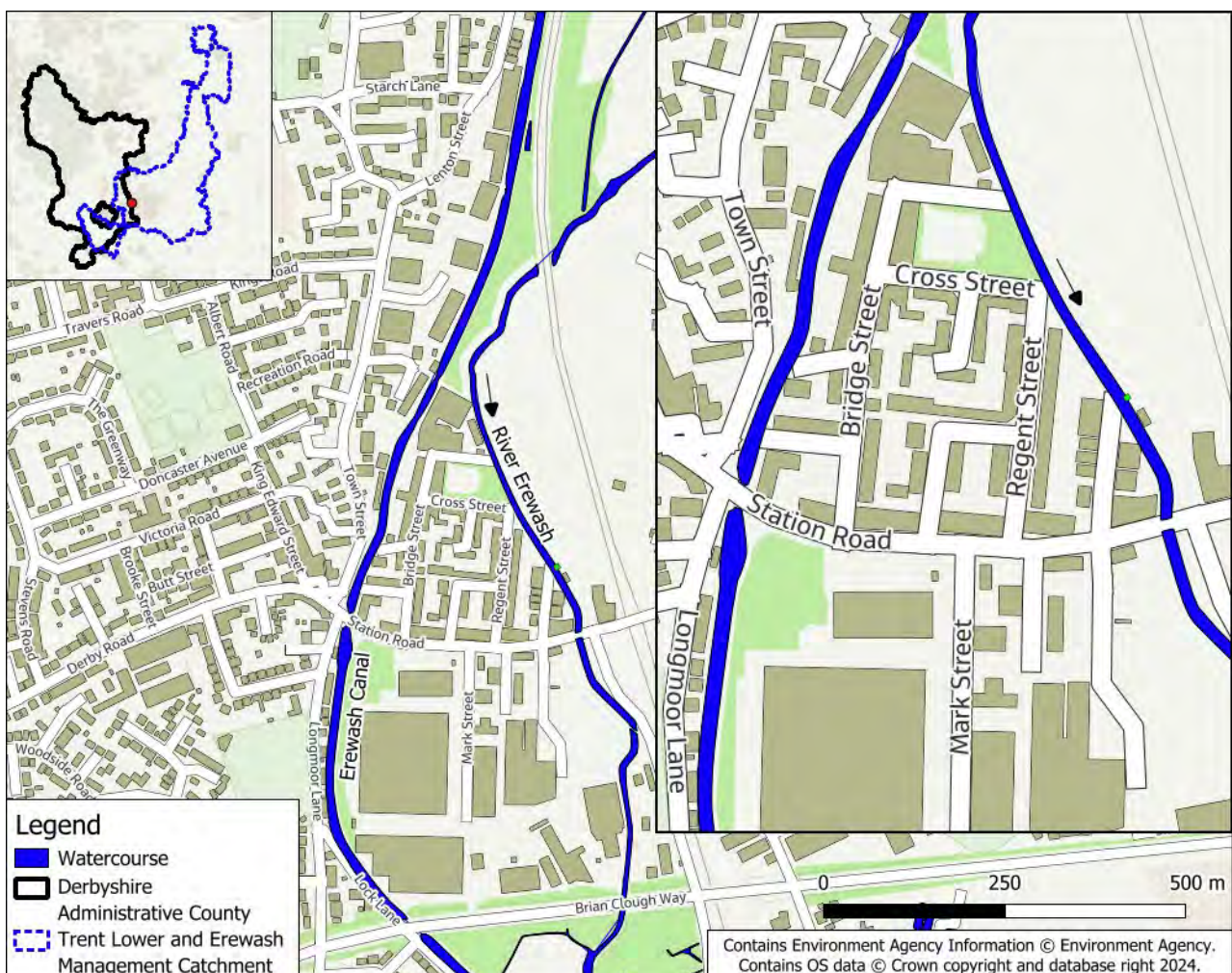


Figure 7-10: Overview of Sandiacre community.



The flooded community is mainly residential consisting of terraced housing and flats. There are also several businesses and commercial properties within the community that were flooded.

Critical infrastructure in the area consists of Station Road (B5010) which runs through Sandiacre, across the canal and river. The East Midlands Railway Line is approximately 100m to the east of the community.

There are no known vulnerable groups within the community.

The community is located on the floodplain of the River Erewash. The local topography is relatively low lying, and the community sits at a similar level to the top of bank of the River Erewash. The local superficial geology is alluvium, including gravel, sand, silt, and clay.

The Environment Agency Historic Flood Map indicates that similar flood extents to that of Storm Babet have occurred previously, with flooding having previously occurred in 1947, 1957, 1960, 1977, and 1978. The majority of properties flooded in Sandiacre were built in the last 20 years.

All the residential properties in the community that flooded as a result of Storm Babet have also flooded previously from the River Erewash.

The Flood Map for Planning (<https://flood-map-for-planning.service.gov.uk/>) shows that all of the flooded properties within this community are in Flood Zone 2. Areas in Flood Zone 2 have between a 1% and 0.1% AEP of river flooding. Additionally, some homes have a high risk of surface water flooding, based on the Long Term Flood Risk Map (<https://check-long-term-flood-risk.service.gov.uk/postcode>). High risk is defined as greater than 3.3% AEP of flooding. Flood zones at Sandiacre are shown in Figure 7-11.

Some internally flooded properties located on Bridge Street, Canal Street, Grasmere Street, Regent Street and Cross Street have a medium or high risk of surface water flooding. Others, such as those on Bradley Street and Station Road are typically at low or very low risk of surface water flooding. This is based on the Long Term Flood Risk Map (<https://check-long-term-flood-risk.service.gov.uk/postcode>). Low risk is defined as between a 1% and 0.1% AEP of flooding. Some properties at the northern end of Wentworth Street, properties along Middleton Street, including Lower Street and those at the eastern end of Station Street have a high risk of surface water flooding. High risk is defined as greater than 3.3% AEP of flooding.

Figure 7-12 shows the surface water flood risk for the community based on the national mapping referred to above.



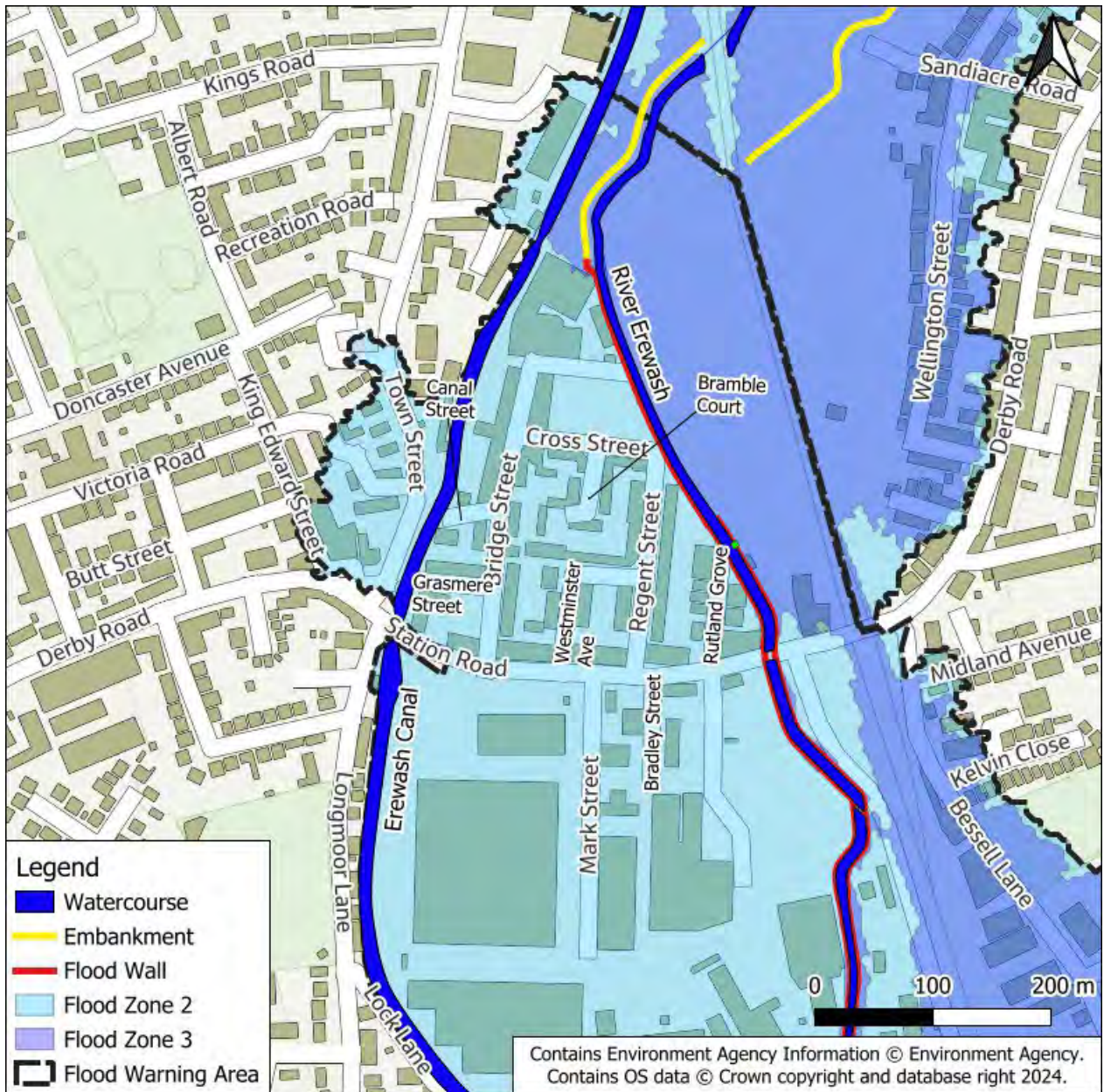


Figure 7-11: Current flood risk arrangements and flood zones at the community.



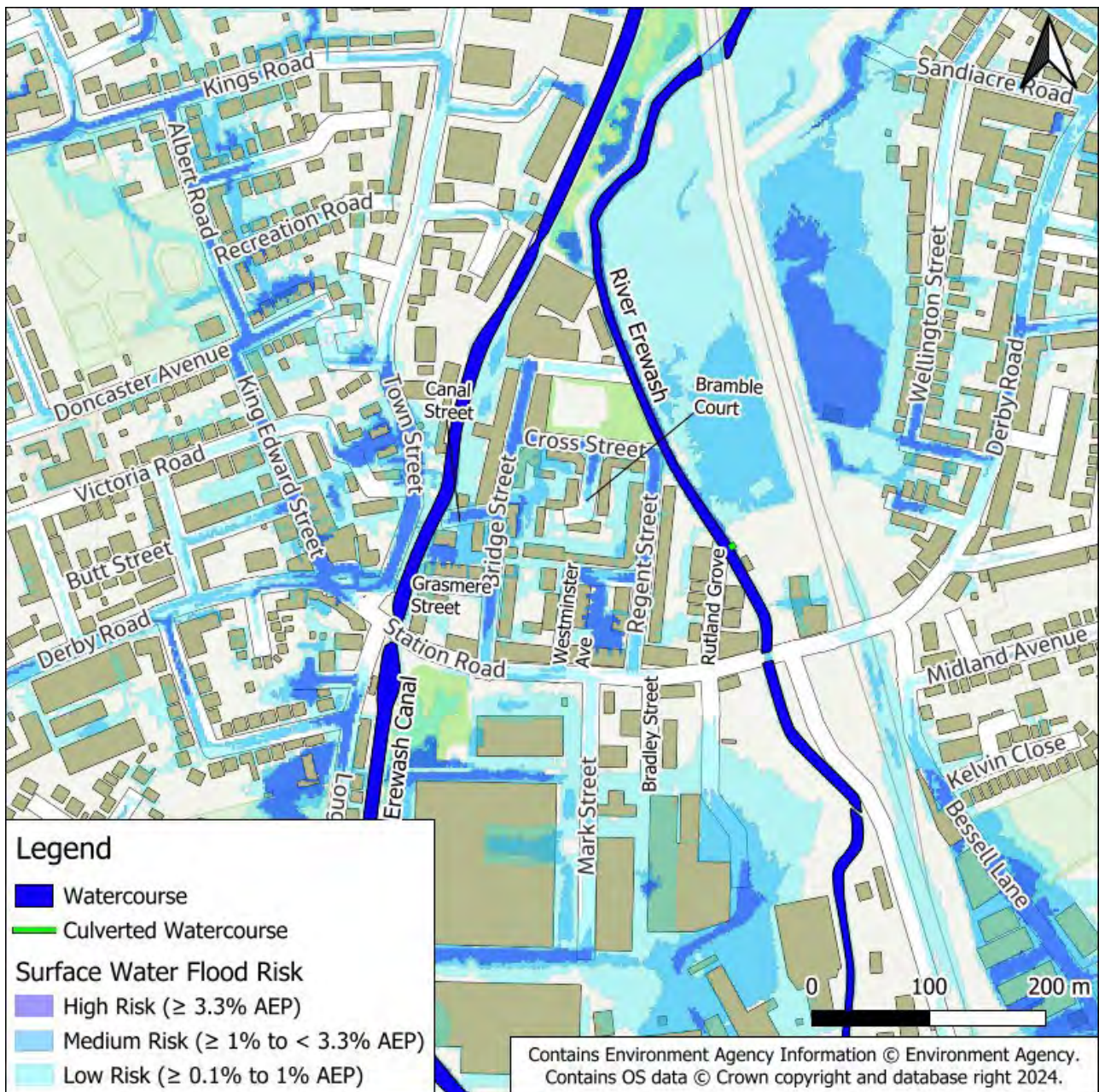


Figure 7-12: Map showing the chance in any given year of flooding from surface water at Sandiacre (Source: Long Term Flood Risk Map).

The community is not located within or near to any nationally designated environmental sites.

## 7.4.2 Current Flood Risk Management Arrangements

All the properties are in the 'River Erewash in Derbyshire and Nottinghamshire' Flood Alert Area and the 'River Erewash at Sandiacre' Flood Warning Area. On anticipation of a potential flood event, residents who are signed up to alerts and warnings are informed when flooding is likely to occur.

The Environment Agency's Asset Information and Maintenance Programme (<https://environment.data.gov.uk/asset-management/>) shows that there are three flood defence walls along the west bank of the River Erewash. The flood walls north of Station Road were constructed in the 1960s and the flood wall south of Station Road was constructed in 2012. These are all maintained by the Environment Agency. They provide a Standard of Protection up to a 1% AEP flood event. The east bank of the River Erewash also has flood defence walls that are maintained by the Environment Agency. Figure 7-11 shows the current flood risk arrangements for the community.

## 7.4.3 Storm Babet Incident Details

A Flood Alert was issued to the 'River Erewash in Derbyshire and Nottinghamshire' Flood Alert Area on the 19th of October 2023 at 1:13am. A Flood Warning was subsequently issued to the River Erewash at Sandiacre

Flood Warning area on the 21st of October 2023 at 11:12am. The Flood Warning was approximately 6 hours after the onset of property flooding. Residents reported that they had previously received many Flood Alerts which may have lessened the impact of them. Many residents were also not signed up to the Flood Warning service.

The 129 homes and businesses flooded across the community include properties on Station Road, Bradley Street, Rutland Grove, Westminster Avenue, Regent Street, Grasmere Street, Cross Street, Bridge Street, Draycott Road, Canal Street, Mark Street, and Bramble Court. Table 7-1 provides a breakdown of properties flooded on each street.

**Table 7-1: Internally flooded property counts.**

<b>Street</b>	<b>Homes</b>	<b>Businesses</b>
Station Road	8	18
Bradley Street	1	1
Rutland Grove	8	0
Westminster Avenue	17	1
Regent Street	19	1
Grasmere Street	8	1
Cross Street	6	0
Bridge Street	24	1
Draycott Road	6	0
Canal Street	1	0
Mark Street	0	2
Bramble Court	5	0
<b>Total</b>	<b>104</b>	<b>25</b>

#### **7.4.4 Flood Mechanisms, Extent and Impacts**

The primary source of flooding was from the River Erewash.

There is river flow data available for the Sandiacre gauge located just upstream of Station Road on the River Erewash. The Sandiacre gauge shows that flows began to rise on the 19th of October 2023 and reached a peak flow of 36.4 metres cubed per second on the 21st of October 2023; the second highest flow ever recorded at this gauge.

The River Erewash overtopped its banks and flowed into the Erewash Canal north of Gas Street, opposite Brookfield Mews. The defences north of Gas Street tie into the railway embankment. The Environment Agency acknowledge they do not know the porosity of this embankment and that this needs further investigation. It is also likely that a connection between the Erewash Canal and the River Erewash opened a flow path via the canal which led to flooding of properties. There were also other river-canal interactions upstream during this event at Langley Mill and other rural areas, making it possible that the canal was already elevated before the River Erewash overtopped at this location. These factors caused water levels in the canal to rise, creating a secondary flow path for the flood water, which flowed south across the community. The onset of flooding was reported to be very quick. The volume of water caused significant property damage, with several properties' floors being lifted by the force of water. Figure 7-13 below shows flooding from the canal, which was caused by the River Erewash overflowing into the canal. The photograph was taken from Station Road looking north along the canal.





**Figure 7-13: Flooding of the Erewash Canal: The River Erewash overtopped, and fluvial flood water entered the Erewash Canal which acted as a conduit for the flood flow.**

The flood defence wall on the west bank of the River Erewash, opposite Megavaux, overtopped, with the wrack marks 0.3m above the crest level of the defence wall. Overflowing at this location led to flood water flowing westward across the community and to the south, across Station Road. This led to flooding of the industrial park, south of Station Road. The east bank defence wall also overtopped in this location, leading to flood water flowing in a southward direction across Station Road, towards the business park and railyard. Figure 7-14 below shows flooding to the south of Station Road and the railyard to the left of the image. The railway line became a flow path for flood water and was closed due to flooding.



**Figure 7-14: An aerial photograph looking south flooding to the industrial estate and railyard south of Station Road caused by the River Erewash overflowing.**

## **7.4.5 Actions by Public Bodies**

This section outlines the actions undertaken by public bodies immediately and in the aftermath of the flood event which are specific to this community. Please refer to section 8.1 of this report for a summary of actions that were implemented at all communities.

Public bodies that have been involved in the flood-event response at this community include:

- Derbyshire County Council
- Breaston Parish Council
- Erewash Borough Council
- Environment Agency

The Environment Agency issued a Flood Alert to the River Erewash in Derbyshire and Nottinghamshire on the 19th of October 2023 at 1:13am. A Flood Warning was subsequently issued to the River Erewash at Sandiacre on the 21st of October 2023 at 11:12am.

Derbyshire County Council, the Environment Agency and Severn Trent Water held a drop in event for residents and business affected by flooding in the Lower Erewash in Sawley on the 16th of February 2024.

The Environment Agency, Derbyshire County Council and Severn Trent Water have also undertaken numerous site visits and local engagement activities after the flood event.

## **7.5 Community Impacts – Long Eaton**

### **7.5.1 Location Characteristics**

102 residential properties in the town of Long Eaton suffered internal flooding as a result of Storm Babet. Figure 7-15 below shows the community that that was flooded. The area flooded is adjacent to the River Erewash, a main river which flows southwards through the community and is a tributary of the River Trent. Golden Brook is an ordinary watercourse located approximately 700m south of the community, which flows in a north-easterly direction. The confluence between the Golden Brook and the River Erewash is located approximately 1.1km downstream of the community.



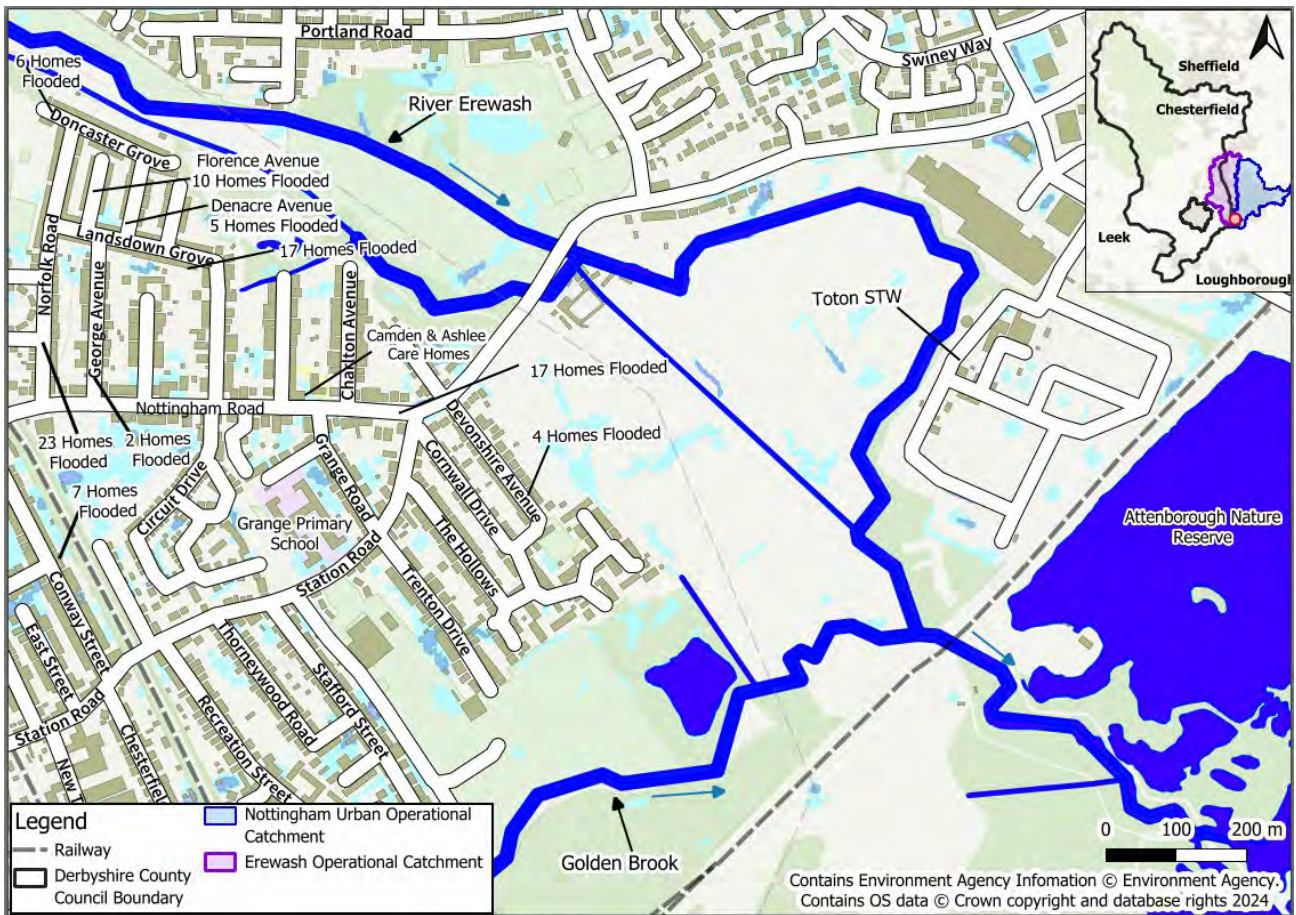


Figure 7-15: Overview map of the Long Eaton community.

The community is comprised of a mixture of terraced, detached, semi-detached and bungalow type residential properties, as well as some local businesses.

Critical infrastructure within this area includes the Main Midland Railway and the A6005 Nottingham Road. There are no known vulnerable groups within the community that have reported internal flooding, however there are two residential care homes and a school.

The community is located on the floodplain of the River Erewash. The local topography is relatively flat and low-lying compared to the opposite side of the River Erewash, where Stapleford is situated. The Long Eaton community sits at a similar elevation to that of the River Erewash, with a gradual sloping of the land towards the river. The local geology consists of a mixture of clay, silt, sand, and gravel superficial alluvium deposits.

The Environment Agency Historic Flood Map indicates that properties within the community flooded previously between 1932 and 1978.

The Flood Map for Planning (<https://flood-map-for-planning.service.gov.uk/>) shows that 97 of the 100 properties that flooded within this community are in Flood Zone 2, as shown in Figure 7-16 below. Areas in Flood Zone 2 have between a 1% and 0.1% AEP of river flooding. Thirteen properties within the community are located within Flood Zone 3, which means that they have a greater than 1% AEP of flooding from rivers.



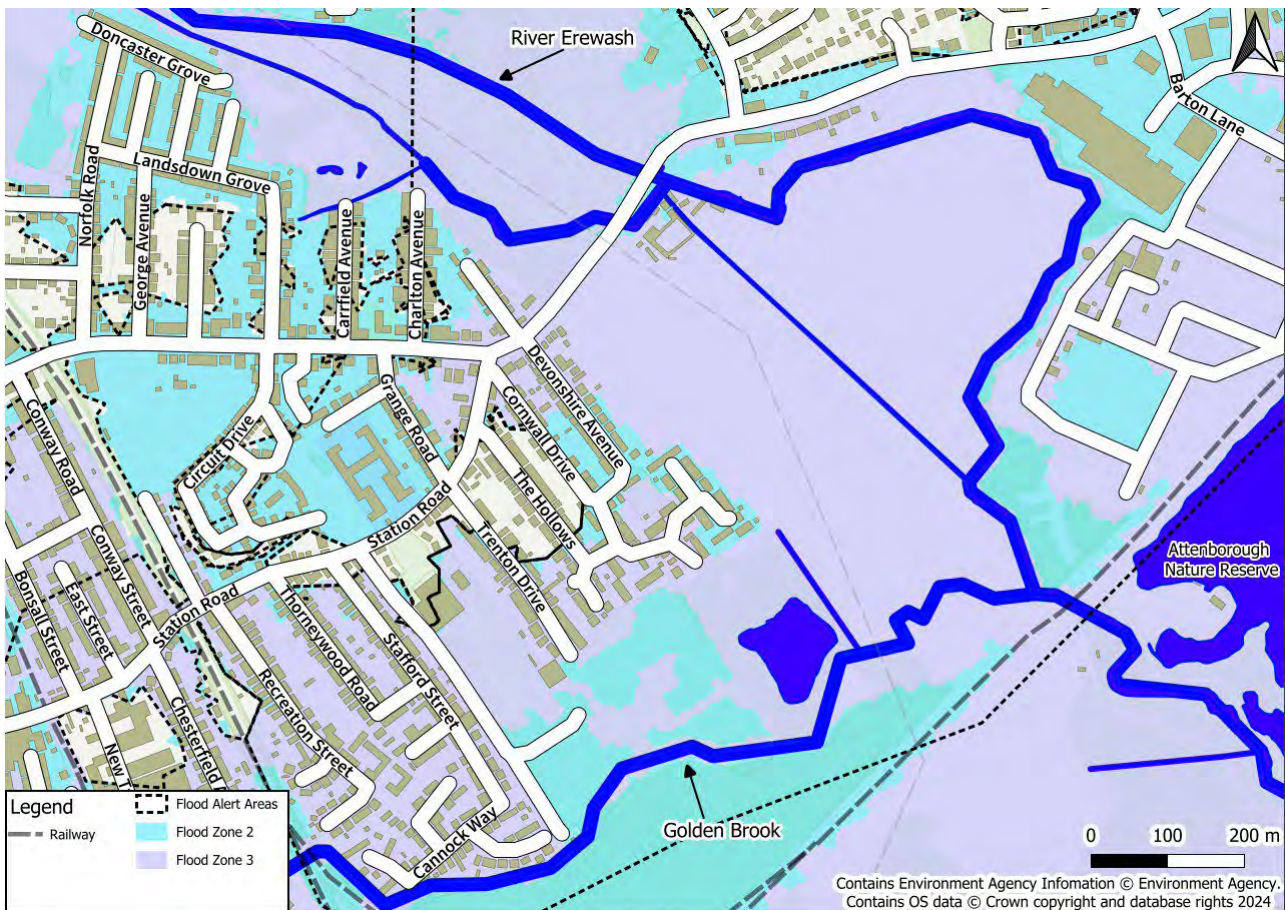


Figure 7-16: Flood Zones and Flood Alert area for the Long Eaton community.

Generally the risk of surface water flooding is low in the community based on the Long Term Flood Risk Map (<https://check-long-term-flood-risk.service.gov.uk/postcode>).

The Long Eaton community is not located within any nationally designated environmental sites. However, the Trent Meadows nature reserve is located to the south of the community. There is also the Attenborough Nature Reserve, which is located downstream of the community, along the eastern bank of the Erewash, see Figure 7-15. This nature reserve is identified as a Site of Special Scientific Interest.

## 7.5.2 Current Flood Risk Management Arrangements

The majority of properties within Long Eaton community are located within the 'River Erewash in Derbyshire and Nottinghamshire' Flood Alert Area and the 'River Trent and Erewash at Chilwell and Attenborough' Flood Warning Area. On anticipation of a potential flood event, residents who are signed up to alerts and warnings are informed when flooding is likely to occur.

The Environment Agency's Asset Information and Maintenance Programme (<https://environment.data.gov.uk/asset-management/>) shows the following flood risk management assets in the area.

There is a flood defence embankment called the Toton Flood Bank. This is 341m long and was built in 1981. There is a 15m length of flood wall at its upstream end. These assets provide benefit to Charlton Avenue, Harlaxton Drive and other roads west of them.

There is also a 560m long flood relief channel in place, running parallel to the River Erewash. This is used during times of high flows to convey more floodwater away and reduce flood levels immediately upstream. There is a weir at the upstream end of this channel, controlling when river flows are diverted into it. This flood relief channel will have benefitted the community affected in Storm Babet. These assets are maintained by the Environment Agency.

There are various other flood defence assets in the area, but they are not directly relevant to the community affected in Storm Babet.



### 7.5.3 Storm Babet Incident Details

A Flood Alert was issued to the 'River Erewash in Derbyshire and Nottinghamshire' Flood Alert Area on the 19th of October 2023 at 1:13am. This was followed by a Flood Warning being issued to the 'River Trent and Erewash at Chilwell and Attenborough' Flood Warning Area on the 21st of October at 11:12am.

The 102 homes which flooded internally included properties on several streets within the community. These streets are identified in Table 7-2. No businesses have been recorded as experiencing internal flooding as a result of Storm Babet in this community.

Table 7-2: Internally flooded properties within the Long Eaton community.

Street	Number of homes
Recreation Street	1
Devonshire Avenue	4
Harlaxton Drive	1
Carrfield Avenue	2
George Avenue	2
Norfolk Road	23
Doncaster Grove	6
Florence Avenue	10
Landsdown Grove	17
Denacre Avenue	5
Conway Street	7
Nottingham Road	17
Mayfield Grove	4
Margaret Avenue	3
<b>Total</b>	<b>102</b>

### 7.5.4 Flood Mechanisms, Extent and Impacts

The primary source of flooding affecting all properties within this community was from the River Erewash. Hydrology data shows that on the 21st of October 2023, the peak mean flow recorded at the Sandiacre gauge, approximately 2.5km upstream of Long Eaton community, reached 26.4 m<sup>3</sup>/s; the second highest ever recorded.

The flood mechanisms within this community, at the time of writing this report, are unknown. Derbyshire County Council identified water depths of 0.45m to 0.60m along Nottingham Road, under the railway bridge, near to the Long Eaton Kwik Fit. A resident along Margaret Avenue identified the road to be completely flooded causing internal flooding to the whole ground floor of their property. Residents along Denacre Avenue and George Avenue reported the floodwater to be rising through the floors. Properties along Nottingham Road saw gardens and the ground floor of properties flooded.

Figure 7-17 shows the flow routes from the River Erewash overflowing and initially joining Doncaster Road.



Figure 7-17: Flood Zones, assets and flow routes from the River Erewash entering the community via Doncaster Grove

## 7.5.5 Actions by Public Bodies

This section outlines the actions undertaken by public bodies immediately and in the aftermath of the flood event which are specific to this community. Please refer to section 8.1 of this report for a summary of actions that were implemented at all communities.

Public bodies that have been involved in the flood-event response at this community include:

- Derbyshire County Council
- Breaston Parish Council
- Erewash Borough Council
- Environment Agency

The Environment Agency issued a Flood Alert to the River Erewash in Derbyshire and Nottinghamshire Flood on the 19th of October 2023 at 1:13am. This was followed by a Flood Warning being issued to the River Trent and Erewash at Chilwell and Attenborough on the 21st of October at 11:12am.

The Environment Agency held a drop in event on the 16th of February 2024 at Sawley to discuss the flood event and any actions taken. This was also attended by Derbyshire County Council.

The Environment Agency, Derbyshire County Council and Severn Trent Water have undertaken numerous site visits and local engagement following the flood events.

## 7.6 Community Impacts – Langley Mill

### 7.6.1 Location Characteristics

Forty-eight homes and thirty-six non-residential properties suffered internal flooding during Storm Babet in Langley Mill. Langley Mill is located 30km north-east of Derby in the Amber Valley district of Derbyshire. The area flooded is adjacent to the River Erewash and the Erewash Canal. The River Erewash is a main river and both watercourses flow southwards. A tributary of the River Erewash, Nether Green Brook, is located to the



east of Langey. The brook flows via culvert beneath both the A610 and the canal and enters the River Erewash to the east of Dean Street. Nether Green Brook is an ordinary watercourse. Figure 7-18 shows an overview map of the area.

The residential properties impacted within this community are terraced homes. The non-residential properties are comprised of numerous business types, such as restaurants, takeaways, shops, a depot yard, and self-storage facilities. There are no known vulnerable groups within the community that have reported internal flooding.

Critical infrastructure within this area includes the Midlands Railway Line, the A608 Derby Road and the A610, which connects the community to Nottingham. There is also a Severn Trent Water pumping station, and a sewage treatment works (STW), also known as Millhay Heanor STW. The pumping station is located approximately 400m downstream, whilst the STW is located approximately 900m downstream of the flooded community.

The community is located on the floodplain of the River Erewash. The local topography of the community is flat and sits at a similar elevation to that of the Erewash and the Canal, with a gradual sloping of the land towards the river.

The local geology consists of a Penning Middle Coal Measures Formation bedrock, which is mudstone, siltstone and sandstone, and superficial deposits of alluvium, such as clay, silt, sand and gravel.

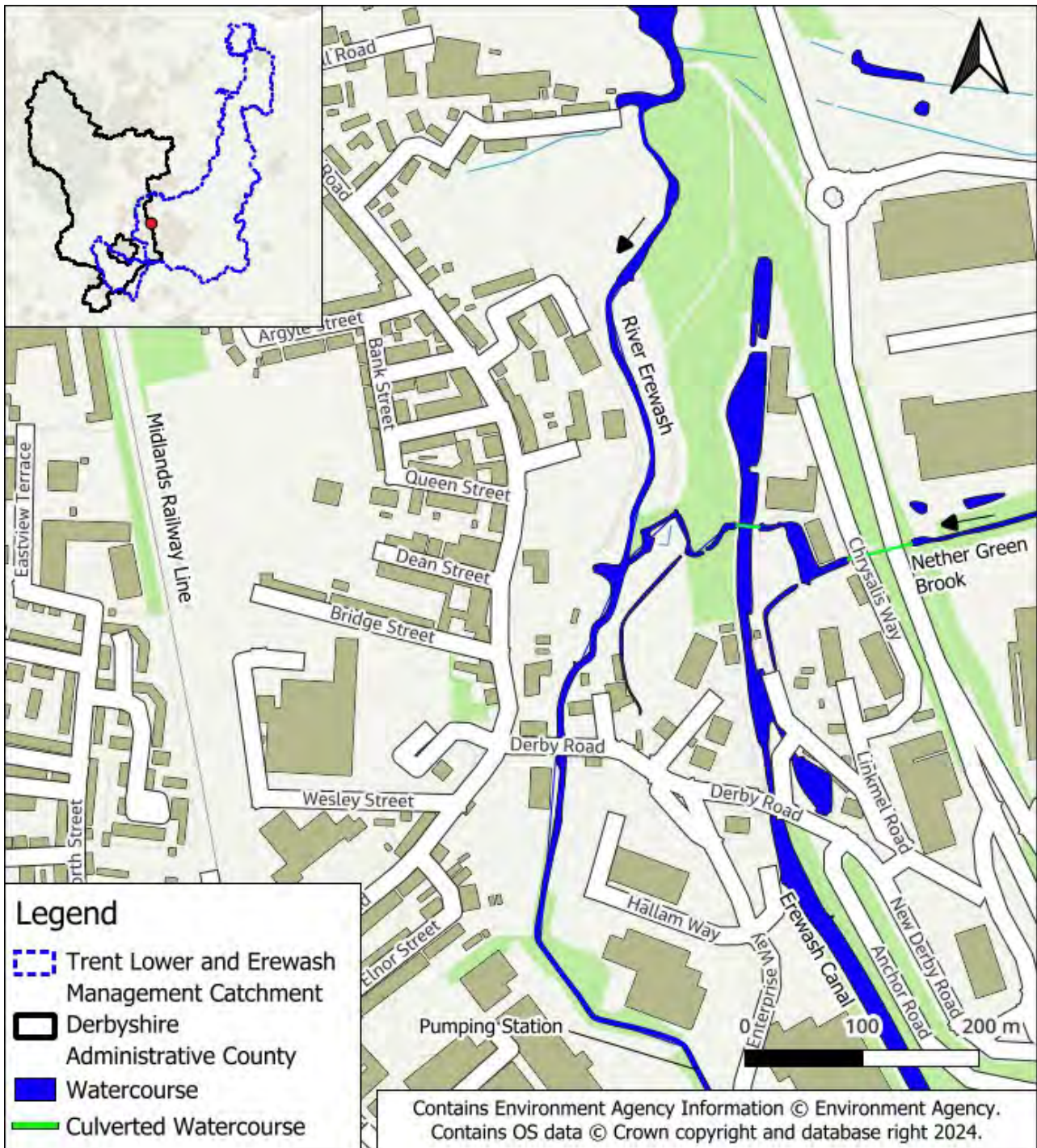


Figure 7-18: Overview map of the Langley Mill community.

The Environment Agency Historic Flood Map indicates that only fifteen properties within the community have flooded previously, three residential and twelve non-residential. The properties that have flooded previously are located on Cromford Road, Derby Road, Boundary Lane, Station Road, Dean Street, and Enterprise Way.

The Flood Map for Planning (<https://flood-map-for-planning.service.gov.uk/>) shows that twenty-one residential and twenty-nine non-residential properties that flooded internally during Storm Babet are located within Flood Zone 2. The remaining properties are located in Flood Zone 3. Flood Zone 3 means the properties have a greater than 1% AEP of flooding from rivers. Flood Zone 2 means the properties have a lower probability of flooding from rivers of between a 1% and 0.1% AEP. Figure 7-19 below demonstrates the Flood Zones.



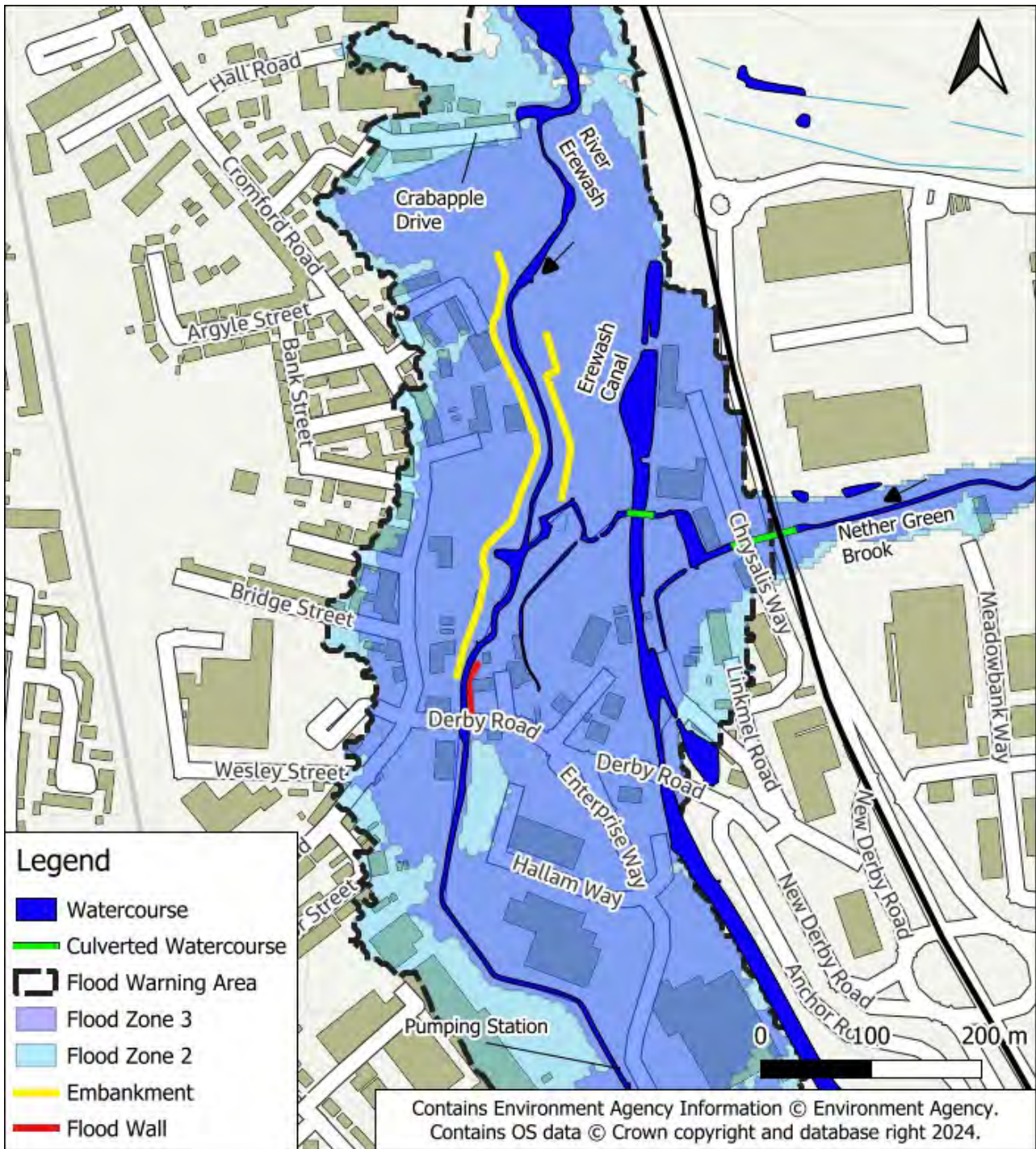


Figure 7-19: Local Flood Risk Management Assets and Flood Zones for the Langley Mill community.

Additionally, based on the Long Term Flood Risk Map (<https://check-long-term-flood-risk.service.gov.uk/postcode>), all the residential properties have at least a low risk of surface water flooding (between a 1% and 0.1% AEP), with many properties at station Road, Dean Street, Cromford Road and Enterprise Road having a high risk of surface water flooding (more than 3.3% AEP). Figure 7-20 shows the risk of flooding from surface water at Langley Mill.



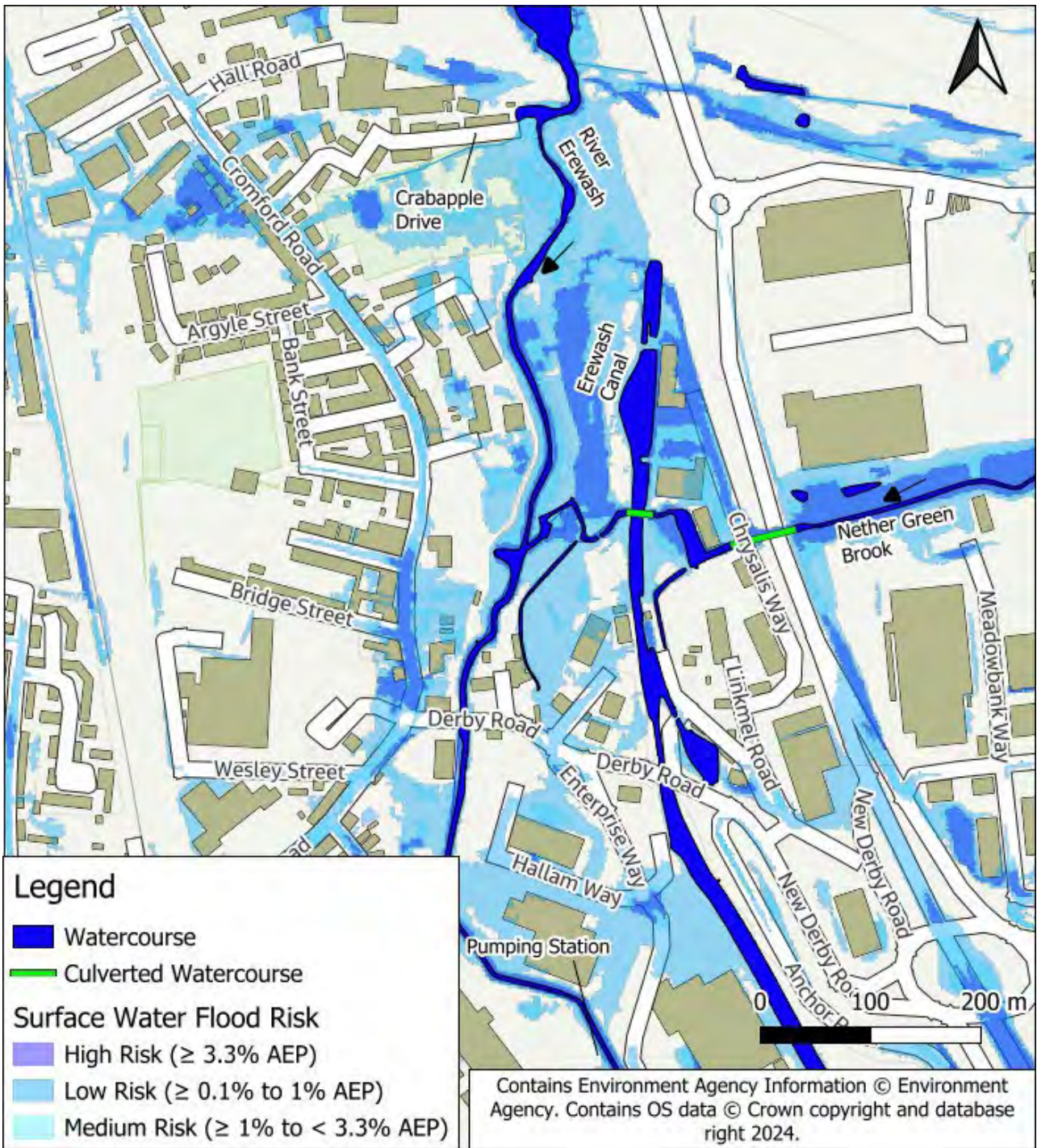


Figure 7-20: Map showing the chance in any given year of flooding from surface water at Langley Mill (Source: Long Term Flood Risk Map).

The community is not located within or near any nationally important designated environmental sites.

### 7.6.2 Current Flood Risk Management Arrangements

All properties within the community, except those identified in Table 7-3, are located within the local Flood Alert and Flood Warning areas. The local Flood Alert Area is the 'River Erewash in Derbyshire and Nottinghamshire' Alert Area. The local Flood Warning Area is the 'River Erewash at Langley Mill' Warning Area. Therefore, on anticipation of a potential flood event, residents who are signed up to receive this alert are warned of the possibility of flooding. These residents are subsequently issued a warning as part of the flood warning service, indicating that flooding is expected to occur.

Table 7-3: Location and number of properties which are not within the local Flood Alert and Warning Areas.

	Number of properties
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Street	Not within the local Flood Alert Area		Not within the local Flood Warning Area	
	Homes	Non-residential	Homes	Non-residential
Cromford Road	1	3	1	3
Dean Street	4	2	4	2
Queen Street	1	0	1	0
Station Road	1	1	1	1
<b>Total</b>	<b>7</b>	<b>6</b>	<b>7</b>	<b>6</b>

The Environment Agency's Asset Information and Maintenance Programme (<https://environment.data.gov.uk/asset-management/>) shows current flood risk management arrangements within the area. There is a 410m long flood defence embankment on the west bank of the River Erewash located reducing flood risk to Cromford Road, plus Bridge Street and Dean Street. There is another embankment, 160m long, on the east bank of the River Erewash and this embankment may extend further to the north east based on information in the Flood Zone map. Both embankments were designed to provide a 1% AEP standard of protection.

There is also a flood defence wall 50m in length. It is located along the east bank of the River Erewash, immediately upstream of the Derby Road bridge. It also provides a 1% AEP standard of protection.

The Environment Agency maintain the floodwall and embankments.

### 7.6.3 Storm Babet Incident Details

A Flood Alert was issued to the River Erewash in Derbyshire and Nottinghamshire Alert Area on the 19th of October 2023 at 1:13am. A Flood Warning was issued to the River Erewash at Langley Mill Warning Area on the 20th of October 2023 at 6:44am. Internal flooding of homes is understood to have taken place on the 20th of October 2023, starting at approximately 2:00pm.

Table 7-4 shows the streets and property numbers which flooded during Storm Babet.

Table 7-4: Internally flooded properties within the Langley Mill community.

Street	Homes	Non-residential
Cromford Road	16	21
Queen Street	1	0
Dean Street	4	4
Boundary Lane	0	1
Station Road	6	6
Derby Road	1	1
Enterprise Way	0	2
<b>Total</b>	<b>28</b>	<b>35</b>

### 7.6.4 Flood Mechanisms, Extent and Impacts

The primary source of flooding was from the River Erewash, with the Erewash Canal acting as a conduit for the transfer of flood water. In some locations, Nether Green Brook contributed to the flooding. As shown in Figure 7-21, the community can be separated into three areas where the flood mechanisms originate from:

- the River Erewash
- the Erewash Canal and Nether Green Brook
- a combination of the River Erewash, the Erewash Canal and the Nether Green Brook, the floodwaters from which were mixed.

Overflowing of the Erewash Canal was entirely due to the River Erewash and Nether Green Brook over flowing into the canal; if this interaction had not occurred the canal would not have overtopped.

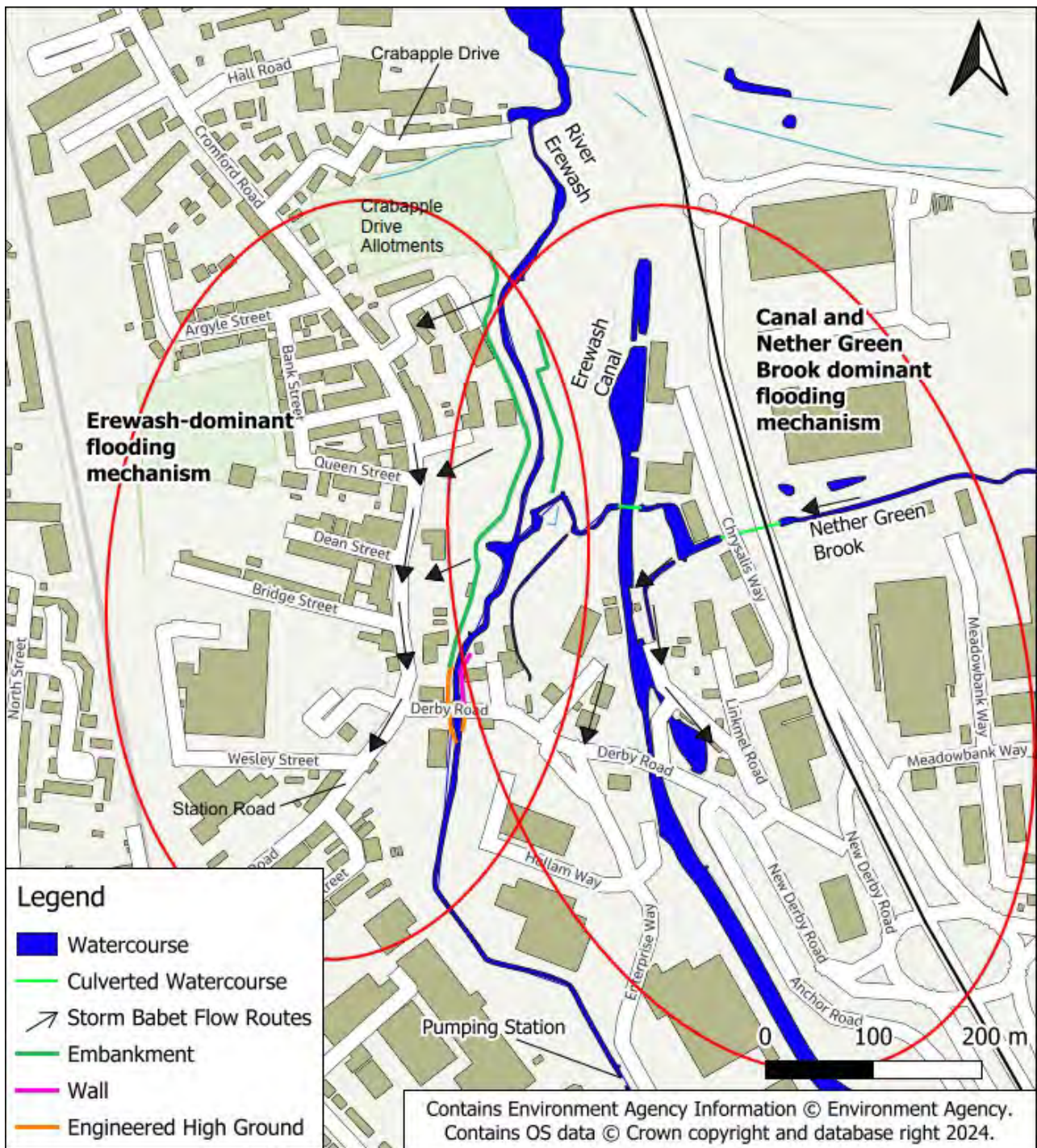


Figure 7-21: Flood mechanisms and flow directions at Langley Mill.

Many properties on the west bank of the River Erewash were flooded. The 90 degree bend in the River Erewash, south of the Crabapple Drive allotments, has been identified as the first point where the river overtopped its west embankment. Floodwaters are thought to have flowed across the Frametrade UK Ltd yard and onto Cromford Road. However, at the time of writing this report, records are uncertain whether flood waters crossing the depot yard flowed from the Frametrade UK Ltd yard, or whether they originated from an overtopped bank further downstream of the 90 degree bend previously identified.

Once floodwater reached Cromford Road, the topography meant the water flowed southwards down Cromford Road. This caused internal flooding of properties on adjacent streets, including Queen Street, Dean Street, and Derby Road. It was reported that the surcharging of surface water from drains occurred before the River Erewash overflowed its banks. Severn Trent did not receive any reports of drain issues but are investigating further. Floodwater also overtopped the River Erewash's bank behind D&D Transport car park. The water flowed across the D&D Transport car park and onto Cromford Road.

Once the floodwater reached the roundabout, where the A608 (Derby Road) and Cromford Road meet, the water flowed south-west, impacting the properties along Station Road. Residents described 'two pulses of



water' on the 20th of October 2023 at around 11:00am at the roundabout on Cromford Road and Derby Road. Although post incident inspections have been unable to determine the exact cause, there were also reports that a large culvert at Ironville, which is approximately 4km upstream on the River Erewash, became unblocked and appeared to 'draining quickly, like someone had pulled the plug' at a similar time.

Another location where the River Erewash overtopped was at the Derby Road bridge. Water levels were high enough for the Erewash to overtop the bridge and cause flooding to Derby Road.

Floodwater depths of approximately 1m were reported in multiple locations. Commercial properties also identified that flooding was caused by the bow waves from passing vehicles. These flood waters entered properties through doors, drains backing up, toilets and/or through the brickwork. Internal flooding of homes along Cromford Road and Station Road reached the height of skirting boards. Frametrade UK Ltd identified internal flooding of their property reached radiator heights, approximately 0.9m. External flooding along Cromford Road was reported to have ranged from ankle depth up to 'waist height'. Station Road had external flooding which reached 'ankle depth' whilst Derby Road reached flood waters which were 'knee deep'. There were reports of floodwater damage to an electrical cable underground on the corner of Cromford Road at the roundabout with Derby Road. The effects of which were reported to have 'blew a hole in the pavement'.

There are five culverts along Nether Green Brook, local to Langley Mill, allowing it to flow beneath critical infrastructure including the A610 and the Erewash Canal. The restricted capacities of these culverts are thought to have caused surcharging and overtopping of banks in several locations. Once water from Nether Green Brook entered the Erewash Canal, the Canal acted as a conduit for the flood water, resulting in flooding across the Langley Mill Boatyard. Floodwater was also transferred southwards along the canal and overtopped lock gates. Where floodwater overflowed from the west banks of the canal, the local topography encouraged the flow overland towards the River Erewash which contributed to the flooding described above from the River Erewash. It is important to clarify that the canal was not considered a cause of flooding, it simply acted as a conduit for the flood water.

A wrack mark is a line of debris left following a flood event. They are often indicators of how high the floodwaters reached. Wrack mark levels identified on local infrastructure, as shown in Figure 7-22, identified water depths reached 59.9mAOD along both banks of the River Erewash. These water depths can be compared to bank heights of approximately 55mAOD and 58mAOD on the west and east bank respectively.

Figure 7-22 is presented below showing a wrack level on the upstream face of the Derby Road bridge crossing the River Erewash.



Figure 7-22: Wrack mark on the upstream face of Derby Road bridge. Source from the Environment Agency.

The River Erewash at Shipley Gate gauging station is located approximately 2km downstream of the Langley Mill community, near Shipley lock. The gauging station identified the maximum water level reached was 3.25m on the 20th of October 2023 at 7:30pm. This is the highest ever recorded at this site. The second highest water level at this gauging station was a height of 3.05m and was recorded on the 16th of February 2020 at 10:30am. Local water levels on the Erewash, during Storm Babet, are likely to have been the highest experienced since the gauge record began.

### 7.6.5 Actions by Public Bodies

This section outlines the actions undertaken by public bodies immediately and in the aftermath of the flood event which are specific to this community. Please refer to section 8.1 of this report for a summary of actions that were implemented at all communities.

Public bodies that have been involved in the flood-event response at this community include:

- Derbyshire County Council
- Aldercar and Langley Mill Parish Council
- Amber Valley Borough Council
- Environment Agency
- Severn Trent

The Environment Agency issued a Flood Alert to the River Erewash in Derbyshire and Nottinghamshire on the 19th of October 2023 at 1:13am. A Flood Warning was issued to the River Erewash at Langley Mill Warning Area on the 20th of October 2023 at 6:44am.



Following Storm Babet, the Environment Agency inspected the flood defences. A total of eleven sections of these assets were identified as having overtopped during Storm Babet. Inspections determined that following storm damage, two assets were below required condition and two were in poor condition. The remaining assets were considered to meet the required standard.

The Environment Agency conducted a site walk over with Derbyshire County Council on the 7th of November 2023 during which they liaised with residents to better understand the flood mechanisms and flow routes.

The Environment Agency is encouraging more members of the community to sign up to flood warning services.

The Environment Agency hosted a public drop for Langley Mill and Ilkeston residents and businesses on the 25th of January 2024 at Ilkeston Town Football club. Derbyshire County Council and Severn Trent Water were in attendance.

During this investigation, Severn Trent were made aware of drainage issues at Deans Street and so are investigating this issue further.

Amber Valley Borough Council offered additional waste collections for the residents affected.

## 7.7 Community Impacts – Ironville

### 7.7.1 Location Characteristics

Twenty-two residential properties suffered internal flooding in the village of Ironville during Storm Babet. The properties flooded were in the Adelaide Walk area which is located west of the River Erewash and north of the Cromford Canal. Figure 7-23 provides an overview of the community.

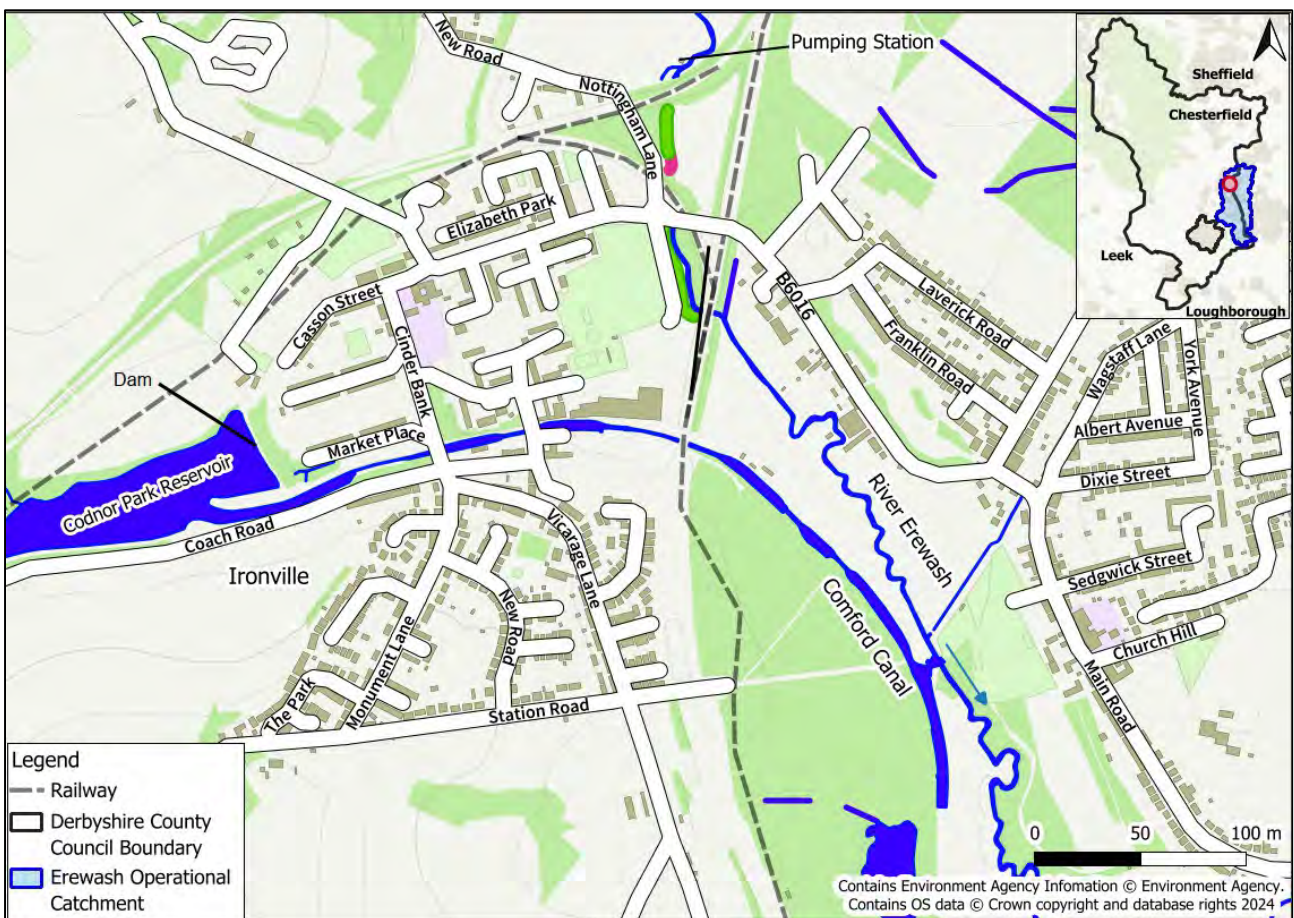


Figure 7-23: Overview map of the Ironville community.

The residential properties within this community are terraced and semi-detached homes. There are no known vulnerable groups within the community that have reported internal flooding. Critical infrastructure within this area includes the Erewash Valley Railway Line and the B6016 Victoria Street.

The community is located on the floodplain of the River Erewash which flows southwards. The local topography of the flooded community is flat, sitting at approximately 74mAOD. The community sits at a similar elevation to that of the banks of the Erewash, with a very gradual slope of land towards the river. The Cromford Canal flows from west to east past the flooded community, travelling to the south, parallel to the River Erewash. The Codnor Park Reservoir is situated at the head of Cromford Canal, and a dam is located at its eastern end.

The local geology consists of bedrock and superficial deposits. The bedrock is a Pennine Lower Coal Measures Formation consisting of mudstone, siltstone and sandstone, whilst the superficial deposits are alluvium, comprised of clay, silt, sand and gravel.

The Environment Agency Historic Flood Map indicates that Adelaide Walk and Regent Court, which flooded during Storm Babet, also flooded on the 26th of February. However, it cannot be confirmed which properties were flooded.

The Flood Map for Planning (<https://flood-map-for-planning.service.gov.uk/>) shows that all twenty-two homes, are located within Flood Zone 3. Flood Zone 3 means the properties have a greater than 1% Annual Exceedance Probability (AEP) of flooding from rivers. Figure 7-24 shows the Flood Zones in the Ironville community.

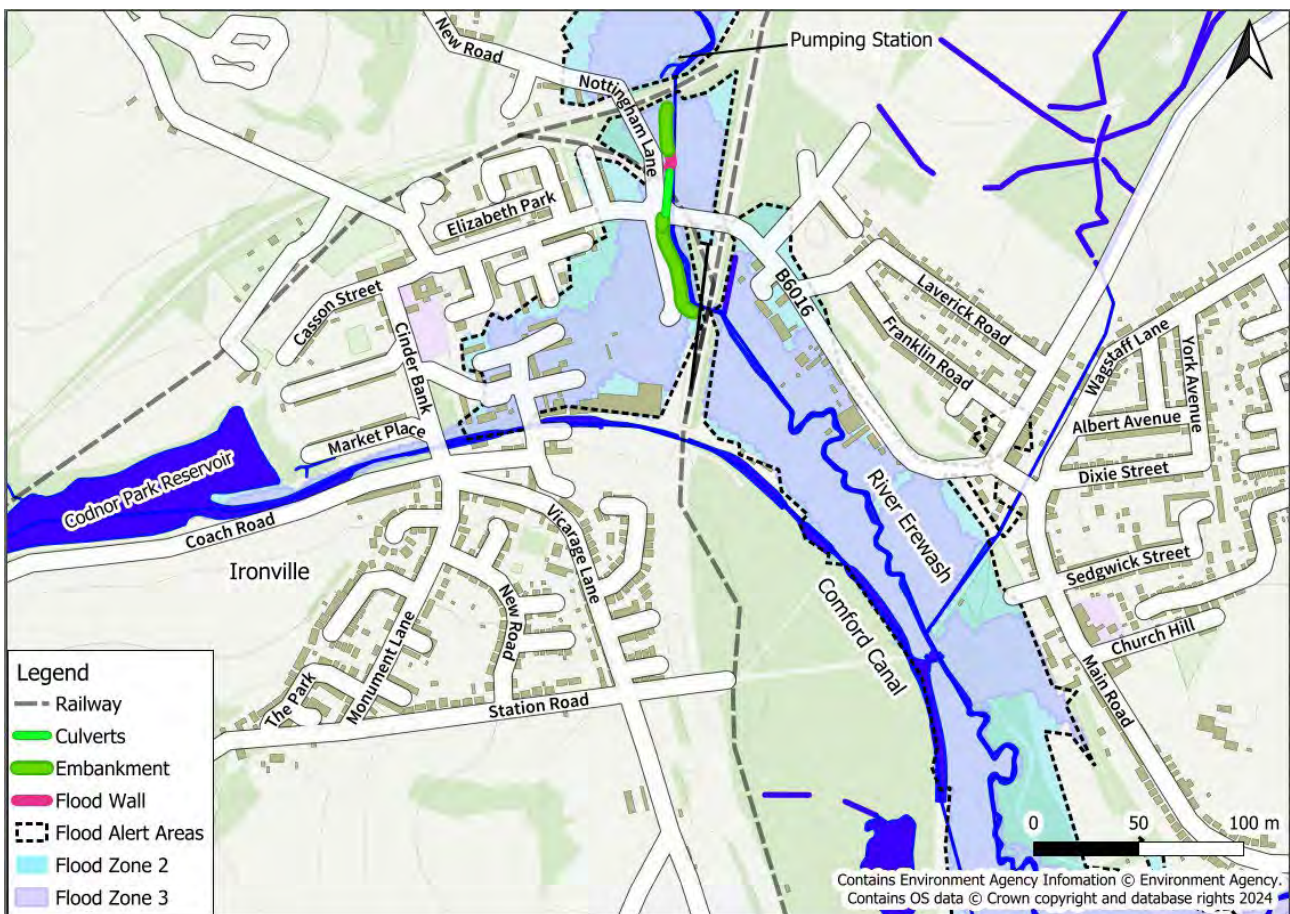


Figure 7-24: Local Flood Risk Management Assets, Flood Zones and flow directions for the Ironville community.

Based on the Long Term Flood Risk Map (<https://check-long-term-flood-risk.service.gov.uk/postcode>) there is only limited surface water flood risk in the community, mainly focussed at Regent Court and the north end of Cinder Bank. Figure 7-25 shows the surface water flood risk for the Ironville community.



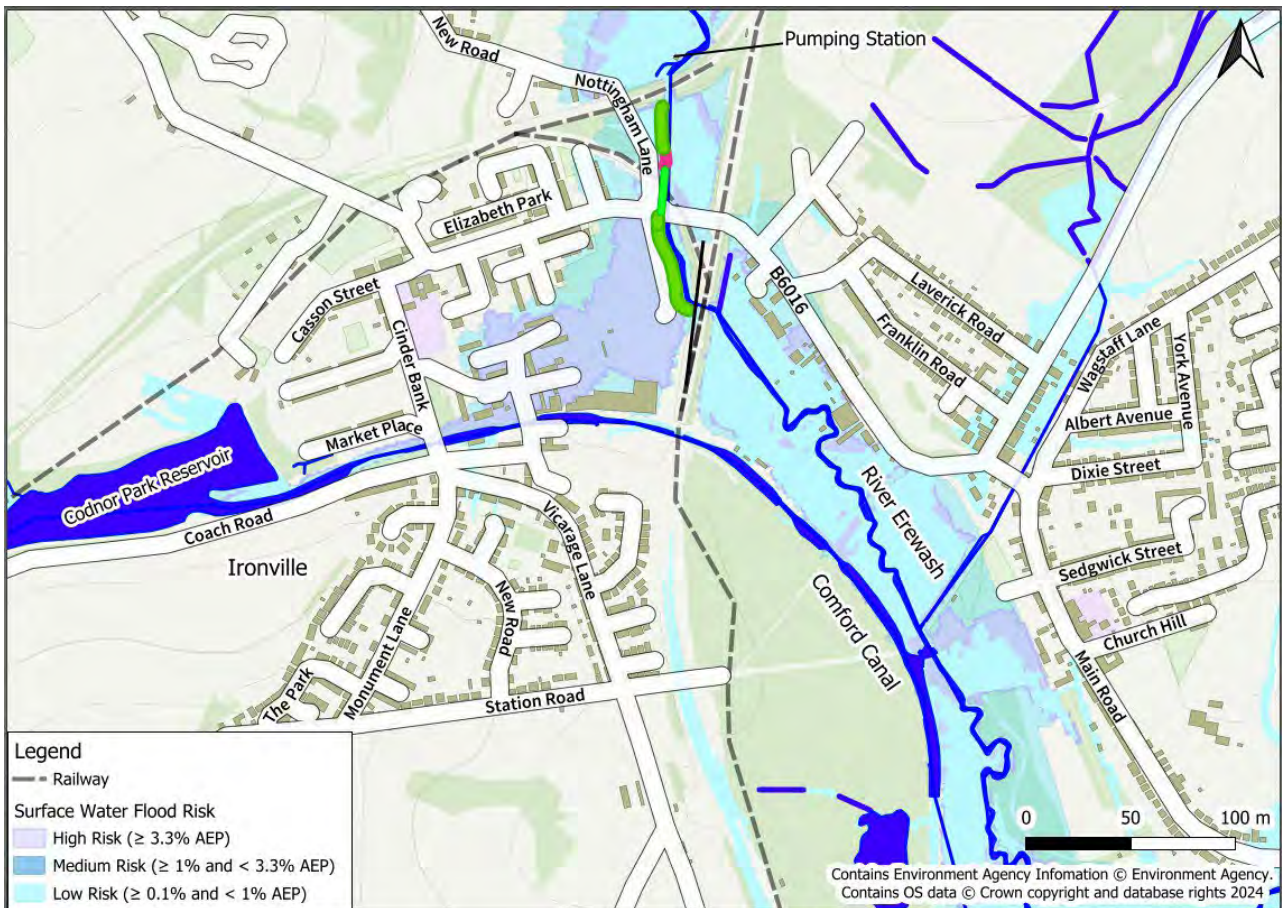


Figure 7-25: Map showing the chance in any given year of flooding from surface water at Ironville (Source: Long Term Flood Risk Map).

The community is not located within or near any nationally important designated environmental sites.

### 7.7.2 Current Flood Risk Management Arrangements

All properties within the community are located within the River Erewash in Derbyshire and Nottinghamshire Alert Area and the River Erewash at Ironville Warning Area. Therefore, on anticipation of a potential flood event, residents who are signed up to receive the services are warned of the possibility of flooding.

The Environment Agency's Asset Information and Maintenance Programme (<https://environment.data.gov.uk/asset-management/>) shows there are formal flood defence assets within the community. These defences reduce the flood risk to the Ironville community from the River Erewash, upstream and downstream of Victoria Street, the B6016. The Environment Agency maintain these assets. Figure 7-24 shows the current flood risk management arrangements within the area.

Embankments are the primary flood defence with a total length of 220m. A floodwall, 29m in length, is also located upstream of the community, north of Victoria Street (B6016). The Environment Agency have inspected all assets post flood event and assessed they all meet the required condition standard.

### 7.7.3 Storm Babet Incident Details

A Flood Alert was issued to the River Erewash in Derbyshire and Nottinghamshire Alert Area on the 19th of October 2023 at 1:13am. A Flood Warning was issued to the River Erewash at Ironville on the 20th of October at 11:45am.

A total of twenty-two residential properties were flooded internally during Storm Babet. These properties were located on Adelaide Walk, Regent Court and Deepdale.

The Independent newspaper published on the 21st of October 2023 stated that eighteen homes within the Ironville community had to be evacuated.

## 7.7.4 Flood Mechanisms, Extent and Impacts

The primary source of flooding affecting all properties was from the River Erewash. Reports suggested water overflowed the west bank of the Erewash, upstream of the Midland Railway Line. This water flowed over nearby fields and then onto Nottingham Lane, south of the properties. Flood waters then flowed southwards along Nottingham Lane via the underpass beneath the railway. At this location a resident reported floodwaters to be 'higher than a car bonnet'. Elevation information shows the land along Nottingham Lane falls away to the south and towards the centre of Ironville. Flood water flowed from Nottingham Lane, across the recreational playing fields, and impacted the houses in Regent Court and Deepdale. Floodwaters from Nottingham Lane also flowed along Victoria Street and the B6016, causing flooding along the main road between Ironville and Jacksdale, to the south-east of the community.

The Environment Agency have suggested that possible mechanisms of flooding could include exceedance of channel capacity or a potential blockage at a structure along the River Erewash. Residents reported that the water observed coming out of the bank of the Erewash was 'draining quickly, like someone had pulled the plug'. The Environment Agency have since identified a three-barrel culvert under the railway which potentially had a blockage. Reports suggested this culvert has a history of large debris build-up. A blockage at the railway culvert could have caused water to back up and come out of the Erewash channel upstream of the Midland Railway Line. The Environment Agency suggest that the culvert could have cleared itself due to the upstream water pressure.

The Environment Agency believe that the formal flood defences identified in Section 7.7.2 were not overtopped and did not fail. Instead, they were outflanked by the flow path described above.

A property along Regent Court identified the depth of internal floodwaters reached 0.9m.

The Environment Agency conducted a site walk over of the community on the 16th of November 2023. The findings from this visit suggested that properties within the Adelaide Park area experienced flood waters of up to 0.5m deep.

The Severn Trent pumping station is located along the right bank of the River Erewash, between the river and Nottingham Lane, upstream of the railway underpass. Investigations following the event indicate that the pumping station continued to pump and did not fail during Storm Babet. However, it became overwhelmed by the River Erewash because the station had nowhere to pump to.

A business depot, located south of the community and the local recreational fields, had external stock affected by flood water. A concrete panelled boundary wall restricted flow into the depot from the recreational playing fields. There is uncertainty of the flow path into this depot. Floodwaters could have come over the embankment, although local business owners do not believe this to be the source. An alternative flow path would have been across the recreational playing fields and into the depot, overflowing the boundary wall.

## 7.7.5 Actions by Public Bodies

This section outlines the actions undertaken by public bodies immediately and in the aftermath of the flood event which are specific to this community. Please refer to section 8.1 of this report for a summary of actions that were implemented at all communities.

Public bodies that have been involved in the flood-event response at this community include:

- Derbyshire County Council
- Ironville Parish Council
- Severn Trent
- Amber Valley Borough Council
- Environment Agency

The Environment Agency issued a Flood Alert to the River Erewash in Derbyshire and Nottinghamshire on the 19th of October 2023 at 1:13am and a Flood Warning to the River Erewash at Ironville on the 20th of October at 11:45am.

The Environment Agency conducted a site visit on the 16th of November 2023 to identify the flow paths described within this report. Other actions by the Environment Agency include a site visit with Network Rail to discuss the maintenance of the 3 barrel culvert. During these visits the Environment Agency suggested



actions to keep it clear.

Derbyshire Fire and Rescue evacuated properties via boats during the event.

On the 25th of January 2024, a public drop-in meeting was held at the community to provide support and guidance to those affected. RMAs in attendance included the Environment Agency, Derbyshire County Council and Amber Valley Borough Council.

Prior to Storm Babet, there was an issue with a system at Pye Bridge Treatment Works which meant that Severn Trent had to manage flows at Ironville Sewage Pumping Station (SPS). The repairs were completed, and equipment was removed from site before the storm. During the storm the pumping station and sewer network was operational and working as expected. After the event, Severn Trent attended the site and investigations indicate that the assets were working as expected.

## 7.8 Community Impacts – Pinxton

### 7.8.1 Location Characteristics

In the south-west corner of the village of Pinxton, Derbyshire, a community of twenty-two properties were internally flooded as a result of Storm Babet. The community lies close to the confluence of the River Erewash, which is approximately 100m to the south, and an unnamed ordinary watercourse lies immediately to the west adjacent, and parallel to, Widmerpool Street. The River Erewash is designated as a main river. The community is located north of the River Erewash, which flows from east to west through the village. Figure 7-26 shows the community location with nearby features such as Pinxton Wharf and the Severn Trent Sewage Treatment Works.

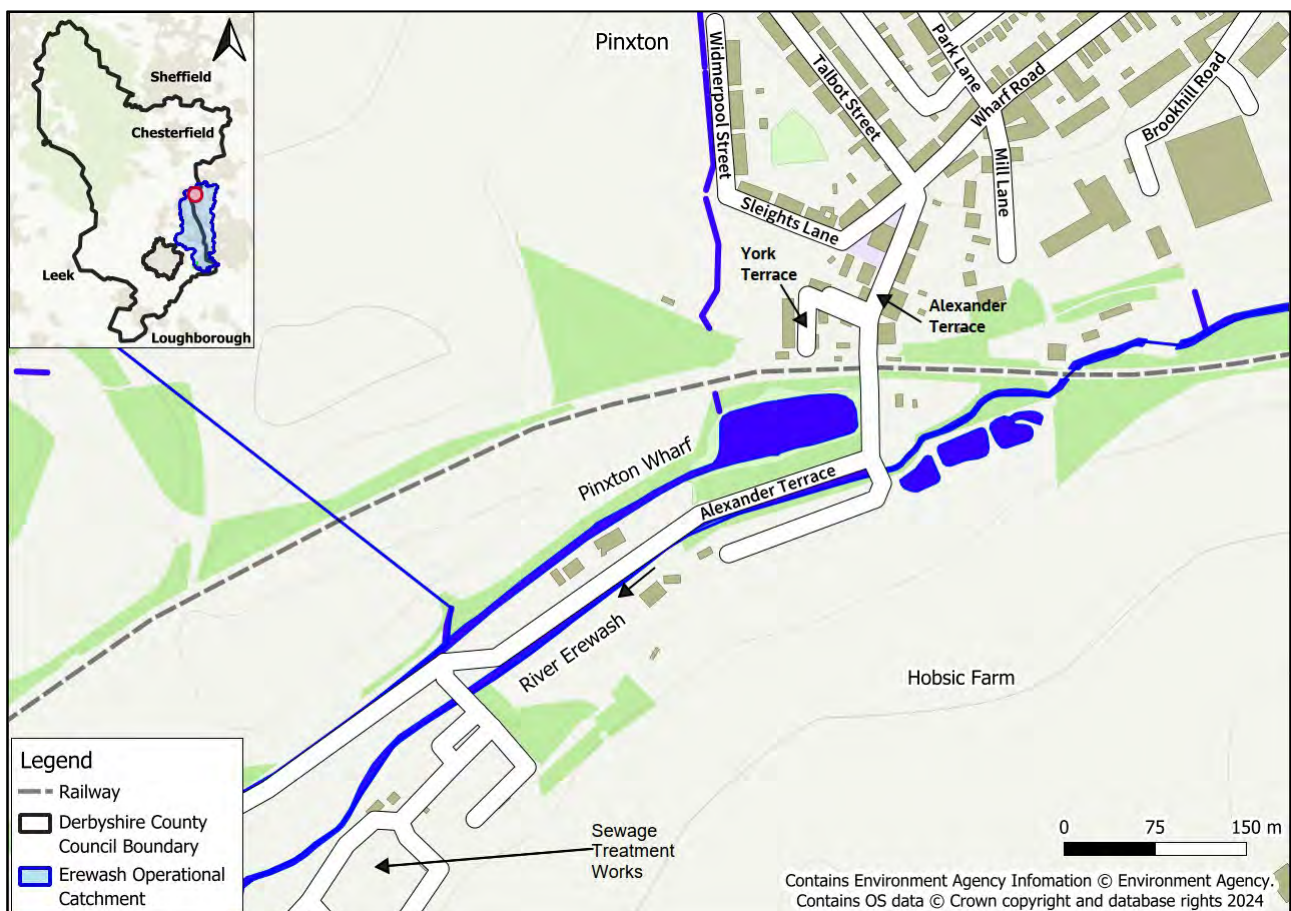


Figure 7-26: Overview of Pinxton community.

The community is residential, mainly made up of terraced housing. There are no known vulnerable groups within the flooded community (e.g., schools, hospitals and residential care homes), but Longwood Infant Academy school is located just north of the properties that flooded.

Critical infrastructure within the area includes the Trowell to Kirby Railway line less than 100m south of the

community. The M1 Motorway is located over 1km to the east on the eastern edge of Pinxton. There is a Severn Trent Water sewage treatment works (STW) approximately 400m downstream of the community.

The local topography is relatively flat and not much higher than the banks of the River Erewash. Local superficial geology is alluvium, including gravel, sand, silt, and clay.

The Environment Agency Historic Flood Map indicates that most properties that flooded as a result of Storm Babet have been flooded previously by the River Erewash. Flooding from the river has previously occurred in this area in 1965, 1977 and 2007. Flooding from the sewer network is believed to have occurred in 2012.

The Flood Map for Planning (<https://flood-map-for-planning.service.gov.uk/>) shows that all the flooded homes within this community are in Flood Zone 2. All the properties are within Flood Zone 2. Flood Zone 2 means the properties have a low probability of flooding from rivers (between a 1% and 0.1% AEP). Flood Zone 2 and Flood Zone 3 at Pinxton is shown in Figure 7-27.

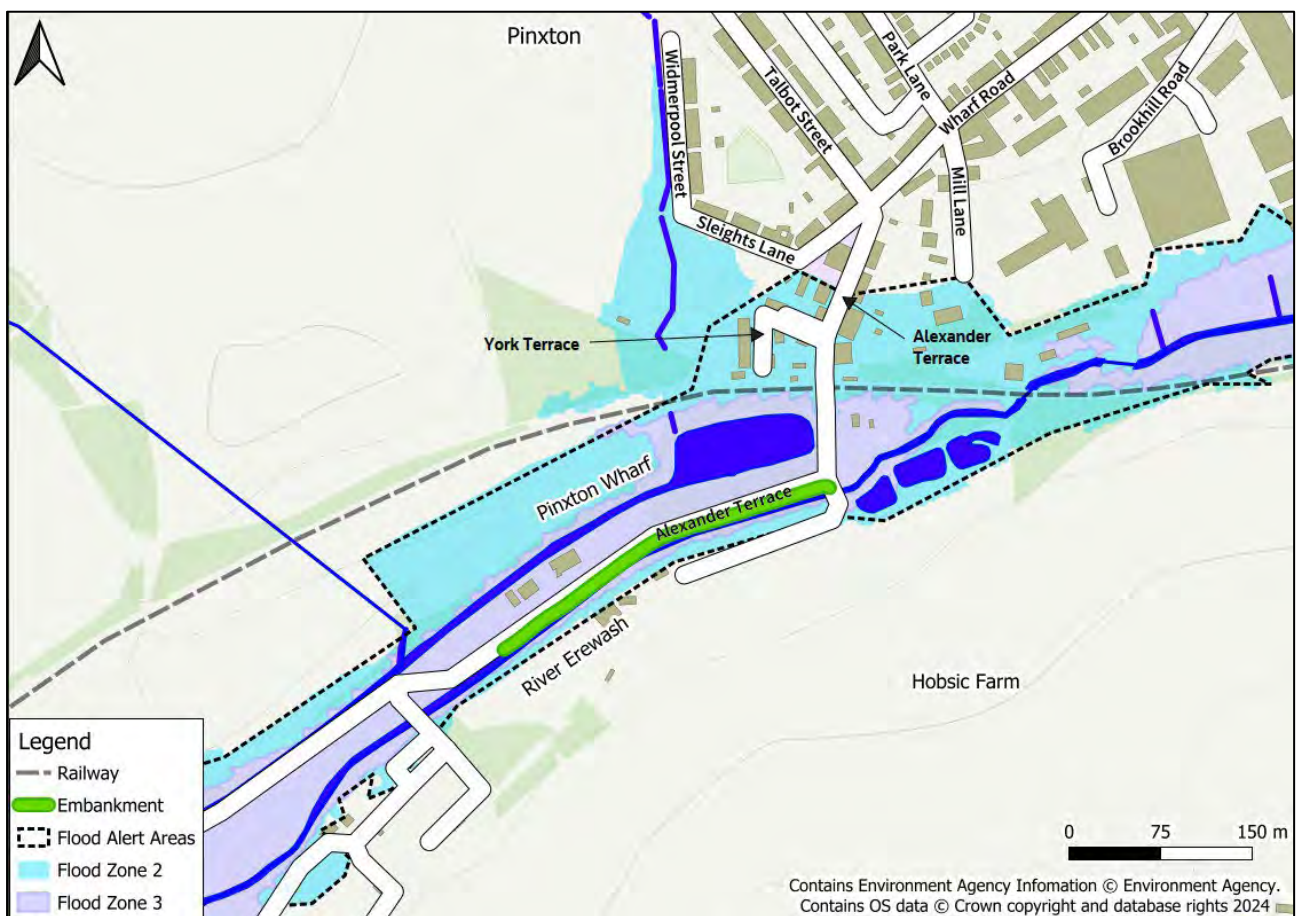


Figure 7-27: Current flood risk arrangements for the Pinxton community.

The Environment Agency Long Term Flood Risk Map (<https://check-long-term-flood-risk.service.gov.uk/postcode>) indicates that all the properties flooded are at risk of flooding from surface water. Some properties on Alexander Terrace and York Terrace are at high risk of flooding from surface water, meaning more than 3.3% AEP. Figure 7-28 shows the surface water flood risk mentioned.



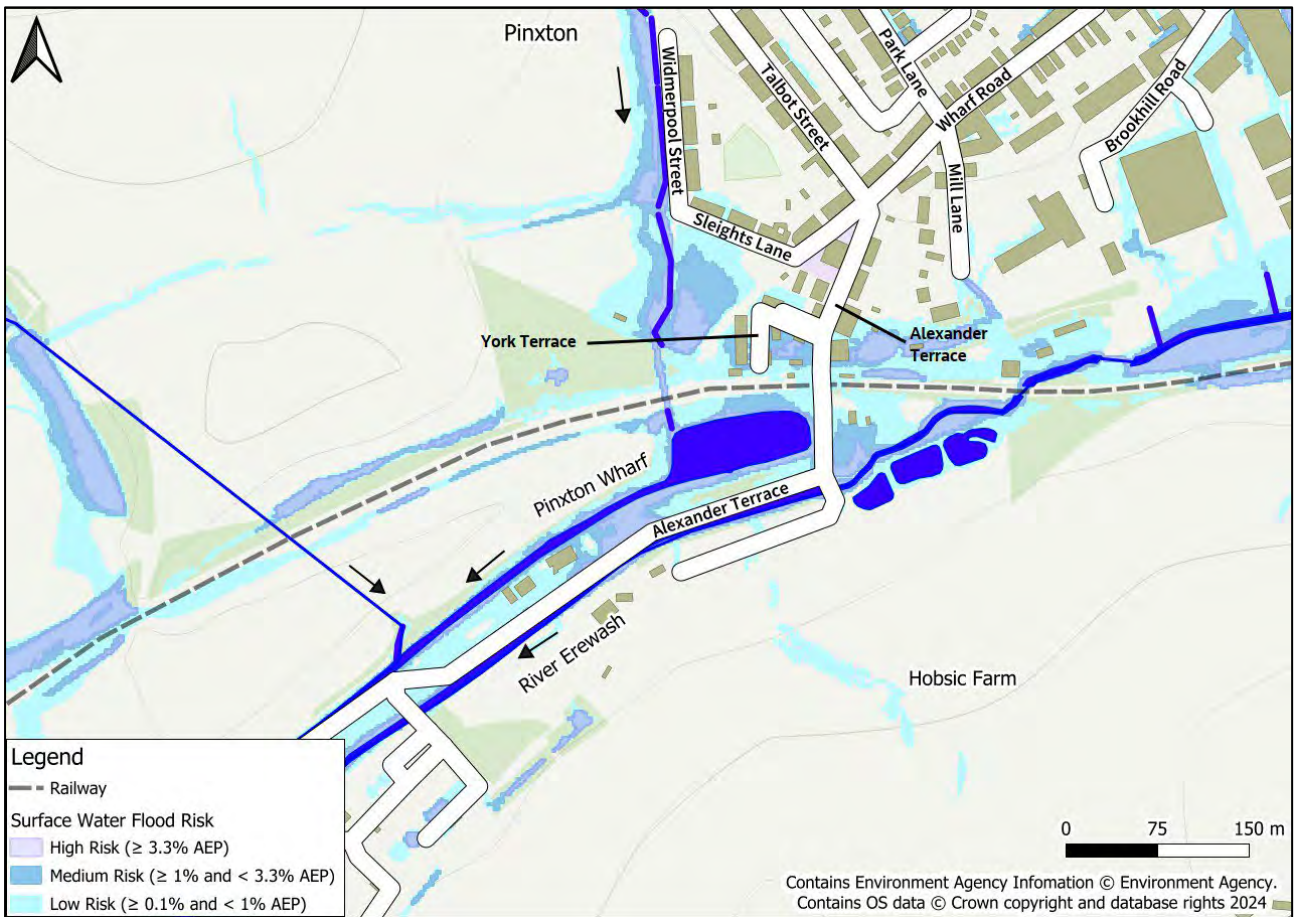


Figure 7-28: Map showing the chance in any given year of flooding from surface water at Pinxton (Source: Long Term Flood Risk Map).

## 7.8.2 Current Flood Risk Management Arrangements

Figure 7-27 shows the existing flood risk management arrangements. There is a 304m long flood defence embankment on the north bank of the River Erewash that runs from the Alexandra Terrace bridge to the STW. However, it only provides a 50% AEP standard of protection. The Environment Agency maintain this asset, but it is in very poor condition according to the Environment Agency Asset Information and Maintenance Programme system. The culvert indicated on Figure 7-27 is not Environment Agency owned and therefore the responsibility of the riparian owner.

The community is located within the 'River Erewash in Derbyshire and Nottinghamshire' Flood Alert Area and the 'River Erewash at Pinxton' Flood Warning Area. On anticipation of a potential flood event, residents who are signed up to alerts and warnings are informed when flooding is expected.

Following the flooding in 2012, Derbyshire County Council and Severn Trent installed a Property Flood Resilience (PFR) scheme to protect some properties on York Terrace, Wharf Road, and Alexandra Terrace.

## 7.8.3 Storm Babet Incident Details

A Flood Alert was issued to the 'River Erewash in Derbyshire and Nottinghamshire' Flood Alert Area on the 19th of October at 1:13am, and a Flood Warning was issued to the 'River Erewash at Pinxton' on the 20th of October at 7:29am. Internal flooding of residential properties is understood to have taken place shortly after on the morning of the 20th of October.

The peak river level recorded on the 20th of October at the River Erewash gauge at Pinxton, approximately 300m downstream of the community, was 2.65 metres. This is the highest level ever recorded at this station.

The twenty-two internally flooded homes include ten properties on York Terrace and ten properties on Alexandra Terrace. One property also flooded on Mill Lane. Additionally, the Boat Inn pub on Alexandra Terrace also suffered internal flooding.

#### 7.8.4 Flood Mechanisms, Extent and Impacts

The primary sources of flooding affecting the properties in the community were from the sewer network and surface water runoff, combined with the inability of these systems to drain because of high river levels. Sewer flooding occurred due to the network not being able to cope with the volume of water. During a visit, Derbyshire County Council observed evidence that the manhole covers had lifted. This was due to the amount of water in the sewer network, which was unable to discharge into the River Erewash because the river levels were high. The drainage network issues are a known recurring issue in the area with sewer flooding previously having occurred on multiple occasions, including 2012 when a previous Section 19 Flood Investigation Report was undertaken.

A resident of York Terrace provided Derbyshire County Council with photographic evidence of the impact of flooding which can be seen in Figure 7-29 below. The resident also noted that flooding started to reach the outside of the property at 6:30am to 6:45 am and by 11:00am the property suffered internal flooding.



Figure 7-29: Flooding to a property in York Terrace.

Although reports indicate that the main sources of flooding were from the sewer network and surface water runoff, it is likely that the river also contributed towards the flooding. The river level recorded on the 20th of October 2023 at the River Erewash at Pinxton monitoring gauge was 2.65m, the highest ever level recorded. There is also an unnamed watercourse to the west of York Terrace that flows from north to south, and into the River Erewash at Pinxton Wharf. It is possible that this unnamed watercourse overflowed its banks.

A survey undertaken by the Environment Agency after the flood event found that the bank levels of the River Erewash, parallel to Pinxton Wharf, were lower than the wrack marks found in this location. This indicates that flood water from the Erewash could have entered Pinxton Wharf, causing levels to rise within the pond. This could have prevented the unnamed watercourse from discharging into the wharf, causing it to back-up and overflow towards the back of York Terrace.

Surface water was reported as contributing to the flooding of the community. York Terrace and Alexandra Terrace, north of the railway line. The community sits at a low point, lower than the land to the north of the community. This means any surface water runoff flowing southward down Alexandra Terrace will pool in this location. Figure 7-30 below shows the low point on Alexandra Terrace.





Figure 7-30: Low area in local topography where water will naturally gather.

### 7.8.5 Actions by Public Bodies

This section outlines the actions undertaken by public bodies immediately and in the aftermath of the flood event which are specific to this community. Please refer to section 8.1 of this report for a summary of actions that were implemented at all communities.

Public bodies that have been involved in the flood-event response at this community include:

- Derbyshire County Council
- Breaston Parish Council
- Severn Trent
- Bolsover District Council Environment Agency

The Environment Agency issued a Flood Alert to the 'River Erewash in Derbyshire and Nottinghamshire' area on the 19th of October at 1:13am, and a Flood Warning to the 'River Erewash at Pinxton' area on the 20th of October at 7:29am.

Bolsover District Council delivered sandbags in advance of the onset of flooding. Some of the residents at the time did not take up the offer of sandbags as the flooding had not yet occurred. When the flooding started, some residents requested sandbags but by then Bolsover District Council had none left to distribute.

Following the event, Bolsover District Council removed effluent that had come from the drainage network and onto the adopted highway and collected flood damaged items from the properties. Bolsover District Council also offered temporary accommodation to the residents who suffered flooding.

On the 25th of January 2024, a public drop in was held at the community to provide support and guidance to

those affected.

Derbyshire County Council is working with Severn Trent Water to investigate the drainage issues. Residents have also been provided with a form to fill in for the PFR Scheme grant claims process in the interim.

## 7.9 Community Impacts – Aston-on-Trent

### 7.9.1 Location Characteristics

Nine residential properties suffered from internal flooding in Aston-on-Trent as a result of Storm Babet. Aston-on-Trent is in South Derbyshire. Both the Trent and Mersey Canal and River Trent are located approximately 1 to 3km to the south and east of the village. The River Trent is designated as a main river. Figure 7-31 shows the Aston-On-Trent community.

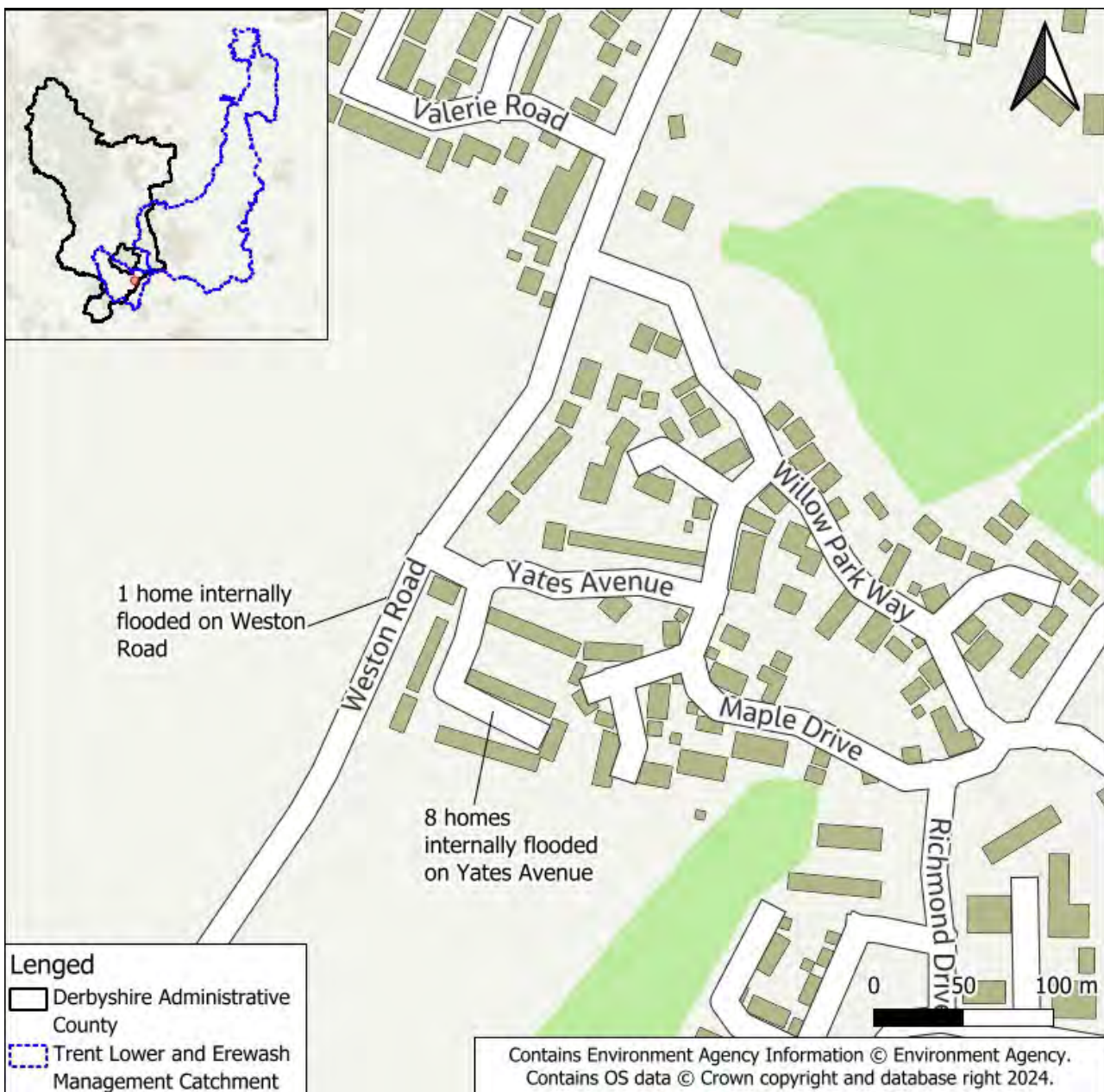


Figure 7-31: Local Flood Risk Management Assets and Flood Zones for the Langley Mill community.

The community is mainly residential, with a mixture of new build developments, and those built throughout the 20th century. Within the community there are two vulnerable community groups, a primary school, as well as a retirement village. However, these did not flood during Storm Babet.

Critical infrastructure surrounding the area includes the A50, located north of Aston-on-Trent which connects



the M1 with Stoke-on-Trent. Aston-on-Trent has two main roads running through the community: Derby/Shardlow Road and Weston Road.

Topography suggests that Aston-on-Trent sits on a gradual slope that declines east towards the River Trent floodplain. The prominent local superficial geology deposits include sand, clay, silt, sand, and gravel.

The Environment Agency Historic Flood Map indicates that the properties that flooded because of Storm Babet had not flooded previously. The community is also not located within the floodplain of the River Trent.

The Long Term Flood Risk Map (<https://check-long-term-flood-risk.service.gov.uk/postcode>) shows a high likelihood of surface water flood risk to areas of Weston Road, Yates Avenue and Valerie Road with some properties having a more than 3.3% Annual Exceedance Probability (AEP) of surface water flood risk. This is shown in Figure 7-32 below.

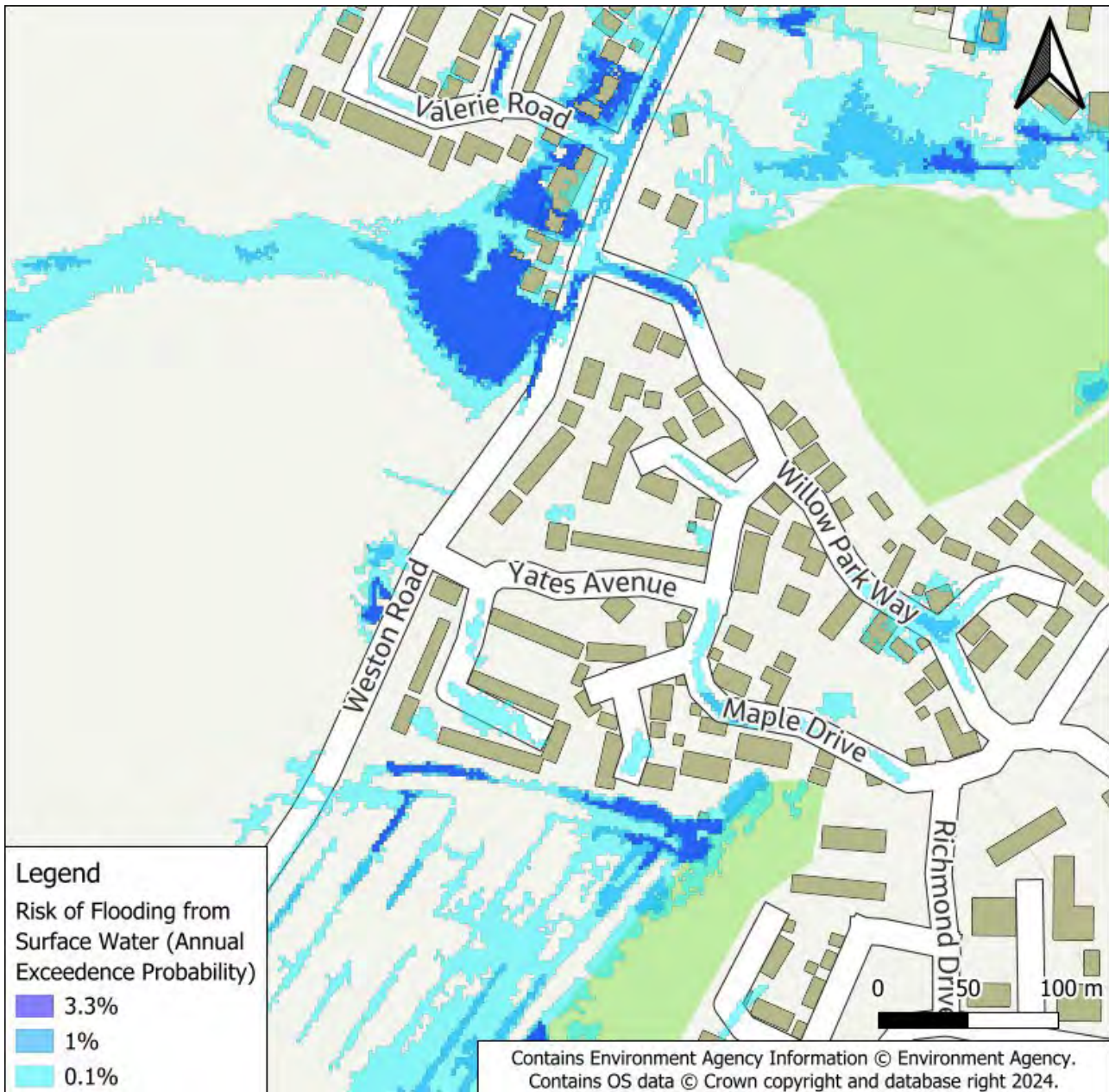


Figure 7-32: Map showing the chance in any given year of flooding from surface water at Aston-on-Trent (Source: Long Term Flood Risk Map).

The community is not located within or near any nationally important designated environmental sites.

## 7.9.2 Current Flood Risk Management Arrangements

Aston-on-Trent is not currently included within any Environment Agency Flood Alert or Flood Warning areas.

The Environment Agency's Asset Information and Maintenance Programme (<https://environment.data.gov.uk/asset-management/>) shows there are currently no flood defences in the community. However, there is a surface water pumping station operated by Severn Trent Water, and a ditch west of Weston Road, that helps with surface runoff from the nearby farmland which is maintained by the landowner.

### 7.9.3 Storm Babet Incident Details

Of the nine homes that flooded internally, eight were on Yates Avenue and one was on Weston Road, located to the southwest of the community.

### 7.9.4 Flood Mechanisms, Extent and Impacts

Local accounts suggested that there was a significant volume of run-off from farmland to the west of Weston Road during Storm Babet. Water initially collected in a large ditch to the east of the field at the boundary of Weston Road. The ditch was eventually overwhelmed spilling on to Weston Road, reaching the residential properties on Yates Avenue. The flow direction and ditch are illustrated in Figure 7-33.

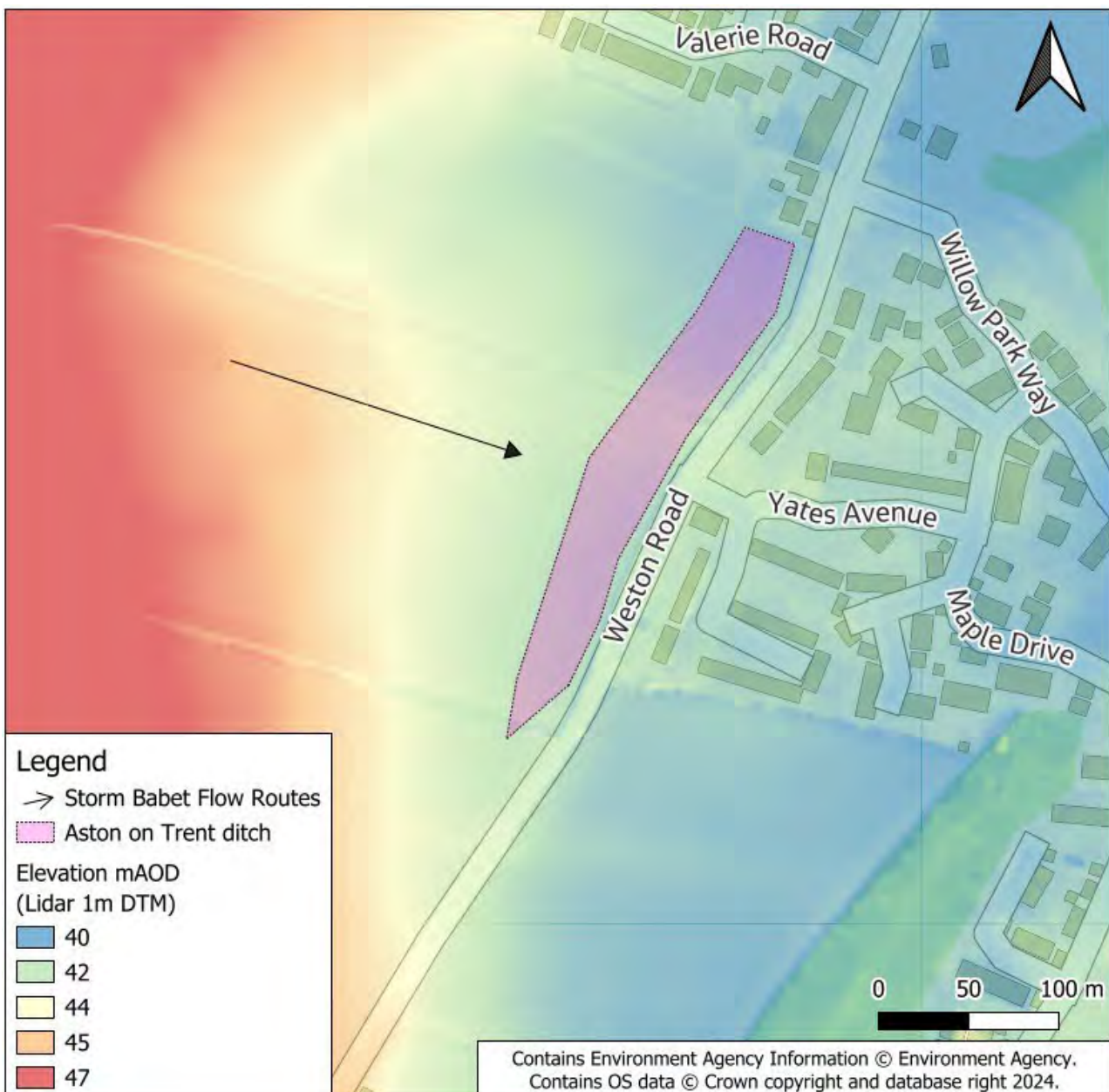


Figure 7-33: Topography of Aston-on-Trent, with arrows indicating the flow routes of surface flood water.

Following the flooding in this area, recommendations have been made for a deeper excavation of the ditch,



and horizontal ploughing of the farmland west of Weston Road.

### **7.9.5 Actions by Public Bodies**

This section outlines the actions undertaken by public bodies immediately and in the aftermath of the flood event which are specific to this community. Please refer to section 8.1 of this report for a summary of actions that were implemented at all communities.

Public bodies that have been involved in the flood-event response at this community include:

- Derbyshire County Council
- Breaston Parish Council
- South Derbyshire District Council
- Environment Agency

South Derbyshire District Council have undertaken visits to affected properties both during and after the event to determine the factors which have caused flood risk.

Derbyshire County Council are investigating flooding mechanisms from the ordinary watercourses in Aston-on-Trent to identify maintenance needs.