Contents

6. Idle and Torne Management Catchment

6.1 Idle and Torne Catchment Event Hydrology

This section describes the hydrological conditions that were experienced across the Idle and Torne 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.

6.1.1 Catchment Characteristics

The Idle and Torne sub-catchment referred to in this report is in the north-east of Derbyshire, covering the headwaters of the Rivers Poulter and Meden which meet the River Idle at Elkesley. The River Idle moves eastwards, joining with the River Trent at West Stockwith. Towns within this sub-catchment include Clowne and Shirebrook. The total extent of the Idle and Torne catchment is beyond the Derbyshire County boundary and is therefore not discussed in this report.

Figure 6-1 indicates the sub-catchment extent in respect of the Derbyshire area, in addition to the rainfall, river flow and level gauges used for the hydrological analysis of this sub-catchment. It is noted the majority of these stations are outside the sub-catchment boundary referred to in this report. However, they are within the wider Idle and Torne catchment and will be representative of the hydrology within the reports sub-catchment.

There are a few minor watercourses within the sub-catchment referred to in this report. In the north, Bondhay Dyke flows into the River Ryton near Whitwell Wood, and Millwood Brook flows into the River Poulter through Creswell. The headwaters of the River Poulter are to the east of the sub-catchment in Langwith. In the south, Merril Sick flows into the River Meden near Pleasley.

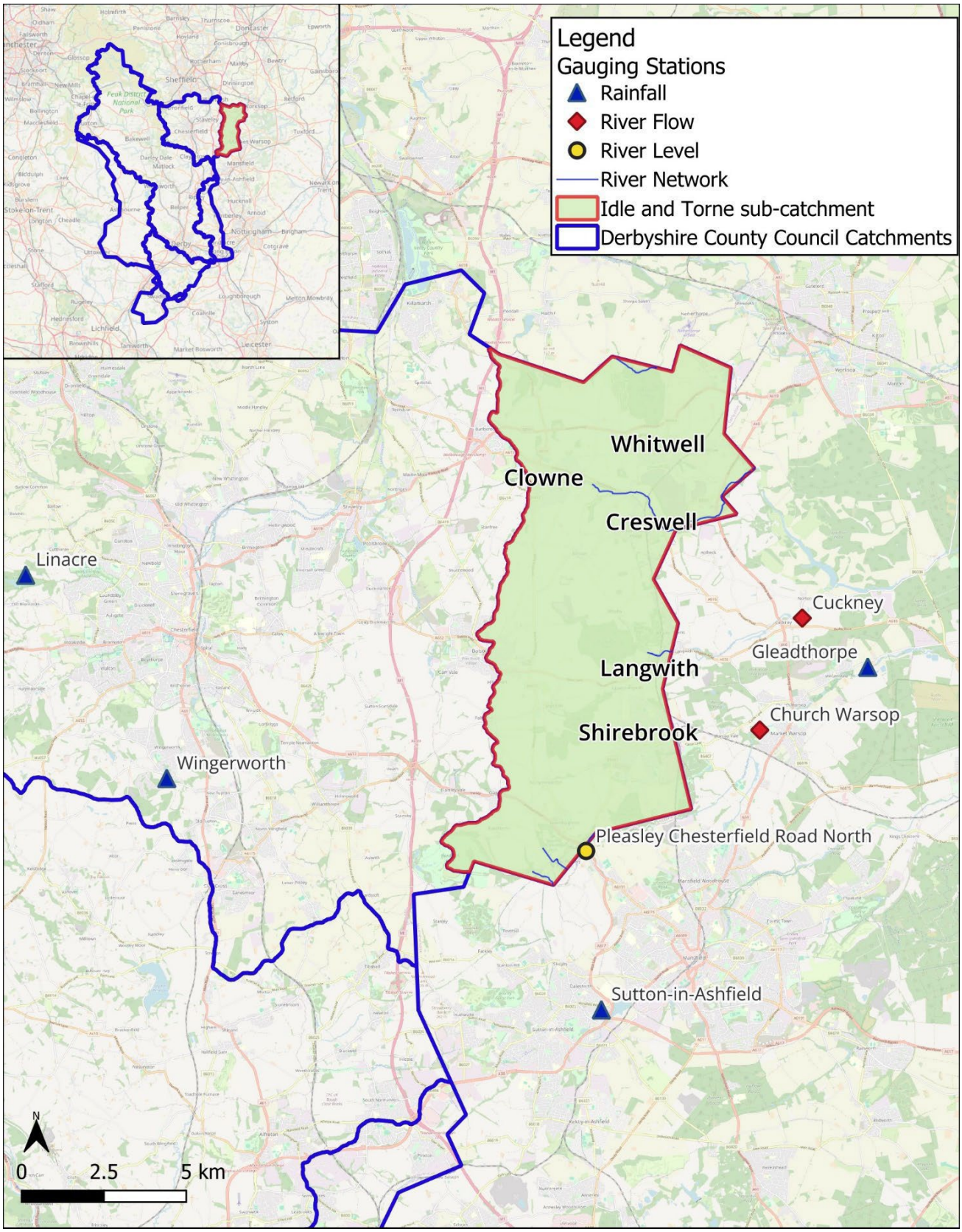

Figure 6-1: Catchment extent and rainfall, river flow and river level gauges.

6.1.2 Hydrological Summary

6.1.2.1 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.

6.1.2.2 Rainfall

During Storm Babet, heavy rainfall lasted from 19th to 21st of October 2023 across the Idle and Thorne sub-catchment, with rainfall peaking early on 20th of October from 3:45am to 4:15am. Similar extremities and rarities of rainfall were recorded at all stations, with recorded rainfall equating to 0.9 to 2.0% AEP events. The stations are located outside of the sub-catchment referred to in this report, however the results indicate towns across the sub-catchment including Clowne, Shirebrook, Whitwell, Pleasley, Creswell and Langworth would have experienced extreme rainfall during Storm Babet.

6.1.2.3 Rivers

Similar responses to heavy rainfall were recorded in the headwaters of rivers close to the Idle and Thorne sub-catchment, on the River Poulter near Cuckney and Langwith and on the River Meden near Pleasley. All stations recorded a peak flow on the 20th of October, 18 hours after peak rainfall. All stations surrounding the Idle and Torne catchment produced the highest ranked flows or levels on record in response to Storm Babet in October 2023.

6.1.2.4 Communities

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

- 1.2% AEP: Clowne

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.

6.2 Community Impacts – Clowne

6.2.1 Location Characteristics

Seventeen residential properties and one commercial property to the north of Clowne village centre suffered internal flooding as a result of Storm Babet. Figure 6-2 below shows an overview of the community. The community is adjacent to an unnamed ordinary watercourse which originates to the north-west of Clowne and flows through Harlesthorpe Dam before flowing southwards through the community. Most of the flooded properties are to the east of the watercourse.
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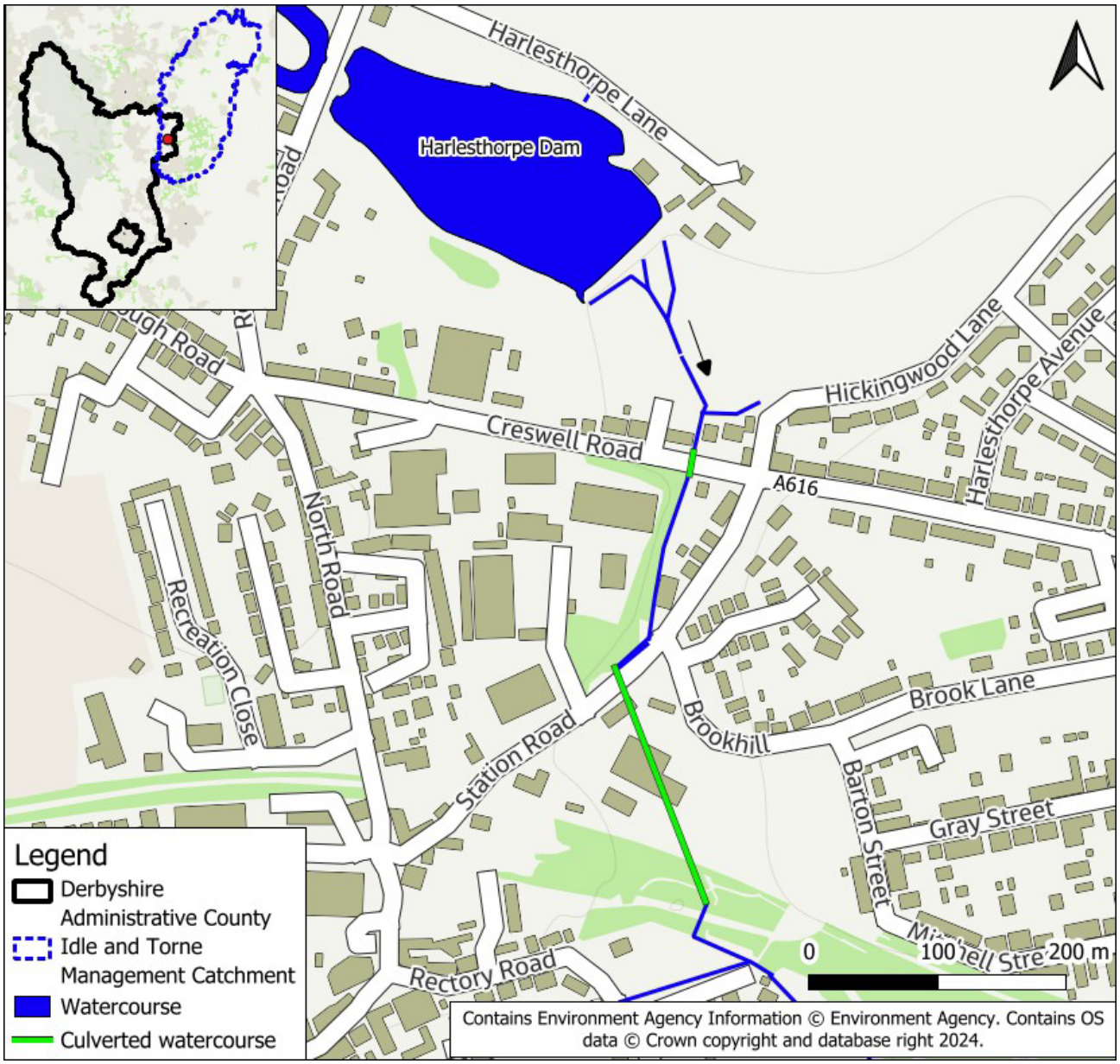

Figure 6-2: Overview map of Clowne community.

The community is mainly residential, with some isolated businesses. Homes adjacent to Station Road and Hickingwood Lane are predominantly a mix of terraced and detached. Critical Infrastructure within the area includes the A616 (Creswell Road), which is the primary road connecting Clowne to the M1 to the west, and South Muskham to the east. There are no known vulnerable groups within the community.

Within the community, the watercourse flows beneath the A616 in two 600mm diameter brick arch culverts. Before running adjacent to Station Road, the watercourse flows through an open section at the back of residential and commercial properties where there are several informal bridges. The watercourse then diverts at a sharp angle beneath Station Road into a 600mm diameter culvert, before flowing under a disused railway line, which is now the Clowne Branch Line Greenway. The culverts are the riparian owner's responsibility to maintain, with the Highways Authority being responsible for maintaining sections underneath the highway.

The local superficial geology is till (i.e., gravel, sand, clay and boulders).

Anecdotal evidence identifies that flooding occurred during 2007, likely due to overtopping of the watercourse, which was exacerbated by blocked culverts.

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 1. Flood Zone 1 means the properties have a low chance of flooding from rivers, less than 0.1% AEP.
However, some homes on North Road 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 6-3 shows the surface water flood risk for the community based on the national mapping referred to above.

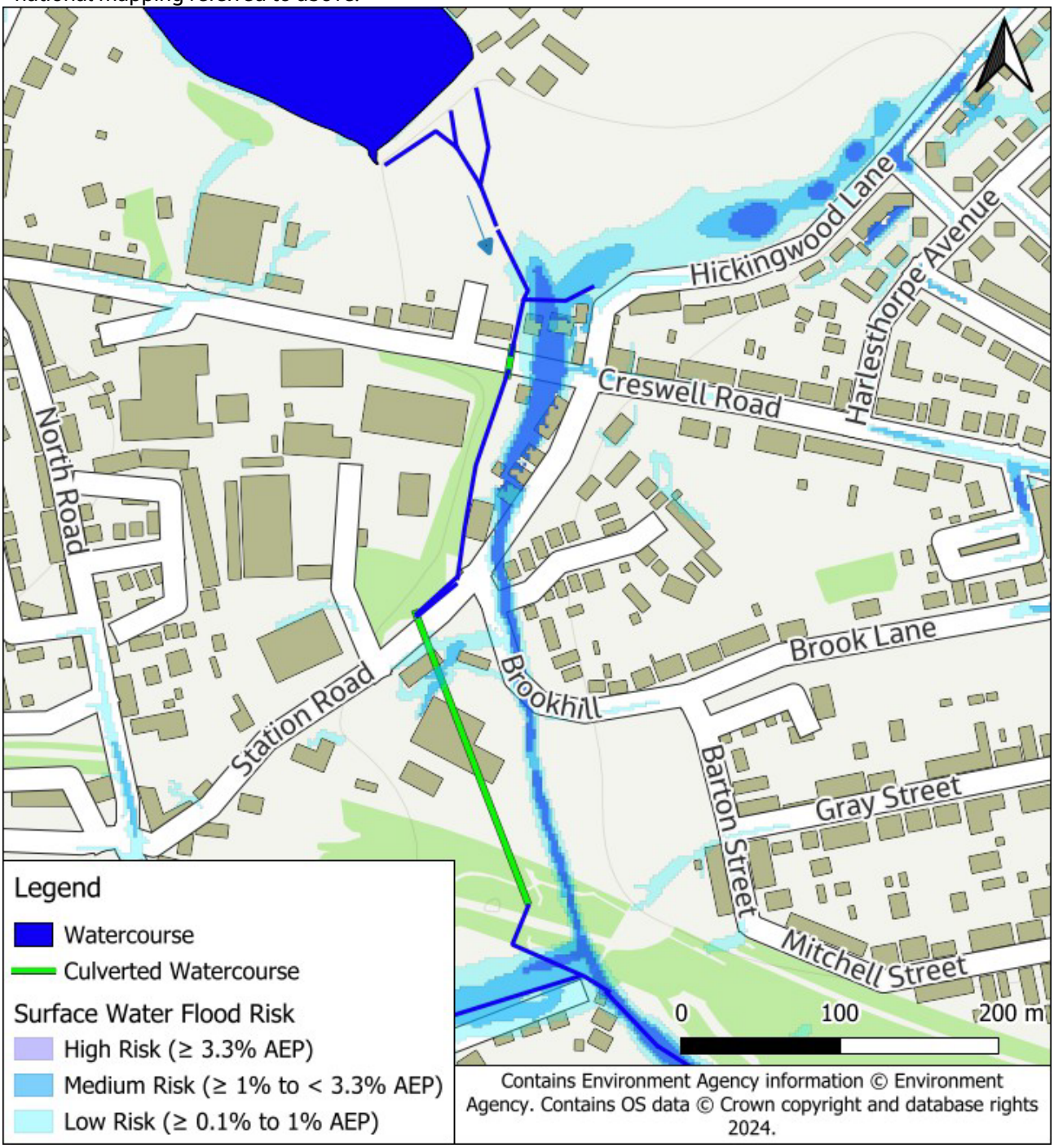

Figure 6-3: Map showing the chance in any given year of flooding from surface water at Clowne (Source: Long Term Flood Risk Map).

Clowne is not located within a nationally designated site, however the community is located approximately 1.5km upstream of the Hollinhill and Markland Grips Special Site of Scientific Interest.

6.1.2 Current Flood Risk Management Arrangements

The Environment Agency do not issue Flood Alerts or Flood Warnings at Clowne.

The Environment Agency's Asset Information and Maintenance Programme (https://environment.data.gov.uk/asset-management/) shows that there are no known formal defences in the community.

6.2.3 Storm Babet Incident Details

As identified in section 6.1.2, no flood warning service is provided in this area. It has been noted that Bolsover Borough Council received reports that Clowne was flooding on the 20th of October 2023, between 5:00pm

and 5:30pm.

The seventeen homes and one commercial property which flooded internally include properties on Station Road, the A616 (Creswell Road) and Hickingwood Lane.

6.2.4 Flood Mechanisms, Extent and Hazards

Figure 6-4 indicates the local topography and flow routes during Storm Babet. The primary source of flooding affecting all of the properties within this communities was from the ordinary watercourse. Flooding may have been exacerbated by the culvert under Station Road and the A616 (Creswell Road) being overwhelmed.

The flooding was exacerbated by surface water run off due to saturated ground north of Hickingwood Lane. The surface water then flowed towards the watercourse and increased levels. There are also a number of road gullies along the A616 (Creswell Road) and Station Road that discharge into the watercourse. Details received from the residents suggest that the flooding issues arose from the gullies being unable to discharge to the watercourse.

It has been reported that the flooding caused several garden walls to collapse at properties along Station Road, due to the depth of the water.

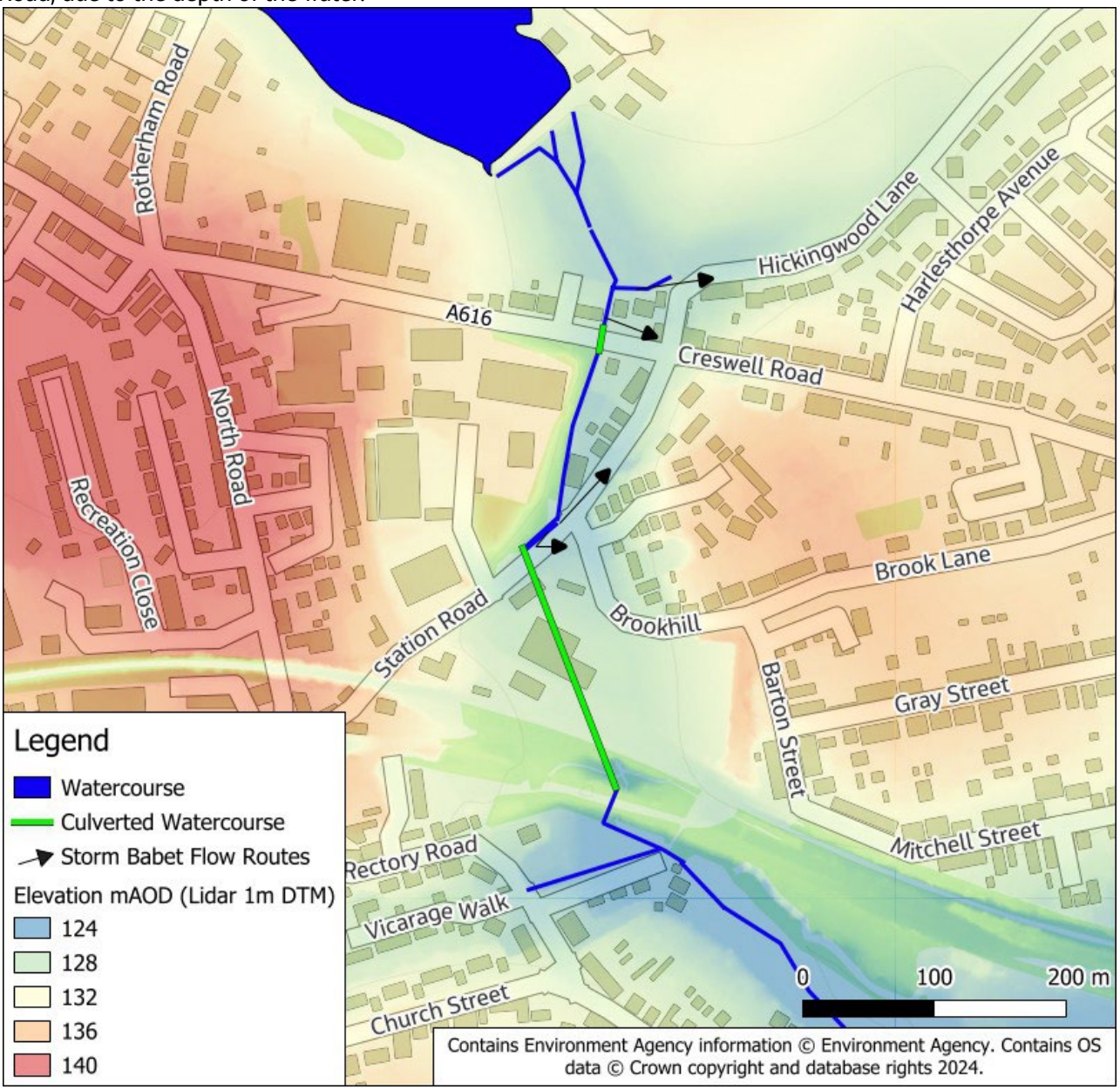

Figure 6-4: Ground level and Storm Babet flow routes at Clowne.

6.2.5 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
- Bolsover District Council

Bolsover Borough Council delivered sandbags for residents on the 20th of October 2023. The flooding eventually became so severe, that water overwhelmed the sandbags and entered properties. On the 21st of October, Bolsover District Council delivered further sandbags at the junctions of Station Road and the A616 (Creswell Road), on the anticipation of further flooding. Following the flooding, Bolsover Borough Council provided additional assistance to residents by collecting flood damaged household items.

Derbyshire County Council have undertaken numerous site visits and local engagement after the flood event. Derbyshire County Council Flood Risk Management Team and Highways Team investigated the causes of flooding, talked to residents, the parish council and landowners and have promoted the Property Flood Resilience (PFR)
Scheme. Derbyshire County Council have also worked with the parish council and Bolsover District Council to coordinate the clearing of the watercourse and have publicised training for flood wardens.