

The UK's Evolving Physical Landscape: Sheffield Floods

The Sheffield Floods of 2007

Sheffield is a city in **South Yorkshire** that experienced devastating floods in **June 2007**.

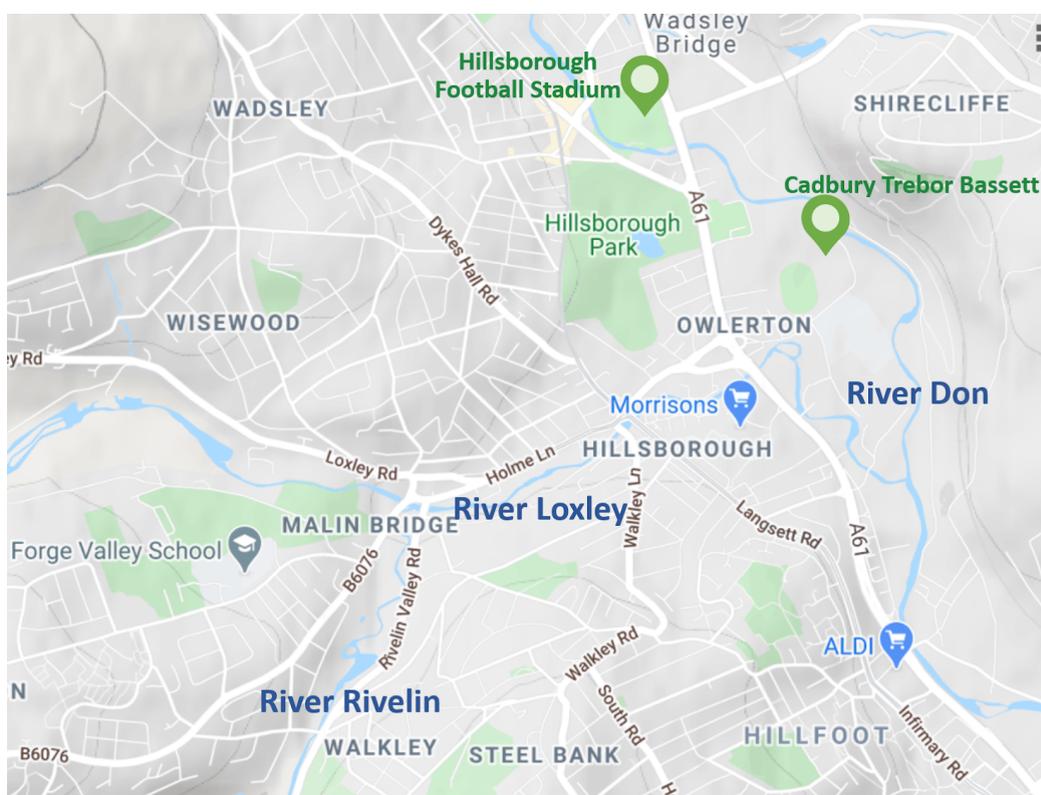
Heavy and prolonged rainfall overwhelmed the city's **drainage systems**, and the River Don - which flows through Sheffield - **burst its banks**. This caused widespread flooding and many issues in Sheffield: **2 people died**, over **1,200 homes** were flooded, **1,000 businesses** were affected and **13,000 people had no power** for two days.

Several areas of Sheffield were severely affected, including **Lower Don Valley, Brightside and Hillsborough**. Hillsborough is shown in the map below, located at the **confluence of the rivers Don, Loxley and Rivelin**. This area was hit hard by the River Don overflowing, and areas such as the **Hillsborough Football Stadium** and the **Cadbury Trebor Bassett Headquarters** were in floodwaters up to **6 feet high**.



Location of Sheffield. (Source: Google Maps)

The causes of flooding can be attributed to a combination of **human and physical processes**.



Hillsborough, Sheffield. (Source: adapted from Google Maps)
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Physical Processes

Heavy and prolonged rain fell on South Yorkshire during England's wettest May-July since 1766. Sheffield's rainfall levels were much higher than average for the season.

- 15th June: Over **90mm of rain** fell over Sheffield in **48 hours**.
- 25th June: Nearly **100mm** fell in Sheffield in **24 hours**, the highest daily rainfall on record for Sheffield.
- June was the **wettest month recorded in Yorkshire** since 1882.
- 286mm of rain fell in Sheffield in June 2007. Sheffield's **average rainfall in June** is 76mm.



The Wicker, Sheffield. (Source: www.thestar.co.uk)

Several hills surround Sheffield, in fact it is known as the "city of seven hills" due to its topography. It also sits at the foot of the Pennines. Rainfall flows rapidly down the surrounding hills as runoff and drains into Sheffield's river systems, filling them quickly.



Elevation of Sheffield. Red = high. Blue = low. (Source: www.topographic-map.com/maps/7yb5/Sheffield/)

Human Processes

Sheffield is a heavily urbanised area, with concrete and tarmac surrounding the rivers. These impermeable surfaces stop water from infiltrating into the ground; and instead water is directed into urban drainage systems.

On the 15th June, drains began to be overwhelmed with rainwater in some parts of the city and surface water flooded areas even when rivers were still not at full capacity.

This problem was only made worse when rainfall continued to fall heavily for weeks. When the rivers burst their banks, drainage systems could not take any more water, leading to widespread flooding. However, Sheffield council claimed the drainage systems were not at fault.



(Source: AXA insurance)

The worst damage caused by the flooding was seen in the natural floodplains of the River Don, which have been used for industry.

Many important businesses built in low-lying areas were flooded, including:

- Clarkson Osborn
- Sheffield Forgemasters International
- Cadbury Trebor Bassett

These businesses suffered around **£15 million each** in damages, and had to undertake huge clean-up operations.

Many homes and businesses that were flooded were located on the natural floodplains of rivers.

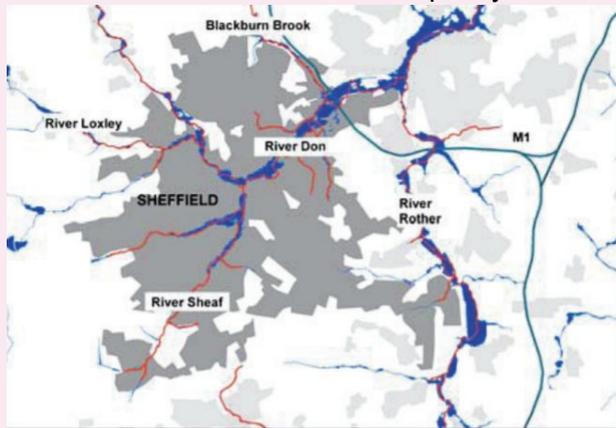


Three **fast-flowing rivers**, the **River Don**, the **River Loxley**, and the **River Sheaf**, join in Sheffield, and many other tributaries also contribute to the rivers' flows.

High rainfall levels caused all of the rivers of Sheffield to rise in June 2007, but the **River Don** particularly was a major cause of flooding.

Several rivers flow directly into the **River Don** (seen in the image below). These rivers continued to contribute to the Don's discharge as heavy rainfall continued, and eventually the channel became overwhelmed with water and **burst its banks**.

Water continued to flow into the river, and flooding worsened. Fast flowing torrents of water began **flowing down roads** in the city centre as the rivers were over capacity.



Areas of Sheffield that Flooded in June 2007 (flood area in blue). (Source: [Environment Agency](#))

During stormy and windy weather, **trees fell** and **blocked river channels**, backing up water and causing even more flooding in areas.

Poor **river management** and weak **building regulations** have limited the ability for rivers to **naturally overflow and drain into floodplains**, which has increased flooding risk.

Urbanisation in Sheffield has left the River Don and its tributaries with **no space to naturally expand and flood**, which is important for flood risk reduction.

These rivers are squeezed into **man-made channels (called culverts)** which **direct and manage water**. This means when the rivers do swell, they have no space to flow onto floodplains, and instead **flood homes and businesses**.



Buildings directly next to the River Don. (Source: [Environment Agency](#))

Some **flood defences** were simply not strong enough and were breached, such as at Meadowhall Shopping Centre. Officials say they were **not designed for flooding events as severe as the one in 2007**.

