

Low Crosby Flood Management

Storm Desmond

1. Storm Desmond, the 4th named storm during the winter of 2015/16, brought record-breaking rainfall to much of northern England. The rain fell on already saturated ground triggering severe flooding across the region.



<https://www.accuweather.com/en/weather-news/storm-desmond-slams-uk-and-ireland-with-flooding-rain-strong-winds/377728>

- (a) On the map, locate and label the approximate position of Carlisle.
- (b) Describe the areas of highest rainfall (shown dark green) in the UK.

2. Access the link to the Met Office video at <https://www.metoffice.gov.uk/weather/warnings-and-advice/uk-storm-centre/storm-desmond>.

- (a) What was the 48-hour (UK record-breaking) rainfall total for Thirlmere in Cumbria? ____mm
- (b) This rain fell in a period of just 38 hours. Calculate the average hourly rainfall during this period. _____mm/hour
- (c) Give the location that recorded a new UK record-breaking 341.4mm rainfall in a 24-hour period. _____
- (d) Describe the impacts of Storm Desmond on transport and power.

[Play the video to see the track of Storm Desmond and the focus on the rainfall on northern England]

3. Flood risk is expressed as a probability or likelihood that a specified event (flow rate or river height) will occur. The Annual Exceedance Probability (AEP) is used to describe the likelihood of a specified flow of water being exceeded each year.

- An event that is likely to occur once in 10 years (high frequency, low magnitude) has an AEP of 0.1 or 10%.
- An event that is likely to occur once in 100 years (low frequency, high magnitude) has an AEP of 0.01 or 1%. In the UK, most flood protection schemes aim to prevent flooding at this level.

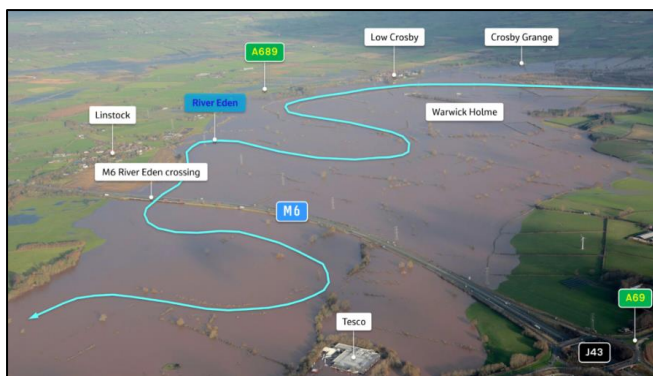
(a) Calculate the AEP for an event that is likely to occur once in 50 years.

(b) Calculate the AEP for an event that is likely to occur once in 250 years.

(c) What was the AEP for the flood event at Low Crosby in 2015? _____

(d) The Eastern Village Defence embankment was designed to withstand an event with a 2% AEP (a once in 50-year event). Explain why the embankment did not help to protect Low Crosby in 2015.

4. The photo below shows the extent of flooding following the record-breaking rainfall. Locate Low Crosby at the top of the photo.



Source: Environment Agency



Source: Cumbria County Council

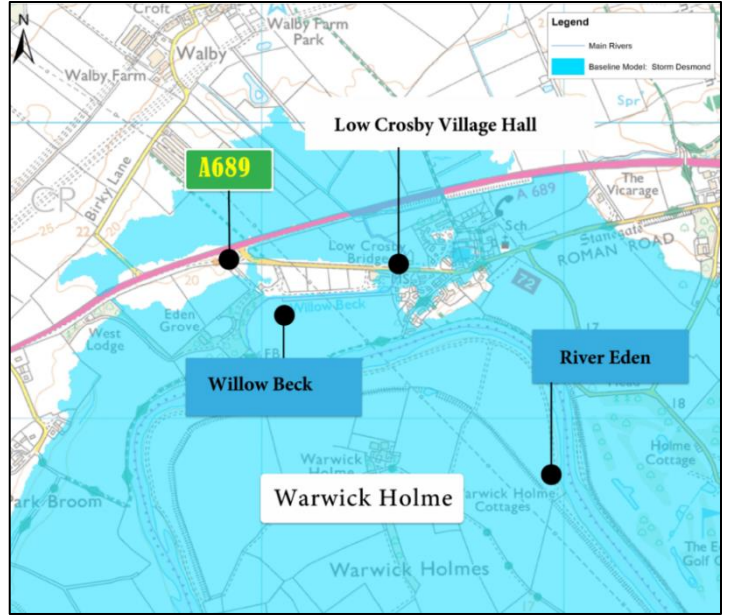
(a) In what direction is the photo looking? _____

(b) 'The location of Tesco on the floodplain is an unwise decision.' Do you agree? Why?

5. Low Crosby was inundated by floodwater on 5th and 6th December 2015 when the River Eden overflowed. An estimated 60 properties were affected in the village. Using evidence from the photos and map below, suggest the social, economic and environmental impacts of the flood.



Source: Environment Agency

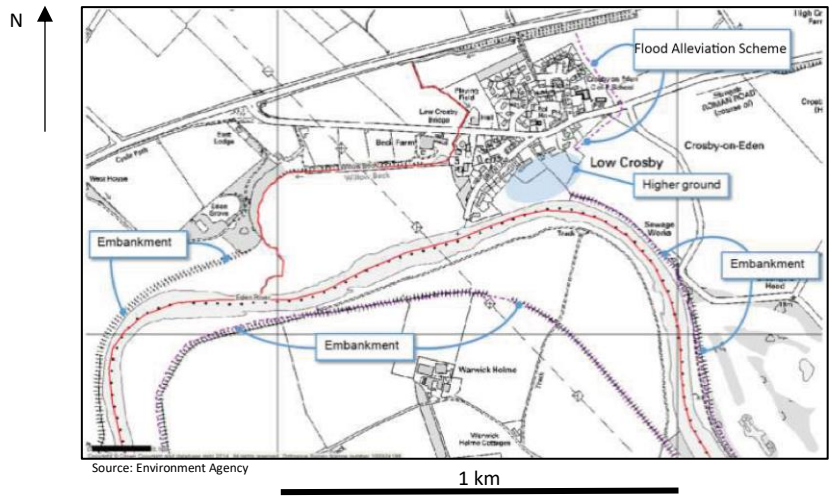


Social:

Economic:

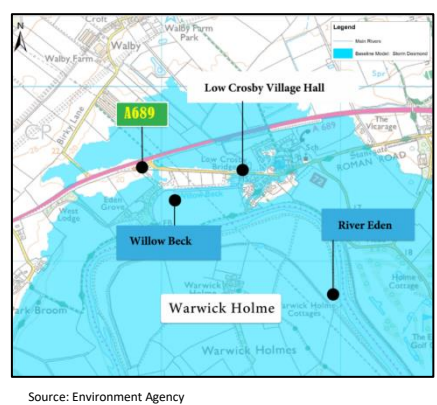
Environmental:

6. The map below shows the locations of the flood defences constructed after the 2005 flood event.



- (a) Locate the flood embankment to the east of Low Crosby (labelled 2009-11 Flood Alleviation Scheme). Use a dark colour to shade the extent of the embankment.
- (b) Suggest reasons for the position and shape of the eastern embankment.

- (c) Using information from the Powerpoint presentation, annotate the map to describe the existing flood defences.
- (d) The map below shows the extent of the flooding in 2015. Use this to shade the flooded area on the map above.



(e) To what extent did the existing flood defences protect Low Crosby from flooding in 2015?
