Proof of Evidence - ADDENDUM

Hydrology, Drainage, & Flood Risk Assessment

Produced by David Sawyer
Rule 6 Party
Peel Hall - APP/ M0655/W/17/3178530

Contents

1.0 Personal Details

My name is David Sawyer and I am a retired civil engineer.

I was formerly employed at Warrington and Runcorn Development Corporation from 1974-1987.

I have also worked for a number of major consulting engineers including:

Rendel Palmer and Tritton
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Prior to retirement I was employed as a Project Coordinator at United Utilities

I live at 4 Brathay Close Warrington WA2 9UY.

2.0 Introduction

2.1 In August 2020 the Peel Hall Rule 6 Party submitted a Proof of Evidence entitled 'Hydrology, Drainage and Flood Risk Assessment' together with a Proof of Evidence Summary to the Planning Inspectorate in respect of the Peel Hall public inquiry. The Proof of Evidence Summary was presented to the inquiry on 16th September 2020.

2.2 At the time of the inquiry in September 2020 the UK had suffered over 20 major storm events in the previous four years, and February 2020 was the wettest on record in the UK. The inquiry was adjourned in late September to enable further work to be carried out on highways modelling, and since then two further storm events have occurred which have greatly affected the UK in general and Warrington in particular. In the light of these recent storm events and following a request to the Planning Inspectorate the Rule 6 Party has now been given permission to submit an Addendum to the original Hydrology Proof of Evidence.

2.3 As you will be aware the appellant proposes to utilise the Spa Brook for the purposes of discharging surface water from the Peel Hall site, and our own investigations have shown that the Spa Brook forms part of the Sankey Brook catchment. It is culverted from a point close to the apartments on Poplars Avenue through to Mill Brook located approximately a half mile to the south.The discharge point at Mill Brook is located to the west of the Junction 9 retail park on Winwick Road, and Mill Brook itself discharges to Dallam Brook a short distance downstream. In turn Dallam Brook passes beneath Hawley's Lane before it discharges to Sankey Brook approximately 500m downstream near to Southworth Avenue.

2.4 The two storm events in question have between them caused widespread damage across much of Warrington. However our review will concentrate on showing how these storms have affected those parts of the town that are most relevant to the inquiry, that is to say the appeal site itself and the broader Sankey Brook catchment. We will also provide details of the intensity of these storms and look to place them in an historical context, with particular reference to the effects of climate change.

2.5 The first of the two storm events occurred on the weekend of 3rd/4th October 2020 and is referred to by the Met Office as Storm Alex. The second event occurred over the three day period from 18th to 20th January 2021 and is referred to by the Met Office as Storm Christoph. Details of both these events in relation to the appeal site and the Sankey Brook catchment are set out below and much of the factual information provided is based upon content posted online by the Met Office and the Warrington Guardian.

3.0 Storm Alex 3rd/4th October 2020 - Overview

3.1 In November 2020 the Met Office posted the following information relating to Storm Alex:

'Storm Alex marked an emphatic transition to unsettled autumnal weather across the UK. Alex brought stormy conditions with strong winds to the southern half of the UK and the Channel Islands on 2 October 2020, with associated fronts bringing prolonged and widespread heavy rain on 3rd to 4th. Parts of central southern England and eastern Scotland recorded totals of 100mm or more in the first four days of the month, and on 3 October many weather stations recorded their wettest October day on record. The extensive nature of the rain resulted in the UK receiving 31.7mm as an area-average for the rain-day 3 October 2020, making this the UK's wettest day on record in a daily series back to 1891.

A large number of weather stations recorded their wettest October day on record, including several with 100+ year records, and scattered widely across the UK from London to the West Midlands, to Lancashire and to Aberdeenshire. At Oxford, 60.0mm on 3rd October made this Oxford's sixth wettest day in almost 200 years of daily records (1828), and its wettest day for 47 years (since 67mm on 27th June 1973). The three day fall of 104.8 mm was the highest 72-hour total on record at this station, just surpassing July 1968 (104.5mm). (Thanks to Stephen Burt, University of Reading).

On 3 October 2020 the UK recorded a daily rainfall total of 31.7mm (as an average across the whole of the UK). This made this the UK's wettest day on record in a series from 1891 – in over 47,000 days - beating the previous record from 25 August 1986, and the first time that the UK area-average rainfall for a single day has exceeded 30mm.
It was also provisionally the wettest day for Scotland with an average of 46.1mm.

Remarkably, of the 40 days in the UK area-average daily rainfall series from 1891 where the total has exceeded 20mm, three have occurred in 2020 including storm Alex (31.7mm, 3 October 2020, rank 1), storm Dennis (27.2mm, 15 February 2020, rank 3) and storm Ciara (20.7mm, 8 February 2020, rank 31).

Six out of the UK's top 20 wettest days (as UK area-average daily rainfall) in the series from 1891 have occurred this century (since 2000) and of these, two occurred in the year 2020.

3.2 In Warrington a flood alert was issued for the Sankey Brook catchment and minor flooding was observed in Sankey Valley Park. The river level gauge located at Higham Avenue recorded a water level of 2.95m on Sunday 4th October which indicated that minor flooding was possible.

3.3 The photographs below were taken on the morning of October 4th by local Dallam resident Malcolm Mitchell. The photos show Sankey Brook at Higham Avenue in Dallam, and it should be noted in Figure 2 that the Brook has overflowed towards a disused section of the former Sankey/St Helens Canal.

Figure 1 - Sankey Brook looking north - October 2020

Figure 2 - Sankey Brook looking south - October 2020

3.4 The photograph below was also taken by local resident Malcolm Mitchell on the morning of October 4th and it shows flooding downstream from Dallam at Sankey Valley Park.

Figure 3 - Sankey Valley Park - October 2020

4.0 Storm Christoph 18th to 20th January 2021 - Overview

4.1 In January 2021 the Met Office posted the following information relating to Storm Christoph:

'Storm Christoph brought some exceptionally wet weather to North Wales and northern England from 18 to 20 January. 100mm of rain or more fell across upland areas, and parts of Cheshire, Greater Manchester and Lancashire received around the January whole-month long-term average rainfall from this event.

For north-west England and North Wales this was one of the wettest 3-day periods on record. Storm Christoph also brought some strong winds, particularly across eastern England and Scotland, and as the storm cleared eastwards, it brought some significant snowfalls with blizzard conditions across upland in the north-east.

A number of homes were flooded in Cheshire, much of Northwich town centre was under water and residents of two care homes were evacuated by dinghy. Homes were also evacuated in Warrington, Chester, Didsbury and Northenden in Manchester, Ruthin and Bangor-on-Dee in North Wales, and Maghull in Merseyside due to rising floodwater, while some properties were also flooded in South Wales. Evacuations were made more difficult by both the ongoing coronavirus pandemic and falling snow. A bridge over the River Clwyd in Denbighshire was swept away by floodwater, and the East Coast Main Line was affected by floods between York and Darlington. The snowfalls caused travel disruption, with many roads affected by snow, the A9 closed south of Inverness and the Queensferry crossing closed for a time due to the risk of falling ice. Icy conditions on the M5 near Bristol caused multiple crashes including an overturned lorry. Avalanche debris was spotted in the Pentland Hills south-west of Edinburgh.'

50 to 100mm of rain fell widely across Wales and north-west England, with over 100mm across upland areas of Wales, south-west England, the Lake District and the Pennines, and locally 150 to 200mm across the higher ground. Half of the January full-month average rain fell widely across Wales and northern England, with the whole-month average falling across parts of Cheshire, Greater Manchester, Lancashire and parts of north-east England and East Lothian.

North-West England and North Wales experienced three consecutive very wet days from 18 to 20 January with area-average rainfall totals of 18.2mm, 35.7mm and 25.5mm – overall 79.4mm making this provisionally the wettest 3-day period on record for this region in a series from 1891 – marginally

wetter than 3 to 5 December 2015 (78.2mm) – the latter including the record-breaking rainfall from storm Desmond.

Storm Christoph was named for the potential impacts from the heavy rainfall and flooding, but nevertheless there were some strong winds, particularly across eastern England with Marham (Norfolk) recording a gust of 60Kt (69mph) overnight 20th to 21st as the low moved east across the UK. As the low moved into the sea, it intensified, drawing a cold northerly airflow to north-eastern parts of the UK bringing snow across upland areas of north-east England and eastern Scotland on 21 January, with strong winds leading to blizzard conditions at times over high ground.'

4.2 Locally the Warrington Guardian reported in relation to Storm Christoph as follows:

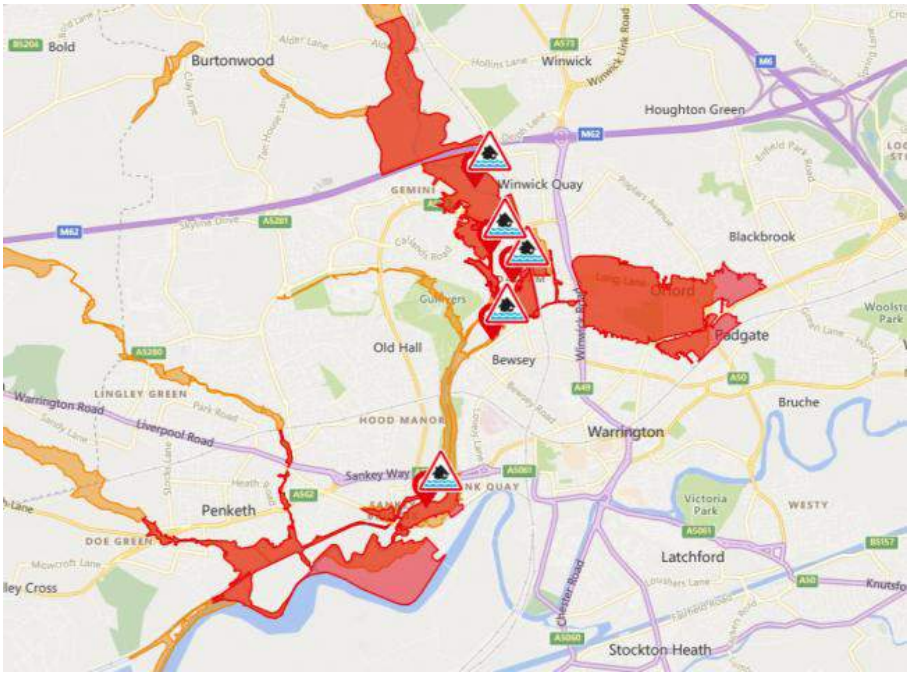

Figure 4 - Flood Warning Map issued on 21st January 2021

4.3 *'Heavy rainfall from Storm Christoph has resulted in a number of flood warnings being issued across Warrington.*
Around 100 residents have been evacuated from their homes in the town as a result of flooding.
As of this morning there are still five flood warnings in play in the town and one flood alert, according to the Government's flood information service.
A flood alert for the River Glaze catchment area, which included Howley, Padgate, Woolston, Cinnamon Brow, Glazebrook and Glazebury has been removed.

4.4 *'Sankey Brook at Gemini – flood warning*

River levels are rising at Causey Bridge river gauge as a result of heavy rainfall and will remain high until Friday. We believe there is a possibility of flooding for commercial and retail property off Europa Boulevard at Gemini Industrial Park.Further heavy rainfall is forecast over the next 48 hours.' See Figure 5 below.

Figure 5 - Cromwell Avenue - January 2021

4.5 *'Areas closest to Sankey Brook at Dallam – flood warning*

*River levels are rising at the Higham Avenue river gauge as a result of persistent heavy rainfall. Consequently, flooding of property is expected.Further rainfall is forecast over the 48 hours***.**'

4.6 *'Wider area at risk from Sankey Brook at Dallam – flood warning*

River levels are rising as a result of heavy rainfall and are expected to remain high until Friday. Consequently, flooding for properties between Callands Road and Sankey Brook is possible. Further rainfall is forecast over the next 48 hours.' See figure 6 below.

Figure 6 - Sankey Valley Park - January 2021

4.7 *'Sankey Brook around areas of Bewsey, Longford, Orford, Great Sankey and Penketh – flood warning*

*River levels are rising as a result of heavy rainfall and are expected to remain high until Friday. Consequently, flooding for properties close to Sankey Brook is possible***.'** See Figures 7 and 8 below.

Figure 7 - Hawleys Lane east of railway line - January 2021

Figure 8 - Hawleys Lane west of railway line - January 2021

4.6 *'Areas closest to Sankey Brook at Sankey Bridges – flood warning*

*River levels are rising at the Liverpool Road river gauge as a result of heavy rainfall and are expected to remain high until Friday. Consequently, flooding of properties along parts of Liverpool Road is possible. Further rainfall is forecast over the next 48 hours***.'**
See Figures 9 and 10 below.

Figure 9 - Old Liverpool Road - January 2021

Figure 10 - Old Liverpool Road - January 2021

5.0 Appeal Site Flooding - October 2020/January 2021

5.1 The Peel Hall Rule 6 Party has received a number of reports and photographs of flooding at various locations on the appeal site, and we enclose a short selection of these photographs below.

5.2 Figure 11 below was taken at Ballater Drive Playing Fields on 9th October 2020 some days after Storm Alex passed through the region.

Figure 11 - Ballater Drive - October 2020

5.3 Figure 12 below again shows the playing fields at Ballater Drive, this time in January 2021 immediately following Storm Christoph.

Figure 12 - Ballater Drive - January 2021

5.3 Figure 13 below show an aerial photograph of Radley Common Community Centre taken on 21st January 2021, looking south.

Figure 13 - Radley Common Community Centre - January 2021.

6.0 Comments and Discussion

Storm Alex

6.1 Storm Alex arrived in the UK over the weekend of 3rd/4th October 2020.

6.2 As the storm strengthened across the UK the Environment Agency started to issue flood warnings and flood alerts, and by early morning on Sunday 4th October the EA had issued 15 flood warnings and a further 74 flood alerts across England. These flood alerts included the entire Sankey Valley catchment from St Helens to Warrington, and the alert indicated that flooding could occur and that local residents should be prepared for that to happen.

6.3 Locally in Warrington the water level along Sankey Brook started to rise at lunchtime on Saturday 3rd October and by 1am on Sunday 4th October the level of the water gauge at Higham Avenue in Dallam indicated that minor flooding could occur.

6.4 This warning turned out to be correct because by lunchtime on Sunday 4th October it was evident that minor flooding had occurred in Sankey Valley Park which is located a short distance downstream from the Higham Avenue water gauge.

6.5 Fortunately Warrington was spared the worst of the storm and we are not aware of any significant flooding throughout the rest of the town or its immediate surroundings as a result of Storm Alex.

6.6 However the fact that Sankey Brook caused flooding in Sankey Valley Park when the rest of the town appeared to be relatively unscathed is significant in itself given the massive flood event that was set to occur less than four months later across the same Sankey Valley catchment as a result of Storm Christoph.

Storm Christoph

6.7 Storm Christoph arrived in the UK over the 3-day period from 18th to 20th January 2021.

6.8 As of 10am on Wednesday 20th January the Environment Agency had issued 52 flood warnings and 175 flood alerts across England. Prominent amongst the flood warnings was one which referred to ‘areas closest to Sankey Brook at Dallam.’

6.9 As of 8pm on 20th January 20th 2 serious flood warnings had been issued in Great Manchester meaning there was a threat to life and serious disruption. People living in the north west were being urged to prepare for the risk of significant flooding for the rest of the week.

6.10 Locally in Warrington the water level along Sankey Brook started to rise at midnight on Tuesday 19th January and by midnight on Wednesday 20th January the level of the water gauge at Higham Avenue in Dallam indicated that minor flooding could occur. The water level continued to rise and by early afternoon on 20th January the water level passed the previously recorded maximum level at this location. The water level finally peaked in the early hours of Thursday January 21st at 5.99m which is more than 2.5m higher than the previously recorded maximum level at this location.

6.11 Five flood warnings were issued on Thursday 21st January along the whole of the Sankey Brook catchment from Europa Boulevard in the north to Liverpool Road in the south, and major flooding was recorded at many locations, including:
Cromwell Avenue
Calver Road
Winwick Road
Gough Avenue
Densham Avenue
Hawleys Lane
Longshaw Street
Old Liverpool Road
-plus many minor roads throughout this region. The photos enclosed with this document represent just a small number of the many photos and videos sent through to the Rule 6 Party in the days since the storm occurred.

6.12 As a result of the storm over 300 residents in more than 100 homes mainly located in Bewsey and Dallam had to be evacuated from their properties and housed overnight in emergency accommodation. Warrington Borough Council's Chief Executive Stephen Broomhead confirmed that 'we had a month's worth of rain in 30 hours - the volume of rain along with the snow as well was huge.'

6.13 It should also be noted that the appeal site itself has demonstrated evidence of substantial flooding as a result of Storm Christoph. The Rule 6 Party has received a number of reports and photographs of flooding across the site as a result of the storm, including drone footage showing an extremely large flooded area in the vicinity of Windermere Avenue and Grasmere Avenue at Radley Common Community Centre. We have also received an unconfirmed

report on Facebook from a local resident that the 'backyards of the flats on Windermere Avenue were totally flooded from the fields and woodland area' following Storm Christoph on 20th/21st January.

General Comments and Discussion

6.14 Given this information regarding the appeal site and the fact that the existing watercourses the appellant proposes to use for the disposal of surface water connect to areas downstream that remain prone to flooding then it is not difficult to envisage a substantial flood event occurring on and around the site during a future storm event should it ever be developed.

6.15 The appellant's response to the suggestion in our original Proof of Evidence regarding flooding on and around the site is set out in the TPA Technical Note - Response to Rule 6 Proof of Evidence dated August 2020. In the document TPA make at least five references to the provision of additional on-site attenuation across the site, including expanding the capacity of the Spa Brook and the retention and controlled release of flood water within the site itself.

6.16 However these proposals give no comfort at all to local residents who have seen at first hand the strength of Storm Christoph and the way in which it has undermined existing flood defences throughout the Sankey Brook catchment. It also begs the question as to exactly how much storage will need to be provided across the appeal site given that the appellant has already identified the requirement for 11 attenuation ponds in his original flood risk assessment.

6.17 In our original Hydrology Proof of Evidence which we submitted to the Inquiry in September 2020 we referred to the fact that climate emergency means many catchments routinely experience a 1:100-year flood every year making accounting for climate change imperative.

6.18 In that respect the two storm events that have occurred since the inquiry was adjourned have shown this to be the case, and both have established unwanted records of their own.

6.19 On 3rd October 2020 Storm Alex produced the UK's wettest day on record in a series dating back to 1891, and from 18th-20th January 2021 Storm Christoph produced the wettest 3-day period on record in a series dating back to 1891 in the North West of England and North Wales.

6.20 It is now clear that storm events are becoming far more frequent and much more intense given that six out of the UK's top 20 wettest days in the series

from 1891 have occurred this century (since 2000) and of these, two occurred in the year 2020.

6.21 It was also clear following Storm Christoph last week that a number of watercourses downstream from the appeal site that are intended to be used for the disposal of surface water were again unable cope with the sheer volume of water generated by the storm. Mill Brook, Dallam Brook and Sankey Brook all caused widespread flooding throughout north Warrington on a scale not seen in recent times.

6.22 In practical terms this meant that Densham Avenue located immediately downstream from the appeal site experienced flooding to properties and businesses for the third time since October 2019, despite flood alleviation works by way of storage tanks having being installed in 2015. Hawleys Lane nearby was also flooded for the third time in the past 18 months.

6.23 WBC Chief Executive Stephen Broomhead also confirmed that the council would be undertaking a review to look into the response from authorities and improvements for the future. The review will also look at some of the areas worst affected by the flooding, such as Bewsey, Dallam and Densham Avenue to see if previous measures introduced there worked.

6.24 Mr. Broomhead also confirmed that the Council is looking at a joint bid with St Helens Council for £6 million from the Government for increased flood defences on Sankey Brook. Both of Warrington's MPs, Charlotte Nichols and Andy Carter are backing it.

7.0 Closing Statement

Hydrology, drainage and flood risk were placed into reserved matters at a very early stage in the Peel Hall application process and there appears to have been very little discussion on these topics until the period leading up to the 2020 inquiry. However since the inquiry was adjourned the devastating events surrounding Storm Christoph and its impact on the people of Warrington have brought these topics very much to the fore.

In our original Proof of Evidence we expressed major concerns about the poor level of detail contained in the appellant's flood risk assessment. We posed a number of important questions relating to the Spa Brook itself, the source of the Spa Brook upstream, the use of a long and fixed diameter culvert to discharge surface water from the site, the potential issues with groundwater discharge and the location of two critical drainage areas downstream. Unfortunately the appellant's response in each case was simply to state that even more attenuation could be provided, including the retention and controlled release of flood water within the site itself, a vitally important issue that has barely rated a mention in the past 56 months since the first application.

The Rule 6 Party supports the joint bid between Warrington Borough Council and St Helens Council for a £6 million funding package from the Government for flood defences on Sankey Brook. However before any work is carried out we believe that a full hydrology, drainage and flood risk investigation must be undertaken across the Sankey Brook catchment. This investigation will need to identify all the major issues across the catchment and the work required to bring about a permanent solution to the flooding that seems to beset certain locations on a regular basis.

We also believe that it would be totally irresponsible for any party to proceed with a major housing development in north Warrington that is dependant upon the Sankey Brook catchment for the disposal of surface water until such time as a full hydrology, drainage and flood risk investigation has been completed. The events surrounding Storm Christoph were devastating for so many people, and the last thing they want to see at the present time are proposals for yet more housing in this part of Warrington, particularly if the proposed housing is upstream from their own property.

For many people living in the Sankey Brook catchment flooding issues have now become a reality as a result of Storm Christoph, and it is certainly something that they don't want to go through again. Therefore for all the reasons set out in this closing statement the Rule 6 Party firmly believes that the appellant's appeal against refusal to allow the Peel Hall site to be developed must again be turned down.