

Preliminary flood risk assessment: Cheshire East Council

This addendum by Cheshire East Council (2017) updates the council's preliminary flood risk assessment report published in 2011. Read the addendum in conjunction with the [preliminary assessment report](#).

Addendum

The preliminary flood risk assessment (PFRA) and flood risk areas (FRAs) for Cheshire East Council were reviewed during 2017, using all relevant current flood risk data and information.

Past flood risk

To assess whether any flood events have changed the understanding of significant flood risk in the lead local flood authority (LLFA) area since 2011, all incidents of flooding recorded by Cheshire East Council, the Environment Agency, Cheshire Fire and Rescue Service, and United Utilities were collected and reviewed using a GIS analysis.

Figure 1 (see page 5) shows the location of all internal flood incidents post 2011 recorded across the LLFA area and Table 1 summarises the number of flood incidents by town.

Table 1 - Number of internal flood incidents post 2011 by town

Location	Number of flood incidents
Macclesfield	47
Crewe	34
Nantwich	34
Poynton	26
Wilmslow	25
Knutsford	17
Congleton	12
Bollington	11
Sandbach	10
Middlewich	9
Handforth	6
Disley	5
Alsager	4
Alderley Edge	4
Mere	4
Prestbury	4
Audlem	3
Wildboarclough	2
Mow Cop	2
Aston	1
Brereton	1
Road Heath	1
Scholar Green	1
High Legh	1

The GIS analysis identified a number of incidents located outwith the 1% AEP (1 in 100) surface water flood area as illustrated by the risk of flooding from surface water (RoFSW) mapping. These incidents were then spatially joined to the existing 1km grid squares (PFRA_PeopleSensitivityGrid_1KM.shp), with the number of people, non-residential properties and critical infrastructures affected by past flood events recorded within the files metadata.

This information was then used to identify any new 1km grid squares that would now exceed the 'significance' thresholds as set by the Environment Agency. However, based on the

incident data collected and the methodology applied, no new 1km significant risk areas were identified.

Only one flood event has occurred since 2011 that was significant enough to require an investigation under Section 19¹ of the Flood and Water Management Act. During this event, which occurred in Poynton in 2016, flooding was a result of prolonged and heavy rainfall, which exceeded the capacity of the surface water drainage system and high water levels in the local watercourses, which also resulted in a reduced outfall capacity of local sewer networks. Consequently, 117 residential properties flooded between the 11th and 13th June, of which 11 suffered from flooding internally. Businesses affected included the Brookside Garden Centre, which experienced flood depths of approximately four foot. Nine road closures were recorded and landslides resulting from heavy rain closed the railway line. It is noted that Poynton was identified as an area where the flood risk threshold was exceeded in the 2011 PFRA report and this flood incident has not changed our understanding of risk in this area.

Future flood risk

An assessment was undertaken to review whether new information on the potential consequences of future floods, the impact of climate change or long-term developments has changed the understanding of flood risk in the LLFA area since 2011.

Existing future risks

Since the original PFRA report in December 2011, the Environment Agency has released the RoFSW as a supplementary dataset to the Areas Susceptible to Surface Water Flooding map (AStSWF) used in the 2011 assessment. Cheshire East Council considers the RoFSW to provide a more accurate representation of surface water flood risk for the 1% AEP (1 in 100 year) and 0.1% AEP (1 in 1000 year) event. Annex 2 contains the details of the new assessment methods and model.

In addition to surface water, the impact of other local flood sources has been considered including groundwater through interrogation of the Environment Agency's AStGWF dataset. The review identified Crewe and Nantwich as having a high potential for groundwater flooding. However, there are no records of flood incidents from this source indicating that groundwater flooding is not a significant risk in these areas.

The Council have undertaken detailed flood modelling of ordinary watercourses at four locations across Cheshire East with two locations in Wilmslow and two in Poynton. These models have identified additional risk areas outwith that indicated by the RoFSW data. However, the additional properties identified as being at risk in Wilmslow would not result in the significant threshold being exceeded for any 1km grid square. 1 km grid squares covering Poynton already exceed the significance threshold. As such, no change is proposed the Environment Agency assessment of risk based on this information.

Flood risk to sensitive receptors including: heritage sites, listed buildings, railway stations, IPPC and COMAH sites, and vulnerable local sites such as caravan sites, have also been considered as part of this PFRA review. The analysis identified a number of Grade II listed buildings at risk from surface water flooding in Congleton. However, by giving these sites equal status to non-residential properties, no new 1km grid squares were found to exceed to the significant risk threshold. No other locally important sites were identified as being at risk from surface water.

¹ An investigation into a flooding event that a lead local flood authority (LLFA) is required to carry out under Section 19 of the [Flood and Water Management Act 2010](#), and according to [the LLFA's local flood risk management strategy](#)

The number of key infrastructure items identified as being at risk from the 1% AEP (1 in 100 year) rainfall event within each 1km grid square is presented on Figure 4. As the review process did not identify any other critical receptors at risk of flooding, this figure displays the results of the Environment Agency analysis.

The impacts of climate change

To assess the potential impacts of future climate change, the Environment Agency created a dataset known as the "Heat Map"², which illustrates the absolute increase in the number of people that may be at risk from a 0.1% AEP (1 in 1000 year) rainfall event compared to a 1% AEP (1 in 100 year) rainfall event. This uses the 0.1% AEP (1 in 1000) rainfall event as a proxy for the effects of climate change. If the impacts of climate change are realised, this dataset indicates that the total number of people at risk of surface water flooding in Cheshire East would increase from 5,157 to 24,526. The 376% increase in the number of people at risk is considered to be a moderate impact when compared to other areas across England, with Cheshire East ranked 53rd of 151 LLFAs across England.

The assessment identifies the major towns of Crewe and Congleton as the most sensitive to the impacts of climate change. In these towns, climate change impacts would result in additional 1km grid squares exceeding the significant risk threshold. In both of these areas, clusters of five or more 1km grid squares where the flood risk threshold would be exceeded are formed. This indicates that they would qualify as flood risk areas in the future, based on the current significance thresholds. However, as there are already known surface water flood issues in both of these towns this information does not significantly change our understanding of flood risk but it does confirm the challenges that climate will pose to flood risk management in the future.

The location of 1km grid squares exceeding the significance thresholds in the 0.1% AEP (1 in 1000 year) rainfall event are presented on Figure 3 and are summarised in Table 2 located at the end of this report (see page 6-8).

The impact of long term development

To consider the potential future impacts of long-term development on flood risk, a high level review has been undertaken by comparing future development sites, as allocated in the Cheshire East Council's Local Plan, with the 1% AEP (1 in 100) surface water flood extent from the updated Flood Map for Surface Water. Out of the 80 development sites allocated, the assessment identifies 49 housing, mixed use, and employment sites, which could be at risk from surface water flooding. The proportion of the sites covered by the flood risk zone was calculated and the number of future people to be at risk estimated by assuming 25 homes per hectare³ and 2.34 people per property.

The number of people and property potentially at risk from flooding as a result of future developments was added to the information on the existing level of risk within each 1km grid square to identify any new areas that would exceed the significant risk thresholds. This assessment identified a further seven 1km significant risk areas ("blue squares") due to more than 200 people being at risk from flooding. Three of these areas are located in Macclesfield and would fall within the Macclesfield FRA or immediately adjacent to it. The remaining additional significant risk areas are located in Crewe (3) and Nantwich (1). However, this assessment alone did not identify any additional clusters of five or more squares passing the threshold that would justify being defined as a Flood Risk Area. This assessment of future development impacts assumes that the risk of flooding to these new developments is uncontrolled. However, in England, Section 10 of National Planning

² Information provided by the Environment Agency to support LLFAs in the review of PFRAs in 2017

³ Typical density for suburban development. See for info at

<http://www.insidehousing.co.uk/journals/insidehousing/legacydata/uploads/pdfs/IH.060623.035-037.pdf>

Policy Framework aims to ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk. Where new development is necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and where possible, reducing flood risk overall.

Adherence to Government policy ensures that new development does not increase local flood risk. However, in exceptional circumstances the Local Planning Authority may accept that flood risk can be increased contrary to Government policy, usually because of the wider benefits of a new or proposed major development. Any exceptions would not be expected to increase risk to levels which are "significant" (in terms of the Government's criteria).

The Council will ensure new developments will, where possible manage surface water at source and ensure developments do not contribute to flooding problems elsewhere through both spatial planning and the development management process. Where possible, opportunities for new development to relieve existing problems by improved management of surface water flows will be explored.

Flood risk areas (FRAs)

The following FRA has been identified for the purposes of the Flood Risk Regulations (2009) second planning cycle:

- Macclesfield

Other changes

No changes to or creation of new Risk Management Authorities (RMAs) has occurred within Cheshire East. The roles and responsibilities of the RMAs as defined within the Cheshire East Preliminary Flood Risk Assessment and the Local Flood Risk Management Strategy also remain unchanged.

**Cheshire East Council
December 2017**

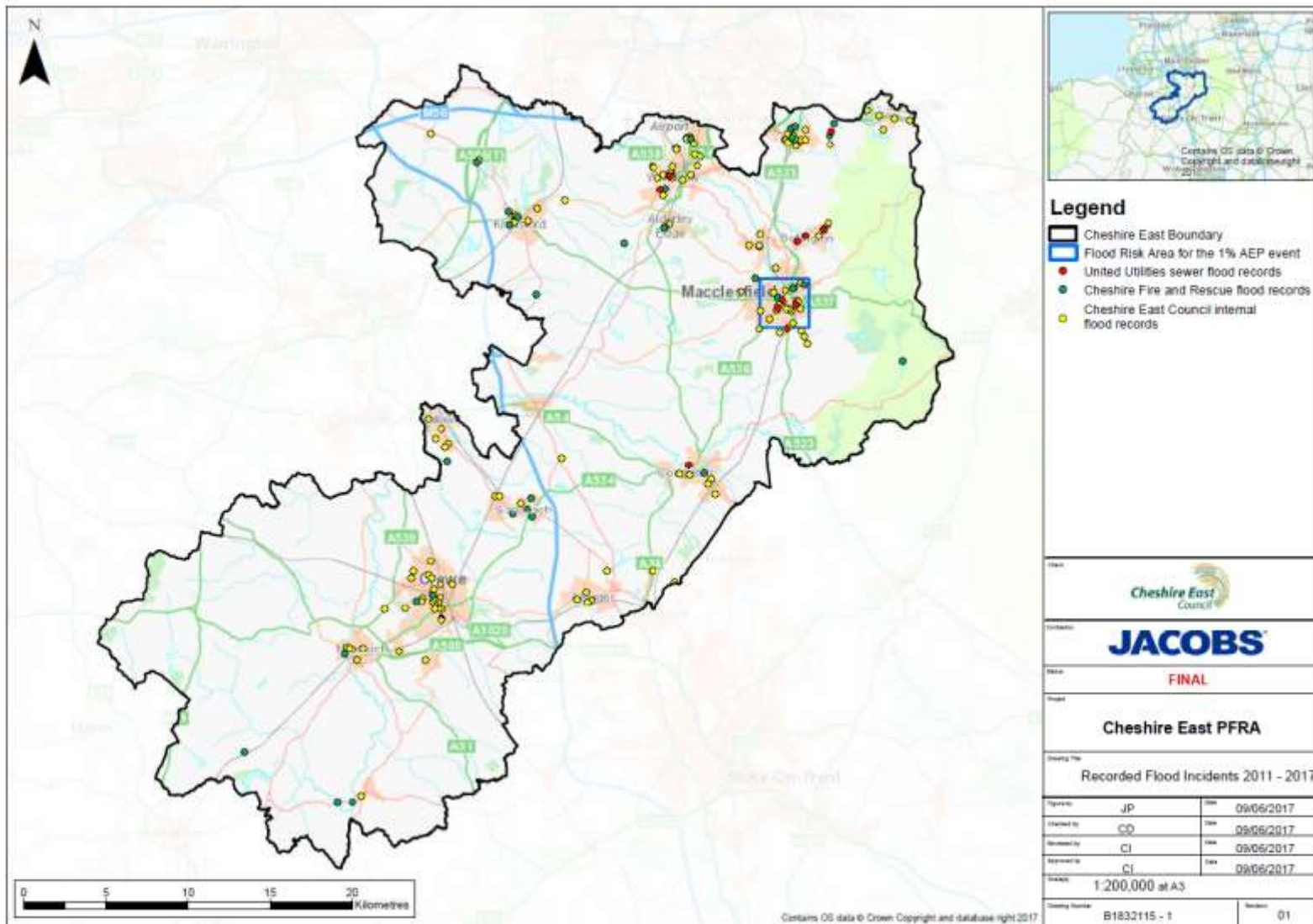


Figure 1: Location of recorded flood events in the Cheshire East lead local flood authority area 2011-2017

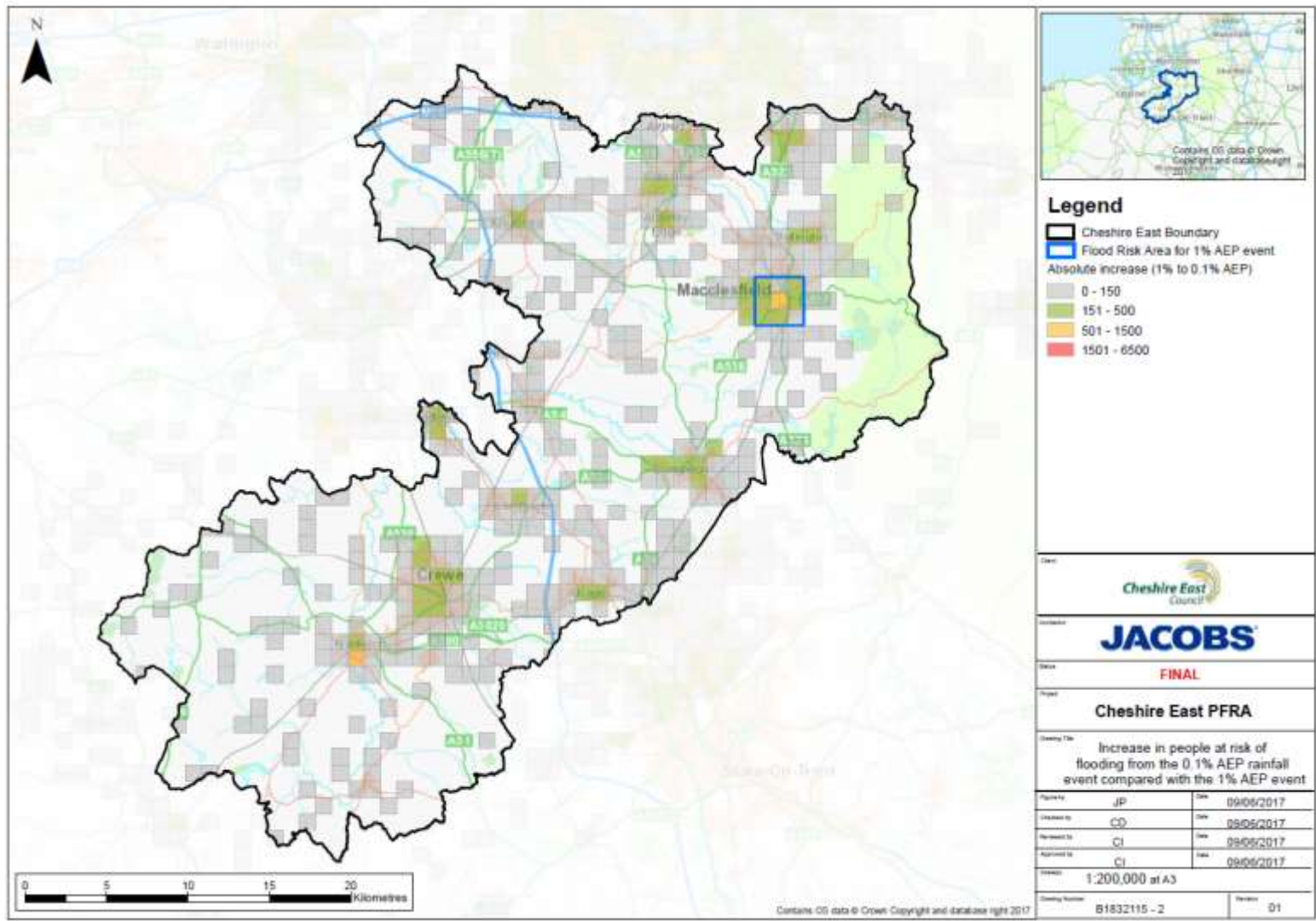


Figure 3: Increase in people at risk of flooding from the 0.1% AEP rainfall event compared with the 1% AEP event

Table 2 - Summary of 1km grid squares which pass the flood risk threshold in the 0.1% AEP Event but not the 1% AEP rainfall event.

Town	Grid square	People at risk from the 1% AEP flood	People at risk from the 0.1% AEP flood	key infrastructure at risk from the 1% AEP flood	key infrastructure at risk from the 0.1% AEP flood	Non-residential property at risk from the 1% AEP flood	Non-residential property at risk from the 0.1% AEP flood
Alsager	X378Y356	14	80	0	2	0	0
Alsager	X381Y356	42	84	1	2	0	0
Alsager	X379Y355	21	178	1	2	0	3
Alsager	X380Y355	61	222	0	0	3	5
Bollington	X392Y377	44	248	0	2	1	9
Congleton	X386Y362	59	318	0	0	7	20
Congleton	X384Y363	77	318	0	0	2	9
Congleton	X385Y363	91	356	1	2	5	35
Crewe	X370Y356	147	353	0	1	19	26
Crewe	X371Y356	56	435	0	1	0	2
Crewe	X369Y354	47	239	0	1	0	0
Crewe	X370Y354	9	220	0	0	0	12
Crewe	X369Y357	33	510	0	2	0	2
Crewe	X369Y355	16	190	0	2	0	7
Crewe	X370Y355	14	229	1	4	16	63
Handforth	X385Y383	23	176	1	2	0	5
Handforth	X386Y384	0	80	0	0	3	22
Handforth	X387Y384	14	208	0	0	0	0
Holmes Chapel	X376Y366	16	66	0	2	0	5
Holmes Chapel	X375Y367	2	42	0	2	0	0
Holmes Chapel	X376Y367	2	73	0	3	0	9
Kidsgrove	X382Y354	164	278	0	0	3	8
Kidsgrove	X384Y355	133	206	0	1	0	1
Knutsford	X373Y378	0	12	0	2	0	4
Knutsford	X375Y377	54	204	0	2	0	0
Knutsford	X376Y379	33	154	1	3	0	6
Macclesfield	X389Y374	75	276	0	0	0	1
Macclesfield	X390Y374	70	222	0	0	0	0
Macclesfield	X391Y372	59	239	0	0	1	8
Macclesfield	X389Y373	145	405	0	0	0	4
Macclesfield	X390Y373	49	227	1	4	0	14
Macclesfield	X392Y373	66	339	1	1	5	22
Macclesfield	X391Y371	30	94	0	1	4	33
Middlewich	X370Y366	33	208	0	0	3	15
Middlewich	X370Y365	89	395	0	0	1	3
Nantwich	X365Y351	56	683	0	1	0	1
Nantwich	X365Y352	75	447	0	0	5	26
Nantwich	X365Y353	21	126	0	0	0	26
Poynton	X391Y382	49	325	0	1	9	38
Poynton	X391Y383	89	527	0	1	5	21
Sandbach	X375Y360	12	91	0	2	6	15
Sandbach	X375Y361	26	239	0	1	0	0
Shavington	X370Y351	7	51	0	3	0	0
Shavington	X370Y352	23	154	0	3	0	0
Wilmslow / Alderley Edge	X383Y380	47	452	0	1	0	3
Wilmslow / Alderley Edge	X384Y380	23	204	1	2	0	3

Town	Grid square	People at risk from the 1% AEP flood	People at risk from the 0.1% AEP flood	key infrastructure at risk from the 1% AEP flood	key infrastructure at risk from the 0.1% AEP flood	Non-residential property at risk from the 1% AEP flood	Non-residential property at risk from the 0.1% AEP flood
Wilmslow/ Alderley Edge	X384Y378	101	295	0	5	6	28
Wilmslow / Alderley Edge	X384Y381	5	82	0	1	2	45
Wilmslow / Alderley Edge	X384Y379	2	44	0	2	0	0