

Flood Risk Regulations 2009
Preliminary Assessment Report for Kirklees

Executive Summary

Kirklees Council, as a Lead Local Flood Authority (LLFA), has new responsibilities under the Flood and Water Management Act 2010 to manage flood risk from local sources. Parallel European legislation, the Flood Risk Regulations 2009, requires every LLFA to prepare a Preliminary Flood Risk Assessment (PFRA) for submission to the Environment Agency by 22 June 2011.

The PFRA process provides a high-level overview of flood risk from local sources, such as surface water, ordinary watercourses and groundwater. Flood risk from reservoirs and main rivers is the responsibility of the Environment Agency.

Lack of information on past flooding incidents and limited understanding of future flood risk means that this initial PFRA for Kirklees provides only an indicative assessment of local flood risk. The threshold for significant flooding has been set at such a high level that Kirklees can make no case to identify a **European** significant Flood Risk Area within the PFRA. Whilst there is little evidence available to quantify specific flood risk, the report clearly confirms that, in general terms, Kirklees is at locally high risk from surface water flooding with around 35,000 people, across the district, at risk from a rainfall event with a 0.5% chance of occurring.

The PFRA, the Councils recently completed Surface Water Management Plan and the forthcoming Local Flood Risk Strategy will provide the framework to develop a better understanding of both past and future local flood risk, in preparation for the next cycle of local flood risk assessment in 2017.

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1. Introduction

- 1.1. The Flood Risk Regulations 2009 require Unitary and County Councils, in their role as Lead Local Flood Authority (LLFA), to take responsibility for the management of local flood risk. The Regulations prescribe a reporting process for LLFAs which involves the production of a Preliminary Flood Risk Assessment (PFRA) for their area, outlining the flood risk from local sources. The first PFRA has to be submitted to the Environment Agency by 22 June 2011. If the PFRA identifies significant Flood Risk Areas (FRAs), as defined by national significance thresholds, further, detailed Flood Hazard and Risk Maps need to be produced by 22 June 2013 and a Flood Risk Management Plan by 22 June 2015. The cycle of reports is then repeated with the next PFRA, informed by the previous process, required by 22 June 2017.
- 1.2. This initial preliminary assessment report provides an evidence base to assess local flood risk. The report considers flood risk from surface water run-off, groundwater, ordinary watercourses and other sources of flooding but **excludes flooding from main rivers, the sea and reservoirs**, which is the responsibility of the Environment Agency.
- 1.3. The evidence provided in the report will determine the identification of Flood Risk Areas (FRAs), if any, in the district. To ensure a consistent and proportionate approach, Defra and the Environment Agency have identified significance criteria and thresholds to produce indicative Flood Risk Areas.
- 1.4. Kirklees Council has recently completed a district-wide Surface Water Management Plan (SWMP) which records the currently available evidence of risk from surface water flooding. The SWMP has been used to challenge and review the indicative FRAs.
- 1.5. Kirklees is a unitary council in West Yorkshire, bounded by Calderdale, Bradford, Leeds, Wakefield, Barnsley, Derbyshire and Oldham. It has a population of around 400,000 and is the 3rd largest metropolitan council in terms of area. Around 40% of the area is heavily urbanised with 60% rural in character, of which half is in the Pennine hills.
- 1.6. With respect to water resources, Kirklees has 27 large reservoirs, managed by Yorkshire Water, around 100km of enmained river, managed by the Environment Agency and substantial, but unrecorded lengths, of minor watercourse. The district is also crossed by several canals, managed by British Waterways, with a total length of 35km. The main rivers in the district are the Colne and the Calder flowing to the river Aire, which drains around 85% of the area, and the river Dearne, flowing to the river Don, draining the remaining 15%. Average annual rainfall figures for the district range from 1800mm at the Pennine headwaters to 800mm in Huddersfield.

2. Lead Local Flood Authority responsibilities

2.1 As a unitary authority, Kirklees has the role as Lead Local Authority (LLFA) to understand and manage local flood risk. The Councils SWMP has set out a process to develop its understanding of local flood risk on a prioritised, risk-based approach. The approach will utilise existing local frameworks for councillor and public engagement as the main mechanism to inform local communities of

- the Councils local flood risk management strategy,
- the Councils proposals to manage the risk and
- the processes to acquire and record locally held knowledge on previous flood incidents and unrecorded drainage systems

2.2 Kirklees is responding to the commitment to partnership working required under the Flood and Water Management Act by taking an active role in the strategic West Yorkshire Flood Partnership meeting and leading on the operational Kirklees Flood Partnership meeting. The Kirklees SWMP action plan commits the Council and its main partners to a continuing working relationship towards a joint approach to reduce flood risk across the district. The action plan also requires a community engagement strategy to be developed to disseminate information on local initiatives to manage flood risk.

2.3 The partnership arrangements for Kirklees are shown below:

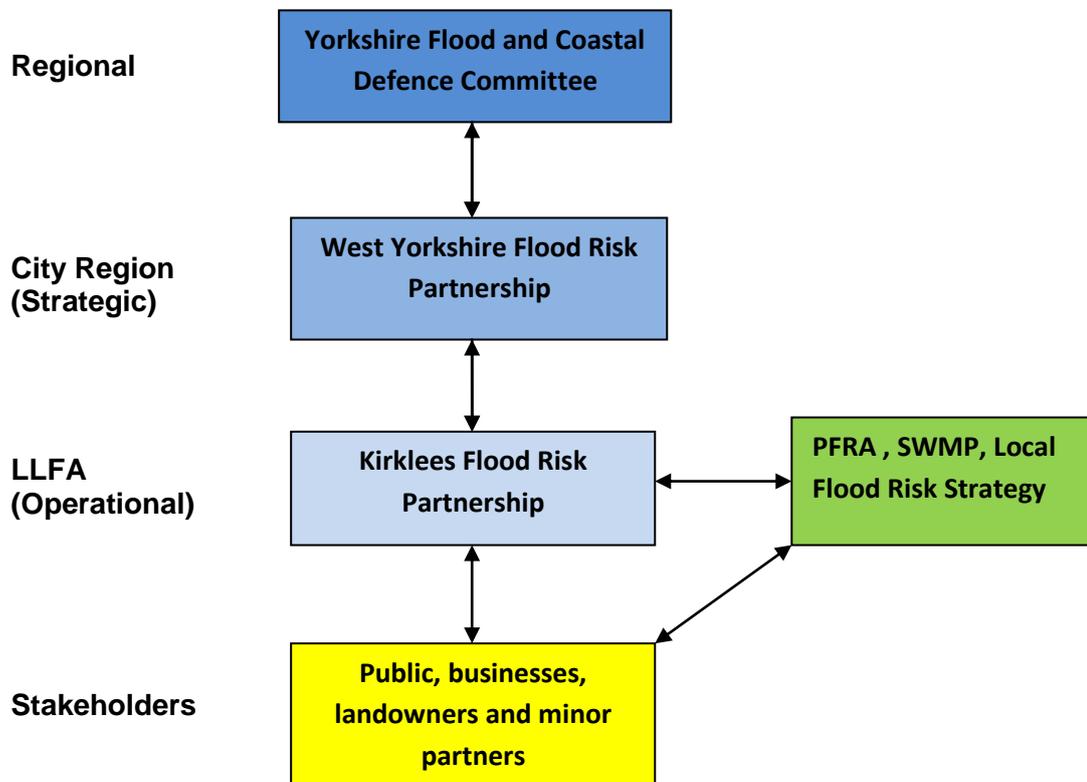


Figure 1 - Flood Partnership Arrangements

3. Methodology and data review

- 3.1. Kirklees, and its preceding authorities, have historically taken a reactive approach to local flood risk management. Flood incident and drainage asset recording have been limited to ad hoc post-flood investigation. Limited funding and lack of foresight in appreciating the value of recording and assessing historic flood incidents has resulted in the Council possessing very limited and incomplete records of past flood events. The use of IT to record customer-reported incidents over the last 10 years has resulted in more complete records for the flooding that occurred at regular periods during the 2000's, but still fall short of providing a comprehensive and consistent assessment of the extent and causes of the flooding events.
- 3.2. The recent completion of the Kirklees SWMP has provided the catalyst to improve the Councils data collection systems to support its new role as LLFA in managing local flood risk. The SWMP will:
- Develop a formal drainage asset recording system for all surface water systems
 - Develop a flood incident recording system
 - Present the two sets of data on a common GIS system to allow easy cross-referencing
 - Provide an initial assessment of relative surface water flood risk across the district
 - Provide a prioritised programme of further detailed investigations
 - Provide a suite of measures that could be employed to mitigate the risk in higher risk areas
- 3.3. Data has been made available by the Councils main partners involved in the SWMP - Yorkshire Water and Environment Agency – but use of the information has been limited by the time constraints to inform both the SWMP and the PFRA. Information that has been used in producing the PFRA include:
- LLFA** - Kirklees SWMP (including all available records of reported flood incidents, both highway and overland flooding), a limited trawl of recent newspaper flooding stories, background information from the Councils Climate Change Adaptation Plan, anecdotal accounts of flooding from Council officers
- EA** - 1st edition surface water maps – Areas Susceptible to Surface Water Flooding (AStSWF)
- 2nd edition surface water maps – Flood map for Surface Water (FMfSW),
 - 2007 aerial photographs
- YW** – Public Sewer network (Insufficient time to consider the implications of the DG5 register). Reservoirs (Inundation plans are currently being prepared by the Council but the risk from reservoir flooding is deemed to be very low)
- 3.4. For the reasons outlined above, this preliminary assessment of local flood risk will be limited by the information currently available. The Council is confident that the regime now in place to record future flood incidents and understand the mechanisms of flooding will provide the evidence to carry out a robust review of the PFRA in 2017, as expected by Regulation 17 of the Flood Risk Regulations.
- 3.5. The LLFA is committed to delivering the outcomes of its SWMP which will include delivering a comprehensive and reliable GIS record of past flood events, an improving record of drainage infrastructure that will help us to understand the flooding mechanisms and a clearer understanding of future flood risk.

4. Past flood risk

4.1. For the reasons described earlier in the report, council records of past flood events are poor. Recording of customer reported flooding through the councils call centre over the last 10 years has facilitated GIS recording of the incidents and there is now a sound basis on which to build a comprehensive record of previous floods. However, the current record of past floods with significant consequences is limited in both number and detail.

4.2. For the purpose of reporting, Kirklees LLFA consider floods with significant harmful consequences to include:

- When floodwater enters habitable properties
- When floodwater disrupts significant transport routes
- When floodwater enters critical infrastructure such as hospitals, schools, day-centres, emergency service property and the like

| Flood Location | Date of Flooding | Description/Type of Flooding | Consequences of Flooding |
|----------------------------------|-------------------------|--|---|
| New Mill | Jul 63 | Thunderstorm/Surface Water | A616 blocked |
| Honley | June 80 | Thunderstorm/Surface Water | Flooded homes + ambulance station |
| Mirfield and Dearne Valley | Oct 00 | 2 week period of rain/Surface Water | 30 flooded properties |
| Mirfield and Holme Valley | July 02 | 40mm in 12 hrs/Surface Water | >10 flooded properties |
| Kirklees | Aug 04 | Heavy rain/Surface Water | Flooded homes |
| Milnsbridge | Aug 05 | Localised thunderstorm/Surface Water | <10 flooded homes |
| Kirklees | June 07 | Heavy rain in May and June/Surface Water | c400 flooded homes + road damage + roads closed |
| Armitage Bridge and Ravensthorpe | Jan 08 | Heavy rain through month/Surface Water | 10-30 properties |
| Slaithwaite | Sept 08 | Heavy rain/Watercourse | A62 blocked |
| Armitage Bridge | Feb 11 | Heavy rain/ Watercourse | 4 flooded homes |

Table 1 - Summary of Past Flooding

Details of past flooding and any consequences are detailed in Annex 1. Past flooding is shown graphically in Figure 2.

5. Future flood risk

- 5.1. The Council has little analytical information available on future surface water flood risk. Limited information on surface water flood risk is available through the councils Strategic Flood Risk Assessment (SFRA) for the river Calder in the general areas of Huddersfield, Mirfield and Dewsbury. A significant amount of work has been carried out in the production of the Councils Surface Water Management Plan (SWMP) to assess all readily available information on local flood risk to develop a programme of further detailed work, prioritised on probability and consequence. The priority areas outlined in the SWMP highlight the areas in the district where the available evidence indicates higher levels of flood risk from sources other than main river. The priority areas are indicated on the summary map in Figure 3.
- 5.2. A number of national assessments of surface water flood risk have been carried out by the Environment Agency. The datasets provide an indication of the highest risk areas and have been used to determine the allocation of funding from Defra for LLFAs. The following tables show the calculated surface water flood risk for Kirklees from a severe rainfall event with a 0.5% chance of occurring, flooding properties to a depth of 300mm. Table 2 shows the spread of risk across the district and Table 3 shows the relative risk in the district compared to its near neighbours.

| Settlement Area | No of Properties affected |
|----------------------------------|----------------------------------|
| Huddersfield | 5500 |
| Dewsbury | 1900 |
| Holmfirth/Honley | 1600 |
| Cleckheaton/Liversedge | 1400 |
| Batley | 1100 |
| Marsden | 450 |
| Skelmanthorpe/Clayton West | 420 |
| Mirfield | 320 |
| Kirkburton | 170 |
| Meltham | 160 |
| Denby Dale | 150 |
| Heckmondwike | 90 |
| Shepley/Shelley | 90 |
| Flockton | 10 |
| Total in main settlements | 13360 |

Table 2 - Surface Water Flood Risk across Kirklees

| LLFA | Surface Water Flooding | Fluvial (River) Flooding | Ranking in all LLFAs |
|-----------------|------------------------|--------------------------|----------------------|
| Lincolnshire | 35,000 | 151,000 | 1/149 |
| Hull | 9,000 | 77,000 | 9/149 |
| North Yorkshire | 16,000 | 40,000 | 19/149 |
| Doncaster | 7,000 | 14,000 | 49/149 |
| Leeds | 16,000 | 5,000 | 50/149 |
| Kirklees | 15,000 | 12,000 | 55/149 |
| Calderdale | 14,000 | 11,000 | 64/149 |
| Wakefield | 10,000 | 21,000 | 79/149 |
| Bradford | 8,000 | 3,000 | 93/149 |

Table 3 - Flood Risk in Kirklees relative to other LLFAs

Excluding Counties and London Boroughs, Kirklees' ranks 7th behind Hull, Birmingham, Brighton, Doncaster, Leeds and Leicester, in terms of the flood risk to be managed by the LLFA.

5.3. Within the context of the flooding issues across the district, the Council considers "**Locally Agreed Surface Water Information**" to be –

- Information that has been accepted by the LLFA as an evidenced and reliable source of local knowledge, principally information received from residents and local members via consultations and investigations
- Information that is accepted by the Environment Agency as evidencing local surface water flood risk, principally the EA national maps, "Areas Susceptible to Surface Water Flooding" and "Flood Map for Surface Water". **It is considered that the "Flood Map for Surface Water" is currently the most representative record of future flood risk for Kirklees** and this data will be the main source of information to support the future development of the PFRA
- Other information includes
 - Council records that detail previous significant flood incidents, significant being those where floodwater enters habitable properties, disrupts significant transport routes or enters critical infrastructure such as hospitals, schools, day-centres, emergency service property and the like,
 - Limited, recent newspaper reports of flooding, often evidenced with photographs,
 - Outputs from the Councils Surface Water Management Plan, which highlights the areas across the district which have been assessed through a consistent process as being at high risk of flooding

Details of predicted future flooding are detailed in Annex 2.

5.4. The impacts of climate change

The Evidence

There is clear scientific evidence that global climate change is happening now. It cannot be ignored.

Over the past century around the UK we have seen sea level rise and more of our winter rain falling in intense wet spells. Seasonal rainfall is highly variable. It seems to have decreased in summer and increased in winter, although winter amounts changed little in the last 50 years. Some of the changes might reflect natural variation, however the broad trends are in line with projections from climate models.

Greenhouse gas (GHG) levels in the atmosphere are likely to cause higher winter rainfall in future. Past GHG emissions mean some climate change is inevitable in the next 20-30 years. Lower emissions could reduce the amount of climate change further into the future, but changes are still projected at least as far ahead as the 2080s.

We have enough confidence in large scale climate models to say that we must plan for change. There is more uncertainty at a local scale but model results can still help us plan to adapt. For example we understand rain storms may become more intense, even if we can't be sure about exactly where or when. By the 2080s, the latest UK climate projections (UKCP09) are that there could be around three times as many days in winter with heavy rainfall (defined as more than 25mm in a day). It is plausible that the amount of rain in extreme storms (with a 1 in 5 annual chance, or rarer) could increase locally by 40%.

Key Projections for Humber River Basin District

If emissions follow a medium future scenario, UKCP09 projected changes by the 2050s relative to the recent past are

- Winter precipitation increases of around 12% (very likely to be between 2 and 26%)
- Precipitation on the wettest day in winter up by around 12% (very unlikely to be more than 24%)
- Relative sea level at Grimsby very likely to be up between 10 and 41cm from 1990 levels (not including extra potential rises from polar ice sheet loss)
- Peak river flows in a typical catchment likely to increase between 8 and 14%

Implications for Flood Risk

Climate changes can affect local flood risk in several ways. Impacts will depend on local conditions and vulnerability.

Wetter winters and more of this rain falling in wet spells may increase river flooding. More intense rainfall causes more surface runoff, increasing localised flooding and erosion. In turn, this may increase pressure on drains, sewers and water quality. Storm intensity in summer could increase even in drier summers, so we need to be prepared for the unexpected.

Drainage systems in the district have been modified to manage water levels and could help in adapting locally to some impacts of future climate on flooding, but may also need to be managed differently. Rising sea or river levels may also increase local flood risk inland or away from major rivers because of interactions with drains, sewers and smaller watercourses. Even small rises in sea level could add to very high tides so as to affect places a long way inland.

Where appropriate, we need local studies to understand climate impacts in detail, including effects from other factors like land use. Sustainable development and drainage will help us adapt to climate change and manage the risk of damaging floods in future.

Adapting to Change

Past emission means some climate change is inevitable. It is essential we respond by planning ahead. We can prepare by understanding our current and future vulnerability to flooding, developing plans for increased resilience and building the capacity to adapt. Regular review and adherence to these plans is key to achieving long-term, sustainable benefits.

Although the broad climate change picture is clear, we have to make local decisions uncertainty. We will therefore consider a range of measures and retain flexibility to adapt. This approach, embodied within flood risk appraisal guidance, will help to ensure that we do not increase our vulnerability to flooding.

Long Term Developments

It is possible that long term developments might affect the occurrence and significance of flooding. However current planning policy aims to prevent new development from increasing flood risk.

In England, Planning Policy Statement 25 (PPS25) on development and flood risk 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, exceptionally, necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and where possible, reducing flood risk overall."

In Wales, Technical Advice Note 15 (TAN15) on development and flood risk sets out a precautionary framework to guide planning decisions. The overarching aim of the precautionary framework is "to direct new development away from those areas which are at high risk of flooding."

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).

5.5. Local Management of Adaptation to Climate Change

A West Yorkshire Adaptation Action Plan was published in September 2010, summarising the evidence base expected for NI188, producing an adaptation action plan and creating a single, unified framework for consultation, engagement and target setting with key partners. A significant element of the action plan relates to adapting to the effects of future flood risk with the inclusion of actions that are complementary to the actions within the councils Surface Water Management Plan, which underpins the information in this Preliminary Flood Risk Assessment.

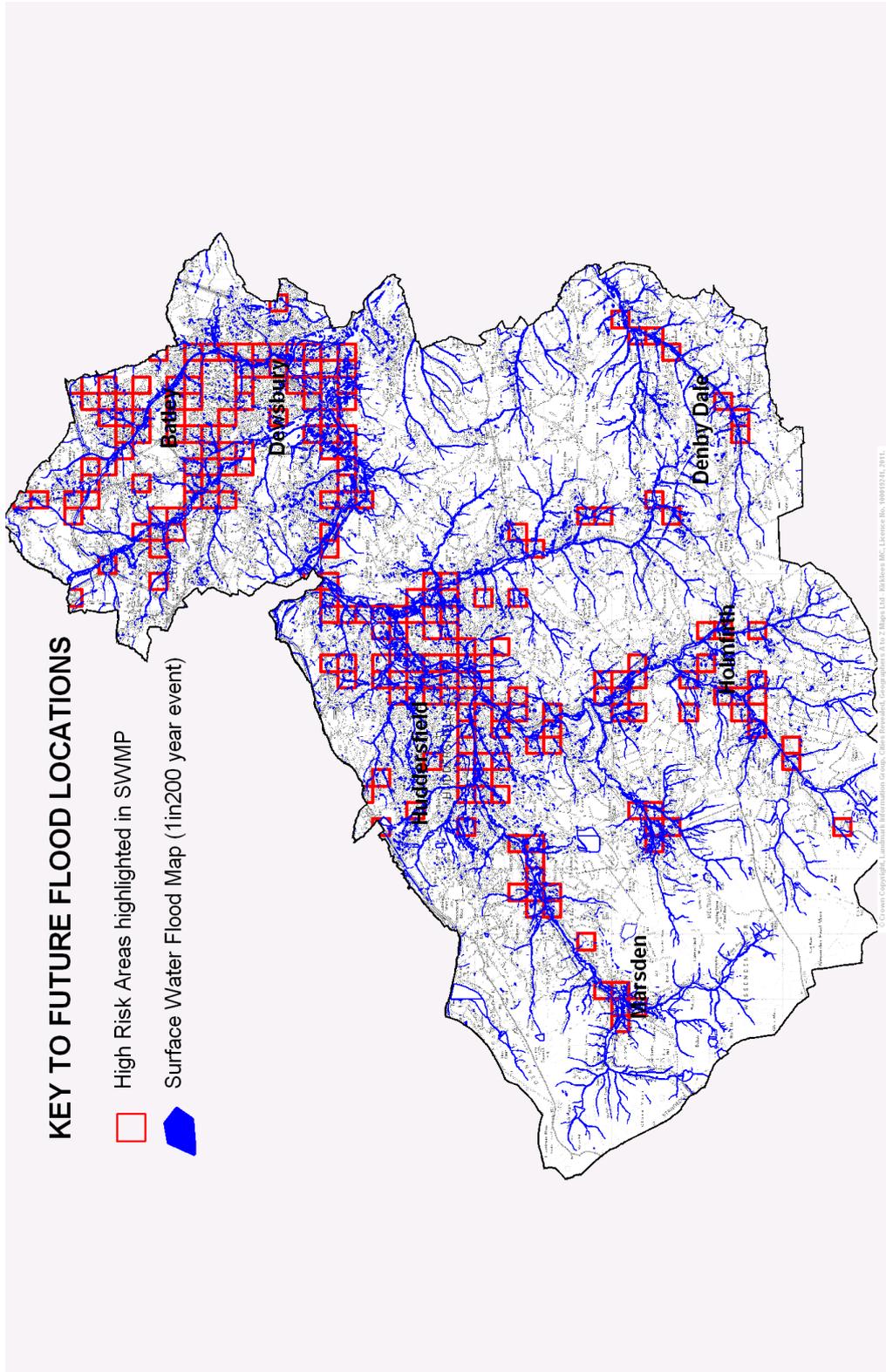


Figure 3 - Future Floods

6. Review of indicative Flood Risk Areas

There are no indicative Flood Risk Areas in Kirklees. Annex 3 has therefore not been completed.

7. Identification of Flood Risk Areas

Kirklees will not propose new Flood Risk Areas to be included in the PFRA, for the following reasons:

- The threshold for determining FRAs is set at 30,000 “at-risk” people. Kirklees has 10,818 at risk in the Huddersfield cluster and 6,929 at risk in the Dewsbury cluster, each falling substantially short of the threshold. A significant number of adjacent high flood risk areas would have to be determined to aggregate to a single cluster greater than 30,000
- The Councils historic records of local flood risk and a lack of understanding of future flood risk mean there is currently insufficient evidence to suggest further local areas for consideration

8. Next steps

The Council has completed and published a district-wide Surface Water Management Plan which sets out a prioritised programme of detailed investigations to provide a robust evidence base for future flood risk mitigation measures. It is anticipated that the SWMP will provide the vehicle to collate the information required to produce a robust PFRA at the start of the next assessment cycle in 2017.

9. References

Calder Strategic Flood Risk Assessment (2008)

Defra (2009) National Rank Order of Settlements Susceptible to Surface Water Flooding

Defra (2009) Distribution of £9.7m early action funding

Defra/ WAG (2010) Selecting and Reviewing Flood Risk Areas for Local Sources of Flooding – Guidance to Lead Local Flood Authorities

Environment Agency (2010) Calder Catchment Flood Management Plan

Environment Agency (2010) Don Catchment Flood Management Plan

Environment Agency (2010) Preliminary Flood Risk Assessment – Final Guidance

Environment agency (2010) Preliminary Flood Risk Assessment – Annexes to the Final Guidance

Environment Agency (2008) 1st generation surface water map – “Areas Susceptible to Surface Water Flooding”

Environment Agency (2010) 2nd generation surface water map – “Flood Map for Surface Water”

Kirklees Climate Change Adaptation Plan (2010)

Kirklees Surface Water Management Plan (2011)

10. Annexes

Annex 1 - Records of past floods and their significant consequences (preliminary assessment report spreadsheet)

Annex 2 - Records of future floods and their consequences (preliminary assessment report spreadsheet)

Annex 3 - Records of Flood Risk Areas and their rationale (preliminary assessment report spreadsheet) - **Nil Return for Kirklees**

Annex 4 - Review checklist

Annex 5 - GIS layer of flood risk area(s) if one/any exist - **Nil Return for Kirklees**