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Chesterfield, Bolsover and North East Derbyshire SFRA
Strategic Flood Risk Assessment

Chesterfield Borough Council, Bolsover District Council and NE Derbyshire District Council
March 2009

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Table of Contents

Executive Summary	8
1.....Introduction	16
1.1 The need for a SFRA.....	16
1.2 SFRA Objectives.....	17
1.3 Planning Policy	17
1.4 Methodology	24
1.5 The Study Area.....	24
2.....Flood Risk.....	28
2.1 Responsibilities	28
2.2 Planning Policy Statement 25.....	31
2.3 Flood Mapping	35
3.....Data Collection	40
3.1 Flood Zone maps.....	40
3.2 Topography.....	40
3.3 Hydraulic Models	40
3.4 Flood Alleviation Schemes	41
3.5 Historic flooding	41
3.6 Defences.....	41
3.7 Flood warning	42
3.8 Other related plans and strategies.....	43
3.9 Data collection for other sources of flood risk.....	44
3.10 Data deficiencies.....	45
4.....Causes of flooding.....	52
4.1 Overflowing of watercourses (including Breach)	52
4.2 Breaching of Embankments.....	53
4.3 Mechanical, Structural or Operational Failure	54
4.4 Flooding from reservoirs, canals and Other Artificial Sources	55
4.5 Groundwater Flooding	55
4.6 Land drainage, sewer and ordinary watercourse flooding.....	55
4.7 Catchment characteristics	57
4.8 Flood Protection of the catchment.....	58
5.....Flooding in Chesterfield, Bolsover and North East Derbyshire.....	62
5.1 Main River Flooding in Chesterfield.....	62
5.2 Analysis of problem areas in Chesterfield	63
5.3 Main River Flooding in Bolsover	65
5.4 Analysis of problem areas in Bolsover	66
5.5 Main River Flooding in North East Derbyshire	67
5.6 Analysis of problem areas in North East Derbyshire	67
5.7 Sewer Flooding	68
5.8 Groundwater flooding and Surface Water Run-off	74
5.9 Other sources of flooding.....	76
6.....Strategic Assessment of Flood Risk.....	80
6.1 Plans and Mapping	80
6.2 Flood risk profile.....	83
6.3 Climate change	86
6.4 Land use changes for Chesterfield	86
6.5 Risk from assets	87
6.6 Flood risk from reservoirs	88
6.7 Mitigation for Flood Zones	90
6.8 Existing Defences below the Required Standard of Protection.....	92

7	Development in Chesterfield, Bolsover and North East Derbyshire	96
7.1	Summary of Regional Flood Risk Assessment	96
7.2	Chesterfield, Bolsover and NE Derbyshire Area	98
8	Assessment of Flood Risk in Study Areas	104
8.1	The Sequential Test	104
8.2	Application of the Sequential Test	105
8.3	The Sequential Approach	105
8.4	Flood risk matrix explanation	107
8.5	General summary	108
8.6	General requirements for planning applications	109
8.7	How to use the SFRA to apply the Sequential Test	115
9	Flood Risk Policies	120
9.1	Current Planning Policy	120
9.2	LDF Draft flood risk policies	122
9.3	SuDS	125
9.4	Culverting of Open Watercourses	125
9.5	Climate Change	126
9.6	Afforestation	126
9.7	Increased Impermeability	126
9.8	Runoff Rates	127
10	Conclusions and Recommendations	130
10.1	Conclusions	130
10.2	Recommendations	131
	Glossary	134
	Appendix A: Historical Flooding Matrix	142
	Appendix B: List of development sites	144
	Appendix C: Data Register	146
	Appendix D: Maps	148
	Appendix E: Use of SuDS and sustainable development	154
	Table 1: Key development planning tools in PPS25 (taken from PPS25)	17
	Table 2: PPS25 Flood Zones (taken from PPS25)	31
	Table 3: Flood Risk Vulnerability Classification from PPS25 (taken from PPS25)	33
	Table 4: Flood Map Types	35
	Table 5: Flood Warning Areas in Chesterfield, Bolsover and NE Derbyshire	43
	Table 6: CBC Sewerage flooding	69
	Table 7: BDC Sewerage flooding	71
	Table 8: NEDDC Sewer flooding	73
	Table 9: Danger to people from breaching relative to distance from defence	84
	Table 10: Danger to people from overtopping relative to distance from defence	84
	Table 11: Danger to people for different combinations of depth and velocity	85
	Table 12: Recommended increases in peak rainfall intensities	86
	Table 13: Percentage of properties that are in Flood Zone 3	96
	Table 14: LPA areas benefiting from defences	97
	Table 15: LPA areas at risk from secondary sources of flooding	97
	Table 16: LPA Areas Residual Risk	97
	Table 17: Flood Risk Profile	98
	Table 18: General responses for all proposed developments	109
	Table 19: Appropriate uses of land in Flood Zones	124
	Figure 1: SFRA Study Area Showing Main Rivers	18
	Figure 2: Development planning process for flood risk (taken from PPS25 Practice Guide)	20
	Figure 3: Process and links to the LDF from PPS25	22
	Figure 4: Individual planning applications – guidance for developers from PPS25	23
	Figure 5: Flood Risk Vulnerability and Flood Zone 'Compatibility (taken from PPS25')	35
	Figure 6: Groundwater Vulnerability Plan	48
	Figure 7: Application of the Sequential Test (taken from PPS25)	106
	Figure 8: Flood Risk Assessment Matrix	112

Figure 9: Sequential Test Requirements.....117

List of Maps(Contained in Appendix D).....149

List of maps - Chesterfield.....149

- Development Sites - Chesterfield Area 01
- Development Sites - Chesterfield Area 02
- Development Sites - Chesterfield Area 03
- Development Sites - Chesterfield Area 04
- Development Sites - Chesterfield Area 05
- Development Sites - Chesterfield Area 06
- Development Sites - Chesterfield Area 07
- Development Sites - Chesterfield Area 08
- Development Sites - Chesterfield Area 09
- Development Sites - Chesterfield Area 10
- Development Sites - Chesterfield Area 11
- Development Sites - Chesterfield Area 12
- Development Sites - Chesterfield Overview

Assets - Chesterfield

Flood Zones - Chesterfield

Historic Flooding, Flood Storage and Defences - Chesterfield Area 01

Historic Flooding, Flood Storage and Defences - Chesterfield Area 02

Historic Flooding, Flood Storage and Defences - Chesterfield Area 03

Historic Flooding, Flood Storage and Defences - Chesterfield Overview

Abbreviations / Acronyms

Abbreviations / Acronyms

AMP	Asset Management Plan
AOD	Above Ordnance Datum
BDC	Bolsover District Council
CBC	Chesterfield Borough Council
CFMP	Catchment flood management plan
CIRIA	Construction Industry Research Information Association
CLG	(Department of) Communities and Local Government
Defra	Department for Environment, Food and Rural Affairs
DPD	Development Plan Documents
EA	Environment Agency
FRA	Site Specific Flood Risk Assessment
FZ	Flood Zone
GIS	Geographical Information System
IDB	Internal Drainage Board
LDD	Local development document
LiDAR	Light Detection and Ranging
LDF	Local Development Framework
LPA	Local Planning Authority
NEDDC	North East Derbyshire District Council
NFCDD	National Flood and Coastal Defence Database
ODPM	Office of the Deputy Prime Minister (now CLG)
Ofwat	Water Services Regulation Authority
PPG	Planning Policy Guidance Note
PPS	Planning Policy Statement
PPS 25	Planning Policy Statement 25
RBMP	River Basin Management Plan
RFRA	Regional Flood Risk Appraisal (RFRA)

Riparian	Persons who own land on the banks of a watercourse or other body of water
RPB	Regional Planning Body
RSS	Regional Spatial Strategy
S106 (Agreement)	Section 106 of the Town and Country Planning Act 1990: allows a LPA to enter into a legally-binding agreement or planning obligation, with a land developer over a related issue.
SA	Sustainability Appraisal
SEA	Strategic Environmental Assessment
SFRA	Strategic Flood Risk Assessment
SHLAA	Strategic Housing Land Availability Assessment
SPD	Supplementary Planning Document
SuDS	Sustainable Drainage Systems
SOP	Standard of Protection

Executive Summary

Executive Summary

ES1. Introduction

- ES1.1 This report is a Strategic Flood Risk Assessment (SFRA) for Chesterfield Borough Council, North East Derbyshire District Council and Bolsover District Council. This SFRA has been prepared in accordance with current best practice, Planning Policy Statement 25 Development and Flood Risk (PPS25) and the accompanying 'living draft' Practice Guide (June 2008).
- ES1.2 The SFRA is a planning tool that enables the council to select and develop sustainable site allocations away from vulnerable flood risk areas. The assessment focuses on the existing site allocations within the districts but also sets out the procedure to be followed when assessing additional sites for development in the future. The SFRA will assist each council to make the spatial planning decisions required to inform the Local Development Framework (LDF).
- ES1.3 The SFRA identifies existing flood risk management measures, including infrastructure and the coverage of flood warning systems. Guidance on the preparation of FRAs for future development sites and the likely applicability of different sustainable drainage systems (SuDS) for managing surface water run-off is also included.

ES2. Flood Risk in the study area

- ES2.1 In order of numbers of residents, the main population centres in the Study Area are Chesterfield, Bolsover, Dronfield, Shirebrook, South Normanton, Clowne, Creswell, Renishaw, Killamarsh, Staveley, Clay Cross and Eckington, although there are also numerous other villages.
- ES2.2 In Chesterfield, Bolsover, and North East Derbyshire there are many different types of flood risk present with the exception of tidal flooding. These include rivers (fluvial), groundwater (notably springs from aquifers), land drainage (low lying areas and runoff from steeply sloped areas), overland flow (pluvial), sewerage, other artificial sources e.g. reservoirs and canals and failure from assets (structures that provide a flood defence function).
- ES2.3 Rivers are the main source of flooding in the Chesterfield Borough Council, Bolsover District Council and North East Derbyshire District Council SFRA area. The reason for this flood risk to people and property is a combination of insufficient channel capacity and the fact that the affected properties are generally on low lying land in the rivers' natural floodplain.
- ES2.4 The recent flooding within the study area (June 2007) is a stark reminder of the potential impact that floodwaters can have upon homes and businesses. It is important to remember that the risk of flooding is posed not only by rivers, but also by surface water runoff and the surcharging of sewers during particularly heavy and/or prolonged rainfall. Unless it is carefully designed, future development can make problems of this kind worse, by blocking flow paths and increasing the volume and speed of runoff from the site. With changing climate patterns, it is predicted that storms of this nature will become increasingly common, potentially increasing the risk posed to properties which are close to even quite small watercourses.
- ES2.5 A regional flood risk assessment (RFRA) for the East Midlands was carried out by Faber Maunsell in July 2006 which assessed potential future flood risk from housing provision and development pressure. Chapter 7 discusses in detail the output from the RFRA in relation to flooding in the study area.

ES2.6 Based on the Regional Flood Risk Assessment (2006) the overall flood risks to each LPA are:

- Chesterfield is classed as medium
- Bolsover is classed as low
- North East Derbyshire is classed as medium to low

ES3. Main risks from Rivers

Chesterfield

ES3.1 The River Rother has been identified as the watercourse that poses the greatest flood risk in Chesterfield. St Augustines in Chesterfield is a location in which failure from assets should be considered.

ES3.2 The areas in Chesterfield where assets are at potential risk of breach are the Derby Road (St Augustines) area of Chesterfield (River Rother), the Rother-Hipper confluence up stream of Station Bridge (Rivers Rother and Hipper) and the Holland Road (Old Whittington) area of Chesterfield (River Rother).

Bolsover

ES3.3 The River Doe Lea has been identified as the watercourse that poses the greatest flood risk in Bolsover. The only known assets within the Bolsover area are along the rural reaches of the River Doe Lea and Normanton Brook. The consequence of increased flooding due to these assets is low.

ES3.4 The area in Bolsover where there is a potential risk of breach is at Pinxton adjacent to the BDC boundary which is protected by flood embankments to a 1 in 100 year standard of protection along the right bank of the River Erewash.

North East Derbyshire

ES3.5 The River Rother has been identified as the watercourse that poses the greatest flood risk in North East Derbyshire. Renishaw and Eckington are areas in NEDDC that have been identified as at risk of flooding from the River Rother.

ES3.6 The known assets within the NEDDC are along the River Drone and the River Rother. Parts of the assets along River Drone are near residential developments, in Dronfield. These assets should be regularly maintained and, if needed, upgraded in order to prevent localized flooding.

ES3.7 The area where assets are at a potential risk of breach is Slitting Mill Farm (River Rother) up stream of Eckington, which is at the boundary of NEDDC and CBC. There do not appear to be any major flood defences in NE Derbyshire where breach could significantly affect existing or future development sites.

ES4. How the SFRA has been developed

ES4.1 A thorough review of existing information was used to identify the level of flood risk at present within the study area from river and other sources. The SFRA identified that the significant source of flood risk within the area was from rivers.

ES4.2 The information on locations of flood risk has been put into a database, with each entry having a reference. These locations have been digitally mapped using a Geographical Information System so that it can be seen if a potential development site could be at risk from one of the potential sources of flood risk. Information such as historic flood outlines and defended areas has also been collected and mapped.

ES4.3 No climate change modeling or flood extent mapping was available for the catchment area as a whole. However, professional judgement has been used to assess the likely impact of climate change.

ES4.4 The study area was delineated into four zones of flood risk in line with PPS25:

Zone 1: Low Probability.

This zone comprises land assessed as having a less than 1 in 1000 annual probability of flooding in any year (<0.1%).

Zone 2: Medium Probability.

This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of flooding (1% - 0.1%) in any year.

Zone 3a: High Probability.

This zone comprises land assessed as having a 1 in 100 or greater annual probability of flooding (>1%) in any year.

Zone 3b: The Functional Floodplain.

This zone comprises land where water has to flow or be stored in times of flood. Equivalent to the 1 in 20 annual probability of flooding in any year (5%).

ES4.5 Within the study area there is a considerable variation in the depth, duration and frequency (and hence the consequence) of flooding to properties situated within Zone 3a. As a result, a further sub-delineation of flood risk has been carried out to assist the LPAs to guide future development to areas of lowest risk within Zone 3a, when it is not possible to find reasonable alternatives in a lower risk zone.

ES4.6 Existing developed areas (or areas with existing planning permission or an allocation that has been protected through the 'Saved Policies' review of the LPAs Local Plans) that are subject to flooding up to (and including) the 1 in 20 year (5%) annual probability have been highlighted as Zone 3a(ii) High Probability.

ES4.7 Areas situated within the 1% (100 year) flood envelope, but outside of the 5% (20 year) flood envelope, have been delineated as Zone 3a(i) High Probability.

ES4.8 The SFRA has been completed in close communication with the Environment Agency (EA). Officers of the EA attended progress meetings where technical issues have been discussed. The EA has also been available throughout the study for guidance to ensure the SFRA is completed in line with their objectives for flood risk management and planning. The SFRA needs to be updated regularly to reflect changes in national and local conditions and policies as these arise.

ES5. Application of the SFRA

ES5.1 PPS25 states that it is the responsibility of developers to consider carefully the flood risk issues at a site as early as possible. The Environment Agency on-line Flood Maps and the SFRA should provide some indication of whether a site is at risk of flooding. However developers should make independent checks prior to purchasing sites/developing sites.

ES5.2 The SFRA has gathered flood risk information in order to complete an initial Sequential Test for future development sites being considered by the LPAs, as described in par 16 of PPS25.

ES5.3 The sequential test requires that land for future development must first be sought within Zone 1 Low Probability. Only if it can be demonstrated that, for sound planning reasons, there are no suitable sites within this area, can sites elsewhere within the District be considered. Sites must then be sought within Zone 2 Medium Probability. Once again, only if it can be conclusively shown that there are sound planning reasons

that outweigh the risk of flooding, can sites be considered for allocations in Zone 3 High Probability.

- ES5.4 Where the Sequential Test has been applied, and the Local Authority considers that there are sound reasons to allocate a site within Zone 2 or Zone 3 on planning grounds, then PPS25 requires the LPA to demonstrate that there are sustainable mitigation solutions available that will ensure that the risk to property and life is minimised (throughout the lifetime of the development) should flooding occur. **This is through the application of the Exception Test and site specific Flood Risk Assessments.**
- ES5.5 To meet the Exception Test the developer should demonstrate the wider sustainability benefits that outweigh the flood risk implications of developing the site.
- ES5.6 This SFRA provides enough information to allow the Sequential Test to be completed for any other sites that are to be brought forward for consideration in the future. The sequential approach should be carried out for sites located in areas at risk of flooding. The developers should make the most appropriate use of land to minimise flood risk, distributing land uses so that the most vulnerable development is located in the parts at lower risk.
- ES5.7 A flood risk matrix has been produced to identify the highest risk potential future development allocations and summarise recommendations. This can be found in the Addendum of the SFRA. For sites affected by multiple Flood Zones, the LPAs should direct the most vulnerable types of development towards the least vulnerable parts of the sites (taking into account flood hazard and the different flood extents).
- ES5.8 It is important to remember however that development in low risk areas, if not carefully managed, may exacerbate existing flooding and/or drainage problems downstream or at a lower level than the development. It is necessary therefore to ensure that developers carry out a Flood Risk Assessment which concentrates on surface water. This should demonstrate that the proposed drainage system design will mitigate any possible increase in runoff that may occur from the site as a result of the proposed development.

ES6. Planning Policy Recommendations

- ES6.1 In consultation with the Environment Agency and the LPAs, the SFRA has developed a suite of specific spatial planning recommendations that should underpin all future development.

ES6.2 POLICY RECOMMENDATION 1 - The Need for a Flood Risk Assessment

The Council may require the submission of an appropriate site specific Flood Risk Assessment from the developer in connection with any application for planning permission.

ES6.3 POLICY RECOMMENDATION 2 - Development in areas deemed to be at Low Probability of flooding, (Flood Zone 1)

The LPA's SFRA has classified all land within one or other of the four Flood Zones described in the SFRA. This classification does not remove the need for site specific FRAs.

ES6.4 POLICY RECOMMENDATION 3 - Development in areas deemed to be at Medium to High Probability of flooding (Flood Zones 2 and 3a)

Developments within the natural floodplain of a river or stream are inherently at risk of flooding and can also increase flood risks to others, not only by increasing surface water runoff rates but by obstructing or diverting flood flows and reducing flood storage. Planning permission should only be granted where specific criteria (Ref: page 124) are met.

ES6.5 POLICY RECOMMENDATION 4 - Development involving building in areas identified as Functional Floodplain (Flood Zone 3b)

Development involving building in areas identified as Functional Floodplain in the SFRA will only be permitted in exceptional circumstances. Specific brownfield sites can be designated as Flood Zone 3a (high risk) and not part of the functional flood plain if agreed between the EA and the LPA.

ES6.6 POLICY RECOMMENDATION 5 - Sustainable Drainage Systems (SuDS)

The LPA will require developers to demonstrate that their surface water drainage proposals, particularly for large sites, are appropriate and adequate for the development and will not increase the flood risk to land and property either upstream or downstream of the development site. The Council considers that Sustainable Drainage Systems (SuDS) are a desirable means of achieving this and encourages their use by developers.

Planning permission for sites without SuDS will not usually be granted unless the Developer can provide sufficient justification as to why SuDS are inappropriate, unfeasible or unnecessary at the proposed development site.

ES6.7 POLICY RECOMMENDATION 6 - Culverting of Open Watercourses

LPAs and the EA will generally oppose the culverting of open watercourses because of the adverse ecological effects, potentially increased flood risk and other consequences that are likely to arise. Where practical in connection with the development proposals, LPAs should seek to have existing culverted watercourses restored to open channels, using planning conditions or S106 legal agreements.

ES6.8 POLICY RECOMMENDATION 7 - Climate Change

All new developments should take account of climate change in terms of both river flows and surface water run-off. River flows should be assumed to increase by up to 20% in 100 years and peak rainfall intensity by up to 30% depending on the lifetime of the development. Current guidance defines development lifetimes of 30 years for retail, 60 years for commercial/industry and 100 years for residential.

ES6.9 POLICY RECOMMENDATION 8 – Afforestation

Afforestation outside floodplains is beneficial and can reduce runoff and flood risk if undertaken in a sustainable manner. Opportunities for afforestation away from the immediate areas of watercourses should be considered, taken up and implemented wherever practical. Deforestation and other significant tree loss should be avoided, especially clear felling.

ES6.10 POLICY RECOMMENDATION 9 - Increased Impermeability

Increases in impermeable area requiring planning permission will not normally be permitted unless it can be demonstrated that the run-off from these areas will not be increased. This could be achieved by the following:

- Sustainable drainage techniques such as permeable pavements and infiltration;
- Underground storage and flow control.

ES6.11 POLICY RECOMMENDATION 10 - Runoff Rates

The LPAs will seek the maximum possible reduction in run off rates:-

- For sites currently draining direct to sewer or watercourse and proposes to use the same outlet(s), a minimum of 30% reduction in peak discharge is required. Indirect drainage via the highway is not included in the calculation of existing flow.
- For sites not currently drained or to be drained to alternative outlets, peak discharge to be restricted to a maximum of 5 litres per second per hectare

ES6.12 Robust Council policy is essential to ensure that the planning recommendations can be imposed consistently at the planning application stage. This is essential to achieve future sustainability within each LPA area with respect to flood risk management.