JACOBS

West Berkshire Council

Strategic Flood Risk Assessment (SFRA) Level 2

North Newbury Development Area

February 2009

West Berkshire Council

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1 North Newbury Development Area

1.1 Introduction

This Level 2 Strategic Flood Risk Assessment (SFRA) has been prepared to assist West Berkshire Council in its planning decisions for the North Newbury Development Area. It supplements information and recommendations contained within the West Berkshire Level 1 SFRA.

This document is specific to North Newbury and the findings and recommendations contained within cannot be applied to other areas covered by the Level 1 SFRA.

1.2 Overview of Flood Risk (PPS25)

The North Newbury Development Area is situated entirely in an area which is at low risk of fluvial flooding; Flood Zone 1 Low Probability in accordance with PPS25. Consequently, there are no restrictions on the type of development which can take place.

However, development in North Newbury is likely to be (without mitigation) both susceptible to flooding and increase the flooding from the following sources:

- surface water runoff
- groundwater
- local drainage systems

Development could also increase the risk of sewer and fluvial flooding elsewhere.

1.3 Spatial Planning Recommendations

1) Consider commissioning a Surface Water Management Plan. The findings of this investigation indicate that the North Newbury Development Area potentially has a number of problems relating to flooding from surface water. The PPS25 advocates the use of Surface Water Management Plans to help manage and reduce the risk of flooding related to surface water.

2) Development in locations identified as Critical Drainage Areas or overland flow paths (see Appendix B Figure 1) should be avoided in line with the recommendations in PPS25 Practice Guide.

3) Consider allocating lower vulnerability development sites within the flow paths highlighted within the Level 1 SFRA as a precautionary measure. The flow paths represent the preferred route of surface water runoff and emerging groundwater.

4) Consult Thames Water regarding the capacity of the receiving wastewater infrastructure. If the infrastructure (sewers and wastewater treatment plants) does not have adequate capacity then there may be considerable impacts on not only the location of the development, but also the type and phasing.

1.4 Development Control Recommendations

The following development control recommendations must be incorporated into all development within North Newbury:

1) The site must be developed in a way reduces the impacts of extreme rainfall events (i.e. an event above the capacity of surface water drainage system) on people and property both in the development itself and in the surrounding area.[1]

2) Overland flow paths for surface water should not be altered unless it can be clearly demonstrated that the risk to both the proposed development and existing development elsewhere is not increased.

3) Implement SuDS to ensure that runoff from the site (post redevelopment) does not exceed Greenfield runoff rates (refer Section 6.6.3 of the Level 1 SFRA). Any SuDS design must take due account of groundwater, soil and geological conditions. The Buildings Regulations 2000 state that infiltration techniques should used as the first option for SuDS where possible. Table 1.1 shows that across the North Newbury Development the potential for infiltration techniques is variable and will be highly dependent on local site conditions.

Characteristic	Development Site Description	Suitability for Infiltration	Further Comments
Topography	Undulating.	Variable - Infiltration relies on gentle slopes, which will exist in a number of locations on site.	Infiltration into a slope may cause instability through saturation of the ground. Stormwater could also re-emerge downslope.
Soils	Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils.	Generally poor - Infiltration relies on the passage of water through the soils.	
	Freely draining slightly acid but base-rich soils.	Good.	
Groundwater	Unconfirmed, but potentially high in several locations	Unknown – Infiltration devices require at least 1m of soil depth between the base of the device and the maximum expected groundwater level.	Groundwater to be determined at a site level. Can also vary at site level.
Geology	Oldhaven, Blackheath, Woolwich, and Reading and Thanet beds.	Variable – Will require site based investigations to confirm suitability.	Sedimentary rocks consisting of sandstones, gravel beds, mudstones and
	Chalk including Red Chalk.	Good – Highly permeable.	Chalk is a major aquifer and a source of potable water. SuDS will need to prevent groundwater contamination in Groundwater Protection Zones.
	London Clay	Poor – Highly impermeable.	

Table 1-1: Site Characteristics and Suitability for Infiltration[2]

[1] See report 'Designing for exceedance in urban drainage - good practice'. (CIRIA Report C635)
[2] Table is partly based on information contained with Chapter 5 of 'The SUDS Manual' (CIRIA 2007)

4) The use of basements in Groundwater Emergence Zones should be discouraged. Where basement uses are permitted however, the basement must be of a waterproof construction to avoid seepage during high groundwater conditions. It must be demonstrated that any below ground construction does not adversely increase the risk of groundwater flooding to adjoining properties.

5) Landscaping and buildings should not be orientated over overland flow paths (post development).

6) As an integral part of the government's "Making Space for Water" agenda, the Environment Agency is actively seeking the renaturalisation of culverted watercourses as part of any future development. Realistic opportunities to reinstate the natural open waterway within existing culverted reaches of the river(s) should be heavily promoted, such as the culverted section of watercourse south of Shaw Farm. Developers should also avoid the culverting of waterway corridors through their site.

7) The surface water management system for the site should be designed to accommodate the 1 in 100 year plus climate change rainfall event. Exceedance flows as a result of more extreme rainfall events, should be designed to be discharged in a controlled way which reduces overall risk elsewhere if practicable (as advocated by PPS25).

8) Safe evacuation routes from site during flooding conditions should be assured. i.e. during exceedance events. See Appendix H in the West Berkshire Level 1 SFRA for further guidance.

1.5 Guidance for FRA Preparation

Guidance on the production of Flood Risk Assessments is contained within Section 6.6 of the Level 1 SFRA. Further supplementary guidance is provided below, in specific relation to the North Newbury Development Area:

1) Pre development and post development runoff rates and volumes should be calculated. Refer to the Environment Agency and Defra document W5-074 'Preliminary Rainfall Management for Developments' version D (PRRMD v. D) for guidance.

2) The development will inevitably require attenuation of excess runoff, this will need to be detailed in the FRA with information such as location, full capacity volume and release volumes and rates. The attenuation facilities should also be suitable for climate change increases in volume and rate of precipitation.

3) Approved Document Part H of the Building Regulations 2000 establishes a hierarchy for surface water disposal, which encourages a Sustainable Drainage System (SuDS) approach. Under Approved Document Part H the first option for surface water disposal should be the use of SuDS, which encourage infiltration e.g. soakaways or infiltration trenches. In all cases, it must be established that these options are feasible, can be adopted and properly maintained and would not lead to any other environmental problems. For example, using soakaways or other infiltration methods on contaminated land carries groundwater pollution risks and may not work in areas with a high water table. Where the intention is to dispose to soakaway, these should be shown to work through an appropriate assessment carried out under Building Research Establishment (BRE) Digest 365.

4) The drainage scheme proposed should provide a sustainable drainage strategy to include SuDS elements with attenuation, storage and treatment capacities incorporated as detailed in the CIRIA SuDS Manual (C697).

5) SuDS will be a material consideration in any planning application. The following document has been produced by West Berkshire Council which shows how SuDS fits into the overall planning policy; *Quality Design - West Berkshire, Supplementary Planning Document, Part 4, Sustainable Design Techniques (June 2006)*[3]

6) The risk from groundwater flooding should be carefully assessed and explicitly covered within the FRA. Measures to mitigate identified risk should also be included where necessary.

[3] The document is available at http://www.westberks.gov.uk/CHttpHandler.ashx?id=10503&p=0

Appendix A

Description of Flood Risks

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A1 Fluvial

Risk to Development Area
The North Newbury Development Area is situated in Flood Zone 1 Low Probability and is therefore not identified as being at risk of fluvial flooding.

Potential Impacts of Development on Risk Elsewhere
Development, without suitable mitigation, can alter the local drainage regime substantially. Typically, following development, greenfield land which previously allowed water (from rainfall) to drain away into the subsoil or pond locally, is replaced by hard standing areas of impermeable material which act to channel water quickly away from the site.

Consequently, both the rate and volume of surface water discharged into local rivers and watercourses can be increased considerably.

If the rate and volume of runoff from the land does increase, the fluvial flood risk elsewhere may be exacerbated. In relation to this development, fluvial flood risk areas adjacent to the River Kennett and the River Lambourn could be affected.

Frequently, the rate and volume of runoff from one development alone may not be enough to increase the level of fluvial flood risk to a noticeable degree. However, the cumulative impacts of a number of development sites could discharge enough water to significantly increase fluvial flood risk in areas.

A2 Land (Surface Water Runoff)

Risk to Development Area
The topography of the proposed North Newbury Development Area is characterised by hilly and undulating land (see Figure 2 in Appendix B).. Large areas of sloping land are typically associated with the generation of surface water runoff which can result in localised flooding during heavy rainfall events.

The natural risk from surface water runoff is also influenced by underlying soil type and geology. Impermeable ground conditions prevent the rainfall from being absorbed into the soil and the potential for surface water runoff increases.

A review of the local soil types[5] and geology[6] has revealed that there areas of both impermeable and permeable ground conditions.

It is highly likely that there will be locations within the North Newbury Development Area that will be at high risk from surface water runoff. This risk was confirmed in July 2007 when intense rainfall caused significant surface flooding to the new Vodafone headquarters near Shaw, on the northern outskirts of Newbury, just east of the A339 road. Following the rainfall event, the office which was constructed in 2003 and contains 3000 employees, was affected by flowing water several centimetres deep.

The level and severity of surface water runoff risk will need to be clarified on a site by site basis through a Flood Risk Assessment (FRA). Vulnerable developments should be avoided in high risk areas. Figures E7 and E8 in Appendix E of the West Berkshire Level 1 SFRA contains mapped information on topography, overland flow paths and geology.

Potential Impacts of Development on Risk Elsewhere
As discussed above, the replacement of undeveloped greenfield land with areas of impermeable hard-standing material means that water can be prevented from passing into the subsoil.

[5] Soilscape Maps, Cranfield University (http://www.landis.org.uk/soilscapes/)
[6] West Berkshire Council Level 1 SFRA (May 08)

On sloping land, surface water will naturally flow away from the site and onto adjacent areas downhill. The construction of buildings/structures in the way of existing overland flow paths can re-direct the runoff into previously unaffected locations.

Therefore it can be concluded that the proposed development within this area could increase the risk of surface water flooding in other locations. Existing areas of development in Newbury could be placed at risk. Specific recommendations to identify and mitigate these potential risks have therefore been provided in Sections 1.3, 1.4, and 1.5.

A3 Groundwater

Risk to Development Area
A review of information contained within the Level 1 SFRA (May 2008) shows that there is likely to be a risk of groundwater flooding within the North Newbury Development Area:

- There is a number of recorded groundwater flooding incidents in developed areas of Newbury.
- Large parts of the development area are identified as being a potential Groundwater Emergence Zone.

Furthermore, a review of the 1:10,000 Ordnance Survey maps shows that there are number of wells, springs, sinks and issues within the vicinity of the Development Area.

Potential Impacts of Development on Risk Elsewhere
Below-ground structures can obstruct groundwater flows which can result in an increase in the risk posed to adjoining, or nearby properties. These impacts are typically determined by local factors and an understanding of the consequences to development in North Newbury will need to be ascertained through a site based FRA (see Development Control recommendations).

A4 Sewer Flooding

Risk to Development Area
Information related to incidents of sewer flooding is kept in a register held by utilities companies, known as the DG5 Register. The information is deemed sensitive and details on the nature of individual sewer related flooding incidents are not given out.

Figure C1 in the West Berkshire Council Level 1 SFRA shows the incidences of flooding in the North Newbury Development Area by post code. According to the figure there have been 1 to 5 flooding incidents within the immediate vicinity of the site. However, it is not known what the nature of these flood incidents were, where it was located and whether the problem has been rectified.

Due to the lack of precise information it is not possible to make an informed appraisal of the risk posed by sewer flooding in this Development Area. Although as the area is undeveloped and is unlikely to contain significant amounts of waste the risk it is presumed that the risk of sewer flooding is low.

Potential Impacts of Development on Risk Elsewhere
The proposed North Newbury Development Area could place the existing infrastructure under pressure. The volume of foul water flows generated from a large development area of this nature may represent a significant increase in the total volume of foul water flows. Consequently there could be locations in the receiving wastewater network that may not be able to handle the increase.

Thames Water should be contacted when outline details of the proposed developments are available, such as number and type of properties, and consequently site discharge rates. They will be able to give an early indication of any potential problems.

A5 Reservoirs, Canals and Other Artificial Drainage Systems

Risk to Development Area

There are no significant reservoirs or canals within the North Newbury Development Area. There are a number of small ponds and artificial lakes in the vicinity of the proposed developments but there are no known flood risks associated with them.

There are also a number of small culverts, drains and drainage ditches. No evidence of local flooding from them is available, which is unsurprising considering their rural location. However, it is reasonable to assume that there is the potential that during high intensity rainfall events there will be localised flooding issues associated with them. Therefore, this is a risk that will need to be considered on a site by site basis, through a Flood Risk Assessment (FRA).

Potential Impacts of Development on Risk Elsewhere

Without appropriate mitigation, the proposed North Newbury Development Area could increase the response rate ('flashiness') and volume of water entering these small channels. Therefore, developed areas adjacent to these channels in downstream locations could be placed at greater

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Appendix B

Development Area Map

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