**West Cheshire SFRA**
Summary Report

CCC, VRBC and ELLESMERE PORT AND NESTON DISTRICT
June 2008

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# Introduction

# 1 Introduction

Faber Maunsell has been commissioned by Vale Royal Borough Council, Chester City Council and Ellesmere Port and Neston district to produce the West Cheshire Strategic Flood Risk Assessment (SFRA).

The SFRA provides an evidence base to inform the emerging Local Development Documents (LDDs) of the councils in relation to the allocation of land with respect to all forms of flooding, including flooding from rivers and the sea, flooding from groundwater, land drainage, sewerage and other artificial forms of flooding (i.e. reservoirs and canals etc.).

## 1.1 Planning Policy Statement 25

The SFRA is based on guidance from PPS25, guidance on development and flood risk.

PPS25 requires that a sequential approach to the location of new development is applied. This is done by the application of the Sequential Test (see Annex D of PPS25). The Sequential Test should aim to steer new development to Flood Zone 1(see section 2.3 of this report for Flood Zone definitions). Where there are no reasonably available sites in Flood Zone 1, taking into account the flood risk vulnerability of land uses, sites can be allocated in Flood Zone 2, applying the Exception Test if required. Only where there are no reasonably available sites in Flood Zones 1 or 2 should decision-makers consider suitability of sites in Flood Zone 3, taking into account the flood vulnerability of land uses and applying the Exception Test if required (see Figure 1 below)

**Figure 1 Flood Risk Vulnerability and Flood Zone 'Compatibility (taken from PPS25[1])**

| Flood Risk Vulnerability classification (see Table D2 PPS25 Annex D) | | Essential Infrastructure | Water Compatible | Highly Vulnerable | More Vulnerable | Less Vulnerable |
|---|---|---|---|---|---|---|
| Flood Zone (see Table D.1 PPS25 Annex D | Zone 1 | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Zone 2 | ✓ | ✓ | Exception Test required | ✓ | ✓ |
| | Zone 3a | Exception Test required | ✓ | × | Exception Test required | ✓ |
| | Zone 3b 'Functional Floodplain' | Exception Test required | ✓ | × | × | × |

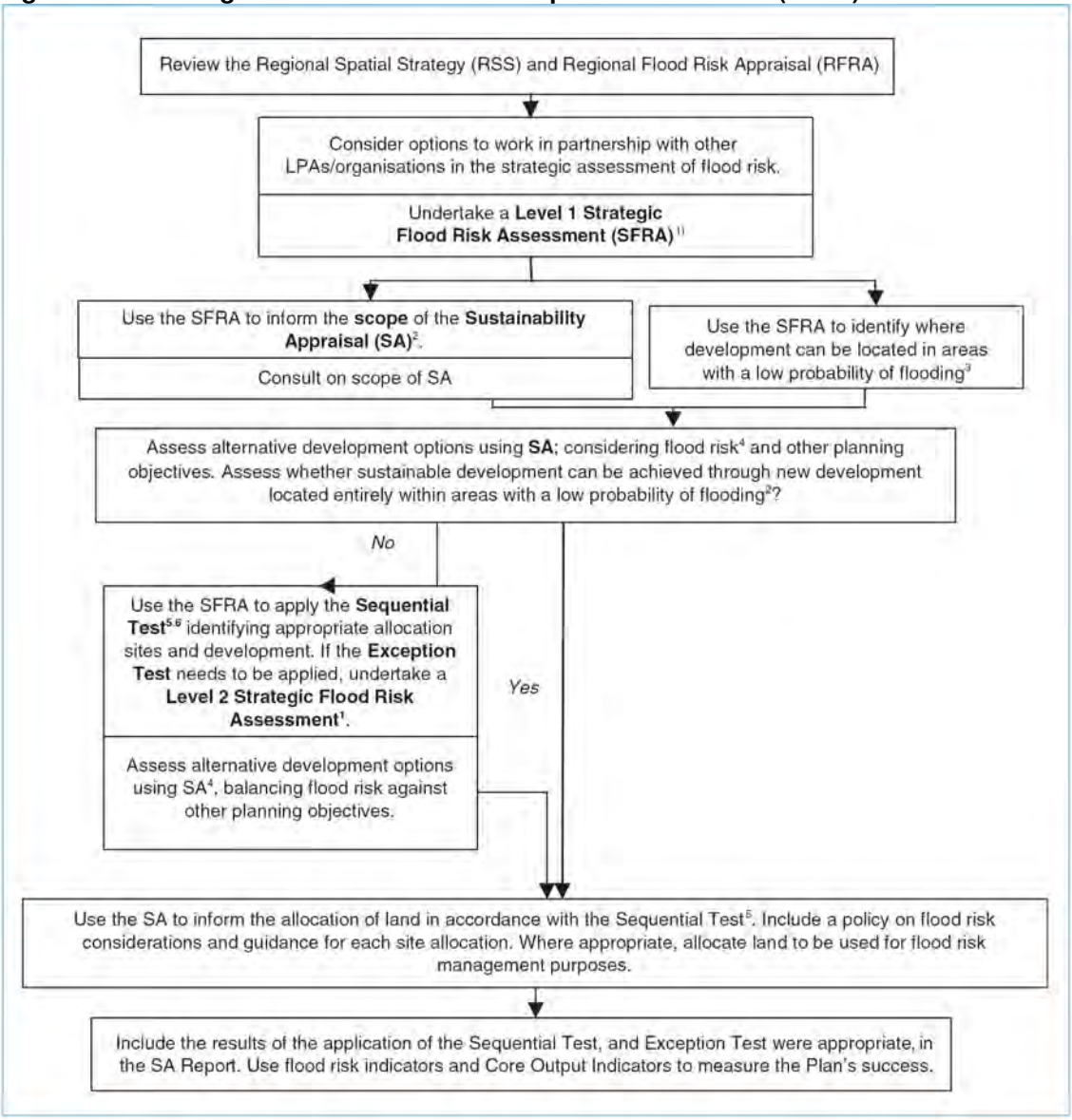
✓ Development is appropriate

× Development should not be permitted

The SFRA provides evidence to produce an initial Sequential Test for the potential future development sites provided by the Local Planning Authorities (LPAs). The SFRA also provides evidence which will allow the local authorities to assess any future allocations in terms of flood risk and produce their Local Development Documents. The evidence includes levels of flood vulnerability in Flood Zone 3 and the impact of climate change.

Figure 2 below from PPS25[2] explains the process and links that factor in flood risk to the LPAs local development documents.

**Figure 2 - Factoring flood risk in Local Development Documents (LDDs) PPS25[2]**




Planning Policy Statement 25 (PPS25) defines four zones of flood risk. These zones are based on the quantified degree of flood risk to which an area of land and buildings are subject at the time at which a land allocation decision is made or a planning application submitted. The PPS25 flood risk zones and their associated fluvial flood risk characterisations are summarised in Table 1 below:

**Table 1 – PPS25 Flood Zones (taken from PPS25[1])**

| |
|---|
| **Zone 1 Low Probability**<br><br>This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%). |
| **Zone 2 Medium Probability**<br><br>This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% – 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% – 0.1%) in any year. |
| **Zone 3a High Probability**<br><br>This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year. |
| **Zone 3b The Functional Floodplain**<br><br>This zone comprises land where water has to flow or be stored in times of flood. SFRAs should identify this Flood Zone (land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1%) flood, or at another probability to be agreed between the LPA and the Environment Agency, including water conveyance routes). |

# 2 Methodology

The SFRA is structured into four phases to meet the requirements of Annex E, PPS25 and the 'living draft' Companion Guide.

Phase 1 – Data Collection and identifying areas at risk of flooding (theoretical and actual) from rivers, the sea, groundwater, land drainage, sewerage, and other artificial sources e.g. reservoirs and canals having regard to defences, topography and topographic features etc. A primary task of the SFRA was to evaluate all existing data, identifying any gaps or inadequacies in the datasets. Faber Maunsell is currently writing the Weaver Gowy Catchment Flood Management Plan (CFMP). The data collected and analysis completed has been used to inform the SFRA.

Phase 2 – Assess impact of external factors on flood risk including land management practices, climate change on flood risk for future horizons e.g. 25 year and 50 year flood risk zones and increased runoff, flood defence failure. Flood risk locations have been collected and mapped. In addition, any other information such as historic flood outlines and defended areas have been collected and mapped. Climate change flood extents have been produced where information is available. The level of risk within flood extents and the level of hazard to people will be assessed where there is existing modelling data to do so. The SFRA makes use of the latest outputs from the Sealand Basin breach analysis completed for Environment Agency Wales. More details on the maps produced can be seen in section 6.1. In addition, further information on the types of flood mapping available is in section 2.4

It is necessary to identify areas of flood risk outside of Flood Zones 2 and 3. PPS25 requires that FRAs looks at all sources of flood risk not just from major tidal and fluvial sources. During the SFRA information on flood risk problem locations has been collected from knowledge holders in the Environment Agency, local authorities, water companies and British Waterways. This information has been put into a database, each entry has a reference. These locations have been mapped in GIS so that it can be seen if a potential future allocation could be at risk from one of these other sources of flood risk.

Phase 3 – Consultation with the Environment Agency etc. in regard to their procedures and policies for responding to Flood Risk Assessments to ensure that Policies are drafted. The SFRA has been completed in close communication with the Environment Agency. The Environment Agency attended progress meetings where technical issues have been discussed. The Environment Agency 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. This also includes the development of flood risk policies for the local authorities

Phase 4 – Reporting including the preparation of a matrix of flood risk in each area (including recommendations on mitigation needs to bring development forward), identification of areas requiring ongoing or further analysis to build on and reinforce the knowledge base. A flood risk matrix has been developed. This lists all proposed future allocations and assess them against all the information gathered. This includes flood extents, historic flood maps, flood defences, flood risk locations from other sources and flood hazard.

# 3 Flood risk

## 3.1 Summary of flood risk

In West Cheshire there are many different types of flood risk present. In some areas long term commitment to the retention and maintenance of flood defences is required (e.g. Chester and the Stanlow complex), in others changes to land use patterns may be appropriate. Coordination of strategies and plans is crucial, and flood warning, appreciation of vulnerability, and a whole range of mitigation measures are essential if sustainable flood risk management is to be achieved.

Flood risk predominantly arises from fluvial (rivers and watercourses) and tidal (sea and estuarial) sources. Fluvial flooding occurs as a result of the overflowing or breaching of river or stream banks when the flow in the watercourse exceeds the capacity of the river channel to accommodate that flow. Tidal flooding occurs when an exceptionally high tide, often accompanied by a storm tide surge (increases in water level due to meteorological conditions including atmospheric pressure and wind generated by storms), overtops and/or breaches the tidal defences along a coastline or tidal estuary.

It is also becoming increasingly important to consider flood risk from other sources. These include groundwater, (notably springs from limestone, sandstone and chalk aquifers), land drainage (low lying areas and runoff from steeply sloped areas), sewerage, and other artificial sources e.g. reservoirs and canals.

As has been illustrated by recent events (e.g. in Summer 2007) flooding can occur virtually anywhere although much flooding was local, rather than strategic in origin and impact. Flooding locations depend very much on the profile and duration of the storms which cause them and on local factors such as blocked drains and culverts, breaches or failure of defences and local topography. Therefore, safety from flooding can never guaranteed. Flooding may occur in locations which appear to be at relatively low risk compared to others.

In West Cheshire there are many different types of flood risk present. In some areas long term commitment to the retention and maintenance of flood defences is required (e.g. Chester and the defences around Sealand Basin), in others changes to land use patterns may be appropriate. Coordination of strategies and plans is crucial, and flood warning, appreciation of vulnerability, and a whole range of mitigation measures are essential if sustainable flood risk management is to be achieved.

Flood risk locations for areas outside of the Flood Zone maps have been put into a GIS database. The flood risk locations can be seen in Figures C1, C2, E1, E2, E3, V1, V2, V3 and V4 in Appendix E of the main report. Each location has been given a reference number. The table in Appendix A provides more details on the type of flood risk at this location. The other flood risk locations include flooding from sewers, reservoirs, canals, land drainage and ordinary watercourses.

## 3.2 Main flood risk issues in West Cheshire

The tidal and fluvial River Dee puts parts of Chester CC at risk of flooding. The main area of flood risk can be found in parts of Chester city but the village of Farndon is also at risk from the fluvial River Dee. Sealand Road, Gladstone Avenue, Vernon Road, Catherine St, Jesmond Road and the Greyhound Industrial Park, The Groves and the Sealand Basin area in Chester have been identified as at risk of flooding from the River Dee. Flood risk locations IDs C14, C15 and C19 provide details on the locations at risk in Appendix A of the main report.

The main flood risk within Chester CC is focussed around Chester itself. The River Dee poses a tidal flood risk to much of central Chester. However, well maintained flood defences protect the city from flooding to a 1 in 200 year standard. Further east, the undeveloped land in the

Sealand Basin is also at risk of fluvial flooding from Finchett's Gutter and Sealand Main Drain. There is a much higher probability of fluvial flooding here but the impact of a less likely tidal flood would be greater. Part of this land is also taken up by an official flood storage area. This is called the Finchetts Gutter Flood Storage Basin and connects Finchetts Gutter and Sealand Main Drain.

The Sealand Basin is the area of high importance for the SFRA as there is a complex flood risk situation and development pressure. This area comprises low-lying land to the west of Chester City centre and on the northern side of the River Dee.

Flood risk across Ellesmere Port And Neston district comprises small isolated locations of flood risk from small watercourses and drainage infrastructure. Rivarce Brook provides the main flood risk however the flood extent is limited and does not affect many existing properties or any potential future development sites. The River Gowy flows through the Stanlow industrial complex. In 2002 flood defences were improved along the lower reaches of the River Gowy. Before the flood defence scheme, the lower reaches of the River Gowy and Thornton Brook were subject to periodic flooding caused by a combination of high tides and river water.

Ince Marshes comprises low lying reclaimed marshland, following dredging of the Manchester Ship Canal, and has a topography ranging from 2.9m to 6m AOD. The area is within the Environment Agency's Flood Zones 2 and 3 and is at risk from fluvial sources (the Ince Marsh, pumped catchment) and from tidal flooding (see Figure E7 in Appendix E of the main report).

Nearly all of Vale Royal BC falls within the large river catchment of the Weaver and Dane. The majority of the flood risk locations come directly from the Rivers Weaver and Dane. This includes the towns of Winsford, Northwich and the industrial area around Frodsham.

The most significant flood risk location in this area is in Northwich, where three river catchments converge; these are the Weaver, Dane and Peover Eye. The River Weaver can flood properties to the south of the centre of Northwich before converging with the River Dane in the centre of the town. This is the main flood risk location with potentially over 300 properties at risk.

Winsford is another town at risk of flooding as the Weaver Navigation runs through and potentially puts 25 residential properties at risk. There is development pressure to the north of Winsford so different levels of flood risk will be considered in the SFRA.

In summary the major flood risk area is in Northwich although there is a low flood risk to Winsford and the industrial area around Frodsham. The Dane converges with the Weaver in Northwich, contributing considerably to flood risk.

# 4 Strategic Assessment of Flood Risk

Flood extents have been produced to represent Flood Zones 2, 3a and 3b (where modelling data is available). Climate change flood extents have also been produced where the relevant data is available. Figures C4, C5, E5, E6, E7, and V6 to V10 show the flood extents produced for different scales for the study areas.

A broad assessment has been made of the flood risk to people in the study area; this has been termed the flood risk profile. This has only been done where there is a risk of tidal flooding to a defended area or a fluvial flood risk area where there is existing modelling. The results of this analysis have been used to judge which potential future development sites , or parts of allocations, are at a greater flood hazard. Certain types of development (i.e. residential) can be directed away from these zones.

The flood risk profile maps can be seen in Figures E9, V12 and V13, Appendix E of the main report. The outputs from the Sealand Basin Breach analysis can also be seen in Figures C15 to C22 of the main report.

## 4.1 Results

The hazard rating for the area of Stanlow at risk from the 1 in 100 year flood is rated as high. This is due to the low lying land and potential flood depths in this area. Stanlow is protected by a flood alleviation scheme so defences would need to be breached or overtopped in order for this flood hazard to be recognised.

Flood risk profile within Vale Royal shows high risk zones in central Winsford and as the Weaver passes through north Winsford.

The undeveloped area most at risk in the Sealand Basin appears to be the land west and immediately to the east of Clifton Drive. This area is flooded to significant depths in all four of the breach scenarios. In the worst case, depth from 1 to 2m could be experienced bringing a significant flood hazard due to the velocity of these flows. The undeveloped land around Finchett's Gutter to the east of Clifton Drive, could also experience flood depths of 1 to 2m and significant flood hazard due to high velocity flows. However, this is only seen in breach 1 which is closest to this land. The large undeveloped land between these two areas could experience shallower depths and a low flood hazard due to the distance from the defences (lower velocities and depths). The Border House Farm and Sealand Industrial Estate areas could experience varying flood depths depending on the breach locations. However the flood hazard in all scenarios is only rated as significant when the breach is very close to this area.

From the Catchment Flood Management Plans, results generally show that landuse change will not have a great impact on flood flows. The future change thought to have the greatest impact is climate change. The increase in flood extents could affect currently developed and undeveloped areas across West Cheshire. Some potential future development sites may be at risk of flooding in the future due to climate change. Other potential future allocations may be at greater risk of flooding due to climate change. The areas which may experience the greatest impact are Northwich and Chester.

# 5 Development in West Cheshire

## 5.1 Chester CC

Data has been provided by the LPA on existing undeveloped Local Plan allocations, potential development sites and key strategic sites. Given the high degree of flood risk in the Sealand Basin area, the Study also makes recommendations regarding the future development and use of land in this area.

Over the next 10 years Chester will be revitalised by £1.4 billion worth of investment. The Chester Renaissance is a programme of major developments including retail sites, residential and restaurants. The aim of the project is to remain loyal to the city's heritage by regenerating areas of historic importance. And the ultimate vision is for Chester to become a "must see European destination" rivalling other leading Northwest retail centres.

At the forefront of the redevelopment is the £400 million Northgate Development which will redevelop the town hall area in Chester city centre. New shops and restaurants, a new bus station and car park, new homes and offices, a new library and new public spaces will be developed. The project will occupy almost one quarter of the area within the city walls - about 4.6 hectares.

The Castle Gateway project will be developed on the site of the old Police HQ. The project, called HQ, is giving space for a hotel, restaurant, office space and residential apartments.

Raillands and Chester Gateway is a £10 million project to regenerate Chester station and its surroundings to create a key gateway into the city and enhance other historically important buildings along Brook Street and City Road. This will improve the transport service to Chester and increase the retail and commercial activity in the surrounding areas.

Delamere Street is a major investment of £34m that will transform the site of the Delamere Street bus station plus a section of the Gorestacks car park into a new quarter providing homes, offices, retail opportunities and a new public car park.

## 5.2 Ellesmere Port and Neston district

Potential future development sites have been suggested by Ellesmere Port And Neston district. These sites have come from a number of sources including the local development plans. These sites have yet to be confirmed and are therefore not confirmed sites for Ellesmere Port And Neston district's LDF. Each site has a reference number which matches with the potential future development sites database in Appendix B and Figures E10 to E13 of the main report.

Within the Neston and Willaston area the distribution pattern of potential future development sites is generally sporadic infill developments. These are approximately 10 small, brownfield infill sites. There are no proposed major developments in the Neston area.

There is a significant amount of future development planned for Ellesmere Port. The potential future development sites include a number of relatively large sites and some infill developments. The majority of these sites are on brownfield land and some are in existing industrial areas. Within the Local Plan the Stanlow complex and surrounding area and the undeveloped Ince Marshes are allocated for employment and industrial use, however, this will be reviewed through the LDF.

## 5.3 Vale Royal

Future development allocations have been collected for Vale Royal BC. These allocations have come from a number of sources including the local development plans. These sites have yet to be confirmed and are therefore not confirmed sites for Vale Royal BC's LDF. Each site has a reference number which matches with the allocations database in Appendix B and Figures V14 to V23 in the main report.

*Northwich Vision*
Vale Royal Borough is working in partnership with, Cheshire County Council, Northwest Development Agency, English Partnerships, British Waterways, Environment Agency and the Learning and Skills Council to develop a 15-year regeneration strategy for Northwich town centre. The development potential that will be released as a result of the mine stabilisation programme will include:

- The provision of 1000 new homes and 2000 new jobs in the centre of Northwich.
- The utilisation of the Rivers Weaver and the Dane, by creating a mixed-use waterfront activity.
- Two new retail areas covering approximately 400,000 sq.ft.
- A newly designed market square in the centre of the town.
- The Barons Quay site. A mixed-use development, comprising residential, leisure, retail, offices and a new cultural centre.

*Winnington Urban Village*
Outline planning permission has now been granted for the regeneration of a derelict industrial site of Wallerscote into a new urban village alongside the River Weaver. This will include a mixed use scheme including 1200 new residential units.

*Winsford*
The Winning Winsford regeneration programme will include major projects to transform the town which will include a new Learning Zone,major regeneration to the waterfront area and preservation work at Winsford Flash, a new Lifestyle Centre and a Business Centre at Woodford Park.

Other projects include:

Two major regeneration projects which are supporting regeneration in the corridor of the River Weaver. The task of REVIVE (Regenerating the Environment Invests in the Economy) across the Cheshire and Warrington region is to restore and reclaim brownfield sites into environmental assets. Its objective is to reclaim and or bring into effective management 580ha of derelict, underused and neglected, predominantly Brownfield land, in Cheshire and Warrington by 2012.

The Weaver Valley Regional Park covers a 40km stretch of the River Weaver from Runcorn to Crewe. The Regional Park proposes to support urban regeneration, promote tourism and encourages reclamation by using the Weaver and Wheelock Valley as a recreational resource. Development along this major watercourse may influence catchment runoff, water storage and floodplain locations.

*Frodsham Waterfront:*
It is intended that this project will re-open the Cut to provide a navigable waterway for pleasure craft to access the waterfront at Frodsham.

# 6 Assessment of Flood Risk in Study Areas

## 6.1 Chester CC

It is evident from the previous Local Plan Inquiry that there is significant development pressure in the Sealand Basin area. Much of this area is shown to be at risk of flooding on the Environment Agency's Flood Zone maps. The flood risk comes from two sources.

Firstly there is the risk of tidal flooding from the River Dee. For this to occur, the River Dee would have to overtop the flood embankment and/or cause a breach in the embankment. The potential future development sites in Sealand are within the tidal breach envelope.

The second source is fluvial flood risk from Finchett's Gutter and Sealand Main Drain. The area to the north of the A548 is in the natural floodplain of these two watercourses. The risk of flooding from the watercourses is higher than the tidal risk but the impact of a tidal flood would be greater than the fluvial flood. A tidal flood could put lives at risk and damage the structural integrity of buildings due to the high velocity and depths that could be expected in some parts.

It is recommended that any future development along the Sealand Basin, should be set back from the flood defences. If a breach in the flood defences did occur, the flood velocities and depths closest to the breach would be very high. This is classed as a rapid inundation zone and provides an extreme level of flood risk (see Table 8) putting peoples lives in danger. A rapid inundation zone is an area which is at risk of rapid flooding should a flood defence structure be breached or overtopped. PPS25's practical guide states that wherever possible, opportunities should be sought to site new development away from existing flood defences.

The breach analysis showed this zone to extend up to 300m from the breach. Any development should therefore be set at least this distance back from the defences.

The undeveloped land west of Clifton Drive is at risk of flooding from Sealand Main Drain and the River Dee. On fluvial flood risk grounds only water compatible and essential infrastructure should be developed in the area classed as functional floodplain. A FRA should identify this extent. The tidal flood risk puts the site within Flood Zone 3a. According to PPS25 the Exception test would need to be completed for more vulnerable development to take place here. However, the breach analysis shows that this area presents a significant degree of flood hazard. If development is to take place here it should be noted that the risk to people, should a breach take place, is significant.

To the east of Clifton Drive is the Finchett's Gutter flood storage basin. This is classed as a reservoir and is therefore designed to a 1in 10,000 year standard. Development can obviously not be permitted in this area. If this area were developed, flood risk would be passed on, further downstream. The area to the south of the storage reservoir is not at risk of fluvial flooding, just tidal flooding from the Dee. The degree of flood hazard from a breach in the tidal defences is classed as significant in this area.

The large undeveloped land between these two potential future development sites is also at risk from fluvial flooding and a tidal breach. However, the degree of flood hazard is estimated as low rather than significant. The area is still within Flood Zone 3a therefore the Exception test is required for more vulnerable development. Part of the site will also be within Flood Zone 3b (functional floodplain of Sealand Main Drain) this should be defined by a FRA.

The area around Border House Farm and the Sealand Industrial Works is within Flood Zone 3a and at risk from a tidal breach. The degree of flood hazard expected here is between moderate and significant. If development is to take place here, the proximity to the defences and the risk to life should be taken into consideration.

These two potential future development sites have been highlighted as having the greatest level of flood risk. According to PPS25 and the breach analysis undertaken, residential development is not considered appropriate.

The remainder of the sites through Chester are at a low level of risk from the River Dee due to tidal flooding. No potential future development sites appear to be at risk from the fluvial Dee. The potential development sites are in either Flood Zone 3a or 2, not 3b as there are significant flood defences through Chester. Several potential future development sites are not at risk now, but may be at risk of flooding in the future due to climate change. These potential development sites have been highlighted in the matrix. Figure 6 shows the functional floodplain in blue for the Sealand Basin. The dark outline is the Finchetts Gutter flood storage area.

Elsewhere the Former Ince Power Station is at risk of flooding from local drains and watercourses. Some of the floodplain should be classed as functional floodplain. Less development should be acceptable if this flood risk is taken into account. Part of this site is in Ellesmere Port and Neston district.

## 6.2 Ellesmere Port and Neston district

Within the development and flood risk matrix (in the main report) each site has been assessed according to its specific issues. The site has been split in line with which flood zone parts fall within it. The sites that are at flood risk have then been highlighted. The LPA should aim to divert development away from locations at risk of flooding when planning what type of development should go where. A summary of the findings can be found below.

The future development sites in and around Neston and Ellesmere Port town are not identified as being at risk from tidal or fluvial flooding. Neston has, in the past, however suffered flooding as a result of other sources such as surcharging of sewers and blocked culverts. The potential future development sites here are mainly infill housing. General Environment Agency guidance on surface water disposal should followed. Table 8.2 and Figure 8.2 are more applicable for these allocations.

Some of the potential future development sites in Neston may be affected by other flood risk problems. These can be identified by overlaying the flood risk problem location GIS theme (and the associated spreadsheet and figures) with the proposed site to see if the site overlaps with a flood problem location. Each flood risk problem location (GIS point theme) is referenced to the associated database (Appendix A in the main report). More details can be found here on the type and extent of flood risk. The developer should look into this source in more detail when completing an FRA.

The Sequential Test is not applicable for the majority of these sites. There are currently no potential future development sites that are affected by the Rivacre Brook floodplain or the associated flood risk problems in and around Great Sutton.

The flood hazard throughout the Stanlow complex at risk from the Flood Zones is considered high. Potential future development site EPNE13, Stanlow Special Policy Area is considered an extreme hazard if flooding occurred (from the flood risk profile results). This proposed development could potentially be inundated by Flood Zones 2 and 3. Extensive flooding would only occur if the flood alleviation scheme failed, which protects the area to a 1 in 100 year fluvial and 1 in 200 year tidal level. It should be noted that this area is a very large area of which only part is in Flood Risk Zones 2 and 3.

In addition to the above risk there are also several historic incidences of flooding from other sources.

Less vulnerable types of development should be put in the Stanlow area within Flood Zone 2 and 3. The flood alleviation scheme protects the area from regular, extensive flooding but the risk from the main rivers, the sea and from other sources can not be eliminated completely.

Potential future development sites EPNH2, EPNH4, EPNH14, EPNH26, EPNI3, EPNE15 and EPNU1 are adjacent to the Shropshire Union Canal and some have several drains running through them. The flood risk from the canal should be considered for these allocations, one study could possibly cover all the sites. This is especially important for the potential future housing allocations.

Flood risk from the Manchester Ship Canal (MSC) has not been assessed by any parties. The risk has not been quantified and the Canal has never been modelled until very recently. PPS25 requires that all sources of flood risk are considered for Flood Risk Assessments. This includes risk from the MSC. There are a number of potential future development sites near to or next to the MSC. It is recommended that a study is undertaken to assess the risk from the MSC to all these locations in

general. A model has recently been completed by Halcrow Group Ltd for the Manchester Ship Canal Company. It is not know whether this model will be made available for a study. The potential future development sites affected by the above issue are: EPNE13, EPNH19, EPNM5, EPNE10, EPNE5, EPNE1, EPNE11, EPNE7, EPNI12 and EPNO1.

The allocation EPNO1 covers the Ince Marshes potential future development allocation. This allocation is affected by the above issue regarding the MSC. In addition there are a number of drains that run through the site. The site is allocated in the Local Plan for oils, chemicals and related industries, but it is unlikely that the land will now be required for such uses. Options for the alternative use and allocation of Ince Marshes will be considered through the LDF. The area is shown to be within Flood Zone 3. However it is not know whether this site is within subclass 3a or 3b. PPS25 states that where the subdivision of Flood Zone 3 is not known, subclass 3b should be assumed. This would be likely to make future development on the site unacceptable due to flood risk. Further evidence should be gathered to confirm whether the allocation is within Flood Zone 3b (functional floodplain). The flood risk section (Section 5.1) confirms the complex nature of flood risk in this location. The area was originally marshland that would flood naturally. As a result this low-lying land is managed by canalised drains that are pumped at their outfall. All these issues would need to be considered within a Flood Risk Assessment if development were to take place here.

## 6.3 Vale Royal BC summary

Within the development and flood risk matrix each allocation or site has been assessed according to its site specific issues. The site may fall within a number of different flood zones and have a different hazard rating.

The flood zone and hazard level that is applicable for the site is indicated in the end columns on the right. This has then been colour coded. The key to the colour code can be seen on the matrix. It should be possible for the LPA to locate where the more flood vulnerable potential future development sites are using the colour coded matrix and the flood zone and flood hazard maps. The LPA should aim to divert development away from higher flood risk zones. A summary of the findings can be found below.

In general flood hazard through Northwich centre is classed as high, the flood extent is also at its greatest through Northwich town centre. In Northwich the lower flood risk areas (in hazard rating and frequency of flooding) are to the north and south of the town centre. The area around the confluence with the Dane and Weaver is at a particularly high risk. This area has a wide, high probability floodplain and a high hazard rating. The potential future development sites with the greatest level of risk associated with them are as follows:

- VLH3 – parts of the Barons Quay allocation near the river Weaver
- VLH5 – The County Council offices site
- VLH7 – Lock Street allocation near to the River Weaver.
- VLH1 and others – Winnington allocation, a large part of this allocation around the Weaver has a high hazard rating and is within the 1 in 25 year flood outline. Winnington Urban Village now has outline planning permission following consultation with the EA. As the detailed phases of the development come forward, flood risk will continue to be a major issue for consideration.

Other areas of high risk include:

- Chester Way
- London Road
- Navigation Road
- Weaverway

The general pattern is that lower risk areas are found further away from the rivers. Locations to the south of Northwich centre and areas between Northwich and Winnington are at a lower risk.

There is a lower level of flood risk associated with Winsford. The number potential future development sites at flood risk in the centre of Winsford is limited due to the confined nature of the floodplain. In addition Flood Zone 3a (functional floodplain) is limited through Winsford due to the higher topography either side of the river. However, as the Weaver leaves Winsford any new, extensive, housing allocations will be at risk of flooding. The LPA should consider in more detail the location of different types of development in this area.

The flood mapping in Winsford is broad scale and therefore the exact location of the areas at risk of flooding cannot be ascertained. More detailed modelling is required to find the exact locations that are most at risk.

Vale Royal Borough Council have commissioned Faber Maunsell to undertake a more detailed Area Flood Risk Assessment for Winsford which will provide information on flood risk for Winsford Town Centre.

The remaining potential future development sites are sporadically distributed throughout the Borough or are not within Flood Zones 2 to 3. For potential future development sites outside of the higher flood risk zones, the general guidance should be followed in the SFRA, especially Table 8.2 and Figure 8.2 (see Sections 8.5 to 8.6).

NB: as there are a large number of potential future development sites, not all of them have entries. This is due to many of them being outside of Flood Zones 2 and 3 and because some of them overlap each other. For the potential future development sites outside of Flood Zones 2 and 3 Table 8.2 and Figure 8.2 in the main report should be used (also read Sections 8.5 to 8.6 in the main report). General requirements for planning applications

# 7 Flood Risk Policies

## 7.1 Draft policy recommendations

The following draft flood risk policy recommendations have been prepared for the West Cheshire SFRA; these can bee seen in the main report. Policies 2, 3, 4 refer to the appropriate uses of land in different flood zones (see Table 2). These draft policies will be refined through the Council's LDF process, in consultation with key stakeholders, and will be subject to independent Examination in Public.

- POLICY 1 - The Need for a Flood Risk Assessment
- POLICY 2 - Development in areas deemed to be at Little-or-No Risk of flooding, (Flood Zone 1)
- POLICY 3 - Development in areas deemed to be at High Risk of flooding (Flood Zones 2 and 3a)
- POLICY 4 - Development involving building in areas identified as Washland or Functional Floodplain (Flood Zone 3b)
- POLICY 5 - Sustainable Urban Drainage Systems (SUDS)
- POLICY 6 - Culverting of Open Watercourses

**Table 2 – Appropriate uses of land in the Flood Zones**

| Flood Zone | Appropriate uses of land |
|---|---|
| Flood Zone 1 | All uses of land are appropriate in this zone |
| Flood Zone 2 | The water-compatible, less vulnerable and more vulnerable uses of land and essential infrastructure in Table D.2 from PPS25 are appropriate in this zone. |
| Flood Zone 3a | The water-compatible and less vulnerable uses of land in Table D.2 from PPS25 are appropriate in this zone. |
| Flood Zone 3b | Only the water-compatible uses and the essential infrastructure listed in Table D.2 from PPS25 that has to be there should be permitted in this zone. |

## 7.2 Sustainable Urban Drainage Systems (SUDS)

Sustainable drainage is the practice of controlling surface water runoff as close to its origin as possible before discharge to a watercourse or to a soakaway. It has many benefits relating to a variety of environmental issues such as reducing flood risk, minimising pollution of watercourses and groundwater, minimising soil erosion and damage to natural habitats, maintaining or restoring natural flow regimes in receiving watercourses, maintaining groundwater recharge and achieving environmental enhancements. The many and diverse benefits resulting from the use of SUDS justify the requirement for the widespread use of SUDS in development proposals.

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

# 8 Conclusions

A Strategic Flood Risk Assessment has been produced for West Cheshire. The study has identified the existing areas of flood risk across the council area from all sources. Where there are proposed development allocations in areas at risk of flooding, the assessment has identified which allocations are most at risk and from what source of flooding. The culmination is a flood risk matrix and guidance notes that should enable the Local Planning Authority to ensure that development types are sensitively located with consideration to flood risk.

All available data has been collated for the local authorities. In some areas there is a need for more detailed information which would improve knowledge of flood risk within the council areas. This includes modelled river reaches and more detailed coastal flood outlines. There is also existing data which has not been made available for this study e.g. sewer flooding information, drainage network GIS data and the Manchester Ship Canal hydraulic model.

West Cheshire is at risk of flooding from a number of sources and mechanisms including watercourse overtopping, tidal flooding, flooding from the sea and rivers due to defence failure, surface water sewer and foul sewer flooding, runoff and land drainage and the failure of artificial sources i.e. canals and reservoirs.

Using the available data, flood maps have been produced for different return periods and climate change extents. The potential impact of climate change has been estimated across the council area. Levels of risk within the flood extents have been estimated where there is the necessary available data.

## 8.1 Chester CC

Flood risk and flood history in CCC is centred around Chester from the River Dee and is low compared to the rest of the North West. Flood risk from the Dee comes from a fluvial, tidal or mixed source. The River Gowy also passes through CCC for the majority of its course but this is a rural catchment and flood risk locations are small scale in nature. There are some other minor flood risk problems in Chester District from sewer flooding and ordinary watercourses.

Using the available data, flood maps have been produced for different return periods and climate change extents. The potential impact of climate change has been estimated across the LPA area.

Levels of risk within the flood extents have been estimated where there is the necessary information using the Sealand Basin breach analysis. It is important to note that this assessed the risks if a breach occurred, not the likelihood of a breach occurring. The undeveloped area most at risk appears to be the land west and immediately east of Clifton Drive. This area is flooded to significant depths in all four of the breach scenarios. In the worst case, depth from 1 to 2m could be experienced bringing a significant flood hazard due to the velocity of flows. The undeveloped land around Finchett's Gutter, east of Clifton Drive, could also experience flood depths of 1 to 2m and significant flood hazard due to high velocity flows. However, this is only seen in breach 1 which is closest to this land. The large undeveloped land between these two areas could experience shallower depths and a low flood hazard due to the distance from the defences (lower velocities and depths). The Border House Farm and Sealand Industrial Estate areas could experience varying flood depths depending on the breach locations. However the flood hazard in all scenarios is only rated as significant when the breach is very close to the area of land in question.

Development in Chester CC is almost solely focussed on Chester city itself; however there are small infill potential future development sites throughout the council area. The largest potential future allocations in Chester CC are also areas that are at flood risk from a number of sources.

Policies for flood risk and development have been drafted for the SFRA including policies for SuDS and culverting. SuDS recommendations and advice has also been included.

## 8.2 Ellesmere Port and Neston district

There are no detailed records of flooding across Ellesmere Port And Neston district due to the small scale nature of past events i.e. not main river flooding. There are some records of past events that have occurred and still pose a risk now. Flood risk from main rivers are confined to the River Gowy at Stanlow and Rivacre Brook through Ellesmere Port. Otherwise there are isolated problems due to sewer and culvert failure and minor watercourse flooding.

Using the available data, flood maps have been produced for different return periods and climate change extents. Climate change is expected to increase flood extent and frequency in the Ince Marshes area. Also, where there are river structures along the urban watercourses flood risk may increase due to higher flows occurring more often.

Levels of risk within the flood extents have been estimated where there is available data. It is difficult to ascertain different levels of flood risk within the flood extents due to a lack of existing data. Where there is data, in the Stanlow complex, the perceived risk from a 1 in 100 yr flood, assuming the defences fail, is high.

Changes in land use are not expected to have a great impact on flood risk but the abandonment of assets could increase flood risk in sporadically across the council area.

Within the Neston and Willaston area the distribution pattern of potential future development sites is generally sporadic infill developments, however there are extensive future developments planned for Ellesmere Port.

The flood hazard throughout the whole of the Stanlow complex is considered high. Potential future development site EPNE13, Stanlow Special Policy Area is considered to be at an extreme hazard if flooding occurred although some areas are at lower risk of flooding. Less vulnerable types of development should be put in the Stanlow allocation.

A number of potential future development sites are potentially at risk from the Manchester Ship Canal and the Shropshire Union Canal. The level of risk can not be ascertained until further studies are undertaken. While there is potentially information available on flood water levels leading to an overtopping of the embankments the precise risk will depend on the relative levels of the left and right banks (i.e. if the right bank (bank adjacent to the Mersey Estuary) is lower there probability of overtopping affecting development would be lower. The more extreme consequence would however be from breach for which no information has been provided.

The Ince Marshes potential future development site is considered to be at a high risk of flooding. The area was originally marshland that would flood naturally. As a result this low-lying land is managed by canalised drains that are pumped at their outfall. Development is not recommended here due to the high levels of flood risk. Any development would need to be of a low vulnerability and have extensive mitigation measures to enable the development to be at an acceptable risk of flooding.

Draft policy recommendations for flood risk and development have been drafted for the SFRA including policies for SuDS and culverting.

## 8.3 Vale Royal BC

There is historic evidence of flooding in Vale Royal BC predominantly from the Rivers Weaver and Dane in Northwich. Flooding from the Weaver has occurred in other locations along its course but Northwich and the surrounding area is the main flood risk location. There may also be other flood risk sources linked to this e.g. sewer flooding. There are other sources of flooding across Vale Royal BC predominantly from watercourse overtopping in isolated locations.

Using the available data, flood maps have been produced for different return periods and climate change extents. The potential impact of climate change has been estimated across the council area.

As a result of climate change, flood risk is expected to increase in Northwich due to an increase in flood frequency and flood extents. Flood risk in the Frodsham and Winsford areas is not expected to increase as much. However increased development in Winsford could put more properties at risk unless future developments around the River Weaver are planned with regard to flood risk from the outset.

Levels of risk within the flood extents have been estimated where there is available data. Levels of flood risk within Northwich are at their highest in central Northwich, where the Dane and Weaver meet. Flood risk profile results also show the Winnington area at a high risk. Flood risk profile increases in central Winsford and then again as the Weaver passes through north Winsford.

Changes in land use are not expected to have a great impact on flood risk but the abandonment of assets could increase flood risk sporadically across the council area.

Within Vale Royal BC major development programmes are planned for Northwich centre and Winsford. These could potentially put more properties at risk if flooding.

In general, flood hazard through Northwich centre is classed as high, the flood extent is also at its greatest through Northwich town centre. In Northwich the lower flood risk areas (in hazard rating and frequency of flooding) are to the north and south of the town centre. The area around the confluence with the Dane and Weaver is at a particularly high risk. This area has a wide, high probability floodplain and a high hazard rating. The potential future development sites with the greatest level of risk associated with them are as follows:

- VLH3 – parts of the Barons Quay allocation near the river Weaver
- VLH5 – The County Council offices site
- VLH7 – Lock Street allocation near to the River Weaver
- VLH1 and others – Winnington, a large part of this allocation around the Weaver has a high hazard rating and is within the 1 in 25 year flood outline.

Other areas of high risk include:

- Chester Way
- London Road
- Navigation Road
- Weaverway

As the Weaver leaves Winsford the new, extensive, potential future housing allocations along Bradford road are all at risk of flooding. The LPA should consider in more detail the location of different types of development in this area.

The flood mapping in Winsford is broad scale and therefore the exact location of the areas at risk of flooding cannot be ascertained.

Area FRAs have been commissioned by Vale Royal BC for Winsford and Northwich. These assessments should build on the information provided in the SFRA and give more detailed guidance to the proposed major developments around the Rivers Weaver and Dane in these locations.

Policies for flood risk and development have been drafted for the SFRA including policies for SuDS and culverting. SuDS recommendations and advice has also been included.

# 9 Recommendations

## 9.1 Chester CC

- Address data deficiencies (see Section 3.8 for the main report for details).
- The recently completed breach analysis for the Sealand Basin should be used by the LPA to consider the potential levels of flood risk to people when proposing future development.
- Any future development along the Sealand Basin embankments should be set back by at least 300m
- Any proposed future development on land, west and immediately to the east of Clifton Drive and the land in and around Finchett's Gutter flood storage basin, should seriously consider the significant degrees of flood hazard that could occur.
- If development is to take place within the above areas, extensive flood mitigation measures will be required. No built development should be considered in the Finchetts Gutter flood storage basin.
- Any future development in the above areas should assess the flood risk from Sealand Main Drain and Finchett's Gutter in more detail to see if development can take place on fluvial flood risk grounds.
- The potential future allocation at Border House Farm and Sealand Industrial Estate should take into account its proximity to the river Dee and the potential for a significant degree of flood hazard should a breach occur. This location is at a lower risk than the locations described in bullet three.
- The flood defences though Chester should be maintained to the 1 in 200 year standard in the locations where there is existing urban development.
- The guidance and matrix in the report should be used for all developments in order to identify appropriate and correct consultation process and requirements for preparing a site specific FRA, as supplemented by central government and/or the Environment Agency from time to time.
- The LPA should use the SFRA in assessing potential sites to be allocated through the LDF.
- Developer contributions towards flood protection, strategic Sustainable Urban Drainage facilities, land drainage, and flood mitigation etc. may be required for some developments. This will be dealt with on a case by case basis.
- Surface water arising from a developed site should, as far as is practicable, be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development, while reducing the flood risk to the site itself and elsewhere, taking climate change into account. This should be demonstrated as part of the flood risk assessment and considered at all stages of the planning process.
- The SFRA should be reviewed on a bi-annual basis to ensure that the latest flood risk data is available in making informed development allocation decisions.

## 9.2 Ellesmere Port and Neston district

- Flood risk from the Manchester Ship Canal and Shropshire Union Canal could not be ascertained. Flood Risk Assessments should assess risk from all sources including canals. There are a number of potential future development sites adjacent to the canals. Rather than many different developers completing a separate assessment, it is recommended that one

study is completed to cover all the allocations. This should cover both the issues of overtopping and breach.

- Within the Stanlow area at risk from Flood Zones 2 and 3, flooding would occur regularly with a high hazard potential if there was not a flood alleviation scheme present. However, other sources of flooding still pose a risk to the site. The standard of protection should be maintained into the future therefore the area should be acceptable for less vulnerable development types.
- Flood extent and frequency in the Ince Marshes area is expected to increase in the future due to climate change. This area is low lying and has a number of drains running through it which would normally flood naturally but are now pumped out to the Mersey. The draft CFMP policy is to retreat from maintenance in this area. This SFRA recommends that, on flood risk grounds, development should not take place here due to the risk from a number of sources, future management of the catchment and due to the natural tendency of this area to flood.
- The infill potential future development sites within Ellesmere Port and Neston district should be acceptable as there are no significant flood risk locations near to these other allocations.
- The guidance and matrix in the report should be used for all developments in order to identify appropriate and correct consultation process and requirements for preparing a site specific FRA, as supplemented by central government and/or the Environment Agency from time to time.
- The LPA should use the SFRA in assessing potential sites to be allocated through the LDF.
- Developer contributions towards flood protection, strategic Sustainable Urban Drainage facilities, land drainage, and flood mitigation etc. may be required for some developments. This will be dealt with on a case by case basis.
- Surface water arising from a developed site should, as far as is practicable, be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development, while reducing the flood risk to the site itself and elsewhere, taking climate change into account. This should be demonstrated as part of the flood risk assessment and considered at all stages of the planning process.
- The SFRA should be reviewed on a bi-annual basis to ensure that the latest flood risk data is available in making informed development allocation decisions

**9.3 Vale Royal BC**

- A more detailed assessment of the levels of flood risk within the Flood Zones should be undertaken. This should be used to identify the areas least at risk and in turn inform the major developments that are planned in Winsford, Northwich and Winnington.
- In general, higher probabilities of flooding and flood hazards are found in central Northwich and the Winnington area. Less vulnerable development should be located in these areas with more vulnerable development further back from the rivers Dane and Weaver. However, Winnington Urban Village has now been given outline planning permission. As the detailed phases of the development come forward, flood risk should continue to be a major issue for consideration.
- Development at Barons Quay should take into account the flood extents and flood risk profile.
- Extensive mitigation measures or flood defence improvements along the Weaver and Dane may need to be implemented in order for developments at risk of flooding in Northwich to be brought forward.
- In general, the higher levels of flood risk are found in north Winsford, near the extensive potential future housing allocations. Consideration should be given to putting less vulnerable developments closer to the river and residential further back.
- Mitigation measures or flood defence improvements may be required if the extensive riverside developments are to take place in north Winsford.
- The guidance and matrix in the report should be used for all developments in order to find the correct consultation process and requirements for a FRA.

# References

1) Planning Policy Statement 25: Development and Flood Risk, December 2006.

2) Development and Flood Risk: A Practice Guide Companion to PPS25, Department for Communities and Local Government: London, 'Living Draft', Department for Communities and Local Government: London, February 2007.