



Strategic Flood Risk Assessment

Fylde Borough Council

Updated November 2011

This Strategic Flood Risk Assessment has been updated in November 2011 to take account of updates to the Environment Agency Flood Maps.

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Executive Summary

Flooding from rivers and coastal waters is a natural process that plays an important role in shaping the natural environment. However, flooding threatens life and can cause substantial damage to property. The effects of weather events can be increased in severity both as a consequence of previous decisions about the location, design and nature of settlement and land use, and as a potential consequence of future climate change. Although flooding cannot be wholly prevented, its impacts can be reduced and possibly avoided through good planning and management.

It is predicted that climate change over the next few decades will mean milder wetter winters and hotter drier summers in the UK, while sea levels will continue to rise. These factors will lead to increased and new risks of flooding within the lifetime of planned developments.

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

The Sequential Approach

A Strategic Flood Risk Assessments (SFRA) should be carried out by the Local Planning Authority to inform the preparation of its Local Development Documents, having regard to catchment wide flooding issues that affect the area. The SFRA provides the information needed to apply the sequential approach.

A sequential risk-based approach to determining the suitability of land for development in flood risk areas is central to the approach put forward in Planning Policy Statement 25: Development and Flood Risk (2010) and it should be applied at all levels of the planning process. Local Planning Authorities should apply the sequential approach as part of the identification of land for development in areas at risk of flooding.

The Sequential Test

In areas at risk of river or sea flooding, councils are advised to consult the Environment Agency Flood Zone maps and check which areas fall within the different flood zones. (Zones 1 -3 with Zone 1 being the area least likely to witness flooding and Zone 3 the most likely). Preference should be given to locating new development in Flood Zone 1. If there is no reasonably available site in flood zone 1, the flood vulnerability of the proposed development can be taken into account in locating development in Flood Zone 2 and then Flood Zone 3. Within each Flood Zone, new development should be directed to sites at the lowest probability of flooding from all sources as indicated by the SFRA.

The Exception Test

If, following application of the Sequential Test, it is not possible, consistent with wider sustainability objectives, for the development to be located in zones of lower probability of flooding, the Exception Test can be applied. The Test provides a method of managing flood risk while still allowing necessary development to occur.

The Sequential and Exception Test are described in detail in Planning Policy Statement 25 Development and Flood Risk.

The Sites

Fylde Borough Council has identified a number of potential strategic sites which may have some future development potential. Some of the sites were previously included in the Local Plan and some have been identified by developers. These sites were tested against a whole series of criteria including, for example, the Strategic Housing Land Availability Assessment, Sustainability Appraisal as well as Strategic Flood Risk Assessment.

The Sequential Test – Fylde

In the application of the sequential test the Strategic Flood Risk Assessment has identified flood risk zones within the borough (1,2 and 3) and has assessed the potential of the various possible development sites which have been identified by the Council. This has created a hierarchy of preferred development sites in line with the sequential approach required by Planning Policy Statement 25. The May 2011 version of the Environment Agencies Flood Zone maps were used.

Maps of the sites are shown on pages 5 to 7 and a table showing which flood zones they are in and setting out the hierarchy of sites is shown on pages 3 and 4. Twenty four sites were in Flood Zone 1, one in Flood Zone 2 and ten in Flood Zone 3.

The Strategic Flood Risk Assessment is part of the evidence base and is thus a way of informing preparation of the Local Development Framework and in particular the Core Strategy and Land Allocations Development Plan Document. The Local Development Framework and Core Strategy are the policy documents which will ultimately decide which sites will be selected for development.

Table 1: Recommended Policies for Development Area

| Area | Flood Zone | Map Location | Recommended Policy |
|--|------------|---|---|
| Blackpool Airport Elswick Blackpool Road playing fields Wesham Little Eccleston Warton Wrea Green Weeton Heyhouses Lane Lytham Moss Marton Moss Pontins | 1 | 27,28 2,3,4 29 8,9 1 13,14,16,18 10,11,12 5 33 30 22,23,24,25 26 | There are no material flood issues within this area. Therefore there should not be any restriction on flooding grounds for development of all types within the area. Consideration to surface water runoff should be given in all cases. |
| Whyndyke Farm | 2 | 21 | Development of all types would be allowed within this area, subject to the Sequential Test and the Exception Test being carried out where appropriate. Any development in Flood Zone 2 (whether allocated or not) should be accompanied by a site-specific flood risk assessment to demonstrate that the development is not at risk of unnecessary risk of flooding and will not exacerbate flood risk elsewhere. |
| Lytham | 3a | 19,20 | Only appropriate development would be permitted within this area subject to the Sequential Test and the |

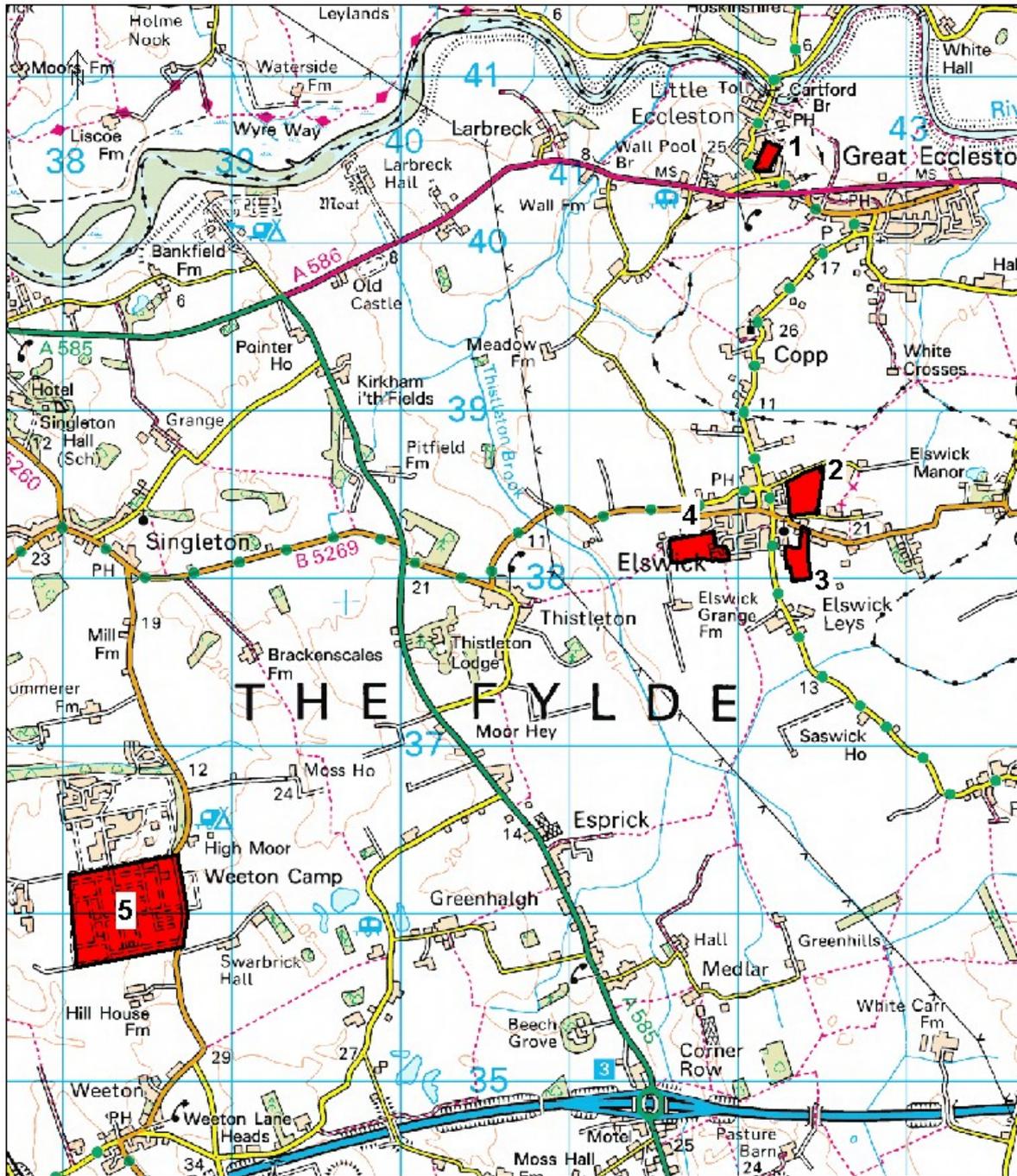
| | | | |
|--------------------|--|-------------|--|
| Lytham Moss | | 31,32,34,35 | Exception Test being carried out where appropriate. A Level 2 SFRA will need to be undertaken to justify any proposed site allocation in Flood Zone 3a. Any development in Flood Zone 3a (whether allocated or not) should be accompanied by a site-specific Flood Risk Assessment to demonstrate that the development is not at risk of unnecessary risk of flooding and will not exacerbate flood risk elsewhere. Consultation with the Environment Agency is recommended. |
| Kirkham | | 7 | |
| Warton | | 15 | |
| Freckleton | | 17 | |
| Newton-with-Scales | | 6 | |

Detailed considerations of flood risk and potential mitigation measures have been prepared for each of the sub Strategic Development Areas above.

This table has been updated (July 2011) to take account of changes to the flood map. The changes made to the table are as follows:

- Site 15 in Warton, Site 17 in Freckleton, Site 6 in Newton-with-Scales and Sites 31 and 32 in Lytham Moss are now all within Flood Zone 3, after previously being within Flood Zone 1.
- Sites 23 and 24 at Marton Moss are now within Flood Zone 1, after previously being within Flood Zone 2.
- Site 26 at Pontins is now in Flood Zone 1, after previously being within flood zone 2.
- Site 21 at Whyndyke Farm is now within Flood Zone 2, after previously being within flood zone 1.

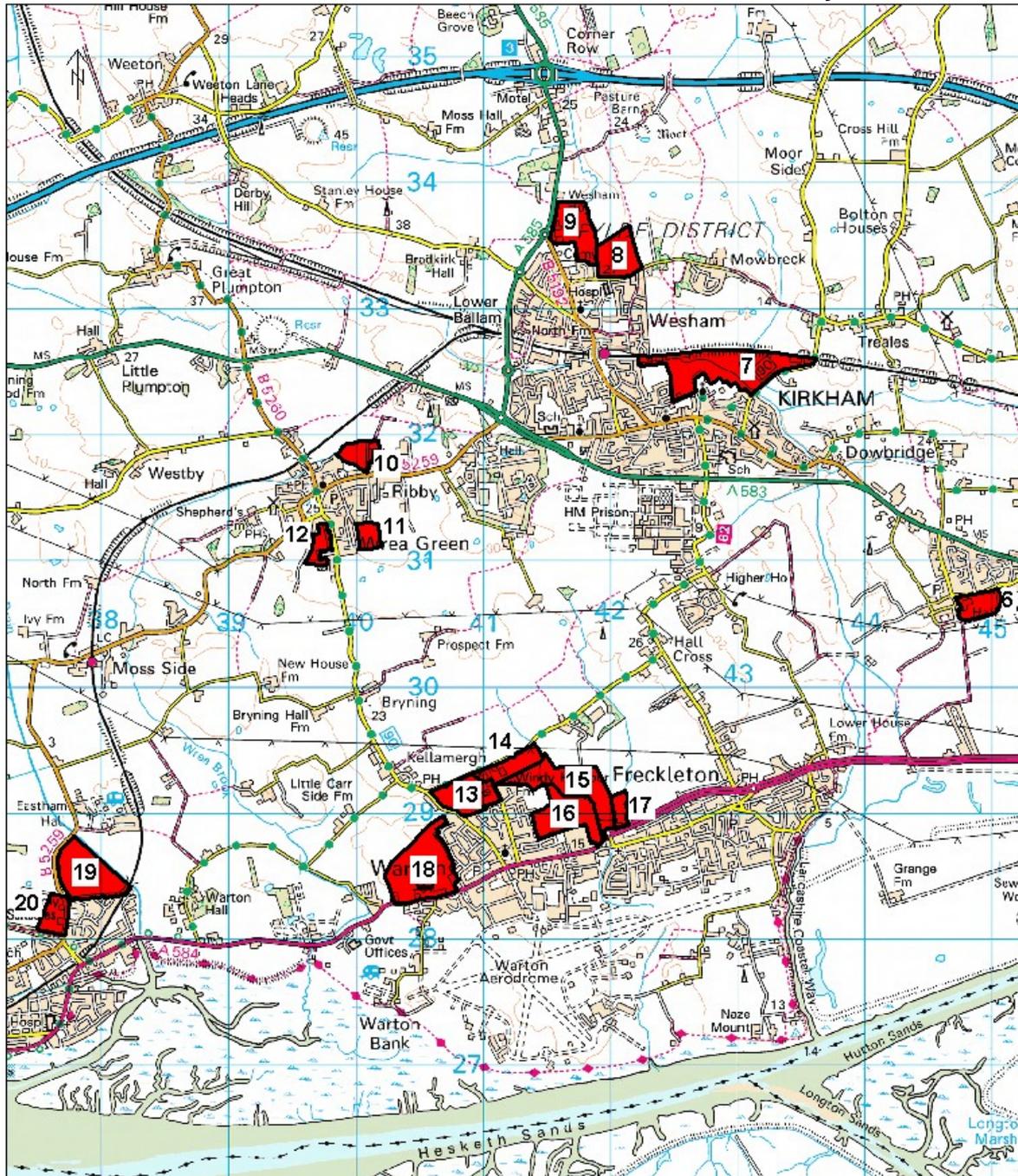
**Map 1: Development areas –
Little Eccleston, Elswick, Weeton**



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Not to Scale

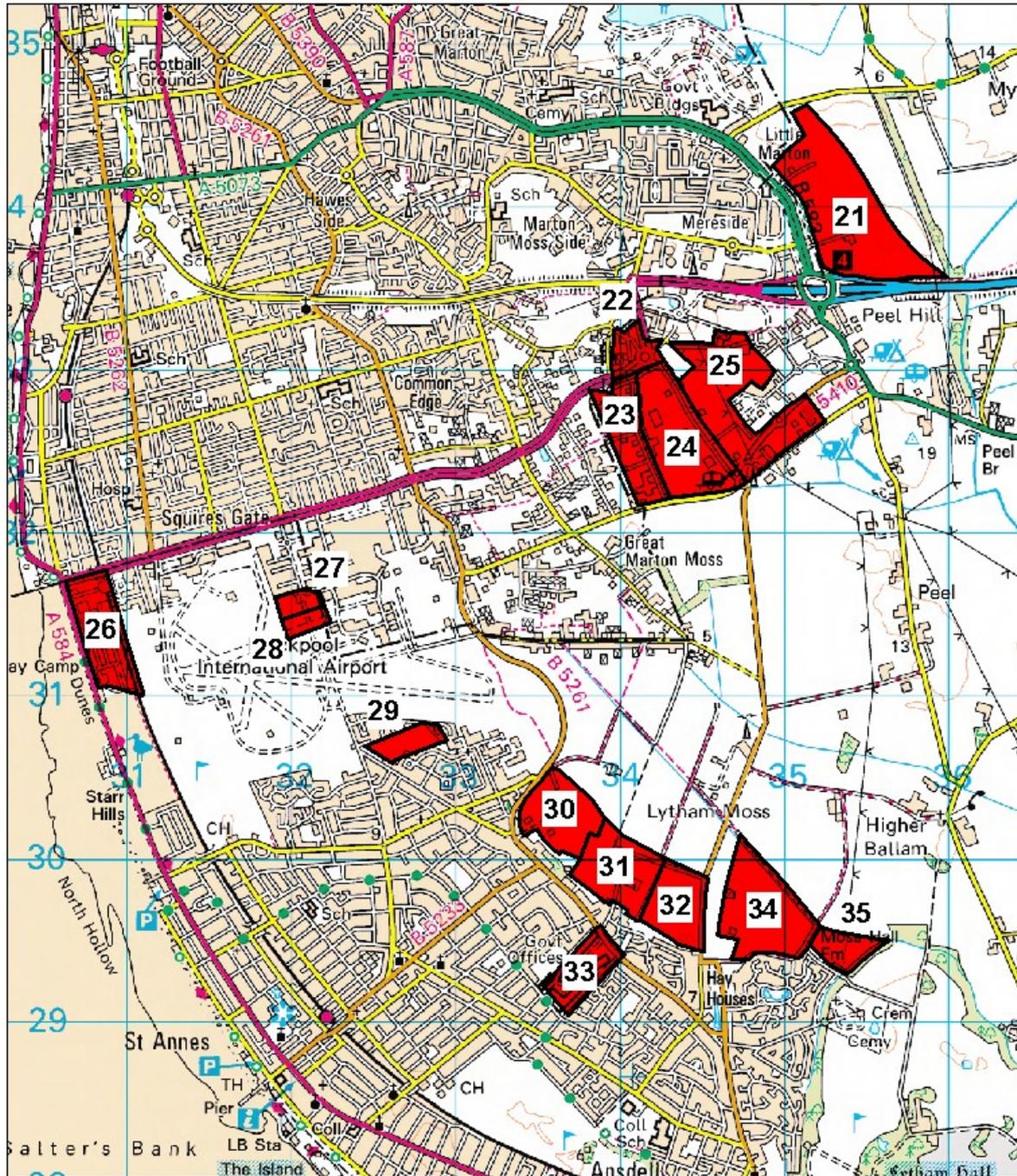
**Map 2: Development areas –
Kirkham, Newton, Wrea Green, Freckleton, Warton, Lytham**



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Not to Scale

**Map 3: Development areas –
Marton Moss, Whyndyke Farm, Blackpool, St. Annes**



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Not to Scale

1.0 Background

Wyre Borough Council have prepared this Strategic Flood Risk Assessment on behalf of Fylde Borough Council in accordance with Planning Policy Statement 25 (PPS25). The area covered by this assessment includes the whole borough but concentrates on the Development Areas.

The threat of flooding and the minimisation of flood risk is a high priority for the Council. Therefore the Council takes its responsibilities with respect to the maintenance and improvement of flood protection assets and the promoting sustainable development very seriously.

This Strategic Flood Risk Assessment has been developed with the assistance of the Environment Agency and key landowners to provide a robust assessment of current and future levels of flood risk, ensuring that future development takes full account of flood risk and sustainability at the outset.

The aim of this flood risk assessment is to work with the planning system, to raise the profile and understanding of flood risk and to influence the spatial planning processes to provide sustainable developments.

The main stages in the development of the Strategic Flood Risk Assessment are:

- The identification of flood zones for the area
- The identification of potential sources and pathways of flooding using appropriate techniques
- Examination of future development proposals, including sequential testing and the application of exemption testing where appropriate
- Identification of residual flood risk and appropriate mitigation measures
- Adoption.

2.0 Introduction

Flooding is a natural process that cannot be wholly prevented. Good planning and management of the risk and consequence of flooding can help avoid and reduce the considerable threat to people and property.

This Strategic Flood Risk Assessment has been prepared by Wyre Borough Council on behalf of Fylde Borough Council in accordance with Planning Policy Statement 25: Development and Flood Risk. The Council shares the Government's objectives for the planning system in which planning promotes sustainable patterns of development, avoiding flood risk and accommodating the impacts of climate change.

The Council will continue to work in partnership with the Environment Agency, other operating authorities and stakeholders to optimise expertise, share knowledge and information to ensure plans are effective and planning policy is guided by clear and accurate information.

2.1 Background to Strategic Flood Risk Assessments

The Strategic Flood Risk Assessment highlights the potential levels of risk from flooding throughout the borough. Where development is identified in flood zones 2 and 3 of the Environment Agency flood zone maps, further developer produced flood risk assessments (Site Specific Flood Risk Assessment – SSFRA) using more detailed scenarios will be required based on the framework identified within this Strategic Flood Risk Assessment.

The Strategic Flood Risk Assessment is a strategic risk based approach through policies in the Regional Spatial Strategy (RSS)¹ and Local Development Documents (LDDs) which:

- Avoid adding to **sources** of flood risk by avoiding inappropriate development
- Manage flood **pathways** to reduce the likelihood of flooding by managing flood defence infrastructure and utilising natural storage of flood water
- Reduces the adverse consequences of flooding on people and property, the **receptors** by avoiding inappropriate development in flood risk areas.

The Strategic Flood Risk Assessment for Fylde Borough Council uses the source, pathway and receptor model to inform the sequential test for all stages of planning within the borough. Where development is considered in Flood Zone 2 or 3 it may be necessary to apply the Exception Test in accordance with guidance given in PPS25.

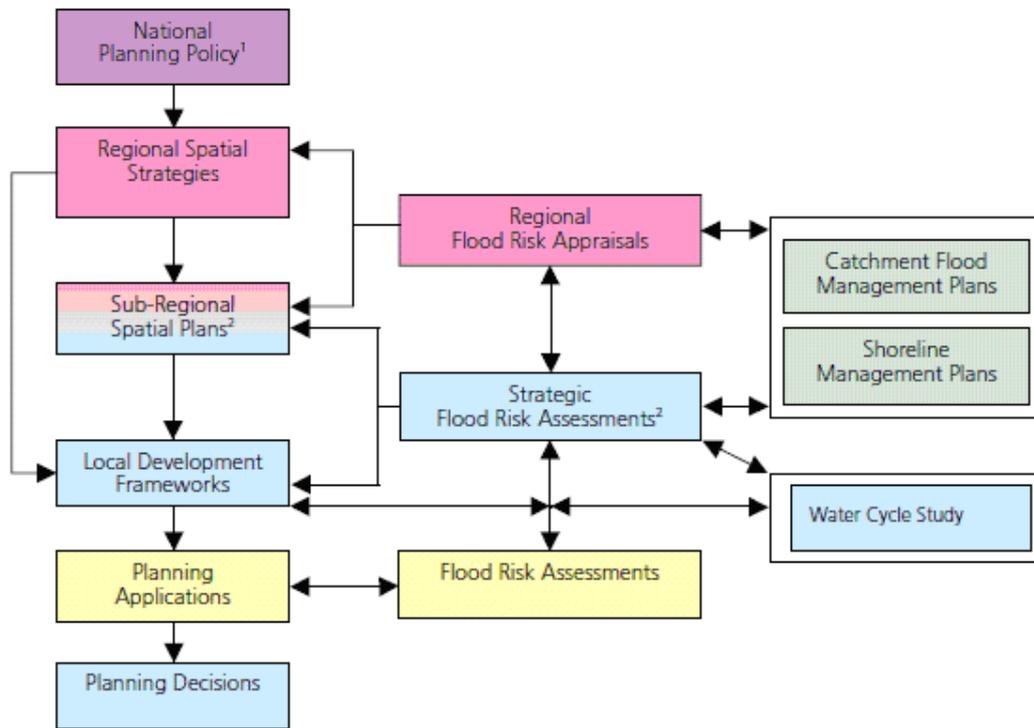
3.0 Managing Flood Risk through the Spatial Planning Process

All forms of flooding and their impact on the natural and built environment are material planning considerations. PPS25 requires that planning authorities take flood risk into account at all stages of the planning process to avoid inappropriate development in areas at risk of flooding. Where new development is exceptionally necessary in such areas, appropriate action and mitigation should be taken to make it safe without increasing the risk elsewhere and where possible reducing overall risk.

This Strategic Flood Risk Assessment fits within the overall planning process as a foundation to sustainable and appropriate planning policy. Fig 1.1 identifies the core role of the Strategic Flood Risk assessment within the overall planning process.

¹ The government has announced its intention to revoke regional strategies

Key documents in the spatial planning process and their links with other key strategies for managing flood risk



Legend: Responsibilities are indicated using colour-coding, as follows.

| | | | | |
|---------------------|---------------------|--------------------------|---|-----------|
| National Government | Regional Government | Local Planning Authority | Environment Agency / Maritime Local Authorities | Developer |
|---------------------|---------------------|--------------------------|---|-----------|

This diagram has been reproduced from Planning Policy Statement 25 'Development and Flood Risk - Practice Guide'

Notes

1 Including Planning Policy Statement 25 'Development and Flood Risk' and the other flooding-related national planning policy listed in Appendix A of Planning Policy Statement 25 'Development and Flood Risk - Practice Guide.'

2 SFRAs may cover more than one local planning authority, and the adoption of a catchment-based approach by a number of LPAs working in partnership could be highly beneficial.

3 This diagram has been developed from the original within the Defra/EA 2005 report FD2320.

4.0 Sequential and Exception Tests

PPS25 states that Local Planning Authorities in allocating land should apply a sequential test to demonstrate that no reasonably available sites are available which have a lower probability of flooding that would be appropriate for the development.

The policies in PPS25 therefore require that throughout all stages of the development planning process both the nature and spatial distribution of flood risk and the degree of vulnerability of different types of development should be assessed and the philosophy of managing flood risk through avoidance/prevention should be reinforced. This Strategic Flood Risk Assessment provides a framework on which an informed sequential test and understanding of flood risk within Lytham St Annes and other potential development sites can be based.

PPS25 requires that planners and developers do not simply match land use types to areas or zones with an 'acceptable' degree of flood risk. Rather, a sequential approach to location of new development is required, by application of the Sequential Test.

- The overall aim of decision-makers should be to steer new development to Flood Zone 1.
- Where there are no reasonably available sites in Flood Zone 1, decision-makers identifying broad locations for development and infrastructure, allocating land in spatial plans or determining applications for development at any particular location should take into account the flood risk vulnerability of land uses and consider reasonably available sites 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. Within Fylde it is recommended only development meeting criteria for suitability within the exception test will be considered within Flood Zone 3.

In the application of this, the Strategic Flood Risk Assessment has identified the above spatial flood risk zones within the borough and has assessed the potential of various possible development sites. This has created a hierarchy of preferred development sites in line with the sequential approach required by PPS25. It should be noted that the SFRA is not a policy document but provides evidence in respect of sites which may be put forward for development.

4.1 Exception Test

The Exception Test makes provision for sites where flood risk is outweighed by wider sustainability considerations and is designed to ensure that the flood risk posed to such sites is controlled and mitigated to an acceptable level, taking account of climate change, without increasing flood risk elsewhere.

Where it is necessary, following application of the Sequential Test, to locate new development in Flood Zones 2 and 3, such development should be focused within areas where:

- The preferred policy option in the relevant Catchment Flood Management Plan or Shoreline Management Plan is to 'hold the line'
- The standard of protection afforded by the existing defences is compatible with the land use type proposed
- Application of the sequential approach has been used to identify the areas within the development area that are at least risk
- Flood forecasting and warning systems, as well as flooding emergency response procedures, are well-developed'.

Table 2 shows the hierarchy of flood risk management measures and illustrates the important role that the planning process has to play in reducing flood risk.

Table 2: Flood Risk Management Measures

| Flood Risk Management Measure | Description | Example tools and measures | Key responsible parties | Reference Within this Assessment |
|--------------------------------------|--|---|---|---|
| Avoidance/ Prevention | Allocate developments to areas of least flood risk and apportion development types vulnerable to the impact of flooding to areas of least risk | Regional Flood Risk Appraisals (RFRAs), Strategic Flood Risk Assessments (SFRAs), Flood Risk Assessment | Planning bodies | Sec 16 |
| Substitution | Substitute less vulnerable development types for those incompatible with the degree of flood risk | (FRAs) and application of the sequential approach | Planning bodies and developers | Sec 18 |
| Flood Risk Management Measure | Description | Example tools and measures | Key responsible parties | Reference Within this Assessment |
| Control | Implement measures to reduce flood frequency to existing developments Appropriate design of new | River Basin Management Plans (RBMPs), Catchment Flood Management Plans | Environment Agency and other flood and coastal defence operating authorities, developers and sewerage undertakers | Sec 17 |

| | | | | |
|-------------------|--|---|--|-------------|
| | developments | (CFMPs), Shoreline Management Plans (SMPs), Flood Risk Management Strategies, appraisal, design and implementation of flood defences | | |
| Mitigation | Implement measures to mitigate residual risks | Flood risk assessments Incorporating flood resistance and resilience measures for example raising floor levels Emergency Planning Documents Implementation of flood warning and evacuation procedures | Planning bodies, developers, the Environment Agency, other flood and coastal defence operating authorities and sewerage undertakers | Sec 18 - 21 |

5.0 Aims and Objectives of the Strategic Flood Risk Assessment

The aim of this Strategic Flood Risk Assessment is to influence the spatial planning process in the context of sustainable developments and to provide sufficient and robust evidence to allow the Sequential Test to be applied in the site allocation process.

In the pursuit of this aim the following objectives are required to be met:

- The assessment should be inclusive, taking account of previous studies, and be proactive in encouraging interaction from consultees and the public.
- The assessment should look at all potential pathways including; tidal, fluvial, sewage, open water and ground water.
- The study should take account of the potential for climate change and the effects on the proposed development areas.

- The study should be compatible with wider sustainability considerations in particular the application of a Sustainability Appraisal.
- The study should allow the planning authority to prepare appropriate policies for the management of flood risk

The study should identify the level of detail required for site-specific Flood Risk Assessments in particular locations, and enable them to determine the acceptability of flood risk in relation to emergency planning capability.

In order to achieve this the Council has committed that it's planners and flood risk managers will work together in taking a strategic approach to the management of flood risk by:

- Ensuring flood risk is considered at the earliest stage of the planning process.
- Helping to embed consideration of longer-term issues such as climate change and coastal erosion into spatial planning.
- Providing greater clarity and certainty to developers regarding which sites are suitable for developments of different types.
- Increasing the chances of developing local authority, community and developer-led initiatives to realise opportunities to reduce flood risk, by adopting a partnership approach.
- Ensuring that both the direct and cumulative impacts of development on flood risk are acknowledged and appropriately mitigated.
- Increasing the potential for planning policies to reflect catchment-wide considerations enabling integrated, sustainable developments, which deliver multiple benefits and enhance the environment.

In particular, the Council will apply the strategic approach by:

- Playing an active role in partnership with the Environment Agency in the development of Catchment Flood Management Plans for the catchments affecting the borough.
- Playing an active role within the coastal groups and proactive working with neighbouring coastal authorities to develop sustainable coastal policies through the second stage Shoreline Management Process (SMP II) process.
- Feeding into these processes the cumulative impacts of developments and working with developers on an informed basis to provide sustainable solutions to flood risk problems.
- Proactively involving the community through open forums, consultation and the provision of clear and concise information on flood risk and the communities role in reducing the potential for flood risk and reducing the effects when flooding occurs.

Reducing the risk of flooding has been identified as a key sustainability objective and sustainability issue, as it is a significant pertinent issue locally and regionally

The aim of this flood risk assessment is to influence the spatial planning process in the context of sustainable developments. Flood risk is an important element in the overall decision-making context. It is therefore recommended that the flood risk

assessment is taken into a wider sustainability appraisal process to ensure that other sustainability factors are given due consideration and that property blight and breakdown of existing communities does not result. This appraisal is therefore compatible with current guidance within the governments Sustainability Appraisal (SA) process provided in *Sustainability Appraisal of Regional Spatial Strategies and Local Development Documents: Guidance for Regional Planning Bodies and Local Planning Authorities*, ODPM, 2005.

6.0 Overview of Key Roles and Responsibilities

Responsibility for the management of flood risk falls within the remit of a number of bodies as set out in paragraphs 21-34 and Annex H of PPS25. The roles of the key parties are briefly outlined below.

Landowners have the primary responsibility for draining their land and managing the flood risk issues associated with their property. Their responsibilities in this respect are clarified in paragraphs 22-23 of PPS25. The owners of assets such as canals and reservoirs are similarly responsible for managing the flood risk issues associated with them.

Spatial planning is the responsibility of the regional and local planning bodies, including Fylde Borough Council. The Planning and Compulsory Purchase Act 2004 and accompanying regulations require regional planning bodies (RPBs) and local planning authorities (LPAs) to produce spatial plans in the form of Regional Spatial Strategies (RSSs)² and Local Development Documents (LDDs). Together these documents form the statutory development plan against which planning applications must be determined, unless material considerations indicate otherwise. Statutory development plans should reflect the Government's policies for sustainable development as developed by Communities and Local Government. These policies include Planning Policy Statement 25: (PPS25) *Development and Flood Risk*, which aims to avoid placing new development, of a type, which is incompatible with flooding, in areas at risk of flooding.

The Environment Agency and other flood and coastal defence operating authorities, including this authority, have statutory powers to manage flood risk to **existing** properties and assets. They prepare strategic plans for measures to reduce flood risk posed to existing communities and assets by rivers, watercourses and the sea, in accordance with policies developed by the Department for Environment, Food and Rural Affairs (Defra). The flood and coastal defence operating authorities are key consultees to the spatial planning process. They hold important sources of information for spatial planners considering new developments in accordance with the planning policies set out in PPS25, including Catchment Flood Management Plans (CFMPs) and Shoreline Management Plans (SMPs).

Sewerage undertakers are responsible for any sewers adopted under the requirements of the Water Industry Act 1991. They prepare Asset Management Plans (AMPs) approved by the water regulator, Ofwat, which include investment programmes to manage the flood risk from sewers. Responsibility for the

² The government has announced its intention to abolish all regional plans and regional planning bodies

maintenance of highway drainage systems lies with the highway authority wherever these are not privately owned.

7.0 Studies

A number of key studies have been prepared for the area covered by this Strategic Flood Risk Assessment. The hierarchy of studies is shown in the diagram below and their conclusions with relevance to this assessment are tabulated in table 3.

Hierarchy of Studies

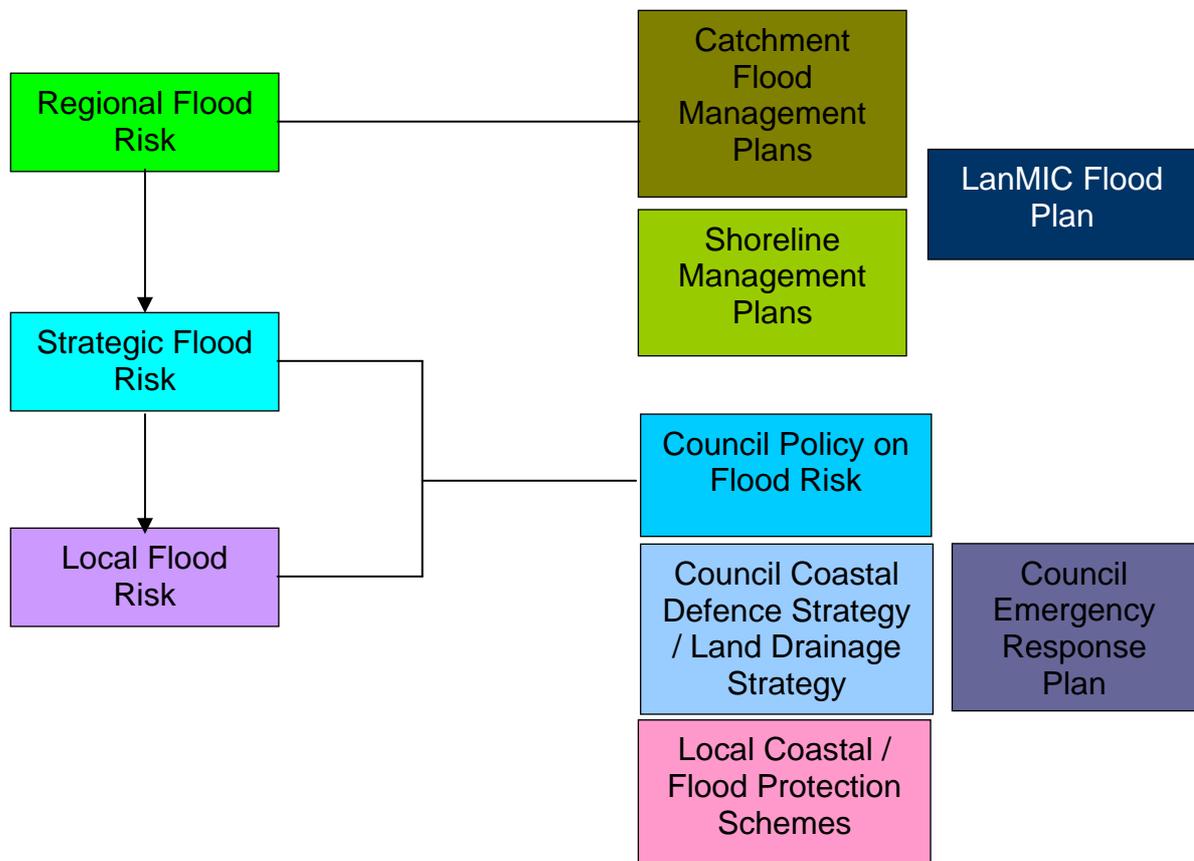


Table 3: Relevant Studies

| Study / Plan | Brief Description of Contents | Key Conclusions |
|---|--|--|
| <p>Ribble Catchment Flood Management Plan (CFMP)</p> | <p>The Ribble Catchment Flood Management Plan (CFMP) is one of 77 CFMPs that the EA has produced throughout England and Wales.</p> <p>The CFMP gives an overview of the flood risk in the Ribble catchment and sets out the EA's preferred plan for sustainable flood risk management over the next 50 to 100 years.</p> <p>The CFMP considers all types of inland flooding, from rivers, groundwater, surface water and tidal flooding, but not flooding directly from the sea (coastal flooding), which is covered by Shoreline Management Plans (SMPs).</p> | <p>Need feasible works to reduce flood risk, particularly at Lytham St Annes, and to utilise the planning system to discourage inappropriate development in the flood plain.</p> |
| <p>North West England and North Wales Shoreline Management Plan SMP2, Sub-cell 11b Southport Pier to Rossall Point.</p> | <p>A Shoreline Management Plan (SMP) provides a large-scale assessment of the risks associated with erosion and flooding at the coast. It also presents policies to help manage these risks to people and to the developed, historic and natural environment in a sustainable manner.</p> | <p>Managed realignment from St Annes (northern boundary) to Squires Gate. No active intervention from Naze Point to Warton Bank. Hold the Line for all other lengths of the coastline.</p> |
| <p>Policy Plan for Flood Risk Management</p> | <p>The policy statement was produced by Fylde to explain the Council's approach to coastal and flood protection.</p> | <p>Commitment to improving, maintaining and monitoring defences.</p> |
| <p>Blackpool and Fylde Coast Protection Strategy</p> | <p>This is currently under preparation, and will set out the management of coastal flood and erosion risk along the coastal frontage.</p> | <p>Identified on the forward plan</p> |
| <p>Flooding Response Plan</p> | <p>Details the councils systems and procedures for responding to flooding emergencies from tidal waters.</p> | <p>Commitment to responding to flooding.</p> |
| <p>Flood maps</p> | <p>The Flood Map published by The Environment Agency show the areas of land that could be at risk of flooding from rivers and the sea for a given return period.</p> | <p>Significant areas of zone 2 and 3 flooding within the borough.</p> |

8.0 Existing Planning Policies on Flood Risk Management

The Council in its review of the Local Plan (2005) identified the potential issue of flood risk for future development and the safeguarding of existing development from inappropriate development causing increased flood risk, as an integral part of the decision on location.

Within all area plans the requirement to ensure that in strategic terms, careful consideration is given as part of new development to the risk of flooding is a key requirement of any option. Where appropriate, planning applications will be required to be supported by site specific Flood Risk Assessments which should be prepared in consultation with the Borough Council.

8.1 Local Development Frameworks

Local Development Frameworks (LDFs) provide a key planning tool for ensuring that flood risk is factored into the detailed allocation of land use types across an area in accordance with national and regional policy, but also taking account of specific local issues and concerns. They provide an opportunity to provide clarification to prospective developers in the form of clear policies for the management of flood risk, as well as guidance on how flood risk issues should be addressed at sites allocated within flood risk areas.

In the preparation of this Strategic Flood Risk Assessment, Fylde Borough Council aims to fulfil its obligations as a planning authority in the consideration of flood risk and to inform the LDF. PPS25 requires that the Strategic Flood Risk Assessment is prepared to an appropriate level of detail to allow the Sequential Test to be applied in the site allocation process.

This Strategic Flood Risk Assessment will form an essential part of the pre-production/evidence gathering stage of the plan preparation process. Fylde is working jointly with other local authorities and stakeholders to prepare common SFRA, such that opportunities for regional planning for flood risk can be taken.

9.0 Overview of the Study Area

The borough of Fylde lies within the Fylde Peninsula, which extends from the Ribble Estuary in the south to the River Wyre in the north. The borough adjoins five other local authority areas. These are Wyre Borough to the north, South Ribble Borough and West Lancashire District to the south, Preston Borough to the east and Blackpool Borough to the north & west.

Extending to over 62 square miles and with a population of 73,249* (*2001 Census), the main centres of population in the borough are St. Annes, Lytham, Kirkham, Wesham, Freckleton and Warton. The remaining rural area comprises of 10 other parishes in which there are several attractive villages.

Road communications in Fylde Borough are generally good but tend to have an east-west bias. The M55 Motorway which connects Blackpool in the west with the M6 in the east runs through the middle of the borough with Junction 4 at the western end of the motorway adjacent to the boundary with Blackpool and Junction 3 in the centre of the borough, just north of Wesham. In the north of the borough the A586 links the A6 in the east to Blackpool in the west. The A585 trunk road which runs broadly north to south links the M55 Motorway with Fleetwood, intersecting with the A586 at Windy Harbour. This carries a large amount of heavy goods traffic to and from the docks at Fleetwood and provides a valuable link with the northern part of the Fylde Coast.

The borough is served by the main railway line between Preston and Blackpool with a station at Kirkham/Wesham. The Blackpool south line which links to the main line at Kirkham/Wesham runs through the twin township of Lytham and St. Annes.

The main sources of employment are British Aerospace at Warton; British Nuclear Fuels Ltd at Salwick near Clifton; Axa and Aegon Financial Services at Lytham; various government offices at St. Annes; the Blackpool Fylde Industrial Estate at the western end of the M55, including ITSA; and Fox's Biscuits at Wesham.

A large proportion of the borough is rural in character comprising of high - medium quality agricultural land. Farming operations range from market gardening and intensive animal rearing to cereal production and dairy farming.

For the most part the landscape of the borough is lowland agricultural plain, the characteristic features of which include large geometric grazing fields (many containing ponds); estate plantations and shelter belts of trees; and vernacular brick built farmsteads. On the fringes of Lytham are mosslands which are used mainly for arable crop production. The Ribble Estuary contains areas characterised as coastal marsh.

The areas and their main flood risks are described in table 4.

Table 4: Sources of flooding by area

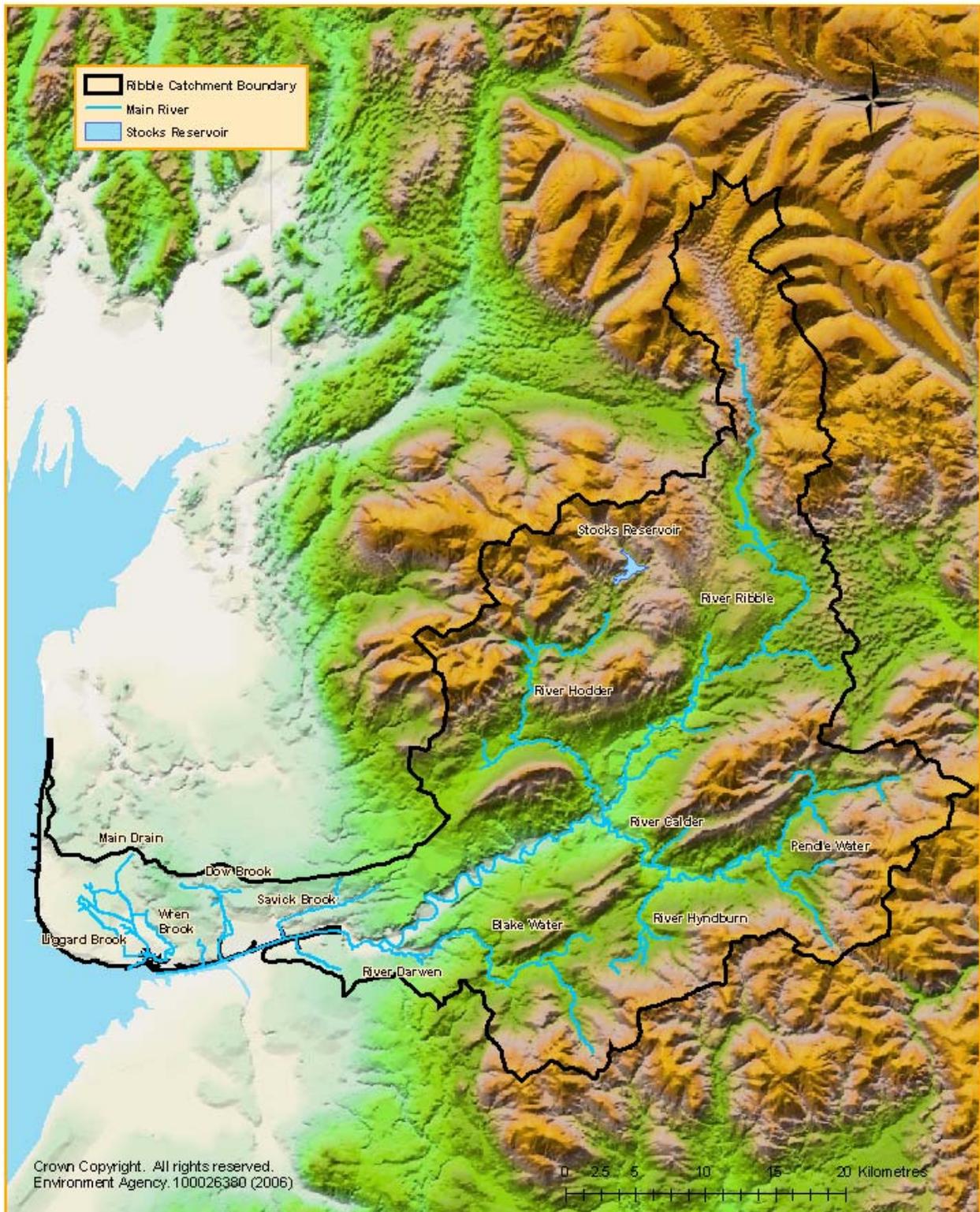
| Area | Area Description | Sources of Flooding |
|---------------------|--|---|
| Elswick | Elswick is a small rural community with a population of approximately 1200 people situated in the heart of the Fylde Countryside. The village is beside the B5269, which is the Blackpool to Longridge road a mile east of the busy A585. Elswick is perhaps best known for Bonds ice cream, which is made in the village and it also hosts two public houses, a post office, village shop, village hall and bowling club with an all weather multi sports area. | The main source of flooding is runoff from flash rainfall events. This is contributed to by agricultural practices in the surrounding area. |
| Kirkham / Wesham | <p>Kirkham is a fairly traditional market town which located in the centre of the borough once centred around the fish stones and market square, both of which can still be seen today. It was a town of some importance in Roman times. Some say it was en-route to a Roman port that is reputed to have existed on the Fylde coast at one time. More recently, during the industrial revolution, it was a centre for textile manufacture with several large mill buildings which are now gone.</p> <p>Wesham (pronounced "Wessam" by locals) is only about 160 years old, and developed as the railway expanded to serve the growing popularity of resort towns like Blackpool. From the 1920s to the 1950s huge numbers of mammoth steam trains plied their way to the coast via the station at Kirkham and Wesham. Closely linked to its neighbour Kirkham, Wesham was also home to several cotton mills during the industrial revolution, although none remain today.</p> | The main source of flooding within this area is from fluvial sources to parts of both Kirkham and Wesham adjacent to the railway line. |
| Little Eccleston | Little Eccleston nestles on the southern bank of the River Wyre on the northern boundary of the borough. The village is the second crossing point on the River Wyre, and travellers using Cartford Lane will cross the Toll Bridge leading to the area known as "Over Wyre". The name "Cartford" implies an earlier origin as the lane leading to a ford across the River Wyre for agricultural horse drawn carts. | The main sources of flooding within this area are from fluvial sources and surface water runoff from flash rainfall events. |
| Newton-with-Scales | Newton is a small village in the southern part of the borough close to the river Ribble which is now principally a residential commuter area for the larger towns like Preston and Blackpool. | There are no significant flood risks in this area. |
| Warton / Freckleton | On the southern boundary adjacent to the river Ribble, Warton a small town, was once famous for a 17th century Post or "Peg" Mill. Warton is now home of British Aerospace, a major local employer. Freckleton is one of the oldest and largest of Fylde's villages, It is a former port situated on the Ribble Estuary, and now gives access to the | The main source of flooding is runoff from flash rainfall events. This is contributed to by agricultural practices in the surrounding area. |

| | | |
|---|---|--|
| | Lancashire Coastal Way walking route. Up to the 1920s there was a toll gate where travellers to Lytham and Preston were obliged to pay a toll for the use of the road. Today it is primarily a residential area. | |
| Wrea Green | Wrea Green is a small pretty village in the centre of Fylde and regularly wins the "Best Kept Village" competition. The focus of the village is The Green which provides a home for the pond (known locally as the Dub), and for cricket matches in summer. | There are no significant flood risks in this area. |
| Weeton | Sheltering in the rural Fylde, between Blackpool and Kirkham, Weeton boasts a traditional triangular village green where Weeton Fair was once held, It is an ancient village, and the site of a bronze age archaeological find. Just outside the village is Weeton Camp, a services settlement, and "home" for many ex-servicemen at some stage in their military career. | The main source of flooding is runoff from flash rainfall events. |
| Lytham / St. Annes | Lytham St. Annes is a seaside resort on the south west boundary of Fylde. The town of St Annes was mostly laid out according to a plan drawn up by businessmen who saw the economic benefits of attracting large numbers of visitors from the mill towns in the east. It retains much of it's original character today. It is a traditional quiet Victorian / Edwardian seaside resort with up-market hotels, a sandy beach and a small pier. It also has sand dunes fringing the beach, and an excellent, but little known sand dune nature reserve. Lytham brims with old fashioned charm and has a history as a seafaring area whose economy was based on fishing and shrimping. Later, wealthy industrialists moved from the industrial east of the county. Today Lytham is famous for golf at Royal Lytham Golf Club, The Green, the recently restored Windmill and Old Lifeboat House Museum, and Lytham Club Day, a local festival each June. The Green overlooks the estuary of the river Ribble and the Welsh mountains. | The main risk of flooding within the area is from tidal sources, from a breach of the coastal or estuary defences. This would lead to significant areas being flooded, including existing development. The area is also susceptible to flooding from fluvial sources due to the low gradients and difficulty in discharging into the estuary, the various watercourses that drain the land. Similarly sewer flooding, groundwater and highway drainage systems can result in flooding problems as they are interconnected to the watercourses. |
| Blackpool Airport / Marton Moss / Whyndyke Farm | Blackpool International Airport lies on the Fylde boundary with Blackpool Borough Council with the Irish sea to the west, the moss to the east and Lytham St Annes to the south. | The main source of flooding within this area is surface run off. There are significant areas which are susceptible to sewer flooding notably Marton Moss due to the high concentration of combined sewers and the low hydraulic gradients within these areas. |

Map 4: Fylde Borough



Map 5: Topography



10.0 Environment Agency Flood Zone Maps

The Environment Agency's flood risk maps for the study area are shown on the following pages.

The Environment Agency Flood Map identifies flood zones defined in Table D1 of PPS25.

Zone 1, Low probability – Area not highlighted – This zone comprises land assessed as having less than 1 in 1000 annual probability of river or sea 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 river flooding (1% - 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%)

Zone 3, High probability – 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 sea flooding (>0.5%)

The Flood Map shows current best estimates of the risk of flooding from rivers and the sea only and does not consider other sources. The Flood Map takes no account of potential climate change impacts. The maps also provide an indication of some areas, which are defended by existing flood defences. The Flood Map information is also provided in digital form to local authorities and is updated as new information becomes available.

The Flood Map is updated quarterly. The maps used for this updated SFRA are from May 2011.

Map 6: EA Flood Map – St. Annes



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Not to Scale

Flood zone 2



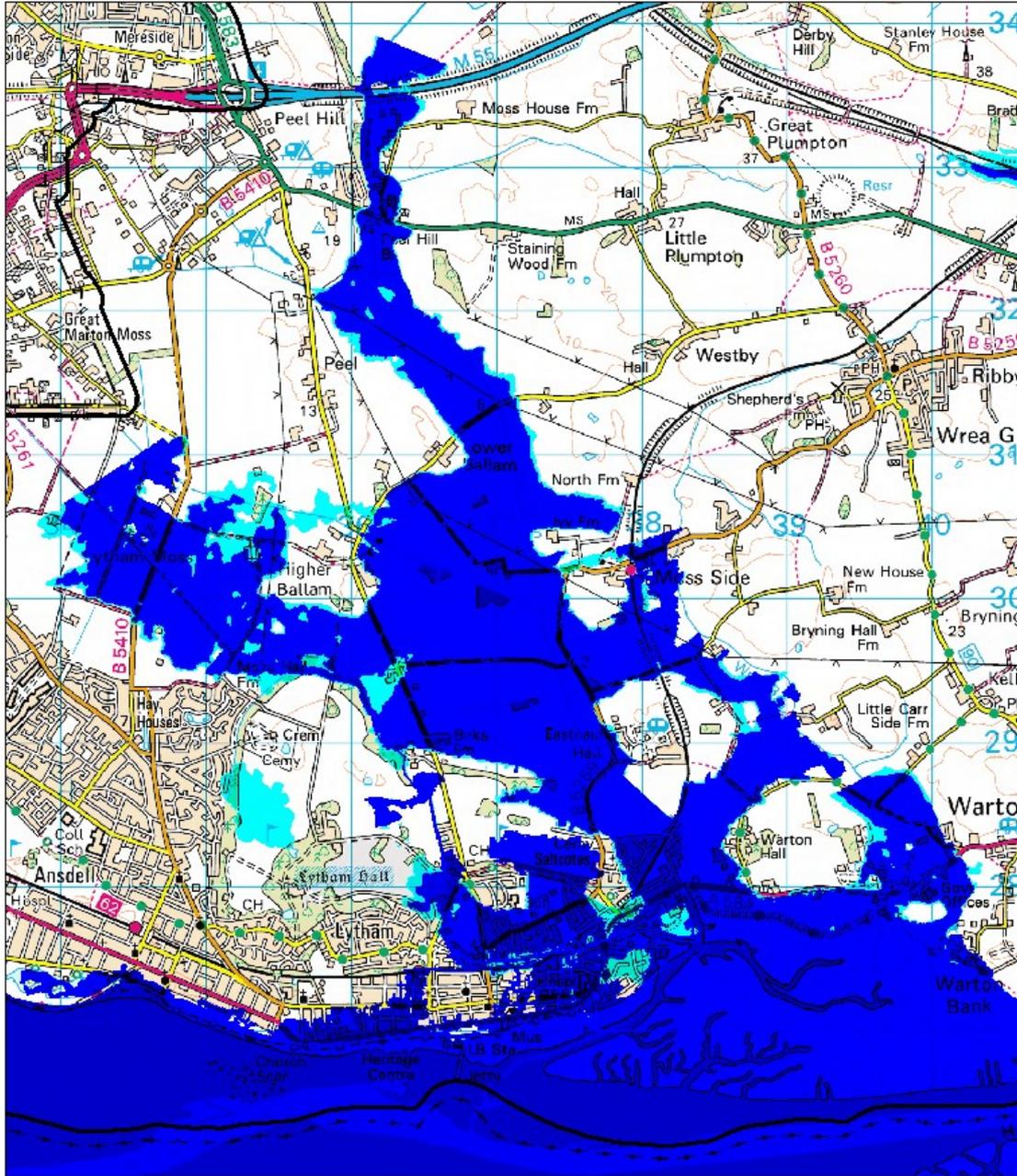
Flood zone 3a



Borough boundary



Map 7: EA Flood Map - Lytham



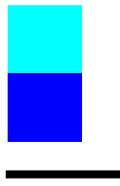
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Not to Scale

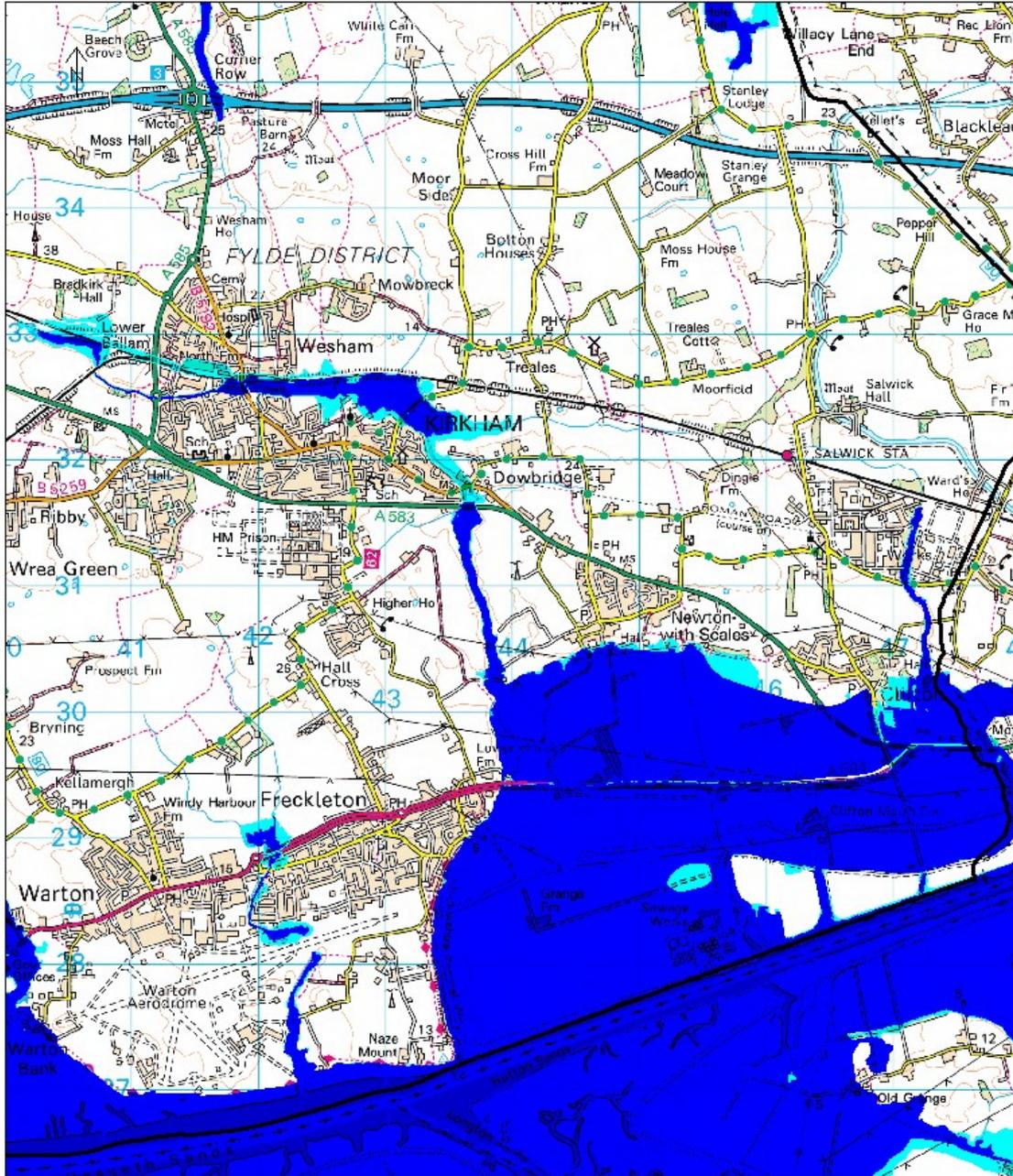
Flood zone 2

Flood zone 3a

Borough boundary



Map 8: EA Flood Map – Warton, Freckleton, Kirkham



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Not to Scale

Flood zone 2



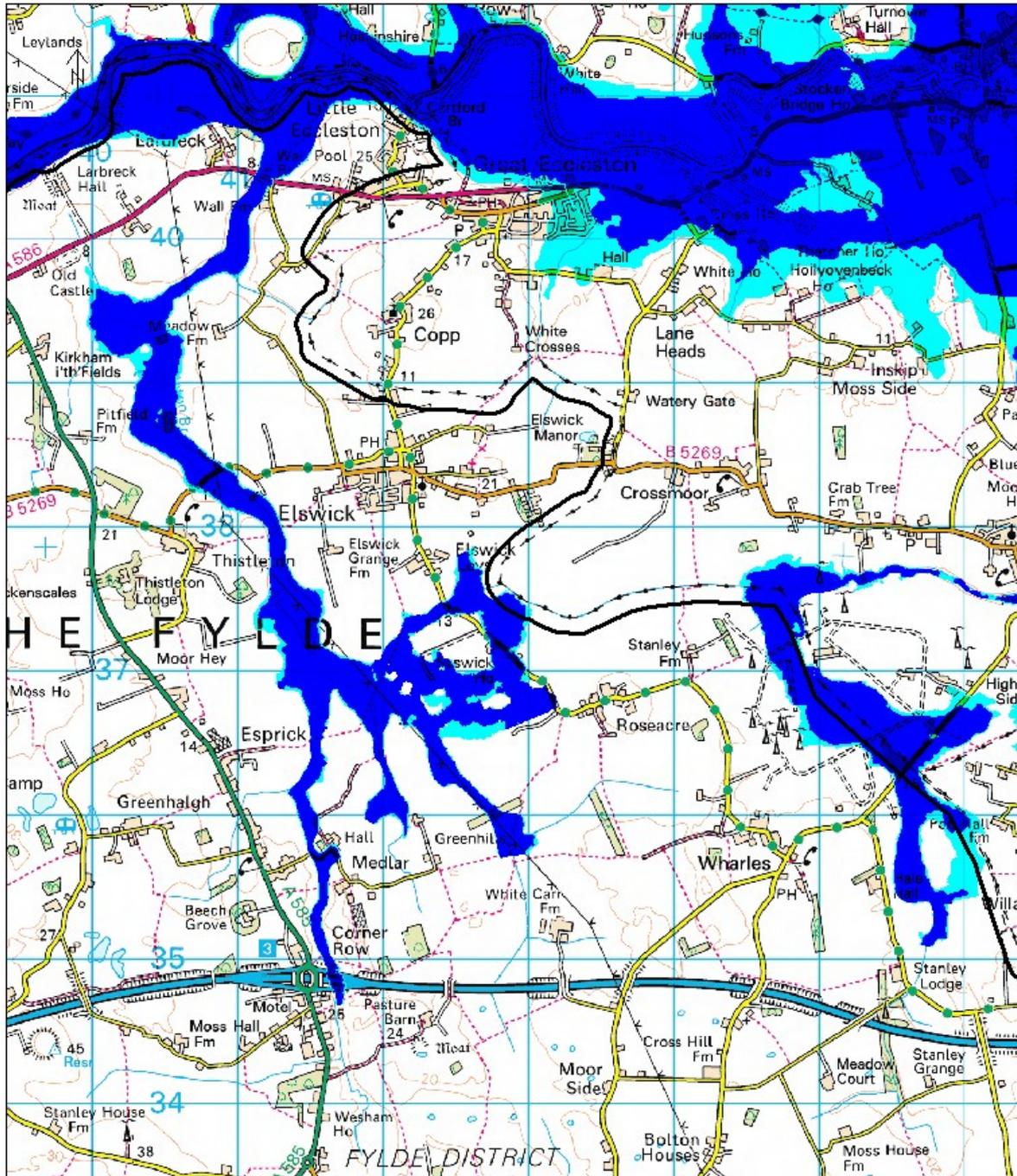
Flood zone 3a



Borough boundary



Map 9: EA Flood Map – Rural NE



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Not to Scale

Flood zone 2



Flood zone 3a

Borough boundary



Map 10: EA Flood Map – Rural NW



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Not to Scale

Flood zone 2



Flood zone 3a

Borough boundary



11.0 Functional Flood Plains

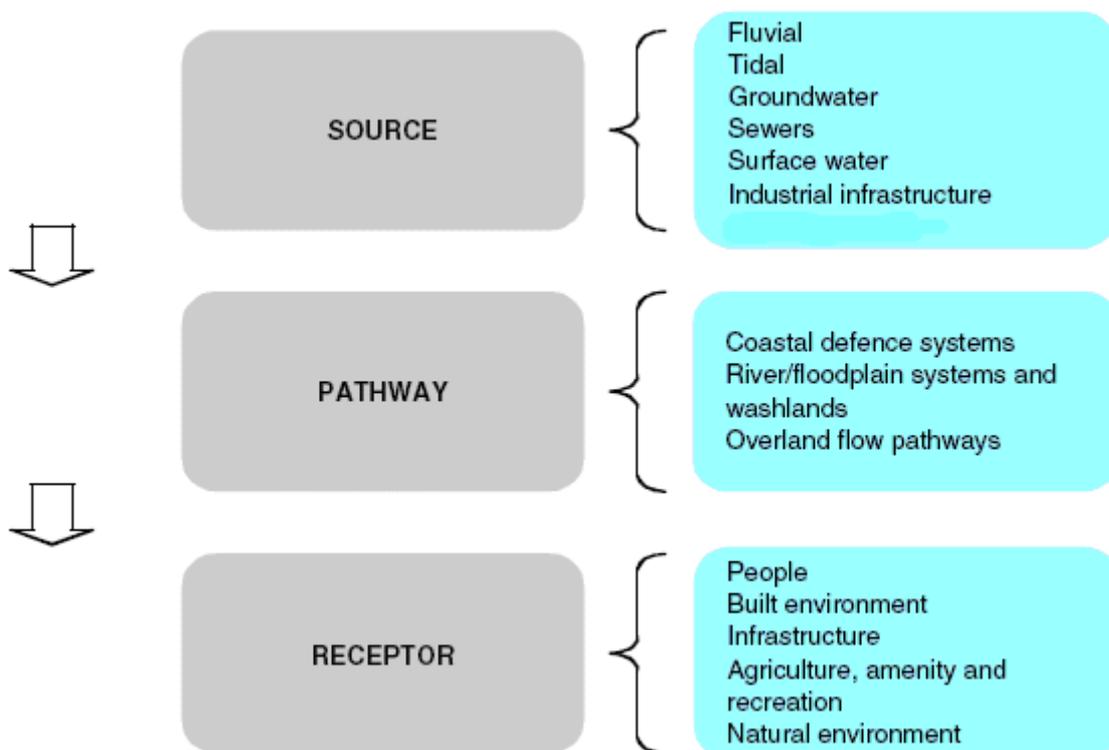
PPS25 defines functional flood plains as land where water has to flow or be stored in times of flood. Analysis of the area indicates that there are **no** areas of land currently protected by flood defences that should be defined as functional flood plain.

12.0 Source Receptor Pathway Model

The Strategic Flood Risk Assessment is a strategic risk based approach through policies in the Regional Spatial Strategy (RSS)³ and Local Development Documents (LDDs) which:

- Avoid adding to **sources** of flood risk by avoiding inappropriate development.
- Manage flood **pathways** to reduce the likelihood of flooding by managing flood defence infrastructure and utilising natural storage of flood water.
- Reduces the adverse consequences of flooding on people and property, the **receptors** by avoiding inappropriate development in flood risk areas.

The Strategic Flood Risk Assessment for Fylde Borough Council uses the source, pathway and receptor model to inform the sequential test for all stages of planning within the borough. Where development is considered in Flood Zone 2 or 3 it may be necessary to apply the Exception Test in accordance with guidance given in PPS25.



³ The government has announced its intention to revoke regional strategies

13.0 Pathways

Fluvial (Rivers)

- Inundation of floodplains from rivers and watercourses
- Inundation of areas outside the natural floodplain due to influence of bridges, embankments and other features that artificially raise water levels
- Overtopping of defences (whether existing or proposed)
- Breaching of defences (whether existing or proposed)
- Blockages of culverts (whether existing or proposed)
- Blockages of flood channels, or flood corridors.

Tidal

- Sea or estuary
- Overtopping of defences (whether existing or proposed)
- Breaching of defences (whether existing or proposed)
- Other flows (fluvial surface water) that could pond due to tide locking
- Wave action.

Groundwater

- Most likely to occur in low-lying areas underlain by permeable rock (aquifers).

Sewers

- Combined, foul or surface water sewers.

Surface water

- Sheet run-off from adjacent land (urban or rural).

Infrastructure failure

- Reservoirs
- Canals
- Industrial processes
- Burst water mains
- Blocked sewers or failed pumping stations.

14.0 Historical Flooding

Fylde do not hold any records of historical flooding.

15.0 Climate Change

Overview

Annex B of PPS25 provides details on the allowances to be made for climate change effects when assessing flood risk. The guidance in Annex B is based on a supplementary note provided by Defra (FCDPAG3) to those appraising publicly funded flood alleviation projects.

The Environment Agency Flood Map and Flood Zones do not currently take account of climate change impacts. However, PPS25 requires that the spatial planning process should take account of these impacts.

The sustainability of land use allocations has been assessed, based on what climate change effects may mean for allocated sites in the long-term.

Careful consideration has been given to areas where rises in sea level will change the effective zoning of sites. Where this is the case this has been stated and the requirement for further modelling work identified.

15.1 Regional Sea Level Allowances

The *allowances used within this assessment* refer to sea level rise, where the evidence base has improved leading to greater certainty. Sea level rise allowances have been used both to assess flood risk and in the design of any protection measures. This therefore reflects a precautionary approach.

The recommended allowances provided in table 5, taken from PPS25, have been used to determine the relevant sea level rise appropriate to the area.

North West Area:

| | |
|--------------|---------------------------------|
| 1990 to 2025 | $2.5 \times 35 = 87.5\text{mm}$ |
| 2025 to 2055 | $7.0 \times 30 = 210\text{mm}$ |
| 2055 to 2085 | $10.0 \times 30 = 300\text{mm}$ |
| 2085 to 2115 | $13.0 \times 30 = 390\text{mm}$ |

Total Sea Level Rise over the 100 year period following the local plan period, which is valid until 2016 equates to 1000mm.

Table 5: Recommended contingency allowances for net sea level rises (Table B.1 from PPS25)

| Administrative Region | Net Sea Level Rise (mm/yr) Relative to 1990 | | | |
|---|--|-----------------|-----------------|-----------------|
| | 1990 to 2025 | 2025 to 2055 | 2055 to 2085 | 2085 to 2115 |
| East of England, East Midlands, London, SE England (south of Flamborough Head) | 4.0 | 8.5 | 12.0 | 15.0 |
| South West | 3.5 | 8.0 | 11.5 | 14.5 |
| NW England, NE England (north of Flamborough Head) | 2.5 | 7.0 | 10.0 | 13.0 |

15.2 Indicative Sensitivity Ranges for Other Parameters

The *indicative sensitivity ranges for other parameters* referred to in PPS25. Peak flows, extreme rainfall, extreme waves and winds have a higher degree of uncertainty. Further evidence and research is required to understand local and regional variations, uncertainties and how to manage them. The analysis will therefore be revisited once a clearer understanding of these measures is given.

Indicative sensitivity ranges, covering peak rainfall intensity, peak river flow, offshore wind speed and extreme wave heights are shown in table 6, taken from PPS25.

Table 6: Recommended national precautionary sensitivity ranges for peak rainfall intensities, peak river flows, offshore wind speeds and wave heights (Table B.2 from PPS25)

| Parameter | 1990 to 2025 | 2025 to 2055 | 2055 to 2085 | 2085 to 2115 |
|-------------------------|-----------------|-----------------|-----------------|-----------------|
| Peak rainfall intensity | +5% | +10% | +20% | +30% |
| Peak river flow | +10% | +20% | | |
| Offshore wind speed | +5% | | +10% | |
| Extreme wave height | +5% | | +10% | |

16.0 Application of Sequential and Exception Test

A sequential test for each site was first undertaken using the source pathway model. This indicated where appropriate development could take place and where exception testing of the site was appropriate. The first level of study was to identify where potential flood risk existed and which sites may require further scrutiny through the exception testing. The first scoping exercise assumes flooding with no defences in place but assesses defence conditions where appropriate.

17.0 Scoping Study of the Borough

An initial broad scoping study has been undertaken for the borough, using the EA's flood risk maps and known flooding from other sources. As a broad outline this is divided into key issues for each of the sub catchment areas in table 7.

Table 7: Key Issues of Catchment Areas

| Area | Main Source | Main Pathway | Historical Flooding | Notes |
|-------------------------|--|--|--|---|
| Central and rural Fylde | Fluvial Flooding. Flash flooding from overland flows. | Rapid runoff from agricultural practices combined with fluvial event. | 1980 flooding to rural areas of the Fylde. | Significant improvement works including the construction of two flood storage basins by the EA. Minor flooding caused by backing up of locked secondary watercourses and surface water outfalls |
| Coastal Frontage | Coastal erosion to frontage, surface runoff and sewer flooding to remainder of area. | Coastal storms causing erosion of defences. High volume of surface water into road gulleys and combined sewer system. Majority of the area is urban and hard landscaped. | None recorded. | Significant investment has been made in coastal defences on the Blackpool frontage and to storage facilities on the sewer network. |
| Ribble Estuary | Tidal Dominated, but also subject to Fluvial flooding when tide locked. | Main pathway is a breach in the existing coastal or estuary defences. Other pathways due to blockages and limited hydraulic gradient. | None recorded. | Significant improvements have been made to the coastal defences. A 100year strategy for improvements to the coastal and estuary defences is underway. |

18.0 Proposed Development Sites within Fylde

Flood risk and considerations within PPS25 are only one of a complex criterion which planners need to take into account when allocating development sites. There are a number of constraints from National Policy Guidance and the Regional Spatial Policy⁴. Notably the requirement to build an average of 65% of new housing on brownfield sites in the Fylde Peninsula.

The Local Development Framework (LDF) will identify sites for development for various purposes including housing and employment. A number of sites have been identified which may have some development potential. Some of the sites have previously been included in Local Plans and some have been identified by developers. It is important that as far as possible, all sites with development potential should be identified so as to test these against a whole series of criteria including for example the Strategic Housing Land Availability Assessment, Sustainability Appraisal etc as well as SFRA. In this way the SFRA is part of the evidence base and is thus a way of informing preparation of the LDF and in particular the Core Strategy and Land Allocations Development Plan Document. The LDF and Core Strategy are the policy documents which will ultimately decide which sites will be selected for development.

In order to provide guidance to developers a framework for development is produced below for the identified flood zones. Windfall sites will be considered against the criteria developed within this SFRA. Developers must show how they fit within the framework below and have applied the sequential test and where appropriate the exception test to justify inclusion of the site, within the considerations of this SFRA and PPS25.

18.1 Framework for Development within PPS25 Zone 1 Low Risk

Minor developments that have been demonstrated to fall outside of the current known flood risk areas and have no known flood risk from other sources and do not increase the risk of flooding current flood risk areas can be developed without further consideration of strategic flood risk issues.

18.2 Framework for Development within PPS25 Zone 2 Low to Medium Risk

Minor developments that fall within flood Zone 2 are considered to be generally suitable for development. Where essential infrastructure or critical development such as hospitals or schools are considered, alternative sites should be sought. New development should where possible be constructed above the 1% peak flood level for fluvial sources and 0.5% for tidal sources with sufficient allowance for freeboard and climate change scenarios until 2016, as defined in section 15 of this report. Proposals for new development within this zone should be accompanied by a site specific flood risk assessment (SSFRA) to delineate these envelopes. The SSFRA should also consider the effects of the new development on existing properties to ensure that it does not worsen existing flooding conditions.

18.3 Framework for Development within PPS25 Zone 3 High Risk

Development within PPS25 Zone 3 will not normally be allowed.

⁴ The government has announced its intention to revoke regional strategies

18.4 Development within functional flood plain PPS25 Zone 3b

Within Fylde this is considered to be those areas falling outside existing flood defences. Following the Exceptions Test no development other than essential infrastructure that needs to be there or developments which are specifically water based, such as boating activities will be allowed. However this development must demonstrate that there is no net loss of floodplain storage, that flood risk elsewhere is not increased and that there is no impedance to water flow.

18.5 Development within currently developed areas PPS25 Flood Zone 3a

Although flood risk within zone 3a is defined as high, this will not act as an embargo against new development. Only appropriate development should be permitted within this area.

To this end all development (excluding minor development, such as non residential extensions, householder modifications or extensions within the existing curtilage see PPS25 p7) should identify and assess the risks from all forms of flooding to and from the development and demonstrate how these flood risks will be managed.

18.6 Generic Flood Risk Considerations

Developers should also pay particular attention to the proposed generic flood risk considerations for any development within the geographical areas.

Table 8: Generic Flood Risk Considerations

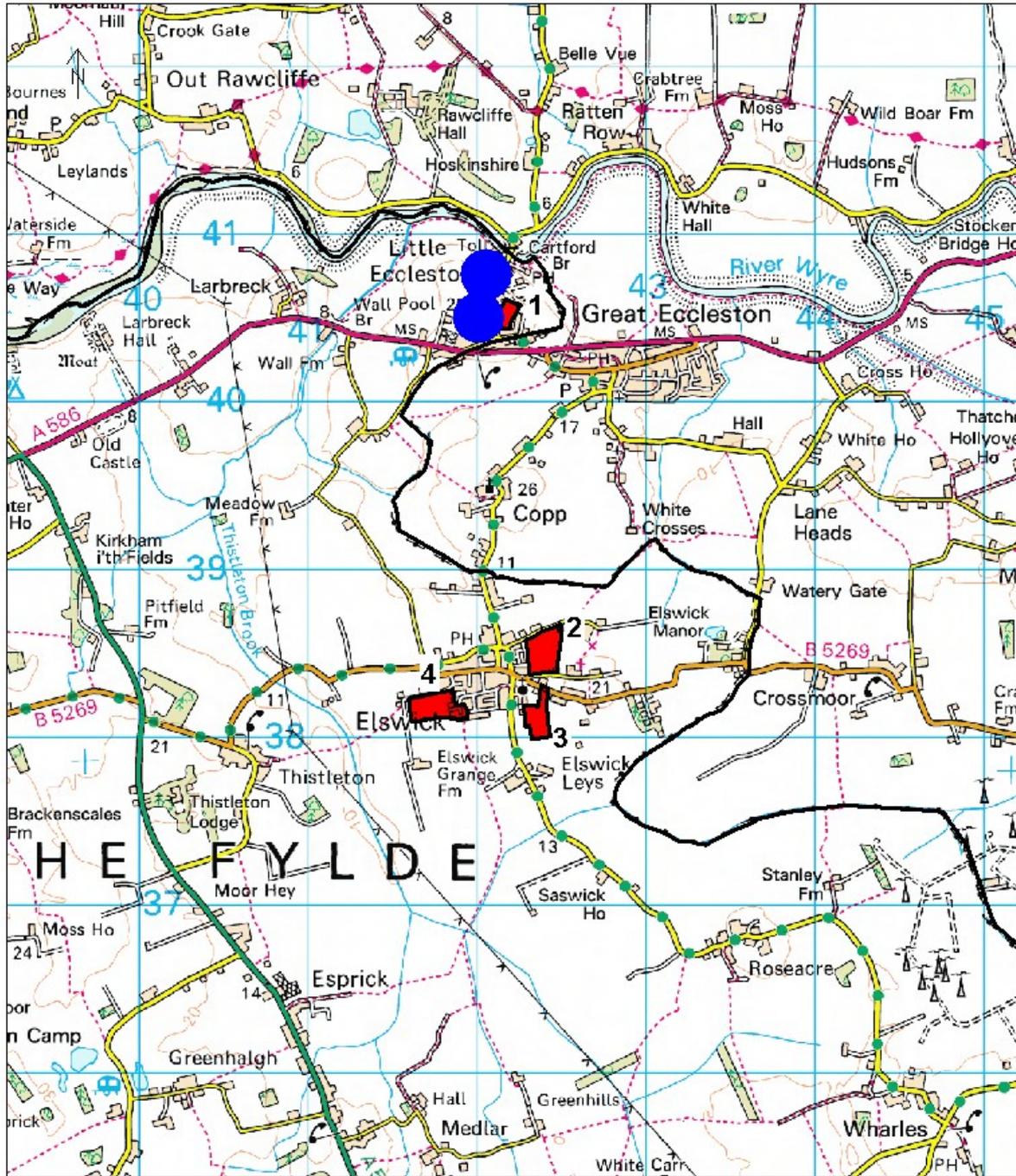
| Flood Zone | Area | Proposed Policy |
|------------|---|--|
| 1 | Blackpool Airport Elswick, Wesham, Little Eccleston, Warton (Map ref. 13,14,16,18 only), Wrea Green, Weeton, Marton Moss, Lytham Moss (Map ref. 30 only) Pontins | Consideration should be given to natural water flows within all development. The development should not adversely affect flow or increase flood risk to development elsewhere, including increasing runoff rates. |
| 2 | Whyndyke Farm | Consideration shall be given to existing sewer capacity in all new development within this area. The development should not adversely affect flow or increase flood risk to development elsewhere, including increasing runoff rates. All proposed development should be supported by a site specific flood risk assessment. |

| | | |
|---|--|--|
| 3 | Lytham (Map Ref. 19,20 only) Lytham Moss (Map Ref. 31,32,34, 35 only) Kirkham Warton (Map Ref. 15 only) Freckleton Newton-with-Scales | No new development other than deemed suitable for sites prone to flood risk or meeting the exemption rules under PPS25 shall be allowed within zone 3. |
|---|--|--|

19.0 Known localised flooding ‘hot spots’

The following maps show localised areas of surface water flooding during periods of prolonged rainfall. Developers in these areas shall pay particular attention to land drainage within their site including the drainage of highways and adjacent land. The hot spot areas are on the whole away from the main river and coastal floodplains, which indicates that they are urban drainage issues of highway drainage, sewer capacity or land run off.

Map 11: Localised flooding 'hot spots' - North



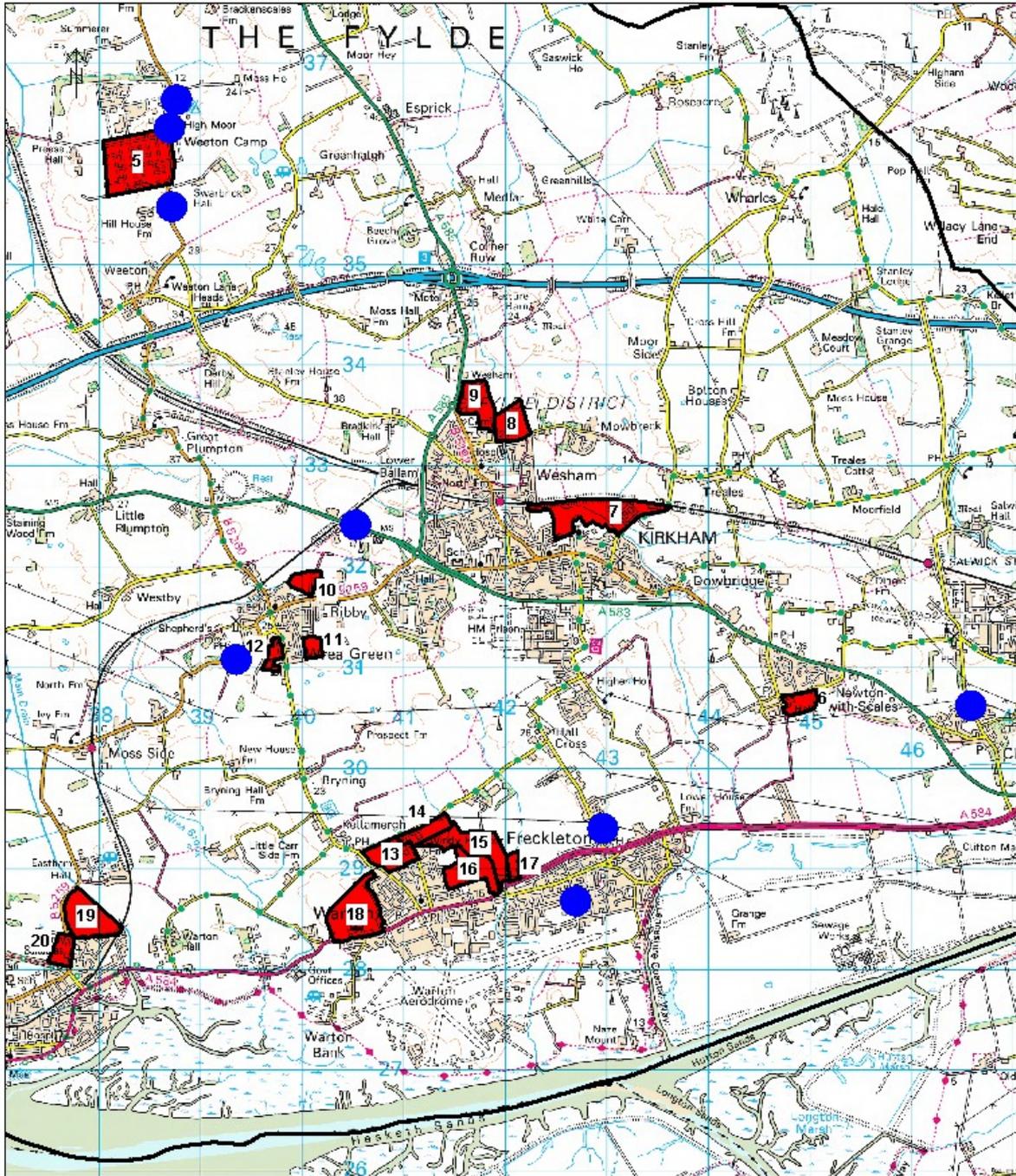
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Not to Scale



Known localised areas of surface water flooding during periods of prolonged rainfall

Map 12: Localised flooding 'hot spots' – Central / South



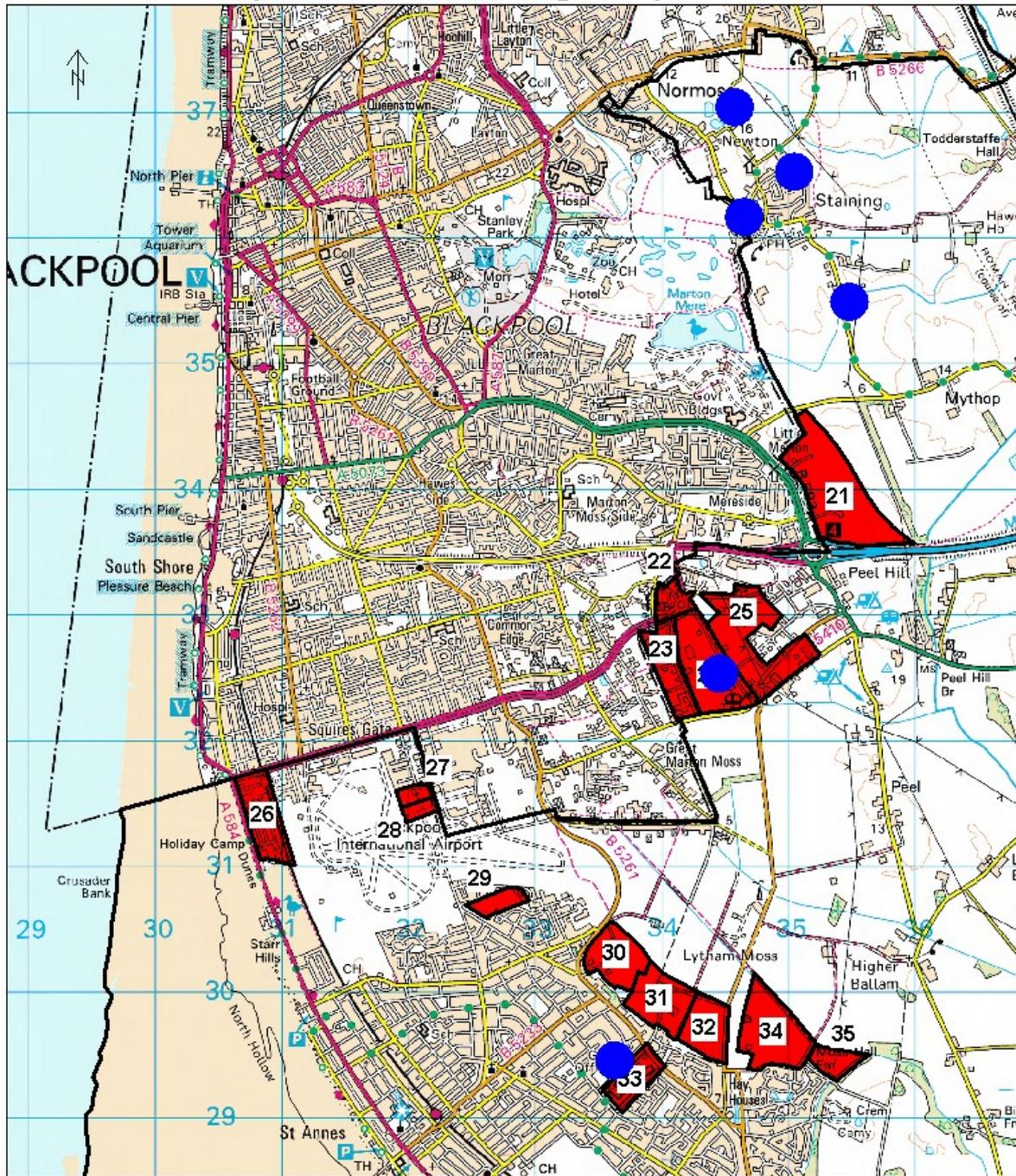
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Not to Scale



Known localised areas of surface water flooding during periods of prolonged rainfall

Map 13: Localised flooding 'hot spots' - West



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Not to Scale



Known localised areas of surface water flooding during periods of prolonged rainfall

20.0 Existing Flood Defence Infrastructure

20.1 Coastal Defence Assets:

Under Contract with Fylde, Wyre Borough Council carry out Coastal Defence inspection and maintenance works along the Fylde. The most recent inspection was carried out in September 2011.

A brief description and risk assessment for each of the defence lengths is summarised in table 9, over the page. Note that the assessment is only for the parts of the sea defences that are the responsibility of Fylde Borough Council. Up to date assessments for the parts of the sea defences that are the responsibility of other organisations will be included when available.

Table 9: Risk Assessment of Defence Lengths

| Structure | | Responsibility | Nature | Status Condition | Status - Deterioration | Significance | Risk Score | Risk level |
|---|-------------|----------------|--------------------------------|------------------|------------------------|--------------|------------|-----------------|
| Name | Length (km) | | | | | | | |
| Squires Gate to St Annes North Boundary (Coast Guard Station) | 2.05 | Fylde BC | Dunes, Beach | 2 (2) | 2 (2) | 4 (4) | 16 (16) | Low (Low) |
| Coastguard Station to Todmorden Road | 0.17 | Fylde BC | Dunes, Shore, Revetment, Walls | 2 (2) | 2 (2) | 3 (3) | 12 (12) | Low (Low) |
| NW of St Annes Pier (Todmorden Road to Pier) | 1.29 | Fylde BC | Dunes, Shore, Revetment, Walls | 2 (2) | 3 (2) | 4 (4) | 24 (16) | Medium (Low) |
| East of St Annes Pier (1) | 0.14 | Fylde BC | Revetment, Walls | 3 (3) | 2 (2) | 3 (3) | 18 (18) | Low (Low) |
| East of St Annes Pier (2) – (Pleasure Island) | 0.69 | Fylde BC | Seawall, Revetment, Shore | 3(3) | 2 (2) | 3 (3) | 18 (18) | Low (Low) |
| St Annes to Fairhaven Lake | 1.52 | Fylde BC | Dune, Shore | 3 (3) | 2 (2) | 3 (3) | 18 (18) | Low (Low) |
| Fairhaven Lake | 0.88 | Fylde BC | Revetment, Seawall | 4 (4) | 2 (2) | 3 (3) | 24 (24) | Medium (Medium) |
| Granny's Bay | 0.38 | Fylde BC | Seawall | 3 (3) | 4 (2) | 2 (2) | 24 (12) | Medium (Low) |
| Lytham Promenade (1) | 1.04 | Fylde BC | Seawall, Revetment | 4 (4) | 3 (2) | 3 (3) | 36 (24) | Medium (Medium) |
| Lytham Promenade (2) | 1.44 | Fylde BC | Seawall, Revetment | 3 (3) | 2 (2) | 3 (3) | 18 (18) | Low (Low) |
| Lytham Promenade (3) | 0.49 | Fylde BC | Revetment | 3 (3) | 2 (2) | 3 (3) | 18 (18) | Low (Low) |

Scoring Evaluation

LOW ≤ 20, or both visual and deterioration not ≤ 2
MEDIUM ≤ 45, or both visual and deterioration not ≤ 3
HIGH > 45, or both visual and deterioration > 3

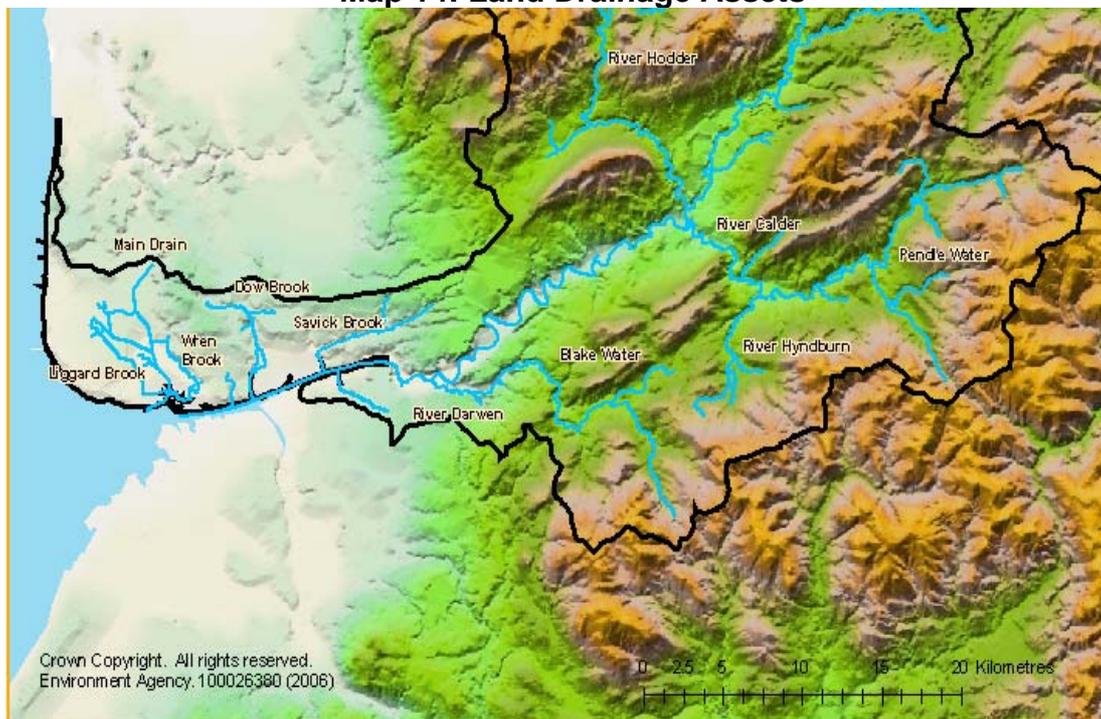
Table 10: Risk Scoring System

| Assessment | | Risk Score | | | | |
|----------------------------------|---|---|--|--|--|--|
| Criteria | Description | 1 | 2 | 3 | 4 | 5 |
| Status Condition (Visual) | Assessment of Visual Condition | Very Good | Good | Fair | Poor | Very Poor / Failed |
| Deterioration | Rate of Deterioration | Improving | None / Minimal | Low | Medium | High |
| Significance | Consequences of failure of backshore defences | Erosion or flooding of low grade agricultural land and associated properties or sites of no designated environmental importance | Erosion or flooding of mixed grade agricultural land and associated properties and/or locally designated sites of environmental importance | Erosion or flooding of high grade agricultural land and/or nationally designated sites of environmental importance or local developments | Erosion or flooding of less developed urban areas with/without some high grade agricultural land and associated properties or internationally designated sites of environmental importance | Erosion or flooding of intensively developed urban areas and/or loss of major infrastructure |
| | Consequences of failure of control structures | Minor changes to local beach behaviour | Minor changes to wider scale beach behaviour | Major changes to local beach behaviour | Major changes to wider scale beach behaviour | Failure of backshore defences |

20.2 Land Drainage Assets

The Land Drainage Assets within the area in the main consist of un-banked open watercourses namely Main Drain, Liggard Brook, Wrea Brook and Dow Brook which drain generally flat, low lying plain areas directly into the Ribble estuary via pumping stations and/or flapped outlets.

Map 14: Land Drainage Assets



These tributaries join the Ribble within the tidal estuary through flapped outfalls. High water levels within the estuary may prevent these tributaries from draining, thereby leading to flooding behind the tidal defences. This problem is made worse by the build-up of sediment in the vicinity of the outfalls. The coincidence of tidal flooding in the Ribble and fluvial flooding on the Ribble may increase flood risk in Lytham and St. Annes due to the 'backing up' of fluvial floodwater caused by a high tide. A brief description and risk assessment summarised below:

Table 11: Risk Assessment of Areas

| Area | Description | Standard of protection | Overall Condition | Worst Condition |
|--------|---|------------------------|-------------------|-----------------|
| | | | 1 - 5 | |
| Lytham | Combination of flood walls and embankments protect the town from direct flooding from the Ribble Estuary and the tidal area of Liggard Brook. The defences are in good condition apart from one section on the right bank of Liggard Brook between Lytham Dock and Lytham which is in very poor condition. The Land Registry building is protected by a privately owned wall. | Unknown | 2 & 5 | 5 |

20.3 Consequences of flooding

Table 12: Consequences of flooding

| Main watercourses | Number of residential properties | | Number of people | Duration (hours) | Velocity |
|--------------------------------------|----------------------------------|---------------------------------|------------------|--|--|
| | 1% flood 1 in 100 year event | 0.1% flood 1 in 1000 year event | 1% flood | 1% flood | 1% flood |
| Liggard Brook, Main Drain, Dow Brook | 6850 | 8300 | 17140 | Variable due to tide conditions at time of flood | Fast from tidal flooding. Slow, flooding from river backing up from tide locked outfalls |

20.4 Climate Change

The impact of climate change on the 1% fluvial event was modelled by The Environment Agency as a 20% increase in the inflows to the model. In most parts this produced an increase in river flow of 10-20%. Where floodplain attenuation is available then the percentage increase was reduced.

With the two tidal models of the lower Ribble and Liggard Brook on the southern Fylde peninsula the impact of climate change on the 0.5% AEP (Annual Exceedence Probability) (1 in 200 year return period) water level has been investigated. For this it has been assumed that sea level will rise 4 mm per year for the next 50 years giving a total rise of 200 mm. Note – this is based on the pre-

October 2006 Defra CFMP (Catchment Flood Management Plan) guidance on predicted sea level rise as a consequence of climate change.

The latest guidance on sea level rise predicts a 260mm rise in sea level over the next 50 years, which does not differ greatly from the previous guidance. However, over the next 100 years the latest guidance predicts a sea level rise of 820mm, compared with a rise of 400mm under the previous guidance. This could have flood risk implications for coastal and estuarine parts of the Ribble catchment and requires consideration amongst planners and local authorities in developing Local Plans.

Water levels in Liggard Brook would be increased quite significantly by 0.8-1.0m in depth in parts of Lytham under this scenario, whereas the rise on the lower Ribble would be much smaller at 0.1-0.2m in parts of Preston.

The CFMP showed that a 20% increase in fluvial flows as a result of climate change would increase property damages by 25-50% in urban areas and 10-20% in agricultural areas for a 1 in 100 year event.

21.0 Recommended Policies for Development Areas

Table 13 sets out recommended policies for the development areas.

Table 13: Recommended Policies for Development Areas

| Area | Flood Zone | Recommended Policy |
|--|------------|---|
| Blackpool Airport Elswick Blackpool Road playing fields Wesham Little Eccleston Warton (Map Ref. 13, 14, 16, 18 only) Wrea Green Weeton Marton Moss Lytham Moss (Map Ref. 30 only) Pontins Heyhouses Lane | 1 | There are no material flood issues within this area. Therefore there should not be any restriction on flooding grounds for development of all types within the area. Consideration to surface water runoff should be given in all cases. |
| Whyndyke Farm | 2 | Development of all types would be allowed within this area, subject to the Sequential Test and the Exception Test being carried out where appropriate. Any development in Flood Zone 2 (whether allocated or not) should be accompanied by a site-specific flood risk assessment to demonstrate that the development is not at risk of unnecessary risk of flooding and will not exacerbate flood risk elsewhere. |
| Lytham (Map ref. 19,20 only) Lytham Moss (Map ref. 31,32,34, 35 only) Kirkham Warton (Map Ref. 15 only) Freckleton Newton-with-Scales | 3 | Only appropriate development would be permitted within this area, subject to the Sequential Test and the Exception Test being carried out where appropriate. A Level 2 SFRA will need to be undertaken to justify any proposed site allocation in Flood Zone 3a. Any development in Flood Zone 3a (whether allocated or not) should be accompanied by a site-specific Flood Risk Assessment to demonstrate that the development is not at risk of unnecessary risk of flooding and will not exacerbate flood risk elsewhere. Consultation with the Environment Agency is recommended. |

22.0 Appropriate Risk Management Measures for Development Areas

The residual flood risk can be managed in a number of ways. It is recommended that any proposed new development is not considered in isolation from the existing residential population. This applies both in terms of not increasing flood risk to existing properties and businesses but a key aim is to reduce the overall flood risk by taking opportunities to reduce the flood risk for all. It is therefore proposed that the following hierarchy of measures are taken to reduce flood risk within the area:

- New development sites are to be constructed in areas of least risk, taking account of acceptability from national and regional planning policy.
- Ensure that infrastructure designed to safeguard against flooding is in good operable condition and is regularly inspected.
- Provide a strategy and necessary funding to maintain, sustain and improve flood protection infrastructure on a risk informed basis, allowing for anticipated future trends, including climate change.
- Provide site-specific mitigation measures including raising of land levels and local flood protection.
- Warn and provide sufficient information to at risk populations to allow them to take appropriate action.
- Provide effective planned and practised emergency evacuation and response.

In order to demonstrate the effectiveness and suitability of mitigation measures and proposed development, it is anticipated that further computational modelling work will be required. This modelling work should take into account and build upon the modelling undertaken for this study, together with other relevant studies.

The additional modelling work will inform the site-specific flood risk assessments (SSFRA) which will be required for any development, within zone 2 or 3. The SSFRA will need to satisfy the general policies for the area, together with the general hierarchical approach to flood risk mitigation proposed above. In addition the following general rules to mitigation must apply:

- The development should be appropriate for the level of residual risk.
- That any proposed mitigation for the development site does not increase flood risk to existing development, through loss of breach storage, or the conveyance of flood water.
- That the proposed mitigation method is appropriate and reduces overall flood risk to the wider population.
- That any proposal is sustainable over the life of the proposed development allowing for the effects of climate change over this period.

22.1 Mitigation Measures for Specific Sites

In addition to the above requirements the following site specific mitigation measures are proposed for each of the development sites. These mitigation measures are identified as a minimum standard for development to proceed.

In order for development to proceed within zone 2 developers should address the following areas for mitigation:

- The main mitigation within this area will be raising of land levels.
- Modelling shall be undertaken to determine flood levels within the site, threshold levels to buildings shall be raised to prevent flood water entering the property, where appropriate. The model must demonstrate that raising of land levels would not increase the risk of flooding to existing properties.
- The developer should ensure that current estuary dynamics are taken into account; a buffer strip to new development will be required around the development to allow natural erosion of the estuary boundary and to take into account climate change.
- Fluvial discharge to the areas main watercourse is through the tidal flap outfall, developers should consider the sustainability of the system within their site-specific flood risk assessment. Consideration should also be given to onsite storage when the outfall is tide locked.

In accordance with this hierarchy the following measures are proposed for the Development Areas:

**Table 14: Measures Proposed for Development Areas in Flood Zone 2
Area: Whyndyke Farm (Map Ref. 21)**

| Source | Pathway | Receptor | | Risk | | Mitigation | Residual Risk | |
|---------------|---|--|---|---|--|---|-----------------|-----------------|
| | | Existing | New Dev | Existing | New Dev | | Existing | New Dev |
| Fluvial | Blockage too or land drainage system unable to discharge | Existing property throughout the area potentially affected | Potential for flooding to all new development | Potential for low levels of flooding to significant numbers of properties | Potential for low levels of flooding to development due to backing up of discharge from the site | Improve and maintain on a regular basis. Provide storage on site. | Low risk levels | Low risk levels |
| Sewers | Surface water entering foul system. Over capacity of system | Existing property throughout the area potentially affected | Potential for flooding to all new development | The capacity of existing system has led to previous sewage problems | Potential for backing up of sewage discharge from the site. | Improvement to sewerage network infrastructure | Low risk levels | Low risk levels |
| Surface Water | Run off from impermeable areas | Existing property where gradients cause adverse conditions | Potential for flooding to all new development if run off not considered | Potential risk from runoff particularly when watercourses and drainage network restricted | Potential risk from runoff particularly when watercourses are high or discharge restricted | Ensure development considers flow and discharge of surface water to new and existing properties from site | No change | Low risk levels |

Table 15: Measures Proposed for Development Areas in Flood Zone 3

Area: Lytham (Map Ref. 19,20) Lytham Moss (Map Ref. 31,32,34, 35), Kirkham (Map ref. 7) Warton (Map Ref. 15) Freckleton (Map Ref. 17) Newton- with-Scales (Map Ref. 6)

| Source | Pathway | Receptor | | Risk | | Mitigation | Residual Risk | |
|--------|-------------------------------|--|--|--|--|---|---|--|
| | | Existing | New Dev | Existing | New Dev | | Existing | New Dev |
| Tidal | Breach of Open Coast Defences | Significant properties and industry adjacent to the site | Proposed Policy to restrict all types of development | Significant flooding to properties and industry adjacent to the site following a breach. | Proposed Policy to restrict all types of development. | Improve open coast defence in accordance with Flood and Coastal Defence Strategy. Raise land levels on new development site. | Risk of breach occurring reduced, from medium to low level of risk. | Proposed Policy to restrict all types of development. |
| | Breach of Estuary Defences | Significant properties and industry adjacent to the site | Proposed Policy to restrict all types of development | Flooding from the estuary is the most likely source at present, either from breach of the embankment or overtopping. | Flooding from the estuary is the most likely source at present, either from breach of the embankment or overtopping. | Improve estuary defences by strengthening and raising. | Risk of breach occurring reduced, from medium to low risk. | Risk of breach occurring reduced, from medium to low risk. |

| Source | Pathway | Receptor | | Risk | | Mitigation | Residual Risk | |
|---------------|---|---|--|---|--|--|-----------------|------------------|
| | | Existing | New Dev | Existing | New Dev | | Existing | New Dev |
| Fluvial | Blockage too or land drainage system unable to discharge | Existing property throughout the area potentially affected | Potential for flooding to all new development | Potential for low levels of flooding to significant numbers of properties. | Potential for low levels of flooding to development due to backing up of discharge from the site | Improve and maintain on a regular basis. | Low risk levels | Low risk levels |
| Sewers | Surface water entering foul system. Over capacity of system | Existing property throughout Lytham St Annes potentially affected | Potential for flooding to all new development | The capacity of existing Lytham St Annes system has led to previous sewage problems. | Potential for backing up of sewage discharge from the site. | Improvement to sewer network. Discharge on separate system direct to sewage treatment works. | Low risk levels | Low risk levels. |
| Surface Water | Run off from impermeable areas | Existing property where gradients cause adverse conditions | Potential for flooding to all new development if run off not considered. | Potential risk from runoff particularly when watercourses are high or discharge restricted. | Potential risk from runoff particularly when watercourses are high or discharge restricted. | Ensure development considers flow and discharge of surface water to new and existing properties from site. | No change | Low risk levels |