Strategic Flood Risk Assessment

Appendix 1 to Strategic Environmental Assessment of Ferrybank/Belview Local Area Plan 2017

Forward Planning
Kilkenny County Council
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Contents

List of Figures

1 Introduction

As part of the Strategic Environmental Assessment for the Ferrybank/Belview Local Area Plan, in line with *The Planning System and Flood Risk Management – Guidelines for Planning Authorities*[1], (Guidelines) a staged approach has been taken to the appraisal and assessment of flood risk.

1.1 Disclaimer

It is important to note that compliance with the requirements of *The Planning System and Flood Risk Management - Guidelines for Planning Authorities*, and of the Floods Directive 2007 60/EC is a work in progress and is currently based on emerging and incomplete data as well as estimates of the locations and likelihood of flooding. In particular, the assessment and mapping of areas of flood risk awaits the publication of the finalised Catchment-based Flood Risk Management Plans [FRMPs]. As a result, this Flood Risk Assessment is based on available information.

Accordingly, all information in relation to flood risk is provided for general policy guidance only. It may be substantially altered in light of future data and analysis. As a result, all landowners and developers are advised that Kilkenny County Council and its agents can accept no responsibility for losses or damages arising due to assessments of the vulnerability to flooding of lands, uses and developments. Owners, users and developers are advised to take all reasonable measures to assess the vulnerability to flooding of lands in which they have an interest prior to making planning or development decisions.

1.2 Structure of a Flood Risk Assessment (FRA)

The Guidelines recommend that a staged approach is adopted when undertaking a Flood Risk Assessment (FRA). The recommended stages are briefly described below:

• Stage 1 ~ Flood Risk Identification
To identify whether there may be any flooding or surface water management issues that will require further investigation. This stage mainly comprises a comprehensive desk study of available information to establish whether a flood risk issue exists or whether one may exist in the future.

• Stage 2 ~ Initial Flood Risk Assessment
If a flood risk issue is deemed to exist arising from the Stage 1 Flood Risk Identification process, the assessment proceeds to Stage 2 which confirms the sources of flooding, appraises the adequacy of existing information and determines the extent of additional surveys and the degree of modelling that will be required. Stage 2 must be sufficiently detailed to allow the application of the sequential approach within the flood risk zone[2].

• Stage 3 ~ Detailed Flood Risk Assessment
Where Stages 1 and 2 indicate that a proposed area of possible zoning or development may be subject to a significant flood risk, a Stage 3 Detailed Flood Risk Assessment must be undertaken.

1.3 Scales of Flood Risk Assessments

Flood Risk Assessments are undertaken at different scales by different organisations for many different purposes. The scales are as follows:

[1] Department of Environment and OPW, *The Planning System and Flood Risk Management Guidelines for Planning Authorities*, 2009

[2] The Sequential approach ensures that development is first and foremost directed towards land that is at low risk of flooding, see Section 3.2 of the Guidelines for further information.

• Regional Flood Risk Appraisal (RFRA): A Regional Flood Risk Appraisal provides a broad overview of the source and significance of all types of flood risk across a region and highlights areas where more detailed study will be required. These appraisals are undertaken by regional authorities.

• Strategic Flood Risk Assessment (SFRA): A Strategic FRA provides a broad (area-wide or county-wide) assessment of all types of flood risk to inform strategic land use planning decisions. The SFRA allows the Planning Authority to undertake the sequential approach and identify how flood risk can be reduced as part of the local area plan process.

• Site Flood Risk Assessment (Site FRA): A Site FRA is undertaken to assess all types of flood risk for a new development. This requires identification of the sources of flood risk, the effects of climate change on the flood risk, the impact of the proposed development, the effectiveness of flood mitigation and management measures and the residual risks that then remain.

This assessment is for a Local Area Plan and therefore is at SFRA scale.

2 Flood Risk Assessment

2.1 Stage 1 Flood Risk Identification

This purpose of this stage is to identify whether there are any flooding or surface water management issues relating to the plan area that may warrant further investigation. Sources which were consulted are outlined below.

2.1.1 Regional Flood Risk Appraisal

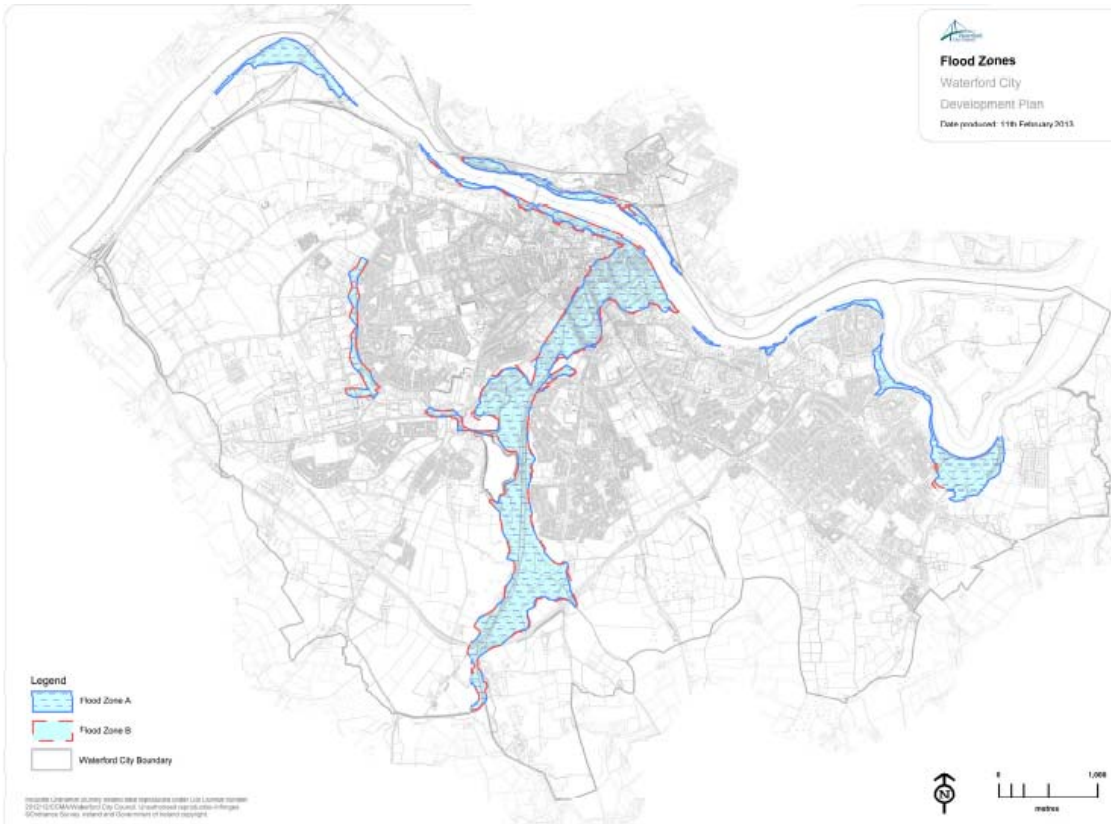
A Regional FRA was carried out and published as Appendix 3 to the Strategic Environmental Assessment of the South East Regional Planning Guidelines, 2010. This document provided guidance on the issues to be addressed in any Strategic Flood Risk Assessment.

The Regional FRA referred to the Suir Catchment Flood Risk Management Plan, which identified areas of potential significant flood risk within the Suir Catchment in Co. Kilkenny as Fiddown, Mullinavat and Piltown. No reference was made to the Ferrybank/Belview area in this RFRA.

2.1.2 Strategic Flood Risk Appraisal

A Strategic Flood Risk Assessment for the county was published in 2014 as part of the County Development Plan 2014-2020. This examined the level of information available on flooding in the county and assessed all settlements affected for the presence of flood risk indicators. This did not cover the Ferrybank/Belview LAP area in detail as the County Development Plan did not propose any change to the zoning therein.

RPS Consulting Engineers, on behalf of Waterford City Council, undertook a Strategic Flood Risk Assessment as part of the review of the Waterford Development Plan for 2013-2019. Much of the data used in this was compiled in the development of the John's River Drainage Scheme Preliminary Report (2001) and the more recent and ongoing works in relation to the Waterford City Flood Alleviation Scheme. This mapped the flood zones within the city boundary, but did not map any areas within Kilkenny County Council, see Figure 2.1: Waterford City Flood zone mapping from Appendix B to the Waterford City SFRA below.



2.1.3 OPW Publications

To comply with the Floods' Directive[3], the OPW commenced a CFRAM (Catchment Flood Risk Assessment and Management) programme in Ireland in 2011.

The CFRAM Programme comprises three phases:

1. The Preliminary Flood Risk Assessment (PFRA): 2011
2. The CFRAM Studies and parallel activities: 2011-2017
3. Implementation and Review: 2017 onwards

The Programme provides for three main consultative stages:

1. 2011 Preliminary Flood Risk Assessments
2. 2013 Flood Hazard Mapping
3. 2015 Flood Risk Management Plans

2.1.3.1 **Preliminary Flood Risk Assessment**

The Floods' Directive required Member States to undertake a national preliminary flood risk assessment by 2011 to identify areas where significant flood risk exists or might be considered likely to occur. In August 2011, the OPW published the National Preliminary Flood Risk Assessment, Draft for Public Consultation[4] which comprised a Report and a set of draft, indicative, maps.

This national screening exercise identified where there may be a significant risk associated with flooding, based on available and easily derivable information. The objective of the PFRA

[3] Directive 2007/ 60/ EC of the European Parliament and of the Council of 23rd October 2007 on the assessment and management of flood risk: Official Journal L288/ 27-34.
[4] http://www.cfram.ie/pfra/

was to identify Areas for Further Assessment (AFA's) and this further assessment would take place through Catchment Flood Risk Assessment and Management Studies (CFRAMS).

The OPW published a list of the Areas designated for further assessment in March 2012. Mullinavat, Piltown and Waterford were included as AFAs[5].

Maps of the County were published as part of the Draft PFRA. The OPW have stated that the maps, although draft and indicative, may be of use to the Local Authorities in a number of areas of activity, particularly in the performance of their planning function in relation to the implementation of the Flooding Guidelines.

These maps indicate flood extents – for fluvial flooding they indicate the 100 year event and the extreme event, or 1 in 1000 year event. They also indicate coastal, pluvial and groundwater flood extents. Fluvial flooding is flooding from a river or other watercourse. Pluvial flooding is a result of rainfall-generated overland flows which arise before run-off enters any watercourse or sewer.

2.1.3.2 **Catchment Based Management Plans**

Phase 2 of the CFRAM programme is the production of CFRAM studies. The OPW in co-operation with various Local Authorities are producing Catchment Flood Risk Assessment and Management Studies. These CFRAMS aim to map out current and possible future flood risk areas and develop risk assessment plans. They will also identify possible structural and non-structural measures to improve the flood risk of the area.

The CFRAM that affects this LAP is the South Eastern CFRAM study. This study commenced in Summer 2011. The South Eastern district is one of Ireland's largest river basin districts covering about one fifth of the country with an area of nearly 13,000km^2.

The main aims of the South Eastern CFRAM Study are to:

- assess flood risk, through the identification of flood hazard areas and the associated impacts of flooding;
- identify viable structural and non-structural measures and options for managing the flood risks for localised high-risk areas and within the catchment as a whole;
- prepare a strategic Flood Risk Management Plan (FRMP) and associated Strategic Environmental Assessment (SEA) that sets out the measures and policies that should be pursued to achieve the most cost effective and sustainable management of flood risk;
- ensure that full and thorough public and stakeholder consultation and engagement is achieved.

For these risk areas, draft flood risk maps and flood hazard maps were drawn up and Draft CFRAM mapping was published in 2014. This mapping can now be used as a data source.

It is important to note that the CFRAM mapping does not cover the whole county, but is focused around designated settlements (the AFAs), therefore the entire LAP area is not covered by this mapping. For Ferrybank and Belview, the available CFRAM maps closely follow the River Suir, see Figure 2.2. In addition to those shown here, the River Barrow was also mapped, covering Drumdowney in the east of the plan area.

[5] See http://www.cfram.ie/wordpress/wp-content/uploads/2011/06/AFA-Designation-Report-120514-Final-2.pdf

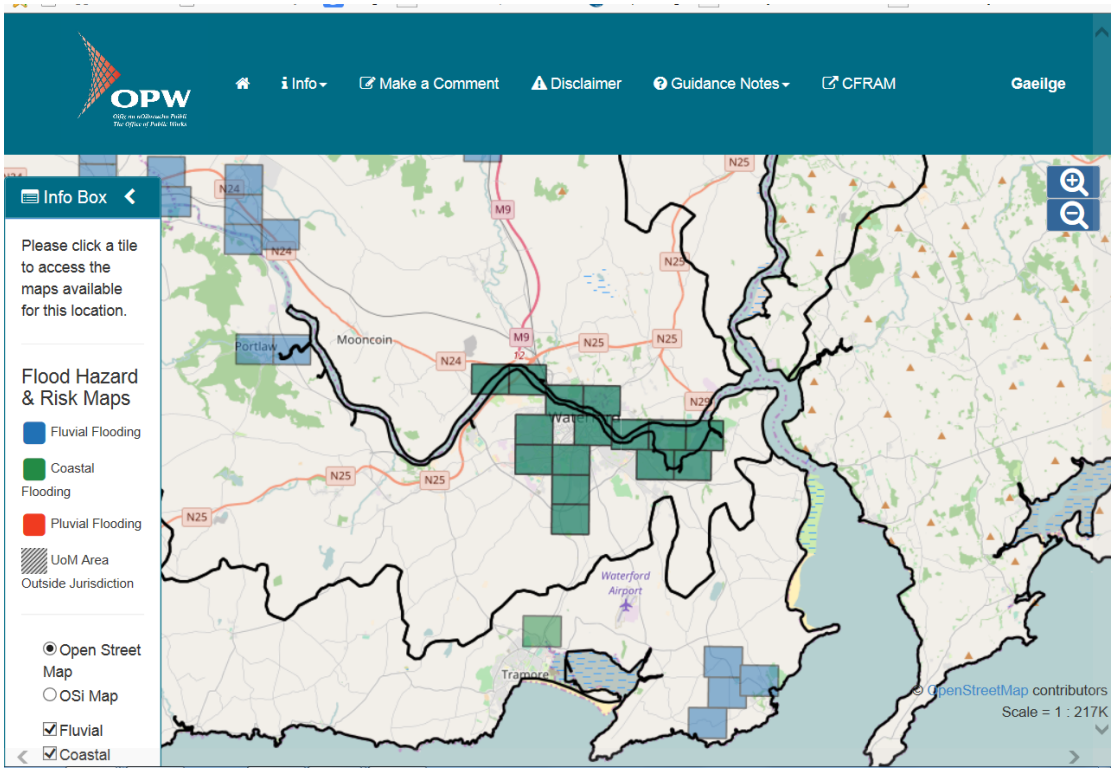


Figure 2.2: Available tiles in Ferrybank LAP area for CFRAM flood maps from OPW

The flood extents maps refer to flood event probabilities in terms of a percentage Annual Exceedance Probability, or 'AEP'. This represents the probability of an event of this, or greater, severity occurring in any given year. These probabilities may also be expressed as odds (e.g., 100 to 1) of the event occurring in any given year. They are also commonly referred to in terms of a return period (e.g., the 100-year flood), although it should be understood that this does not mean the length of time that will elapse between two such events occurring, as, although unlikely, two or more very severe events may occur within a very short space of time.

The CFRAM mapping is now an important and primary input into flood risk assessment studies, however as this mapping does not extend to cover the whole LAP area, a combination of the CFRAM maps and other sources of information will be used.

2.1.3.3 **Flood Risk Management Plans**

Following on from the CFRAM mapping, Draft Flood Risk Management Plans (FRMPs) were published in Summer 2016. Two Draft FRMPs cover the plan area; for Units of Management 15 and 16. FRMPs include measures in relation to flood prevention, protection and preparedness. Emergency response to flooding, recovery from flooding and incorporating lessons learned will be important elements of the FRMPs. Issues such as climate change, land use practices and future development are also addressed in the FRMPs.

2.1.4 Alternative available sources

The data listed below is available and provides information on the historical occurrence of flooding. Flooding and surface water issues in the county were also identified through consultation with the Area Engineer and from any other relevant sources.

i) Office of Public Works OPW Flood Events Mapping

As part of the National Flood Risk Management Policy, the OPW developed the www.floodmaps.ie web based data set, which contains information concerning historical flood data, displays related mapped information and provides tools to search for and display information about selected flood events.

ii) OPW Benefitting Lands mapping
These maps were prepared to identify areas that would benefit from land drainage schemes, and typically indicate low-lying land near rivers and streams that might be expected to be prone to flooding.

iii) Mineral Alluvial Soil Mapping
The soils and subsoils maps were created by the Spatial Analysis Unit, Teagasc. The project was completed in May 2006 and was a collaboration between Teagasc, Geological Survey of Ireland, Forest Service and the EPA. The presence of alluvial soils can indicate areas that have flooded in the past (the source of the alluvium).

iv) Ordnance Survey "Lands liable to floods" mapping (6" OS maps)
These maps have been studied to see if there are any areas marked as being "Liable to Floods" in or in the vicinity of the zoned areas. It is noted that the OS maps simply show the text "Liable to Floods" without delineating the extent of these areas.

It should be noted that some of this data is historically derived, not prescriptive in relation to flood return periods and not yet predictive or inclusive for climate change analysis. Many of these maps were based on survey work carried out from 1833-1844 with many updated in the 1930s and 1940s. Therefore they do not show or take account of recent changes in surface drainage, such as development in floodplains, road realignments or drainage works for forestry or agriculture. So there is significant potential that flood risk in some areas may have increased or been reduced since they were prepared.

2.1.4.1 **Flood Studies, Reports and Flood Relief Schemes**

No flood reports have been completed for the Ferrybank/Belview area.

Waterford City Council and the OPW have been examining flooding in Waterford since the 1990's. Detailed Hydraulic modelling of the John's River was completed as part of the John's River Drainage Scheme Preliminary Report (2001). The Report concluded that the main source of flooding in the city was as a result of water in the River Suir, John's River and Lisduggan Stream overtopping their banks. Flooding from the River Suir and the lower reaches of the John's River was mostly tidal in nature. Flooding in the upper reaches of the John's River (Kilbarry Bog) and Lisduggan Stream was mostly as a result of fluvial flow. Flooding in the intermediary reaches of the John's River was as a result of either large fluvial flows or extreme tides or a combination of both.

Waterford City Flood Alleviation Scheme
The Preliminary Report on the John's River Drainage Scheme was completed in 2001. The report included; an investigation into the sources of flooding in Waterford City; a comprehensive hydrological study; the creation of a detailed hydraulic model of the John's River to predict flood levels; and examined solutions to protect the city against flooding for up to the 100 year return period event (1% probability event). The report concluded that the most effective solution was river containment through the construction of flood walls and flood embankments on the south banks of the River Suir and on both banks of the John's River & Lisduggan Stream up to the Tramore Road area and the raising of sections of the Tramore Road.

In 2004, a further study investigating the potential for phasing the scheme concluded that the scheme could be divided into 5 separate stand alone phases.

Further studies were carried out in 2008 which resulted in a revision to the design flood levels – 200year return period event (0.5% probability event) and the scheme was re-titled 'Waterford City Flood Alleviation Scheme'.

Phase 1 consisted of the construction of flood defences (mostly glass floodwalls) along the south quays of the River Suir from Grattan Quay to Adelphi Quay and on the north bank of the John's River as far as the Courthouse. Construction was completed in May 2010. Flood defence works were also constructed on the banks of the John's River in two low-lying areas of the city that are regularly inundated by floodwaters – Scotch & George's Quay and Waterside. Construction of this separate contract titled 'Waterford City Flood Alleviation Scheme – Phases 2 & 3 Advanced Works' was completed in February 2011.

A modified Phase 5 which involved raising sections of the Tramore Road was also carried out as a separate contract, completed in 2010.

Construction of the remaining phases (2, 3 & 4) commenced in 2012 as one contract involving floodwalls and flood embankments on the south bank of the River Suir downstream of its confluence with the John's River and on both banks of the John's River and Lisduggan Stream as far as the Regional Sports Grounds and the Tramore Road Area. The works are completed and the areas of the city most prone to flooding are now protected against flood events up to the 200 year return period.

As stated above, the design flood level was revised in 2008 following a review of additional data from a water level gauge on Adelphi Quay. The 200year return period flood level was calculated using statistical analysis of historical maximum water levels in the River Suir.

Design Flood Levels (200yr return period event) range from 3.2mOD Malin Head on the city centre quays to 4.0mOD at the Tramore Road area. Refer to Table below.

Waterford City Flood Alleviation Scheme Design Flood Levels

Location	Design Flood Level
River Suir Quays	3.2mOD Malin Head
Catherine Street/ Otteran Place	3.2mOD Malin Head
John's street/ Johnstown	3.3mOD Malin Head
Bath Street/ Poleberry	3.5mOD Malin Head
Inner Ring Road/ Tramore Road Roundabout	3.8mOD Malin Head
Tramore Road	4.0mOD Malin Head

Source: Table 3, Waterford City SFRA, 2013

Having regard to these levels, the contours in the Ferrybank/Belview area were examined (at 10m intervals). This showed that most of the land lies above the 10m level.

2.1.4.2 **Sources of Flooding identified in Waterford SFRA**

The studies done as part of the Waterford City Flood Alleviation Scheme identified the watercourses of the River Suir, John's River and Lisduggan Stream as the main sources of flooding affecting the city. There are other minor tributaries of these rivers that are potentially a source of flooding but as the land tends to rise rapidly away from the main rivers, flooding is most likely restricted to the lower reaches.

Other potential sources include pluvial flooding. However, the sewers laid under the Waterford City Main Drainage scheme have addressed most of these issues. Furthermore, the stormwater pumping stations provided as part of the Waterford City Flood Alleviation Scheme will ensure the continued operation of the drainage outfalls in times of high water level in the rivers.

The other potential source of flooding is from groundwater in particular in Karst areas. There is no evidence of flooding from this source in Waterford City.

The Waterford SFRA concluded that flooding from the above sources is not a significant problem in Waterford City.

2.1.4.3 **Local Authority Personnel**

The Piltown Area Engineer was also consulted regarding historical flooding and flood relief works in the area.

2.1.5 Flood Risk Indicators

Having regard to all of the information sources as outlined above, the availability of information on flood risk in the plan area is identified in a Flood Information Matrix. As the plan area could be subject to a potential flood risk issue, the assessment proceeds to Stage 2.

Flood Risk Indicator Matrix

Area	Available Data by source						
	OPW info	**Other**	**www.floodmaps.ie**	**Alluvial Soils**	**Benefitting lands**	**6" OS maps**	**Local Authority information**
Ferrybank	SE CFRAM along Rivers Suir and Barrow – gives Flood Zone A and B PFRAM for rest of Plan area.	RPS Consulting Engineers (Waterford Flood Relief Scheme)	Recurring flood incident point recorded at Redbridge. One commercial property has been affected, Redbridge Garage and the road is impassable up to six times a year. Last recorded information was 2005.	Alluvial soils mapped along River Blackwater and River Suir to west, and along number of north south channels to east of plan area.	Benefitting lands mapped along River Blackwater to west, at edge of River Suir, and to east of the plan area along Mill Race.	Area at Granny Bridge along River Blackwater and one area in Drumdowney to east of plan area marked as “Liable to Floods” along Mill Race.	Additional – pluvial flooding takes place on the Abbeylands Road adjacent the Waterford City boundary. There is an existing drainage system in place but it is inadequate and an alternative is required to resolve the problem.

2.2 Stage 2 Initial Flood Risk Assessment

The purpose of this stage is to ensure that all relevant flood risk issues are assessed in relation to the decisions to be made and potential conflicts between flood risk and development are addressed to the appropriate level of detail.

An iterative process of flood risk assessment has been undertaken. This has involved the refinement of the zoning objectives map, which was reviewed and amended according to the Flood Zones and the vulnerability of the uses proposed under each zone.

2.2.1 Flood zone mapping

Flood zones are geographical areas within which the likelihood of flooding is in a particular range. There are three types of flood zones identified:

- Flood zone A – where the probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding or 0.5% or 1 in 200 for coastal flooding)
- Flood Zone B – where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding)
- Flood Zone C – where the probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding). Flood Zone C covers all areas of the plan which are not in zones A or B.

Using a combination of the CFRAM mapping, and the flood risk indicators as described earlier, the flood zones are mapped. Given the primacy of the CFRAM mapping, this is used where available. The CFRAM mapping delineates both Zone A and Zone B.

Where CFRAM mapping is unavailable, it has been decided to utilise the flood extents from the PFRAM mapping, for both 1% AEP (1 in 100 year event) and 0.1% AEP (1 in 1000 year event) as Flood Zone A. (Note: In typical flood zone mapping, Flood Zone A would equate to any area where the probability of flooding from rivers is higher than 1 in 100, and Flood Zone B would equate to any area where the probability of flooding from rivers is between 1 in 100 and 1 in 1000. The precautionary principle is being utilised here in the absence of available alternative mapping.) For these areas, Flood Zone B is demarcated by the occurrence of other flooding indicators present.

2.2.2 Application of the Sequential Approach

Having identified the area of flood risk within the plan area the next step is to apply the sequential approach to land use planning. The areas of flood risk were overlaid on the current zoning for the area. This was taken from Amendment 1, Core Strategy (2012). This identified where flood risk management and future development may cause a conflict.

The Guidelines have categorised land uses into three vulnerability classes and have also specified which vulnerability class would be appropriate in each flood zone, or where the Justification Test would be required.

The table of vulnerability classes (Table 3.1 of the Guidelines) is as follows:

Table 1: Classification of vulnerability of different types of development	
Vulnerability Class	Land uses and types of development which include*:
Highly vulnerable development (including essential infrastructure)	Garda, ambulance and fire stations and command centres required to be operational during flooding; Hospitals; Emergency access and egress points; Schools; Dwelling houses, student halls of residence and hostels; Residential institutions such as residential care homes, children's homes and social services homes; Caravans and mobile home parks; Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.
Less vulnerable development	Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions; Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans; Land and buildings used for agriculture and forestry; Waste treatment (except landfill and hazardous waste); Mineral working and processing; and Local transport infrastructure.
Water-compatible development	Flood control infrastructure; Docks, marinas and wharves; Navigation facilities; Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location; Water-based recreation and tourism (excluding sleeping accommodation); Lifeguard and coastguard stations; Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).
*Uses not listed here should be considered on their own merits Source: Table 3.1 of the Flooding Guidelines	

Table 3.2 of the Guidelines sets out how the vulnerability classes interact with the flood zones and when the Justification Test is required.

Table 2: Interaction of vulnerability classes and flood zones			
Development	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable	Justification Test	Justification Test	Appropriate
Less vulnerable	Justification Test	Appropriate	Appropriate
Water-compatible	Appropriate	Appropriate	Appropriate

Source: Table 3.2 of the Flooding Guidelines

Where zoned land is located within either Flood Zone A or B, the need for a further review of flood risk, and the specific zoning objectives, is required. If the proposed zoning was found to be water compatible and located within either Flood Zone A or B, there was no requirement to apply the Justification Test. If, however, less vulnerable uses were proposed for Flood Zone A, or highly vulnerable uses were proposed for Flood Zones A or B, the Justification Test was applied, and if necessary, the zoning objective revised. This process is detailed below.

Note: Vulnerability to pluvial flood risk should not be a limitation to development, but should be incorporated into the local drainage strategy, therefore areas of pluvial flooding were not subjected to the Sequential approach. Areas of pluvial risk are available as part of the PFRA mapping from the OPW.

2.2.3 Zoning Proposals

The Flood Zones in the area were first overlain on the 2009 Zoning Map, taken from the Core Strategy Amendment (2012), see Figure 2.3.

A total of eight areas of potential conflict between development and flood risk are mapped, and the zoning in each of these areas was examined.

A brief examination of the permissible uses under the Draft LAP zones is useful to ascertain in what circumstances the (plan level) Justification Test would be required.

Passive Open Space
The uses permissible under the Passive Open Space zoning of the Draft LAP in the main fall into either the 'Less Vulnerable development' category or the 'Water Compatible development' categories of Table 3.1. Caravan parks, which are a 'Highly vulnerable development' are open for consideration within this zoning, however a proviso will be included that they will not be permitted within the flood zones. Therefore, Justification Tests are not required for Passive Open Space zoning in Flood Zone B. Within Flood Zone A a Justification Test for POS zoning will be required.

Agriculture
The uses permissible under the Agriculture zoning of the LAP for the most part fall into either the 'Less Vulnerable development' category or the 'Water Compatible development' categories of Table 3.1. Houses and caravan parks, which are a 'Highly vulnerable development' are also open for consideration within the Agriculture zoning, however, a proviso will be included that they will not be permitted within the flood zones. Therefore Justification Tests at this plan-making stage are not required for Agriculture zoning outside of Flood Zone A. Within Flood Zone A a Justification Test for Agriculture zoning will be required.

Commercial and Industrial
In general, commercial and industrial zonings within the LAP permit only 'less vulnerable development', however where a site contains a significant source of pollution, i.e. a SEVESO or IPPC site, these fall within the Highly Vulnerable class. Three IPPC sites have been identified in the LAP area which are located beside an area of flood risk, as set out below.

- Eastman Chemical (IPC license: P0002-02)
- Queally Meats (IPC license: P0175-02)
- Dawn Meats (IPC license: P0179-01)

There is one SEVESO site in the plan area, Trans Stock, but this is located outside the area of flood risk.

Water compatible development
This is a new zone under the 2017 LAP, within which the uses are all water compatible, and therefore no (plan level) Justification Test is required for this zone.

2.2.4 Zoning proposals in each area of flood risk

A total of 8 areas of flood risk have been identified. These will now be assessed individually, considering the zoning proposed under this Draft LAP for each site.

Area 1: Grannagh Business, Industrial and Technology park
The area within both Flood Zone A and B was zoned for Passive Open Space in the 2009 LAP as amended.

In general, the uses permissible under the POS zoning of the LAP fall into either the 'Less Vulnerable development' category or the 'Water Compatible development' categories of Table 3.1, therefore Justification Tests are not required for this zoning in the area of flood risk in Flood Zone B. There is a small area of POS zoning within Flood Zone A and this will be rezoned to Water Compatible Development.

Three IPPC sites are located here, (Eastman Chemical P0002-02, Queally Meats P0175-02 and Dawn Meats P0179-01) adjacent to the area of flood risk, however they are not located directly within it.

Area 2: Grannagh Castle
This area was zoned for Passive Open Space in the 2009 LAP as amended. A site with permission for renovation of a dwelling just east of Grannagh Castle is located within Flood Zone A. Under the 2009 LAP (as amended), the refurbishment of derelict dwellings was a use open for consideration, this use is not included within the POS zoning under this Plan. The area of POS zoning within Flood Zone A will be rezoned to Water Compatible Development.

Area 3: Large area in Newrath (11 hectares) encompassing the M9 and N25 interchange and the River Blackwater and Smartscastle Stream.
Under the last Plan the bulk of this area was zoned Passive Open Space and Agriculture. Some small pockets were zoned for Retail Park, Commercial and Business, Industrial and Technology Parks. The area within Flood Zone A will be rezoned to Water Compatible Development. There is an existing service station here, but the WCD zone does allow for expansion and extension of existing uses on their merits.

Area 4: Newrath
This area was zoned for Commercial in the 2009 LAP as amended. There was a small area of Commercial zoning located within Flood Zone A and this area will be rezoned to Water Compatible Development.

Area 5: Christendom, on the north bank of the River Suir
This area was zoned for Passive Open Space in the 2009 LAP as amended. The small area of POS zoning located within Flood Zone A, south of the railway line, will be rezoned to Water Compatible Development.

Area 6: Kilmurry along River Suir
This area was zoned for Passive Open Space in the 2009 LAP as amended. The small area of POS zoning within Flood Zone A, south of the railway line, will be rezoned to Water Compatible Development.

Area 7: Drumdowney Lower and Gorteens, along Mill Race
The majority of this area was zoned for Passive Open Space in the 2009 LAP as amended. A small proportion was zoned for Port Facilities and Industry. The PFI zoning and the POS zoning both allow for Less vulnerable development. Where the PFI and POS zones fall within Flood Zone A, they will be rezoned to Water Compatible Development. The Draft Plan contains an objective for an access road at this location, and this is permissible under the WCD zone.

Area 8: Drumdowney Lower
This area was zoned for Port Facilities and Industry under the existing LAP. This area is now proposed to be excluded from the LAP boundary.

In addition to these 8 areas identified through an examination of the current (2009 LAP as amended) Plan, all other changes to the Plan area zoning were examined in the light of flood risk. No other areas of conflict were identified under the Draft Plan. Figure 2.4 shows the areas of flood risk superimposed on the zoning map.

There are also some areas of pluvial flood risk indicated on the PFRA maps for Ferrybank. These areas have been included on Figure 2.4, and a mitigation measure will be applied to these areas to state "*Areas within which development proposals will be the subject of site-specific Flood Risk Assessment appropriate to the type and scale of the development being proposed*".

The Plan will include detail on the need for Development Management Justification Tests in line with the Guidelines. As the plan has now taken account of all areas of flood risk, to ensure any development taking place will not exacerbate any flooding issue, it is not considered necessary at this stage to proceed to Stage 3, Detailed Flood Risk Assessment.

3 Recommendations

3.1 Incorporation into LAP

This SFRA has fully informed the zoning of the LAP.

A policy is proposed for inclusion in Chapter 9 of the LAP to ensure that where flood risk may be an issue, development proposals shall be the subject of a site-specific Flood Risk Assessment, appropriate to the type and scale of the development being proposed and shall be carried out in line with the Guidelines. This will include for areas of pluvial flooding.

The CDP 2014-2020, contains text and policies on flooding in Section 9.2.9 (Objective 9G).

In addition to assessing flood risk, this LAP will be proactive in addressing flooding. It will seek to protect all stream and river corridors from development, with opportunities for storm water attenuation ponds in the proposed areas of open space, so as to ensure the water quality of rivers and streams is maintained. It will also protect sites of wet grassland and reed swamps which act as natural stormwater retention areas.

SUDS can be thought of as a move away from the conventional practice of piping all surface water directly to the nearest watercourse or river. Using SUDS techniques, water is either infiltrated or conveyed more slowly to watercourses via ponds, filter drains or other installations. This mimics natural catchment behaviour more closely where rainfall either infiltrates through the soil or runs off slowly over the ground surface to the nearest ditch or watercourse. SUDS also attempt to mimic the natural situation whereby pollutants are filtered through soils or broken down by bacteria.

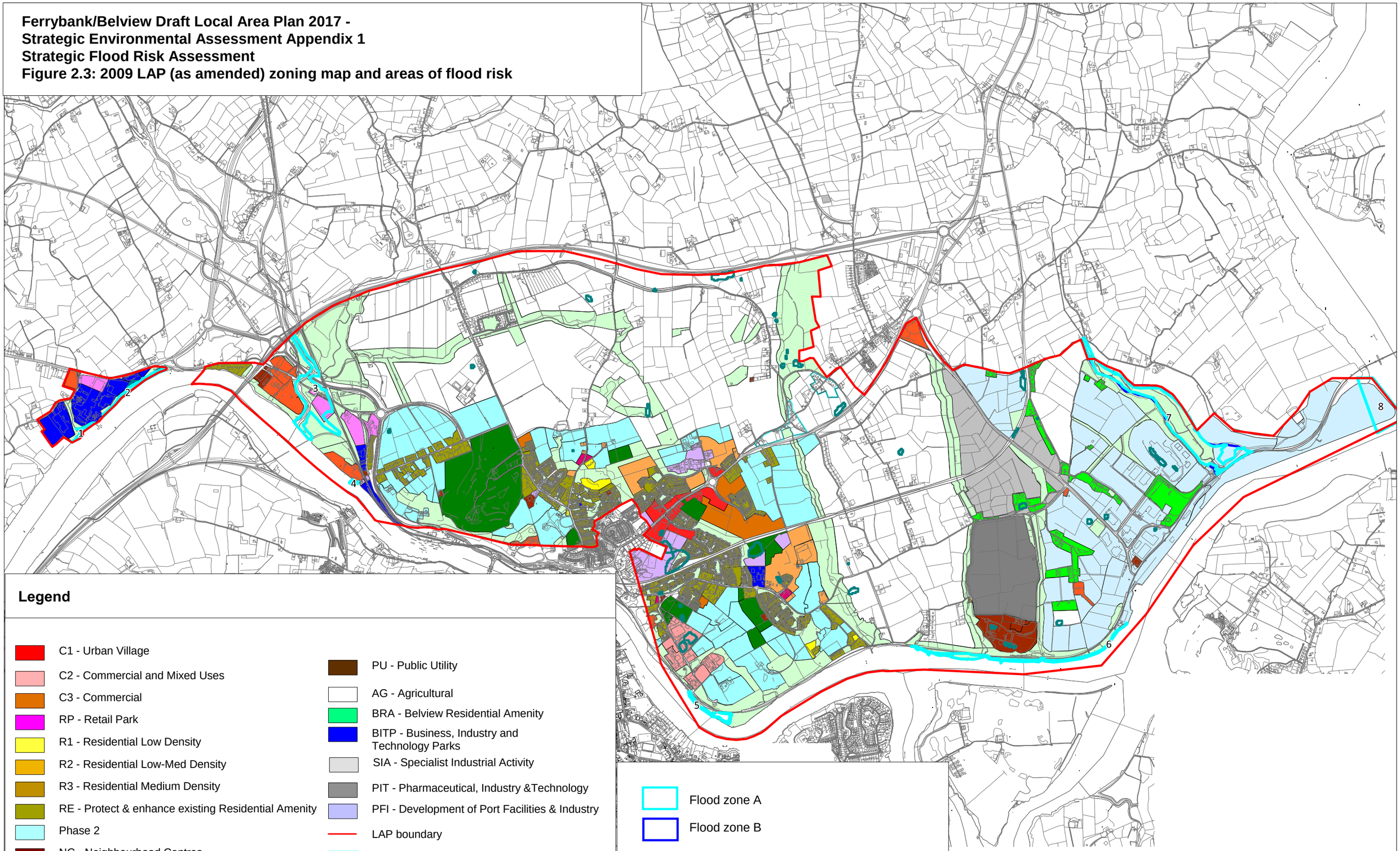
Stormwater retention facilities, such as attenuation ponds, store water which is in excess of the capacity available in downstream channels until storm flows have abated. The provision of such facilities enables an economical and environmental approach to stormwater control. The provision of such ponds provides enormous environmental benefits in terms of protecting the SAC status of the River Suir by filtering potential pollutants that may be included in water runoff.

3.2 Monitoring and Review

As outlined in Section 2, additional information will be made available from the OPW soon in the form of finalised Flood Risk Management Plans (and mapping) that will inform flood risk assessments in the County. It is recommended that the OPW be consulted and that their progress in implementation of the requirements of the EU Flood Directive is reviewed prior to the preparation of the next County Development Plan and the next Ferrybank LAP.

This FRA is based on currently available data and in accordance with its status as a “living document” it will be subject to modification by these emerging datasets of maps and plans as they become available. In the interim any development proposal in the areas identified in this FRA shall be subject to detailed flood risk assessment.

Ferrybank/Belview Draft Local Area Plan 2017 -
Strategic Environmental Assessment Appendix 1
Strategic Flood Risk Assessment
Figure 2.3: 2009 LAP (as amended) zoning map and areas of flood risk



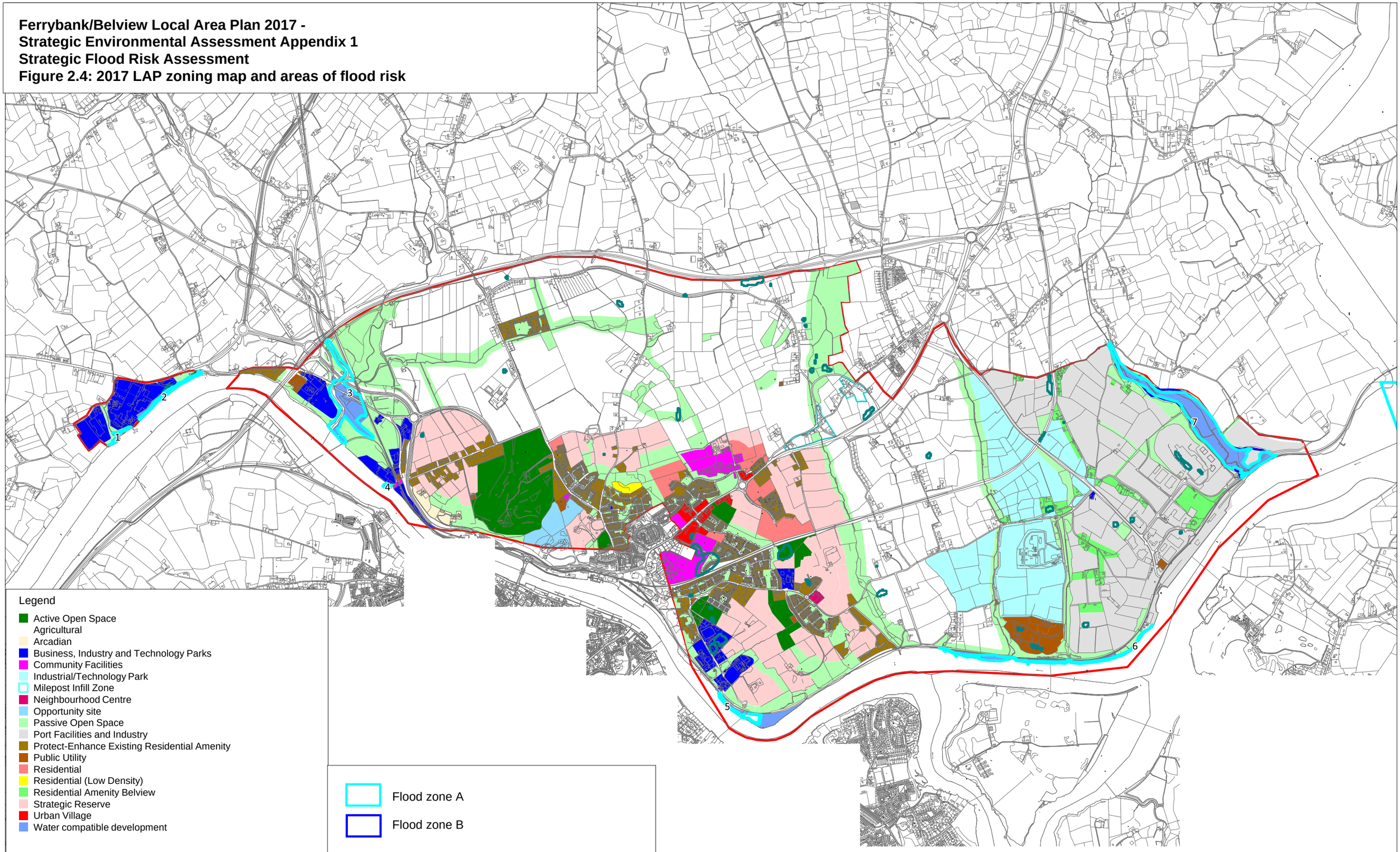
Legend

- C1 - Urban Village
- C2 - Commercial and Mixed Uses
- C3 - Commercial
- RP - Retail Park
- R1 - Residential Low Density
- R2 - Residential Low-Med Density
- R3 - Residential Medium Density
- RE - Protect & enhance existing Residential Amenity
- Phase 2
- NC - Neighbourhood Centres
- CF - Community Facilities
- POS - Passive Open Space
- AOS - Active Open Space
- PU - Public Utility
- AG - Agricultural
- BRA - Belview Residential Amenity
- BITP - Business, Industry and Technology Parks
- SIA - Specialist Industrial Activity
- PIT - Pharmaceutical, Industry &Technology
- PFI - Development of Port Facilities & Industry
- LAP boundary
- Milepost Infill Zone

- Flood zone A
- Flood zone B
- Area of pluvial flooding within which any development proposal will be the subject of site-specific Flood Risk Assessment appropriate to the type and scale of the development being proposed

Date: May 2017
Scale: 1:30,000 @ A3

Ferrybank/Belview Local Area Plan 2017 -
Strategic Environmental Assessment Appendix 1
Strategic Flood Risk Assessment
Figure 2.4: 2017 LAP zoning map and areas of flood risk



Legend

- Active Open Space
- Agricultural
- Arcadian
- Business, Industry and Technology Parks
- Community Facilities
- Industrial/Technology Park
- Milepost Infill Zone
- Neighbourhood Centre
- Opportunity site
- Passive Open Space
- Port Facilities and Industry
- Protect-Enhance Existing Residential Amenity
- Public Utility
- Residential
- Residential (Low Density)
- Residential Amenity Belview
- Strategic Reserve
- Urban Village
- Water compatible development

- Flood zone A
- Flood zone B
- Area of pluvial flooding within which any development proposal will be the subject of site-specific Flood Risk Assessment appropriate to the type and scale of the development being proposed

Date: January 2018
Scale: 1:30,000 @ A3