Eastbourne Level 2 Strategic Flood Risk Assessment

Draft Report

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This report describes work commissioned by Eastbourne Borough Council by an instruction dated January 2024. The Client's representative for the contract was Matt Hitchen of Eastbourne Borough Council. Bethan Griffiths, Elise Coughlin, Erica Godsland and Peter Rook of JBA Consulting carried out this work.

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Abbreviations

AEP	Annual Exceedance Probability
AONB	Area of Outstanding Natural Beauty
EA	Environment Agency
EBC	Eastbourne Borough Council
FCRIP	Flood and Coastal Resilience Innovation Programme
IDB	Internal Drainage Boards
JBA	Jeremy Benn Associates
LLFA	Lead Local Flood Authorities
LPA	Local Planning Authority

NPPF	National Planning Policy Framework
NVZ	Nitrate Vulnerability Zone
PPG	Planning Practice Guidance
SFRA	Strategic Flood Risk Assessment
SPZ	Source Protection Zone

Definitions

Annual exceedance probability: The probability that a given flood event over a given magnitude will be exceeded in any one year.

Flood defence: Infrastructure used to protect an area against flooding such as floodwalls and embankments; they are designed to a specific standard of protection (design standard).

Flood Storage Lake: An area designed to temporarily hold floodwater, reducing the risk of flooding downstream.

Flood Map for Planning: The Environment Agency Flood Map for Planning (Rivers and Sea) is an online mapping portal which shows the Environment Agency Flood Zones in England. The Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences and do not account for the possible impacts of climate change.

Functional Floodplain: The land where water has to flow or be stored in times of flood.

Main River: A watercourse shown as such on the Main River Map, and for which the Environment Agency has regulatory responsibilities and permissive powers to carry out works.

Ordinary Watercourse: All watercourses that are not designated Main River. Local Authorities or, where they exist, IDBs have similar permissive powers as the Environment Agency in relation to flood defence work. However, the riparian owner has the responsibility of maintenance.

Resilience: The capacity of people to recover from the damage suffered during a flood event.

Resilience Measures: Measures designed to reduce the impact of water that enters property and businesses; could include measures such as raising electrical appliances, flood guards.

Return Period: An estimate of the interval of time between events of a certain intensity or size, in this instance it refers to flood events. It is a statistical measurement denoting the average recurrence interval over an extended period of time.

Risk: In flood risk management, risk is defined as a product of the probability or likelihood of a flood occurring, and the consequence of the flood.

Stakeholder: A person or organisation affected by the problem or solution or interested in the problem or solution. They can be individuals or organisations, includes the public and communities.

Water Level Management Structures: Systems and facilities used to control and regulate water levels in areas prone to flooding or requiring specific water management for agriculture, conservation or other purposes.

Executive Summary

Introduction and Context

Eastbourne Borough Council (EBC) have commissioned JBA Consulting to undertake a Level 2 Strategic Flood Risk Assessment (SFRA), with the purpose of providing an appropriate understanding of the level of flood risk affecting development included in the Local Plan. This Level 2 SFRA provides site-specific recommendations and guidance for a series of proposed development sites in the Eastbourne borough.

The aim of the Level 2 assessment is to build on identified risks from the Level 1 SFRA for the proposed development sites, to provide a greater understanding of fluvial, tidal, surface water, groundwater and reservoir related flood risk.

The Level 2 assessment includes detailed assessments of the proposed site options. These include:

- Providing an up-to-date Strategic Flood Risk Assessment, taking into account the most recent policy and legislation in the National Planning Policy Framework (2024).
- An assessment of all sources of flooding including fluvial flooding, tidal flooding, surface water flooding, groundwater flooding and the potential increase in fluvial, surface water and tidal flood risk due to climate change, and how these may be mitigated.
- An assessment of existing flood warning and emergency planning procedures, including an assessment of safe access and egress during an extreme event.
- Advice and recommendations on the likely applicability of sustainable drainage systems for managing surface water runoff, this could also include additional measures such as daylighting culverts, new outlets and pumped systems.
- To provide a comprehensive set of maps presenting flood risk from all sources that can be used as evidence base for use in the emerging Local Plan.
- Advice on whether the sites are likely to pass the second part of the Exception Test and the Sequential Test with regards to flood risk and on the requirements for a site-specific FRA and outline specific measures or objectives that are required to manage flood risk.

Sources of flood risk within the EBC boundary:

- Fluvial flooding – fluvial flood risk is significant across the catchment area, particularly from the main rivers of Langney Sewer and Crumbles Sewer. The proposed development sites that are within fluvial modelling extents include ‘Roselands and Bridgemere’, ‘Hampden Park’ and ‘Langney’ Neighbourhood areas. An additional source of fluvial flooding is the Bourne Stream, which is culverted under the Town centre neighbourhood area and flows from northwest to southeast. Development may increase the flow of water through this culvert, consequently leading to poor drainage. This watercourse poses significant flood risk to the ‘Town

Centre', 'Upperton', 'Old Town' and 'Roselands and Bridgemere' Neighbourhood areas.

- Tidal flooding – all sites in this report, except 'Land to the west of Carlisle Road' and 'College and Hospital, King's Drive,' are subject to tidal flood risk in a defended scenario.
- Surface water – surface water flood risk is significant across the borough, with a vast majority of historical flood events surface water driven. Water predominantly flows into and along topographically low lying areas, and is driven by a range of factors, including the poor drainage system, lack of drainage capacity and tidal locking. The neighbourhood areas at most significant surface water risk in a 0.1% AEP event are: 'Town Centre', 'Seaside', Roselands and Bridgemere', 'Hampden Park', 'Langney', 'St Anthonys and Langney Point' and 'Sovereign Harbour'.
- Groundwater – Land towards the South Downs (in the western part of Eastbourne) is underlain by chalk bedrock, which is highly permeable. To the east, the area is underlain by mudstone bedrock geology. The bedrock geology, combined with a low topography generates concern of a high water table, which would exceed capacity during a flood event. JBA Groundwater emergence mapping indicates that groundwater levels vary significantly within the study area. The neighbourhood areas with the most significant risk are 'St Anthony's and Langney Point', 'Seaside', 'Sovereign Harbour', 'Upperton' and the 'Town Centre'.
- Reservoirs - 'The Land North of Pevensey Bay Road' is the only site subject to residual risk from reservoir failure, and is also at risk in a 'wet day' scenario.
- Sewers – Multiple neighbourhood areas within the study area have experienced flood events related to poor drainage. These include the 'Ratton and Willingdon village', 'Seaside', 'Town Centre' and 'St Anthonys and Langney Point' neighbourhood areas.

Requirements for Developers:

- Locate new development in accordance with the Sequential test and Exception Test, where appropriate.
- Adopt a Sequential approach within the site, situating most vulnerable development in the least vulnerable area.
- Consider opportunities to move development off floodplains, to make space for water.
- Adopt suitable and sustainable drainage strategies which compliment natural drainage pathways where applicable.

- Consider the cumulative impact of multiple sources of flooding on flood risk, considering the implications of climate change on severity and frequency of flood events.
- Ensure development has dry and safe access and egress routes.
- Ensure building design complies with regulations, ensuring that Finished Floor Levels consider the future risk of tidal, fluvial, surface water and groundwater flooding.

1 Introduction

Eastbourne Borough Council (EBC) covers an area of 44km2 along the south coast. The town has an estimated population of 101,700 (ONS, 2021). Eastbourne borough does not have any parishes.

Several key watercourses in the borough are identified by the Environment Agency as Main Rivers. The main rivers in the borough include: the Langney Sewer, Willingdon and West Langney Sewer, Crumbles Sewer, Lottbridge Sewer, Willingdon Upper and Decoy Stream.

The South Downs National Park is situated towards the west of the borough, with elevations reaching 170m at Beachy Head. The East Langney Levels are situated to the east of the catchment. East Langney Levels are topographically low-lying flood plains. Topography varies across the borough, with steeper elevations in the western part of the town towards the South Downs National Park. There are also some localised areas of raised elevation in the eastern part of the town, including Langney and St Anthonys Hill.

The Level 1 Strategic Flood Risk Assessment (SFRA) identified the widespread risk of fluvial, surface water, tidal and groundwater flooding within the EBC boundary, due to its dynamic catchment characteristics, including its low-lying topography, complex geology, high water table, rapid urbanisation and outdated sewer system network. The Level 1 SFRA was used to inform the basis of this report. The Level 1 SFRA outlined the Local Planning Authority's (LPA) requirement to apply the Sequential Test. The information provided in this report is of sufficient detail to inform the application of the Exception Test and, where applicable, site specific flood risk assessments.

1.1 Purpose of the Strategic Flood Risk Assessment

Paragraph 171 of the National Planning Policy Framework (NPPF) states that strategic policies should be informed by a strategic flood risk assessment (SFRA) and should manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and consider the advice from the Environment Agency (EA) and other relevant flood risk management authorities, such as Lead Local Flood Authorities (LLFAs) and Internal Drainage Boards (IDBs).

The Planning Practise Guidance 2022 (PPG) promotes a staged approach to risk assessments, defined by the two levels of SFRA:

- Level 1 SFRA
- Level 2 SFRA

This SFRA report fulfils the requirements for a Level 2 assessment of strategic sites which have been identified for potential allocation within the Eastbourne borough. This report has been formulated in accordance with the PPG (2022) and NPPF (2024).

This report should be read in conjunction with the Eastbourne Borough Council Level 1 SFRA (2024) and contributes to the information established in the Level 1 assessment.

1.2 SFRA objectives

The objectives of this Level 2 SFRA are to:

- Assess the flood risk at potential development sites, by using the most appropriate, up to date and best available models,
- Provide information and maps relevant to the assessment, using the most up to date maps available.
- Provide recommendations to increase the safety of sites from flooding throughout their lifetime, where the Exception Test is required.
- Incorporate and refer to the most recent policy and legislation relating to flood risk, as far as reasonably possible.

1.3 Consultation

The following parties have been consulted in the formulation of this Level 2 SFRA:

- Eastbourne Borough Council
- East Sussex County Council
- Environment Agency
- Pevensey and Cuckmere Water Level Management Board

1.4 National Planning Policy Framework and Guidance

The National Planning Policy Framework (NPPF) was first published in 2012, with its most recent update in December 2024. The framework sets out the government's planning policies for England and the expectation of how this may be applied. The framework builds on core principles of sustainability and is accompanied by the Planning Practice Guidance (PPG). The NPPF is the basis on which local plans should be prepared and is a material consideration in planning decisions.

1.4.1 Planning Practice Guidance (PPG)

The PPG was first published in 2012, with the most recent revision published in August 2022. The PPG is intended to assist local authorities, planning professionals and the public understand how to address the risks associated with flooding and coastal change during the planning process. The Level 1 SFRA further details the content of the PPG.

1.4.2 The Sequential Test

The NPPF sets out that the Sequential Test is applied to new developments. This test aims to ensure that areas at 'low' risk of flooding are prioritised for development. This test discourages development in areas at a 'medium' or 'high' risk of flooding, from any source, both now and in the future.

1.4.3 The Exception Test

It is recognised that there may not always be sufficient capacity for development in 'low' flood risk zones. In these instances, a greater understanding on the extent of flood risk in each proposed site is required, to support the application of the Exception Test.

The Exception Test should only be applied following the application of the Sequential Test. Annex 3 of the NPPF defines the vulnerability of different types of development and Table 2 of the PPG indicates the requirement and applicability for the Exception Test. The exception test must be applied in the following site instances:

- 'Highly vulnerable' development in Flood Zone 2
- 'More vulnerable' in Flood Zone 3a
- 'Essential infrastructure' in Flood Zone 3a or 3b
- Locations where risk of flooding, from any source, would affect the safety of the proposed development or will impact the safety or vulnerability of existing developments in the area.

The recommendations in this report are of sufficient detail to inform the application of the Exception Test. Based on the recommendations in this SFRA, it is understood that Eastbourne Borough Council will apply the Sequential and Exception test, which will be published in a separate document.

1.5 Use of SFRA data

This report has been produced using the best information and data available at the time. Datasets used to inform this Level 2 SFRA may be updated following the publication of the report. The new information may supersede the mapping and modelling data used in this report. In such circumstances, guidance should be obtained from Eastbourne Borough Council, East Sussex County Council and the Environment Agency, to ensure that the most appropriate and up-to-date information is available and used in future flood risk assessments.

2 Sources of data

2.1 Historic data

The Environment Agency's Historic Flood Map was used to understand the extent of historic flooding recorded across the catchment. This EA map incorporates flood extents from river, sea, and groundwater. It is crucial to note that, absence of flooding across the historic flood map and incident report does not mean that an area has never flooded, only that the records are not held or have not met the criteria for inclusion.

East Sussex County Council's Historic Flood Incidents Report was used to identify isolated historic flooding and to understand the prevalence of flooding across the proposed development sites. This data showed that the primary flood sources are surface water, tidal, wave overtopping and sewer flooding. In particular there have been frequent wave overtopping affecting the 'seaside' and 'Devonshire' areas of Eastbourne.

2.2 SFRA flood zones

The Level 1 SFRA defined the flood zones that are used in this Level 2 SFRA. The Flood Zones in the Appendix A mapping incorporate fluvial and tidal model outputs. The fluvial modelling incorporates the latest available data from the EA.

The Flood Map for Planning online does not include climate change allowances and does not separate the identity of Flood Zone 3 as 3a and 3b (functional floodplains). Additionally, the Environment Agency Flood Zones do not cover all catchment or ordinary watercourses with areas <3km^2. Consequently, even though the Environment Agency Flood Zone map shows a location to be in Flood Zone 1, there may be additional flood risk present at the site from smaller watercourses which is not indicated in the flood zones.

2.3 Flood Risk Management Infrastructure

2.3.1 Flood Defences

For sites where existing flood defences provide a reduction in the risk of flooding for the site, it is crucial to understand the level of protection these defences provide and understand the residual risk the defences pose if they are breached. It is also important to understand the implications of climate change on the security of these defences.

In locations where flood defences are required in the protection of a development site, evidence will be required to show that no adverse effects will be caused to other locations both within and outside the catchment area. Level-for-level compensation will need to be established in developments which are proposed on floodplain storage areas. In circumstances where physical defences are proposed, there may be a requirement to demonstrate an appropriate level of commitment to the maintenance of such flood defences.

Flood defences have been mapped using the Environment Agency's Asset Information Management System (AIMS) Spatial Defences dataset. This dataset includes all formal flood defences which are subject to inspection, ownership or management by the EA and specifies the condition of the defence and the relevant standard of protection. Defences include, but are not limited to:

- Sea defences including beaches, groyne fields, beach recharge, flood gates and sea walls
- Natural high ground
- Embankments

Although not included on the EA's Spatial Flood Defence Dataset, other assets including Water Level Management Structures and flood storage areas are also present within the borough. For example, the Fence Bridge Gates at the end of Langey Haven, although not located within the SFRA study area, are influential on the drainage of Eastbourne and the associated flood risk implications. Additionally, the Eastbourne Lakes were created in 1995 and provide floodwater storage.

2.4 Flooding from rivers

Fluvial flood risk is significant in the central and northern areas of the borough, particularly from the main rivers of Langney Sewer and Crumbles Sewer, which affects the rear gardens at Langney Green. A series of smaller ordinary watercourses flow into these main rivers, including the Willingdon and West Langney Sewer, Horsey Sewer, the Decoy Stream, Lottbridge Sewer and Willingdon Upper. Additionally, the Bourne Stream is a significant ordinary watercourse which poses considerable risk to neighbourhoods in the south western part of the borough. This watercourse is culverted under Eastbourne town centre and discharges into the Horsey Sewer.

2.4.1 Eastbourne fluvial model

As part of the Level 1 SFRA, JBA prepared updated climate change flood risk modelling and mapping, which built off the Eastbourne Fluvial Model (linked 1D-2D Flood Modeller-TUFLOW). This updated modelling incorporated the most up-to-date peak river flow allowances presented in the EA's climate change projections for SFRAs. These climate change uplifts for Cuckmere and Pevensey Levels Management Catchment are indicated in Table 2-1.

The model study area extends across the Eastbourne catchment boundary. The study catchment is characterised by a series of interconnected watercourses and statutory main rivers.

Table 2-1: Cuckmere and Pevensey Management Catchment peak river flow climate change allowances

Climate change allowance category	Total potential change anticipated for '2020s' (2015-2039)	Total potential change anticipated for '2050s' (2040-2069)	Total potential change anticipated for '2080s' (2070-2125)
Central	18%	19%	32%
Higher Central	24%	26%	43%
Upper End	35%	44%	76%

2.4.2 Impacts of climate change on fluvial flood risk

Climate change is expected to increase the peak flows of rivers, which will cause flood events to increase in severity and frequency. Climate change is also expected to increase the frequency of defence breach, as more defences will become overtopped by increased volumes of water. Flood defences will require more frequent maintenance and upgrades.

The entirety of the study area falls into the Cuckmere and Pevensey Levels Management Catchment for peak river flow allowances. This is a resource created by the Environment Agency which outlines the allowance that should be made for climate change in any given catchment area. These 2020s, 2050s and 2080s epoch allowances can be seen in Table 2-1.

2.4.3 Integrated model

The Blue Heart Project is one of twenty-five local projects established by the Environment Agency to address current and future flood risk, from sea, rivers, groundwater and surface water.

The Blue Heart project is one of twenty-five local projects as part of the Environment Agency's Flood and Coastal Resilience Innovation Programme (FCRIP). The project is lead and managed by East Sussex County Council (ESCC) and is investigating current and future flood risk from multiple sources of flooding and how those sources interact with one another.

The project aims to adopt a dynamic approach to flood risk across the Eastbourne area. The scheme will monitor water levels across the catchment to support the running of integrated fluvial and surface water models. Real time monitoring can assist in flood warning systems for the population in the catchment. The integrated flood model will be able to assist in future flood preparation, including the relevant management and maintenance of flood defence assets.

The Blue Heart is currently ongoing, with completion expected in 2027. The Blue Heart integrated model has not been utilised for this report.

2.5 Flooding from the sea

All sites in this report, except 'Land to the west of Carlisle Road' and 'College and Hospital, King's Drive,' are subject to tidal flood risk in a defended scenario. The sites at highest risk of tidal flooding are situated on low-lying ground or near the coastline. The flood risk in these areas is potentially from a cumulative combination of flooding from fluvial, groundwater and coastal sources.

Tidal locking also poses a risk to sites located along the coastline. This process occurs when high tide prevents rivers from draining out to sea due to a rise in sea level.

2.5.1 Eastbourne coastal model

The East Sussex Coastal model was commissioned in 2012 by the Environment Agency to investigate coastal flood risk between Newhaven and Hastings. The coastal model used SWAN (Simulating Waves Nearshore) wave transformation model. Simultaneous flood inundation modelling was performed using a linked 1D-2D ESTRY-TUFLOW Model04. As part of work for the Pevensey to Eastbourne Scheme in 2022, this model was updated to provide the most appropriate visual representation of tidal flood risk, using the data available.

2.5.2 Impact of climate change on sea levels

Climate change is expected to have significant impact on sea levels. The Environment Agency have generated sea level allowances for climate change, divided up by River Basin District. Eastbourne catchment falls under the Southeast River Basin District, for which the climate change allowances are displayed in Table 2-2.

Table 2-2: Peak Sea level allowances for the Southeast (1981 - 2000 baseline)

Allowance Category	Annual sea level rise allowance 2000 to 2035	Annual sea level rise allowance 2036 to 2065	Annual sea level rise allowance 2066 to 2095	Annual sea level rise allowance 2096 to 2125	Cumulative rise 2000 to 2125
Higher Central	200mm	261mm	348mm	393mm	1.20m
Upper End	242mm	339mm	474mm	546mm	1.60m

2.6 Surface water flooding

2.6.1 Eastbourne surface water modelling

Surface water modelling has been carried out for East Sussex County Council as part of the Blue Heart Flood and Coastal Resilience Innovation Programme (FCRIP). The Eastbourne Surface Water modelling has been used as a basis for mapping surface water flood risk. The model was updated in 2021 for East Sussex County Council, using the most up-to-date information available at the time. The PPG defines a surface water design flood event to be 1% AEP and incorporates the appropriate allowances for climate change.

2.6.2 Impact of climate change on surface water flooding

Climate change is predicted to result in wetter winters and shorter, more intense summer storms. The increased rainfall is expected to increase the amount of surface water runoff, particularly as rivers struggle to account for increased water volumes. Increased development can increase the quantity and velocity of surface water run-off, resulting in more frequent surface water flood events if not appropriately managed.

Additionally, increasing sea levels and potentially more storms, will increase the duration of tidal locking which will result in more significant surface water flooding.

The Environment Agency have published peak rainfall intensity climate change allowances, divided up by Management Catchment. Allowances have been produced for the 3.3% and 1% Annual Exceedance Probability (AEP) scenarios, providing a central allowance and upper end allowance for the 2050s and 2070s epoch (Table 2-3).

Table 2-3: Peak rainfall intensity climate change allowances for Cuckmere and Pevensey Levels management catchment, 3.3% and 1% AEP return periods.

Allowance Category	Climate change allowances	2050s epoch (up to 2060)	2070s epoch (2061-2125)
3.3% AEP	Central	20%	20%
	Upper End	40%	40%
1% AEP	Central	20%	25%
	Upper End	45%	45%

2.7 Groundwater flooding

The west of the site, towards the South Downs, is underlain by chalk bedrock, which is highly permeable. To the east, the area is underlain by mudstone bedrock geology. The bedrock geology, combined with a low topography generates concern of a high water table, which would exceed capacity during a flood event. It should be noted that Groundwater levels in Eastbourne are also likely to be influenced by tidal fluctuations.

Mapping of groundwater has been based on the JBA Groundwater Emergence mapping dataset. This dataset shows variations in the risk of groundwater emergence at the surface. This is based on the predicted difference between groundwater level and the ground surface for a 1% AEP event. Five zones are defined to describe the risk of groundwater being: at or very near the ground surface; between 0.025m and 0.5m below the ground surface; between 0.5m and 5m below the ground surface; at least 5m below the ground surface; and low risk of groundwater flooding. It should be noted that these risk bands are based on the risk of emergence and not surface flooding due to groundwater. The modelling for JBA's mapping involves simulating groundwater levels for a range of return periods (including 75, 100 and 200 years). Groundwater levels are then compared to ground surface levels to determine the head difference in metres. The JBA Groundwater Emergence mapping categorises the head difference (m) into five feature classes based on the 1% AEP model outputs which are outlined in Table 2-4.

It is important to note that the modelled groundwater levels are not predictions of typical groundwater levels. Rather they are flood levels, i.e. groundwater levels that might be expected after a winter recharge season with 1% AEP, so would represent an extreme scenario.

It should also be noted that the JBA Groundwater Emergence map is suitable for general broad-scale assessment of the groundwater flood hazard in an area, but it is not explicitly designed for the assessment of flood hazard at the scale of a single property. It should also be noted that the map identifies areas where groundwater Is likely to emerge, but not necessarily where water may flow towards and cause flooding once it has emerged. In high-risk areas, a site-specific risk assessment for groundwater flooding is recommended to fully inform the likelihood of flooding.

Table 2-4: JBA Groundwater Emergence Mapping

Gridcodes	Flood depth range during a 1% AEP flood event	Groundwater flood risk
4	Groundwater levels are either at or very near (within 0.025m of) the ground surface	Within this zone there is a risk of groundwater flooding to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
3	Groundwater levels are between 0.025m and 0.5m below the ground surface	Within this zone there is a risk of groundwater flooding to both surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
2	Groundwater levels are between 0.5m and 5m below the ground surface	There is a risk of flooding to subsurface assets but surface manifestation of groundwater is unlikely.
1	Groundwater levels are at least 5m below the ground surface	Flooding from groundwater is not likely.
0	Low risk	This zone is deemed as having a negligible risk from groundwater flooding due to the nature of the local geological conditions.

2.7.1 Impact of climate change on groundwater flooding

Climate change impacts on groundwater flooding are uncertain, given the varying influence of fluvial and surface water flooding on groundwater infiltration. To determine potential changes to frequency and severity under climate change conditions, individual site assessments would need to be carried out to understand the mechanism of geology, topography and urbanisation in each location.

Climate change is expected to cause milder, wetter winters and drier, hotter summers. Consequently, there is a considerable seasonable contribution to the vulnerability of groundwater sources to flood risk. Increased tidal levels have the potential to impact groundwater and watercourse drainage systems. The effects of tidal levels on groundwater sources are likely to materialise over the lifetime of a development, henceforth, further investigative assessments should be completed to identify areas of concern.

2.8 Reservoirs

The Environment Agency Reservoir Flood Extents data consists of datasets for a ‘dry day’ and ‘wet day’ scenario. The ‘dry day’ portrays the flood extent that may occur if a reservoir

were to fail on a day that river levels are at a normal level. The 'wet day' scenario portrays how much worse the flood extent would be if the rivers are already at increased levels from a natural extreme flood event.

'The Land North of Pevensey Bay Road' is the only site subject to residual risk from reservoir failure, and is also at risk in a 'wet day' scenario. The mapping provides extents during a worst-case scenario, which is unlikely to occur on such scale.

Additional waterbodies, such as Shinewater and Hydyne Lakes in Hampden Park, might be classified as reservoirs and are being assessed by a Panel engineer in spring 2025. Decoy Pond, which is also located in Hampden Park, is an impounded waterbody but is not formally classified as a reservoir.

2.9 Sewers

Within Eastbourne borough, public sewers are managed and maintained by Southern Water. Legislation indicates that development is not permitted close to (within 3 metres), or over a public sewer. To build over a sewer, permission would need to be requested from Southern Water.

Southern Water records sewer flooding on their Sewer Incident Report Form (SIRF). This database records incidents of flooding relating to public foul, combined or surface water sewers and displays which properties experienced flooding. This data was obtained for the 2022 Eastbourne and Southern Wealden Level 1 SFRA and shows the number of sewer flooding incidents within the borough between 2011 and 2021. Additionally, Southern Water's Drainage and Wastewater Management Plan (DWMP), published in 2023, has also been used in this L2 assessment to assess the risk of sewer flooding.

2.10 Residual risk

Residual risk to the site is identified as where potential blockages of culverts/structures or overtopping / breach of defences could result in the inundation of a site, possibly with the sudden release of water with little warning.

2.10.1 Overtopping

Overtopping of formal coastal defences needs to be accounted for in this boundary, given the low topography of the region. Considerations for overtopping include the depth and hazard of flood risk and locations impacted by an undefended tidal scenario.

The stretch of coastline within EBC boundary is currently managed under two separate schemes. Holywell through to Langney Point is under management of Eastbourne Borough Council, primarily controlled by a combination of 1.8 million m^3 of beach material, 94 wooden groynes, sea walls and flood gates. The middle section of coastline is known as Sovereign Harbour, which is a private flood defence and managed by Premier Marinas. The stretch of coastline from Sovereign Harbour along to Cooden Beach is under management of the Environment Agency as part of a 25-year plan which is set to come to a contractual

end in 2027. Following 2027 the entire coastline will fall under the management of the Pevensey Bay to Eastbourne Coastal Management Scheme, which will encourage a cohesive and integrated approach to coastal flood risk management; this management will remain contractually in effect for the next 100 years.

Overtopping within this SFRA has been considered as part of the Pevensey to Eastbourne modelling.

2.11 Depth, velocity, and hazard to people

The Level 2 assessment utilises probable depth, velocity, and hazard of flooding across a series of 0.1%, 0.5%, 1% and 3.3% AEP, plus climate change, events. Mapping of this data is valuable in informing the basis of the Exception Test.

Defra's FD2321/TR2 "Flood Risk to People" outlines the hazard categories which have been utilised across the hazard mapping in this assessment, these are highlighted in Table 2-1.

Table 2-45: Description of Flood Hazard ratings

Description of Flood Hazard Rating	Flood Hazard Rating	Classification Explanation
Very Low Hazard	<0.75	Flood zone with shallow flowing water or deep standing water
Danger for some (i.e. children, elderly)	0.75-1.25	Caution: flood zone with deep or fast flowing water
Danger for most	1.25-2.00	Danger: flood zone with deep fast flowing water
Danger for all	>2.00	Extreme Danger: flood zone with deep fast flowing water.

2.12 SuDS suitability

The Flood and Water Management Act (2010) highlights the legislative requirement for SuDS in new developments. The NPPF also drives the importance for sustainable drainage systems to address issues of climate change, water quantity and quality, biodiversity, and amenity.

This report has assessed the geological characteristics of each site to determine any constraints relating to surface water drainage. This assessment has been designed to inform the early stage of site planning and allocation; it is to be used in conjunction with detailed site-specific drainage assessments.

This report has utilised bedrock and superficial geology mapping from the British Geological Survey (BGS) to provide a fundamental understanding of the extent of drainage across the catchment. The following maps have been used in conjunction with the BGS geological mapping to identify further limitations in drainage across the proposed development sites:

- Historic landfill sites
- Groundwater Source Protection Zones
- Risk of Flooding from Surface Water mapping
- Flood Map for Planning
- Detailed River Networks
- Groundwater Drainage Risk Areas 3 and 4 (Aggregated)
- LiDAR

3 Local policy

3.1 Local policies

3.1.1 Sustainable Drainage Systems (SuDS)

SuDS in the Eastbourne Borough Council catchment should be designed in line with the East Sussex LLFA guidance documents: 'Guide to Sustainable Drainage Systems in East Sussex' and the 'Water, People, Places. A guide for maser planning sustainable drainage into developments'.

In addition to this guidance, East Sussex County Council recommends using the SuDS Decision Support Tool for Small Scale Development. This tool was developed to provide further advice and requirements necessary from developers and authorities in determining the suitability of SuDS in the proposed locations of small developments.

East Sussex County Council's Local Flood Risk Management Strategy (2016 – 2026) highlights standing advice for development within the county, which requires development proposals to address the following:

- Accommodation of existing surface water flow paths
- Surface water outfall must be identified before drainage strategy submission, with supporting evidence that the system has the capacity for additional surface water flows.
- Peak flow control – volume discharged from development must not exceed existing greenfield runoff.
- Urban creep – development must allow for potential increases in impermeable surfaces caused by minor extensions and increases in paved areas.
- Infiltration methods must be tested – where infiltration SuDS methods are proposed, sufficient on-site infiltration tests must have been undertaken.
- Consideration of existing flood risk - it is recommended that surface water drainage is designed in consideration of existing flood risk issues in the wider area.

3.1.2 Pevensey and Cuckmere Water Level Management Board

The Pevensey and Cuckmere Water Level Management Board (WLMB) has a regulatory responsibility to actively maintain the most critical ordinary watercourses (those not classified as 'Main River's) within the internal drainage district (IDB). This equates to approximately 25% of total ordinary watercourses in the borough. Main river and coastal defences remain under the managerial authority of the Environment Agency. The Pevensey and Cuckmere WLMB manage the other infrastructure in the drainage district.

The board are responsible for ensuring drainage systems remain regulated, controlled, and facilitated during development. The board have formulated 'Board Bylaws' in conjunction with the Land Drainage Act 1991, to outline the responsibility of developers, landowners, LPA, LLFA, Southern Water and EA. Key bylaws influencing developments include:

- Bylaw 3: Control of Introduction of Water and Increase in Flow or Volume of Water
- Bylaw 4: Operation of Water Control Structures and Alteration, Improvement or Removal of Structures
- Bylaw 6: Diversion or stopping up of Drainage/Flood Risk Management Infrastructure
- Bylaw 7: Detrimental Substances not to be put into Drainage/Flood Risk Management Infrastructure
- Bylaw 10: No Works within 9 metres of the Edge of Drainage/Flood Risk Management Infrastructure

3.2 Coastal Resilience and Adaptation Area (CRAA)

Coastal Resilience and Adaptation Areas (CRAA) are defined as areas where there is a need to increase the resilience capacity of existing and proposed development, through adaptation and resilience actions, to address the consequences of the increased magnitude and frequency of hazards from tidal, fluvial, surface water, sewer and groundwater flood risk, resulting from climate change effects to mean sea level, increased erosion risk and high intensity rainfall.

The CRAA was produced for the Eastbourne and South Wealden Level 1 SFRA. This indicates that the zone extends across the Eastbourne Lakes, Langney, Roselands and a large part of the Eastbourne town Centre.

3.3 Ongoing projects

3.3.1 Blue Heart - Flood and Coastal Resilience Innovation Programme

The Environment Agency has set up the Flood and Coastal Resilience Innovation Programme (FCRIP) as part of the government's National Flood and Coastal Erosion Risk Management Strategy for England. The strategy has been designed with an aim of reducing flood risk to people and property and to build resilience to climate change.

The Blue Heart project is one of the 25 national projects established by FCRIP to address current and future flood risk, from sea, rivers, groundwater, and surface water. The study area expands across the Eastbourne Borough Council catchment area and areas of southern Wealden.

Eastbourne has a high risk of flooding due to its dynamic catchment characteristics, including its low-lying topography, complex geology, high water table, rapid urbanisation and outdated sewer system network. Blue Heart aims to explore the integrated impact of these flood risk factors, to better mitigate and prepare for future flood risk.

Real time monitoring can assist in flood warning systems for the population in the catchment. The integrated flood model will be able to assist in future flood preparation, including the relevant management and maintenance of flood defence and water level management assets.

The Blue Heart is currently ongoing, with completion expected in 2027. The Blue Heart integrated model has not been utilised for this report.

3.3.2 Pevensey Bay to Eastbourne Coastal Management Scheme

The Pevensey Bay to Eastbourne Coastal Management Scheme aims to increase the resilience of the 15km stretch of coastline between Cooden Beach and Holywell to coastal flooding and erosion over the next 100 years. This is one of the largest coastal flood risk projects in the country and will be delivered by the Environment Agency, in partnership with Eastbourne Borough Council, East Sussex County Council, Rother District Council. Wealden District Council, JBA Consulting and VolkerStevin . The scheme is a collaborative project, costing upwards of £100+million and estimates to protect up to 10,000 residential properties in the area, as well as businesses and protected areas.

Until 2027, this stretch of coastline is managed under two separate contracts. Eastbourne Borough Council manage Holywell through to Langney Point, Premier Marinas manage Sovereign Harbour and the Environment Agency manages the stretch of coastline between Sovereign Harbour and Cooden Beach. Following the expiration of the EA's contract with Pevensey Coastal Defences Limited (PCDL) contract in 2027, the Pevensey Bay to Eastbourne Coastal Management Scheme will come into full effect.

The medium-term (Phase 1) project for 2027-2037 aims to respond to a predicted 10cm seal level rise and provide the same standard of protection from coastal flooding. The long-term (Phase 2) project will consider approaches to managing the coast from 2037 into the next century.

3.3.3 SuDS for Schools

The SuDS for Schools initiative is part of the Blue Heart programme and aims to mitigate the significant surface water flooding risk in the urbanised area, while educating students on sustainability, water management and climate resilience. The Blue Heat: SuDS for Schools programme aims to install SuDS in a total of 32 schools across Eastbourne and Southern Wealden. The project is being delivered in multiple phases over several years, with Phase 1 complete and Phase 2 currently being delivered.

4 Guidance for proposed development

4.1 Consenting and permitting

Proposed developments located within the Pevensey and Cuckmere Water Level Management Board (PCWLMB), with the potential to impact the flow of water within an ordinary watercourse, which is not a main river, are required to obtain Ordinary Watercourse Consent from the WLMB. Consent outside the WLMB is required from East Sussex County Council, it its position as LLFA.

The grant of planning permission does not negate the requirement for Ordinary Watercourse Consent.

Other assessments that may be required in addition to Ordinary Watercourse consent include:

- The Water Framework Directive Assessment – assess the impact of discharge on water quality, to ensure that water quality does not impact the ecology or chemical composition.
- An Environmental Appraisal – identifies all significant impacts of the proposed development.
- Marine License – assess the implementations of development on marine ecosystems.
- Flood Risk Activity Permit (FRAP) – an environmental permit required for work on or near a main river, flood defence structure or sea defence

4.2 Hydraulic modelling

JBA Consulting was commissioned by Eastbourne Borough Council to prepare updated climate change flood risk modelling and mapping for the Eastbourne fluvial model, as set out in the Level 1 SFRA. As part of this, the Environment Agency's updated peak river flow allowances were used, which can be seen in Table 2-1.

To account for climate change, the model was rerun for the 3.3%, 1% and 0.1% AEP events. Critical storm durations of 8.75 hours and 61 hours were run for each return period. Undefended and defended scenarios were run for each return period and storm duration. Climate change allowances of +32%, +43% and +76% were applied to all scenarios.

4.3 Access and egress

Safe access and egress to and from sites are required to enable the safe evacuation of people, as well as the safe access for emergency services and Flood Authorities to the development during a flooding event. During the planning stages, the safe access and egress for proposed development sites should be demonstrated and evidenced, to the satisfaction of the LPA. The provision of safe access and egress in the vicinity of the site should also be considered. In locations where offsite risk is higher than onsite risk, restriction to egress should be considered.

4.4 Residual risk

Residual risk must be considered for all development sites that are located within an area benefiting for the effects of flood defences, within areas at risk of reservoir breach and in areas where other flood mitigation measures exist or are proposed.

4.5 High groundwater

The effects of development on the capacity of groundwater sources should be identified, including the discharges into watercourses, which could cause issues with groundwater in other locations.

In line with guidance from East Sussex County Council (LLFA), further site-specific investigations should be carried out to determine the extent of risk to groundwater storage both within and in the vicinity of the site boundary. Additionally, infiltration testing and groundwater monitoring should be undertaken during the winter months.

4.6 Long-term water level management

In the areas where there is a reliance on the regulation of water levels in watercourses, there should be a consideration for the arrangements in the future, with consideration to the influence of sea level rise on the extent of flood risk.

5 Level 2 site assessments

5.1 Neighbourhood area assessments

Maps were generated for the 14 Neighbourhood Areas in Eastbourne, to assess the widespread risk of flooding in the Eastbourne borough. The maps, available in Appendix A, take into consideration the flood risk posed by each source, including fluvial, tidal, groundwater, sewer and surface water. These maps show flood risk extents in 3.3%, 1% and 0.1% scenarios.

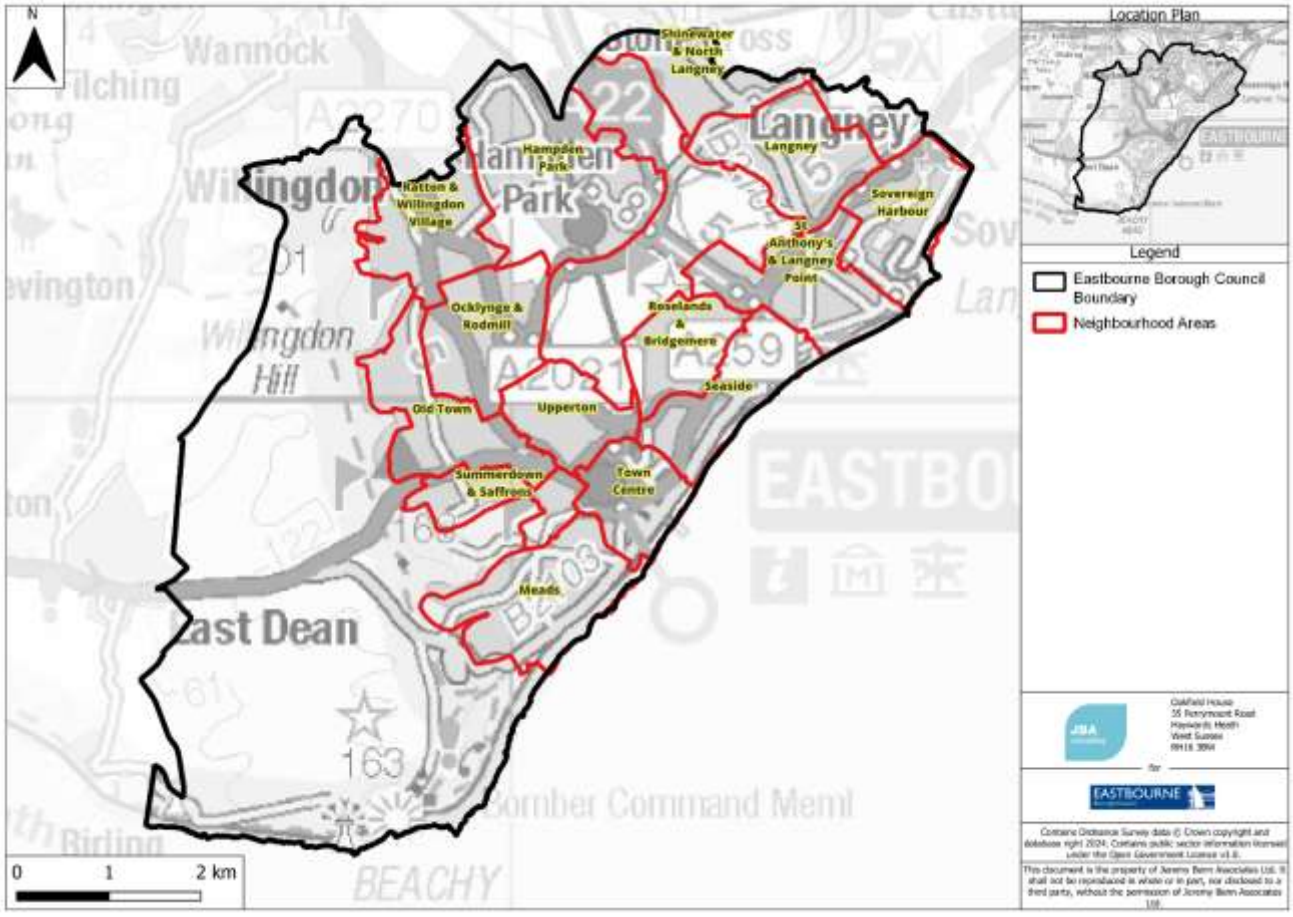


Figure 5-1 Neighbourhood areas in Eastbourne

5.2 Site summary tables and mapping

Site summary tables are included for the 14 sites in Table 5-1:-1 below. Figure 5-2 shows the location of these sites within the borough. Independent of this Level 2 SFRA, site-specific flood risk assessments will be required, in line with planning, flood risk and defence policy and guidance.

The site summary sheets can be found in Appendix A.

Table 5-1: Site locations for site summary tables.

Site name	Site references
Land at East Langney Levels	LA36, LA37, LA38, LA39, LA41 and LA43
Land off Pevensey Bay Road	LA45, LA105, LA106
Sovereign Harbour Site 6	SO07, SO16
Land North East of St Anthony's Hill	EP12
Land at Larkspur Drive	EP17
Land at Southbourne	EP19, EP30, EP31, EP32 and EP33
Former Gas Works, Finmere Road	RO31 and RO25
Sovereign Centre, Grand Parade	SE62
Fort Fun	SE92
Fisherman's Green	SE93
ESK, Courtlands Road	RO20
Land at Tutts Barn Lane	EP36, EP43, EP44, EP45 and EP18
College and Hospital, Kings Drive	OC08, OC09 and OC16
Carlisle Road sites	ME36 and ME69

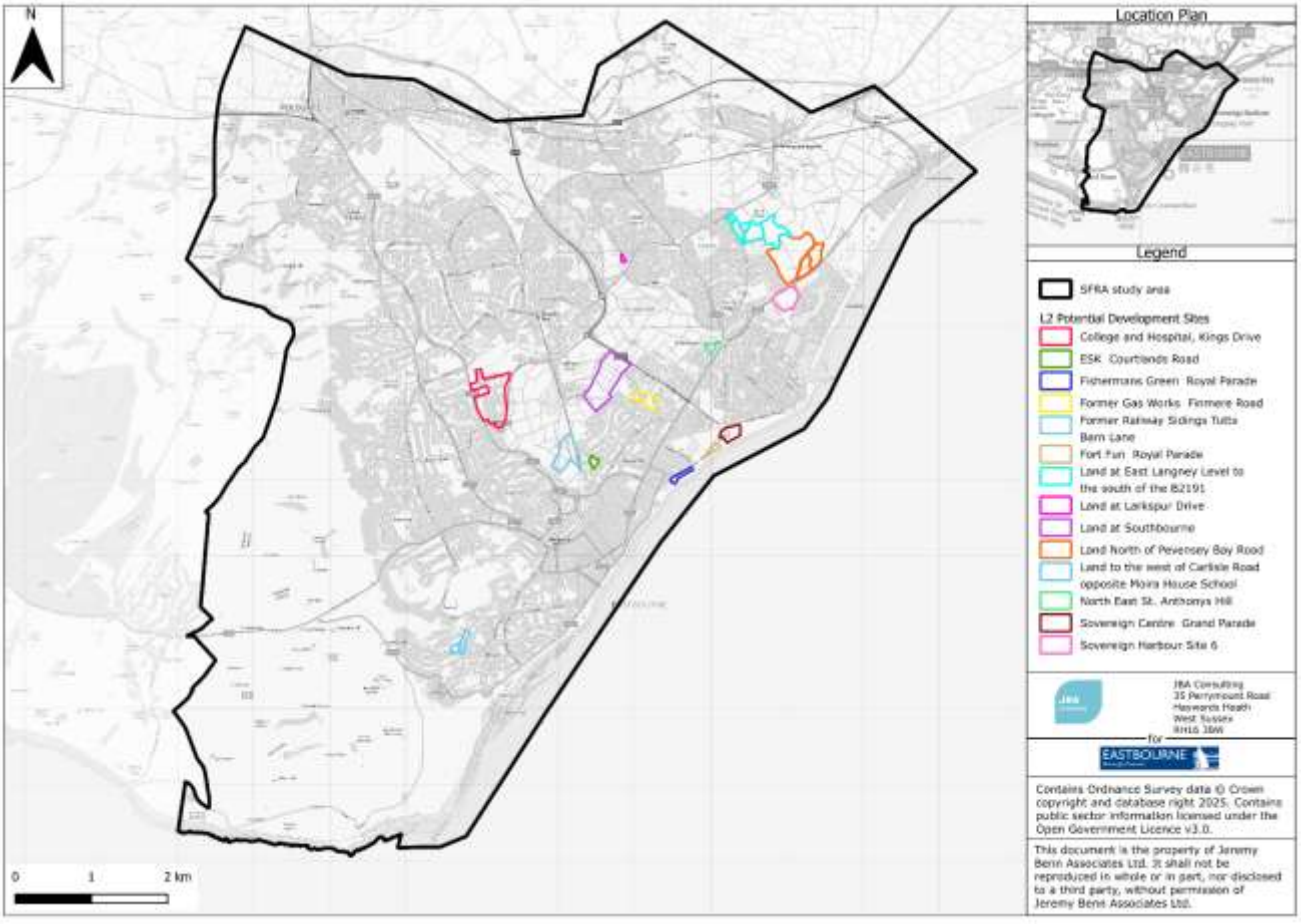


Figure 5-2: Map showing the location of the L2 potential development sites

5.3 Plan wide recommendations for development

The following recommendations have been identified in this SFRA that will apply to all sites in Eastbourne.

Sequential approach to development - Development should adopt a sequential approach to the site layout, with more sensitive parts of the proposed development such as the site access located in the lowest risk areas within the site. Higher risk areas can be used for the least vulnerable aspects of the development such as soft landscaping where possible. Residential uses for any mixed-use developments should be located on the first floor or above.

Flood risk - Development must not increase flood risk either on or off site. The design of proposals to manage flood risk must take into account the impacts of future climate change over the projected lifetime of the development.

Safe access and egress - Development across the plan area must ensure that safe access and egress is achievable during from flood events from all sources, with consideration to the impacts of climate change and residual flood risks such as breach.

Minimising impermeable surfaces – Use of impermeable surfaces should be minimised where practicable using a combination of permeable surfacing and soft landscaping techniques.

Use of SuDS - Implementation of SuDS can provide opportunities to deliver multiple benefits including volume control, water quality, amenity and biodiversity. This could provide wider sustainability benefits to the site and surrounding area. Proposals to use SuDS techniques should be discussed with relevant stakeholders (LPA and LLFA) at an early stage to understand practicable constraints.

Basement dwellings - The PPG states that basement dwellings are 'highly vulnerable', as such it is inappropriate to locate them within areas at risk of flooding. In the interests of safety, basement dwellings must not be located within areas at risk of flooding from any source, both now and in the future.

Source Control - Opportunities to increase water re-use and incorporate source control techniques such as green roofs, permeable surfaces and rainwater harvesting (including water butts and storm water reuse systems) must be maximised as far as possible. This is particularly important in Eastbourne considering the spatial limitations with utilising other SuDS techniques in built-up areas and the limited capacity within the infrastructure receiving surface water runoff from these developments.

Re-using existing connections - It is likely that new development may need to fully or partially reuse parts of the existing drainage infrastructure. The LLFA expects developers to investigate existing and receiving drainage systems on site; investigations should include the risk of misconnections, blockages or under-capacity infrastructure. The developer should also demonstrate that the receiving water body or culvert is fully functioning and has the ability and capacity to take the water. If improvements are required these should be

carried out prior to the discharge of surface water, which should be demonstrated prior to the works on site commencing. .

Surface water discharge rates – The Eastbourne catchment is identified as being at 'high concern' in the Southern Water DWMP, which includes categories for sewer flooding. Development should aim to reduce surface water discharge rates by as much as practical to minimise the impacts on the public sewer network.

6 Neighbourhood Area Assessments

Assessments have been carried out for the 14 neighbourhood areas, summarising the key flood risk issues posed, the recommendations for future development and the strategic opportunities for flood mitigation for future development.

6.1 Neighbourhood Area 1 – Town Centre

Eastbourne town centre is a densely populated area with very little green space. The neighbourhood area consists of the seafront promenade to the east (B2106), Eastbourne Train Station to the north and the central business district located centrally between both. This neighbourhood area is characterised by flat topography, with a slight slope from the west (with elevations of approximately 9.89mAOD by Eastbourne Station) to lower elevations in the south east towards the sea.

The flood defences in this area include a managed shingle beach with timber groynes, as well as a sea wall. The B2106 is elevated above the Eastbourne promenade, which falls in elevation from the south west to the north east.

6.1.1 Key flood risk issues

Tidal – Tidal risk is evident in the northeast area of the site, just south of the railway line. Flooding is particularly evident by the shopping centre, where topography is lowest in the neighbourhood. Tidal locking also poses significant risk to this area.

Fluvial – The Bourne Stream is culverted under the Town Centre neighbourhood area from northwest to southeast. Development may increase the flow of water through this culvert, consequently leading to poor drainage.

Surface water – Surface water flooding occurs predominantly in the north region of the neighbourhood. Extent of surface water flooding is widespread in the 1 in 1000-year scenario, with a ‘Danger to most’ hazard extending across the central region of the town centre, down Terminus Road.

Groundwater – The majority of this area is indicated to be at high risk of groundwater emergence at the surface and basements, which has been reported within some shops along Terminus Road. Below ground development may be particularly vulnerable and high groundwater levels may impact the capacity of surface water drainage systems in this area.

Sewers – Sewer networks are predominantly combined in the town centre and will accommodate both surface water and flow drainage. Southern Water considers ‘asset resilience’ and ‘customer education’ to be key options in this area as part of its DWMP.

6.1.2 Recommendations for development

Source Protection Zones - This area is located within a Groundwater Source Protection Zone (SPZ). If a site is located within a SPZ, infiltration techniques may not be suitable and

should only be used following the granting of necessary permits from the EA. Given the prevalence of SPZ 1, hydrological assessments should be carried out to understand risk to supply source. SuDS should be discussed with authorities at an early stage to discuss constraints and opportunities.

Nitrate Vulnerable Zones – This area is located within a Nitrate Vulnerable Zone (NVZ). If a site is located within a NVZ there should be early engagement with the LLFA and the EA on the proposed SuDS measures and infiltration rate to discuss requirements on the site meeting relevant conditions.

Cumulative Impact Assessment – This area is comprised of both low and medium risk cumulative impact areas. If the site is located within a medium risk area, Cumulative Impact Assessment policy documents must be understood, and the cumulative impact of development should be considered.

Climate Resilience and Adaptation Area (CRAA) – The majority of the town centre is located within a Climate Resilience and Adaption Area, therefore development should consider the relevant policies and requirements. More information regarding Climate Resilience and Adaptation Areas can be found in the Eastbourne and Southern Wealden Level 1 SFRA.

6.1.3 Strategic opportunities

Strategic opportunities have been highlighted for this area through consultation with the relevant risk management authorities. Developers should seek to discuss opportunities with the relevant risk management authorities at an early stage in the site design.

Climate Resilience and Adaptation – This area is within the Climate Resilience and Adaptation Area defined in the Level 1 SFRA. Proposed development should be implemented so as to be safe and resilient to future shocks from all sources and combined events. Development proposals must set out the intended benefit to the wider community and include clear, costed commitments to measures and resilience actions that make development safe for the intended life.

Reliance on defences - The area to the north is dependent on the presence of flood defences to reduce flood risk. Development must ensure there is a suitable commitment to maintain these defences throughout the entire lifetime of the proposed development.

Minimising surface water flows – There are limited opportunities to store surface water runoff in this area, however opportunities to take water out of the public sewer network, for example through disconnecting downpipes and increasing water re-use should be explored on a wider scale.

SuDS retrofit – Given the prevalence of flood risk around the shopping centre, the implementation of SuDS techniques would allow for multiple benefits including surface water attenuation, treatment of runoff, biodiversity and amenity.

Daylighting Bourne Stream – subject to the appropriate assessments development should consider opportunities for daylighting the Bourne Stream which could improve flood risk to this area.

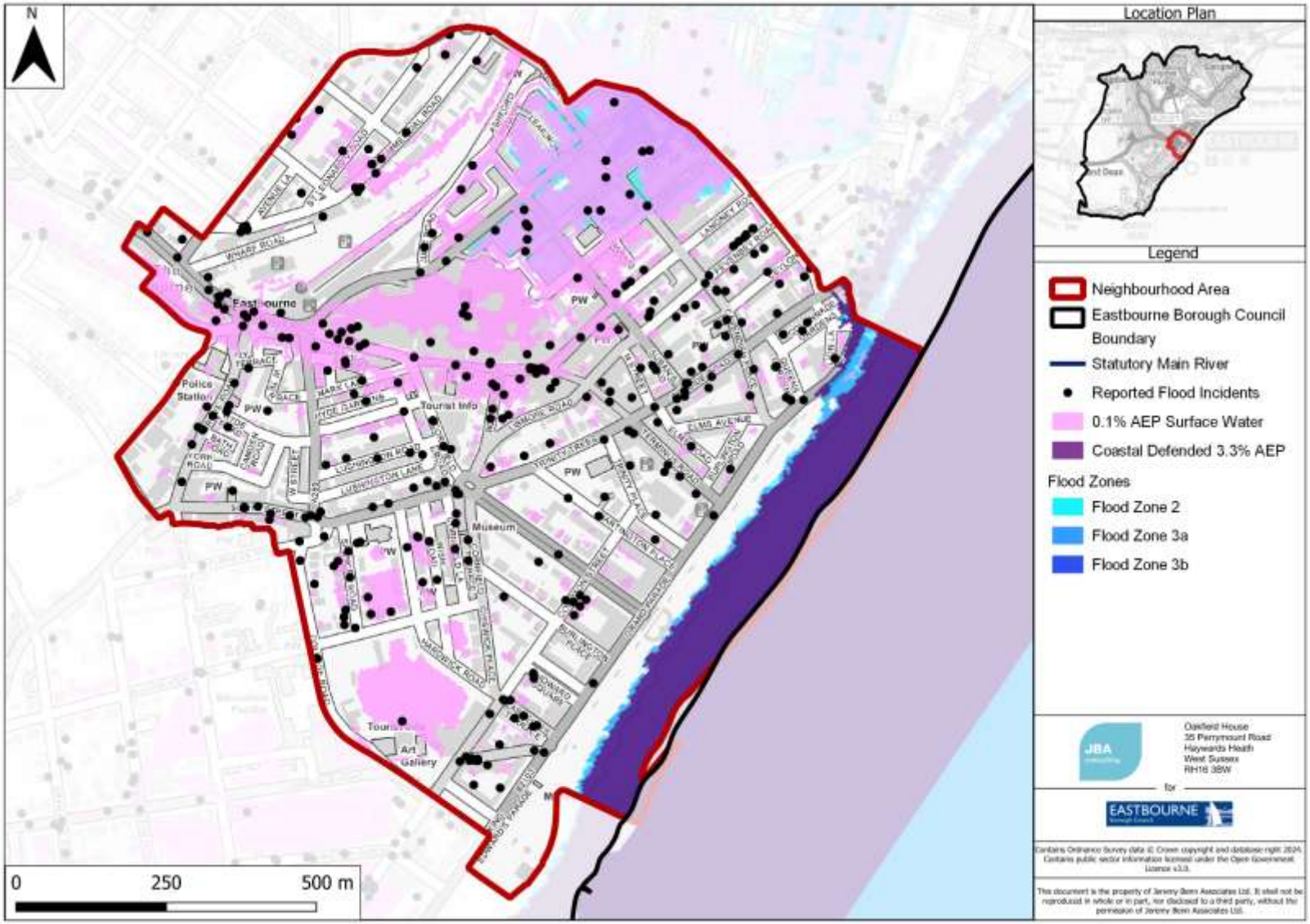


Figure 6-1: Flood risk in the Town Centre neighbourhood area

6.2 Neighbourhood Area 2 – Upperton

The Upperton neighbourhood area is largely residential, with some educational and leisure facilities present. The area consists of limited green spaces and is characterised by steep topography to the west, reaching elevations of 55m AOD. The eastern parts of the neighbourhood area are characterised by lower topography <11m AOD which correspond to areas at greater risk of fluvial and tidal flooding.

6.2.1 Key flood risk issues

Fluvial and Tidal – Fluvial and tidal flood risk in this area is limited to the northeast region. In an upper end CC scenario, there is a 'Danger for most' hazard on Gorringe Road, the access and egress route to the Eastbourne allotments. Danger to most hazard also covers the eastmost section of St Thomas A Becket Catholic Junior School playing field. The culverted Bourne Stream passes through the area to the south. Development may increase the flow of water flowing through this culvert which could increase flood risk.

Surface water – There is a low extent of surface water flooding across the area. 'Danger for some' and 'Danger for all' hazard is confined to a residential region in the southeast region of the site.

Groundwater – Groundwater emergence mapping indicates that groundwater levels are estimated to be between 0.025m and 5m below ground surface, with a lateral trend of a shallowing water table from west to east. High groundwater levels may impact the capacity of surface water drainage systems in this area.

Sewers – Sewer networks are predominantly combined in the town centre and will accommodate both surface water and flow drainage.

6.2.2 Recommendations for development

Source Protection Zones - This area is located within a Groundwater Source Protection Zone. If a site is located within a SPZ, infiltration techniques may not be suitable and should only be used following the granting of necessary permits from the EA. Given the prevalence of SPZ 1, hydrological assessments should be carried out to understand risk to supply source. SuDS should be discussed with authorities at an early stage to discuss constraints and opportunities.

Nitrate Vulnerable Zones – Part of this neighbourhood is located within a Nitrate Vulnerable Zone. If a site is located within a NVZ there should be early engagement with the LLFA and the EA on the proposed SuDS measures and infiltration rate to discuss requirements on the site meeting relevant conditions.

Cumulative Impact Assessment – The catchment is comprised of both low and medium-risk cumulative impact areas. If the site is located within a medium risk area, Cumulative Impact Assessment policy documents must be understood, and the cumulative impact of development should be considered.

Climate resilience and adaption area – Parts of Upperton are located within a Climate Resilience and Adaption Area, therefore development should consider the relevant policies and requirements.

6.2.3 Strategic opportunities

SuDS retrofit – Given the prevalence of flood risk in the St Thomas A Becket school area, the implementation of SuDS techniques would allow for multiple benefits including surface water attenuation, treatment of runoff, biodiversity and amenity. There is currently a 'SuDS for Schools' retrofitting study being undertaken across Eastbourne as part of the Blue Heart project.

Minimising surface water flows – There are limited opportunities to store surface water runoff in this area, however opportunities to take water out of the public sewer network, for example through disconnecting downpipes and increasing water re-use should be explored on a wider scale.

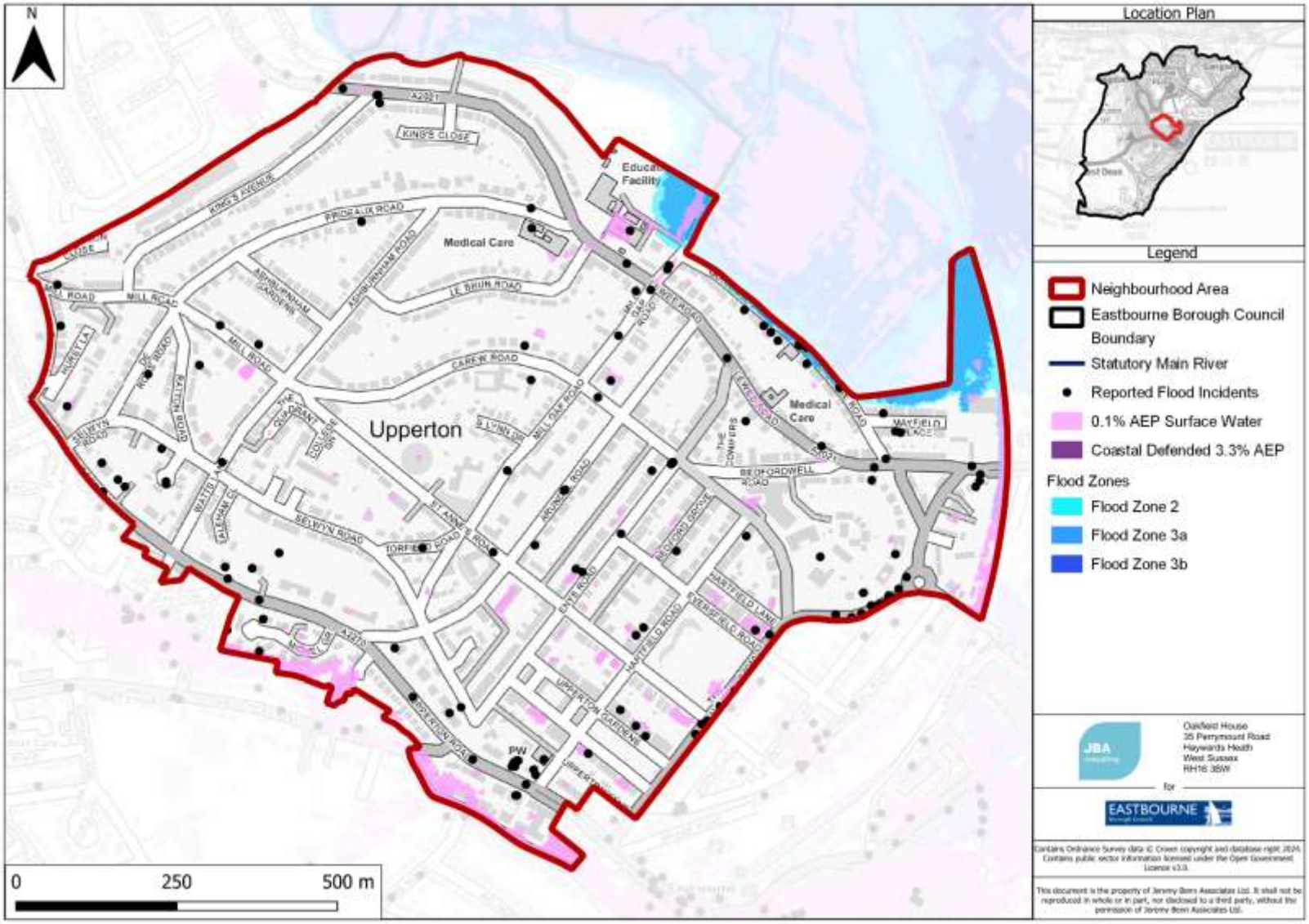


Figure 6-2: Flood risk in the Upperton neighbourhood area

6.3 Neighbourhood Area 3 – Seaside

The ‘Seaside’ neighbourhood area primarily consists of residential developments and green space. The south boundary of the area is characterised by the Eastbourne promenade and a stone beach. The topography is uniform across the site (2m to 6m AOD), reaching greatest elevations of 9.5m AOD on the land neighbouring Royal Parade and the Eastbourne promenade.

6.3.1 Key flood risk issues

Tidal – The area is at risk of widespread tidal flooding, with a ‘Danger to most’ hazard covering upwards of 44ha of land in the 0.5% Upper End CC scenario. Tidal flood risk extends across the Eastbourne promenade, given its proximity to the sea this is expected. The majority of this area is also at risk of flooding during a breach scenario.

This history of flooding from overtopping prior to present defences in this area is 1 in 200 years. However, there may be a small section of the neighbourhood area (around Fisherman’s Green to the east), where the level of defence is less than 1 in 200 years. This is still being investigated.

Fluvial – Fluvial hazard in the 1% AEP event is condensed to the Crumble Sewer channel and Crumble Pond. There is not a widespread extent of fluvial risk. Crumbles Sewer is likely to experience tidal locking as the sea levels rise.

Surface water – Surface water flood risk is condensed to the west region of this neighbourhood area, with a ‘Danger for some and ‘Danger for most’. Surface water flood extents are relatively extensive in these areas. Tidal locking of surface water outfalls is one of the main drivers of surface water flooding in the area. Additionally, surface water and sewer issues have also been recorded along Wartling Road, which is located in the east of the neighbourhood area.

Groundwater – Parts of this area are at moderate risk of groundwater flooding, but this is likely to impact subsurface assets and is mostly consistent with areas already at risk of tidal flooding.

6.3.2 Recommendations for development

Reliance on defences - The area is dependent on the presence of flood defences to reduce flood risk. Development must ensure there is a suitable commitment to maintain these defences throughout the entire lifetime of the proposed development.

Residual flood risk – The area is dependent on the presence of flood defences to mitigate flood risk, proposed development should consider the potential implications for development in the event that these defences were exceeded, breached or overtopped.

Source Protection Zones - This area is located within a Groundwater Source Protection Zone. If a site is located within a SPZ, infiltration techniques may not be suitable and should only be used following the granting of necessary permits from the EA. Given the prevalence

of SPZ 1, hydrological assessments should be carried out to understand risk to supply source. SuDS should be discussed with authorities at an early stage to discuss constraints and opportunities.

Historic Landfill Sites – This area contains a few Historic Landfill Sites. If a site is located within a landfill site, SuDS measures will not be appropriate and infiltration techniques may not be suitable. It is therefore recommended that there is early engagement with the LLFA and the EA on the proposed SuDS measures and infiltration rate to discuss requirements on the site meeting relevant conditions. It is also recommended that contamination assessments are undertaken to understand the risk of developing on a historic landfill site.

Nitrate Vulnerable Zones – Part of the neighbourhood is located within a Nitrate Vulnerable Zone. If a site is located within a NVZ there should be early engagement with the LLFA and the EA on the proposed SuDS measures and infiltration rate to discuss requirements on the site meeting relevant conditions.

Cumulative Impact Assessment – The catchment is located within a medium-risk cumulative impact area. Therefore, Cumulative Impact Assessment policy documents must be understood, and the cumulative impact of development should be considered.

Climate resilience and adaption area – Seaside is located within a Climate Resilience and Adaption Area, therefore development should consider the relevant policies and requirements.

6.3.3 Strategic opportunities

Climate Resilience and Adaptation – This area is entirely within the Climate Resilience and Adaptation Area defined in the Level 1 SFRA. Proposed development should be implemented so as to be safe and resilient to future shocks from all sources and combined events. Development proposals must set out the intended benefit to the wider community and include clear, costed commitments to measures and resilience actions that make development safe for the intended life.

Reliance on defences - The area is dependent on the presence of flood defences to reduce flood risk. Development must ensure there is a suitable commitment to maintain these defences throughout the entire lifetime of the proposed development.

SuDS retrofit - Given the prevalence of flood risk, areas such as the Seaside Recreation Ground to the east of Gilbert Road could be used to retrofit SuDS. SuDS techniques would allow for multiple benefits including surface water attenuation, treatment of runoff, biodiversity and amenity.

Maintenance of local lakes – Crumbles Pond Lake requires regular maintenance to ensure that flow in the culvert watercourse is not over capacitated or backlogged.

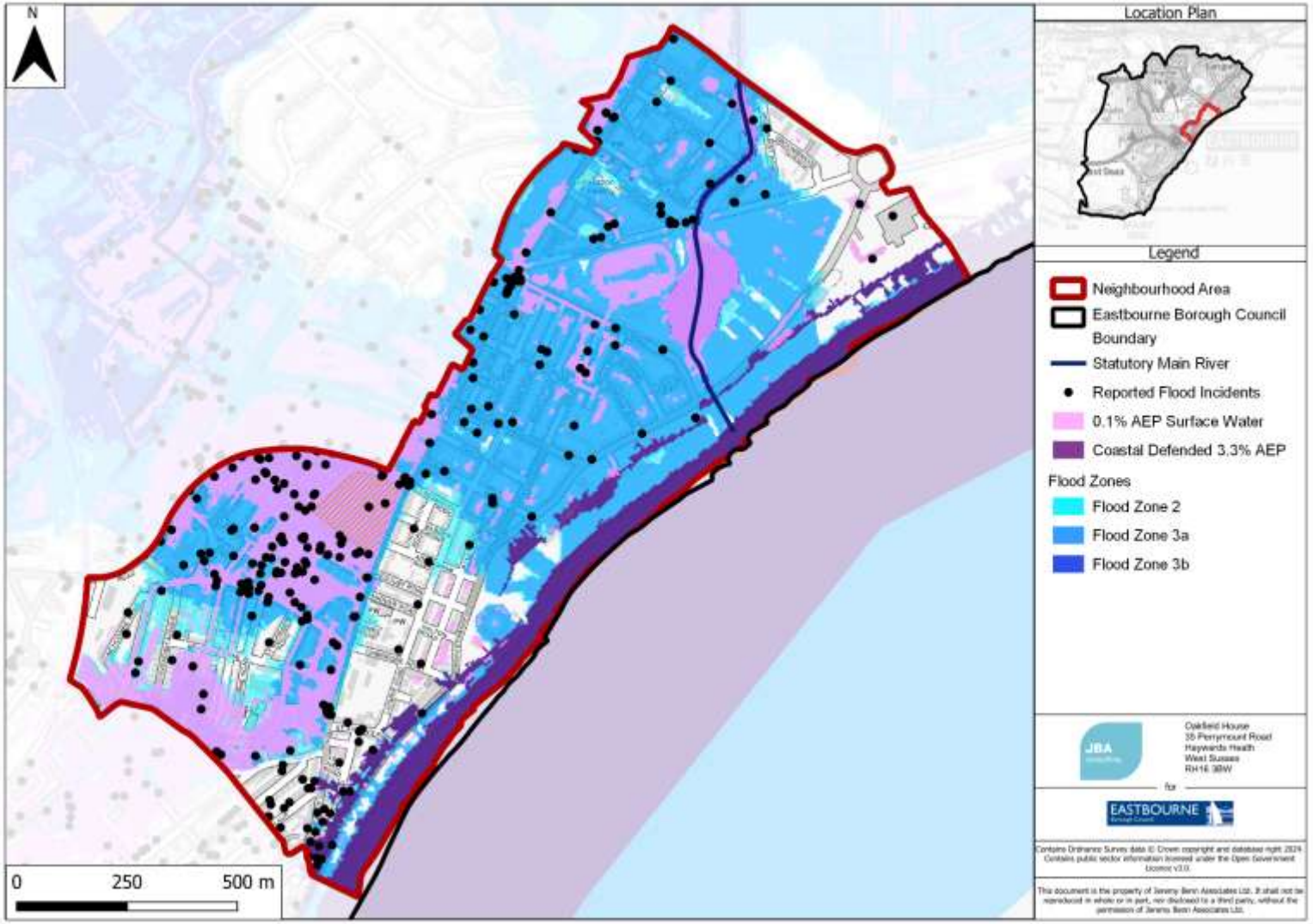


Figure 6-3: Flood risk in the Seaside neighbourhood area

6.4 Neighbourhood Area 4 – Old Town

The Old Town neighbourhood area is bordered by the South Downs to the west. The topography slopes downhill from west to east, from elevations of 96m AOD down to 12m AOD. The area is largely residential development. The area is surrounded by greenspace to the west and is characterised internally by Old Town Recreation Ground, Ocklynge Cemetery and Motcombe Gardens.

6.4.1 Key flood risk issues

Tidal – There is no tidal flood risk in this neighbourhood area.

Fluvial – The source of the Bourne Stream is in Motcombe Gardens which is situated in this area and discharges to the south to the rear of the Goffs. Development may increase the flow of water flowing through this culvert. Additionally, tidal locking may pose a risk to this area.

Surface water – There is a major surface water flow path in the eastern side of the neighbourhood area, primarily on Lawns Avenue and Ocklynge Road, where elevations are approximately 19m AOD. This is consistent with the location of the Bourne Stream in some areas. There is also a significant flow route along Central Avenue.

Land around the Star Inn Pub, to the east of the neighbourhood area, is a particular flooding hotspot, with numerous surface water flooding events recorded previously.

Groundwater – parts of this neighbourhood area may be at risk of groundwater flooding where there are underlying superficial deposits, however the majority of the area is indicated to be at relatively low risk.

6.4.2 Recommendations for development

Source Protection Zones - This area is located within a Groundwater Source Protection Zone. If a site is located within a SPZ, infiltration techniques may not be suitable and should only be used following the granting of necessary permits from the EA. Given the prevalence of SPZ 3, hydrological assessments could be carried out to understand risk to supply source. SuDS should be discussed with authorities at an early stage to discuss constraints and opportunities.

Nitrate Vulnerable Zones – This area is located within a Nitrate Vulnerable Zone. If a site is located within a NVZ there should be early engagement with the LLFA and the EA on the proposed SuDS measures and infiltration rate to discuss requirements on the site meeting relevant conditions.

Cumulative Impact Assessment – The catchment is comprised of both low and medium risk cumulative impact areas. If the site is located within a medium risk area, Cumulative Impact Assessment policy documents must be understood, and the cumulative impact of development should be considered.

6.4.3 Strategic opportunities

SuDS retrofit – Opportunity to create or enhance natural features at Motcombe Gardens, could be explored to reduce the severity of surface water flood risk at Lawns Avenue and Ocklynge Road.

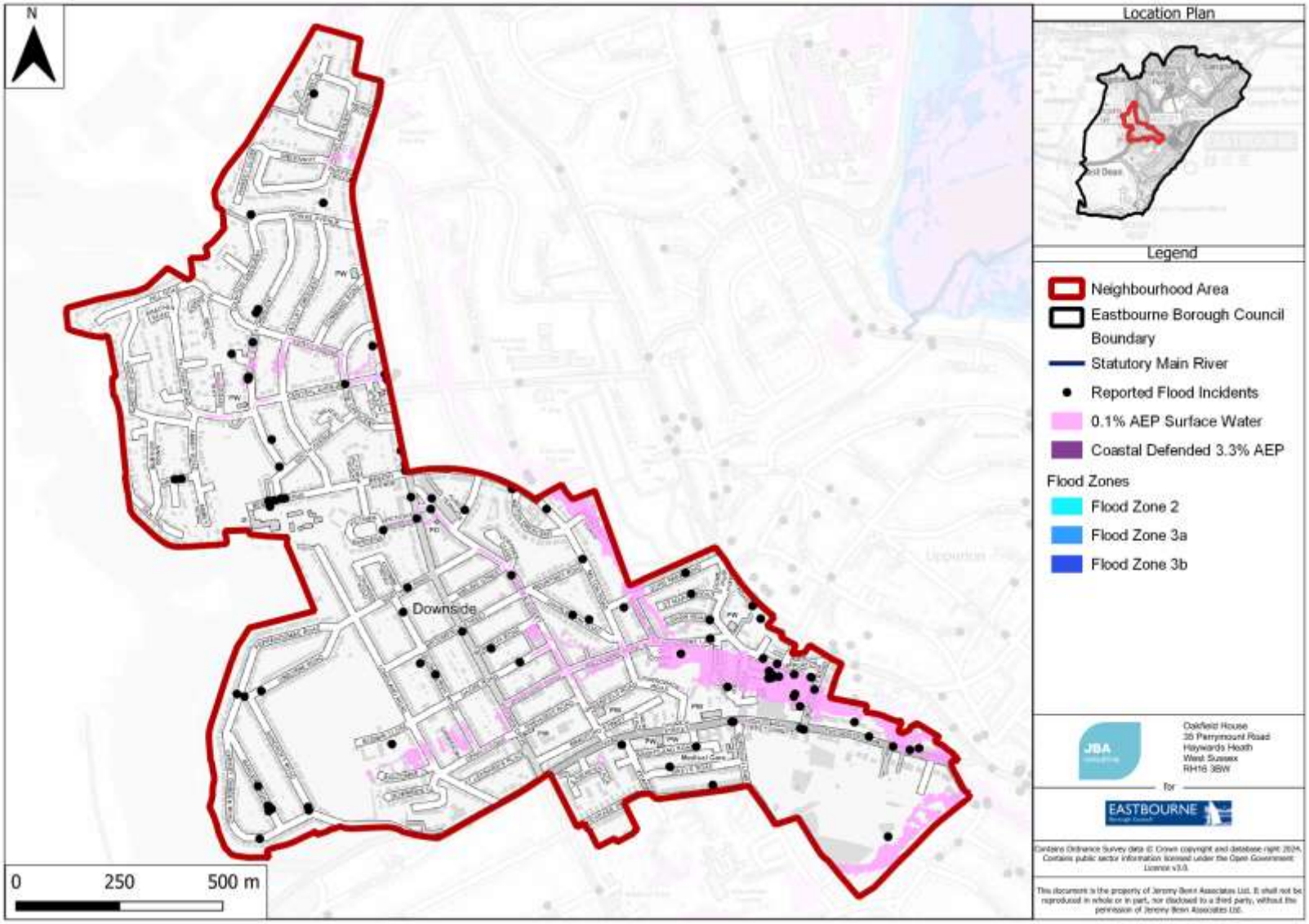


Figure 6-4: Flood risk in the Old Town neighbourhood area

6.5 Neighbourhood Area 5 – Ocklynge & Rodmill

The Ocklynge & Rodmill neighbourhood contains Eastbourne District General Hospital, Eastbourne Sports Park and three schools: Cavendish, Motcombe Community Infant and Ocklynge Junior. Elevations peak along the A2270, 65.76m AOD. This neighbourhood area is located centrally within the Eastbourne catchment. The area is bordered by low lying greenfield land to the east which is within part of the Pevensey and Cuckmere Water Level Management Board's drainage district.

6.5.1 Key flood risk issues

Tidal – The east of the site, around the hospital, is at risk of tidal flooding in the 0.1% upper end climate change scenario. This equates to a 'Danger for most' hazard classification.

Fluvial – Fluvial flood risk is negligible over the majority of this area, only impacting the east side of Cross-Levels Way, where topography is lower.

Surface water – Surface water extent is most extreme at the side of the hospital, to the east. A surface water flow pathway follows the route of Baldwin Avenue and Stuart Avenue, flowing southwards and eastwards. Topography is raised along the A2270 and there is a clear absence of surface water flow along this elevated land.

Groundwater – Groundwater levels across the area vary between >5m and 0.5m below the ground surface. The area at greatest risk is the A2021 running north to south of the site. The majority of the area is considered to be at relatively low risk.

6.5.2 Recommendations for development

Safe access and egress – Development in this area must ensure that safe access and egress is achievable during a flood event for residents and emergency responders, this is particularly important in respect to highly vulnerable development such as the hospital.

PCWLMB requirements – the eastern side of this area borders the Pevensey and Cuckmere Water Level Management Board district (PCWLMB), the PCWLMB may have additional requirements regarding discharge rates (directly or indirectly) into its district. The PCWLMB should be consulted during the detailed design of the site to establish the Board's requirements and determine whether there will be a need to apply for surface water discharge or ordinary watercourse consents.

Source Protection Zones - This area is located within a Groundwater Source Protection Zone. If a site is located within a SPZ, infiltration techniques may not be suitable and should only be used following the granting of necessary permits from the EA. Given the prevalence of SPZ 3, hydrological assessments could be carried out to understand risk to supply source. SuDS should be discussed with authorities at an early stage to discuss constraints and opportunities.

Nitrate Vulnerable Zones – Part of this neighbourhood is located within a Nitrate Vulnerable Zone. If a site is located within a NVZ there should be early engagement with

the LLFA and the EA on the proposed SuDS measures and infiltration rate to discuss requirements on the site meeting relevant conditions.

Cumulative Impact Assessment – The catchment is comprised of both low and medium risk cumulative impact areas. If the site is located within a medium risk area, Cumulative Impact Assessment policy documents must be understood, and the cumulative impact of development should be considered.

Climate resilience and adaption area – Part of Ocklynge & Rodmill is located within a Climate resilience and adaption area, therefore development should consider the relevant policy's and requirements.

6.5.3 Strategic opportunities

SuDS retrofit – Opportunities to retrofit SuDS could be explored to reduce the impact of surface water flow paths at Baldwin Avenue and Glendale Avenue. This could include features such as rain gardens or swales, that could enhance the natural flow pathways whilst providing multiple benefits. Opportunities to retrofit SuDS at Eastbourne General Hospital should be explored further.

Key infrastructure - Eastbourne District General Hospital is located in this neighbourhood area and is critical infrastructure considered to be 'highly vulnerable' development under the PPG. Much of the site is indicated to be at risk of surface water flooding, and much of the drainage likely discharges into the PCWLMB district. Opportunities to improve surface water management and consequently the resilience of the hospital to the impacts of climate change could be explored further.

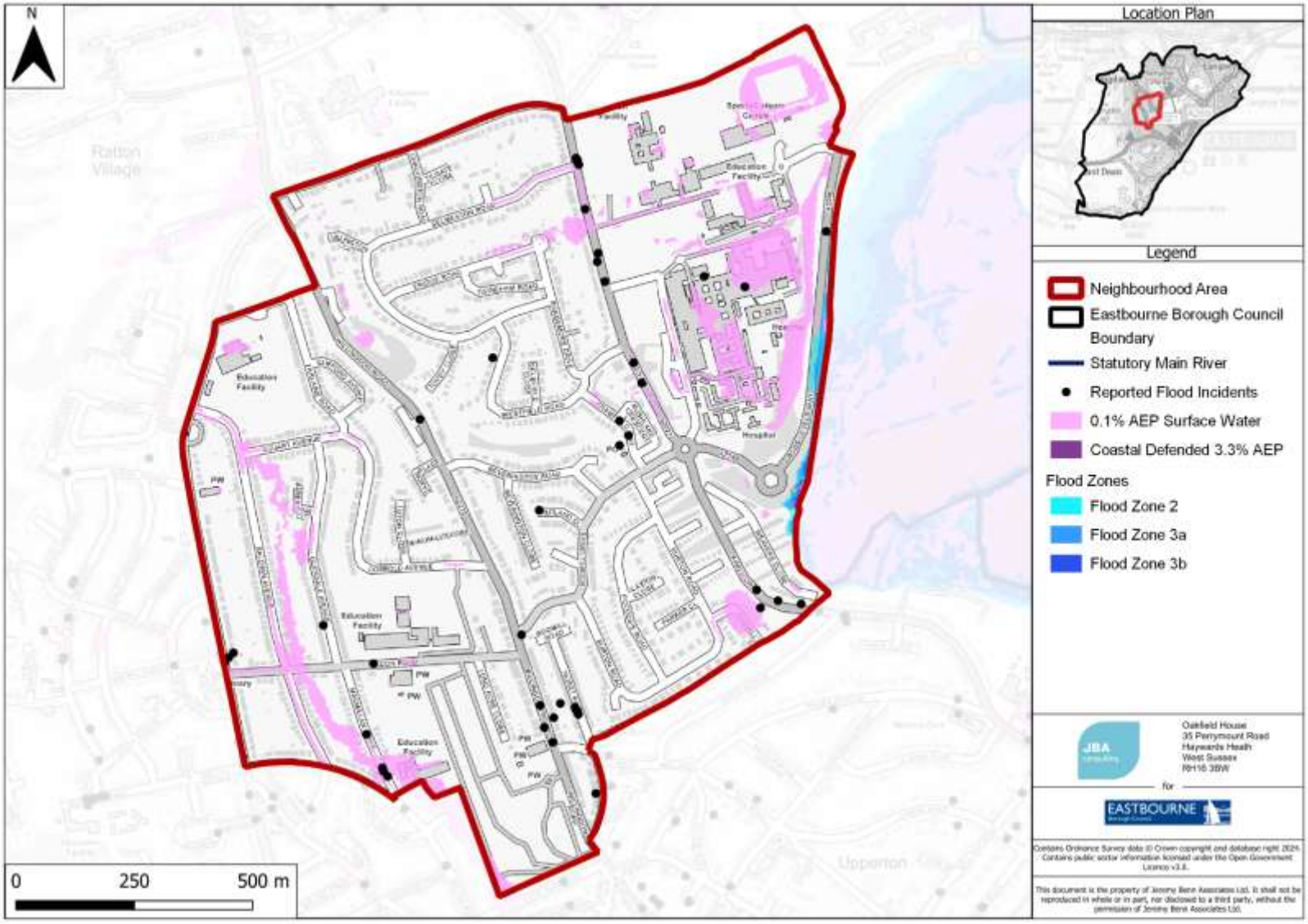


Figure 6-5: Flood risk in the Ocklynge and Rodmill neighbourhood area

6.6 Neighbourhood Area 6 – Roselands & Bridgemere

This neighbourhood is located to the east of the Eastbourne catchment, bordered by the Willingdon Levels to the northwest and residential property and Crumble's Pond to the southeast. The Bourne Stream is culverted under Eastbourne town centre before discharging into the Horsey Sewer. The Horsey Sewer runs directly through the neighbourhood, from north to southwest. An elevated region exists in the northmost of the area, reaching 9.2m AOD. The remainder of the neighbourhood is relatively uniform, lying between 1m and 3.73m AOD.

6.6.1 Key flood risk issues

Tidal – Flood risk from tidal sources extends across the lower lying ground in the Higher Central and Upper End scenarios.

Fluvial – The east and south region of the neighbourhood area is subject to fluvial flood risk, in the areas proximal to the Horsey Sewer. This includes areas that are within Flood Zone 3b. A smaller watercourse network runs parallel to the railway line in the south of the region.

Surface water – Surface water flood risk is only considerable in the 0.1% AEP event. 'Danger for most' hazard is condensed to the southmost part of the area, nearby to Seaside Rec and Playground. There is reason to believe this is sewer overflow, given the unclear flow pathways.

Groundwater – SPZ 1 exists in the south of the neighbourhood area. In the most southern area of the site, groundwater levels are indicated to be very near (within 0.025m) or at the ground surface level. This provides explanation to high surface water rates in the south region on the area.

6.6.2 Recommendations for development

PCWLMB requirements – the eastern side of this area borders the Pevensey and Cuckmere Water Level Management Board district, the PCWLMB may have additional requirements regarding discharge rates (directly or indirectly) into its district. The PCWLMB should be consulted during the detailed design of the site to establish the Board's requirements and determine whether there will be a need to apply for surface water discharge or ordinary watercourse consents.

Reliance on defences - The area is dependent on the presence of fluvial and coastal flood defences to reduce flood risk. Development must ensure there is a suitable commitment to maintain these defences throughout the entire lifetime of the proposed development.

Residual risk – Residual flood risks will need to be considered as part of development in this area, this could include tidal risks such as breach. Other residual risks such as blockage will be important to consider in this area.

Source Protection Zones - This area is located within a Groundwater Source Protection Zone. If a site is located within a SPZ, infiltration techniques may not be suitable and should only be used following the granting of necessary permits from the EA. Given the prevalence of SPZ 1, hydrological assessments should be carried out to understand risk to supply source. SuDS should be discussed with authorities at an early stage to discuss constraints and opportunities.

Historic Landfill Sites – This area contains a Historic Landfill Site and is within an area of contaminated land due to current and former industrial uses. If a site is located within a landfill site, SuDS measures will not be appropriate and infiltration techniques may not be suitable. It is therefore recommended that there is early engagement with the LLFA and the EA on the proposed SuDS measures and infiltration rate to discuss requirements on the site meeting relevant conditions. It is also recommended that contamination assessments are undertaken to understand the risk of developing on a historic landfill site.

Cumulative Impact Assessment – The catchment is located within a medium-risk cumulative impact area. If the site is located within a medium risk area, Cumulative Impact Assessment policy documents must be understood, and the cumulative impact of development should be considered.

Climate resilience and adaption area – The area is located within a Climate resilience and adaption area, therefore development should consider the relevant policy's and requirements.

6.6.3 Strategic opportunities

Climate Resilience and Adaptation – This area is partially within the Climate Resilience and Adaptation Area defined in the Level 1 SFRA. Proposed development should be implemented so as to be safe and resilient to future shocks from all sources and combined events. Development proposals must set out the intended benefit to the wider community and include clear, costed commitments to measures and resilience actions that make development safe for the intended life.

Historic flooding – It is understood that ESCC has undertaken a Section 19 investigation to properties in the vicinity of Astaire Avenue and Hunloke Avenue. The recommendations of this report, notably concerning ownership of the asset identified should be implemented.

Floodwater storage – A series of schools and sports centres provide potential space for underground runoff storage during peak flows, including Stafford Junior School and Roselands Infants School.River restoration opportunities – consideration to removing right angles in the Horsey Sewer or deculverting the Bourne Stream should be considered in the interests of managing flood risk.

SuDS retrofit – Given the prevalence of flood risk in the south of neighbourhood area, the implementation of SuDS techniques would allow for multiple benefits including surface water attenuation, treatment of runoff, biodiversity and amenity.

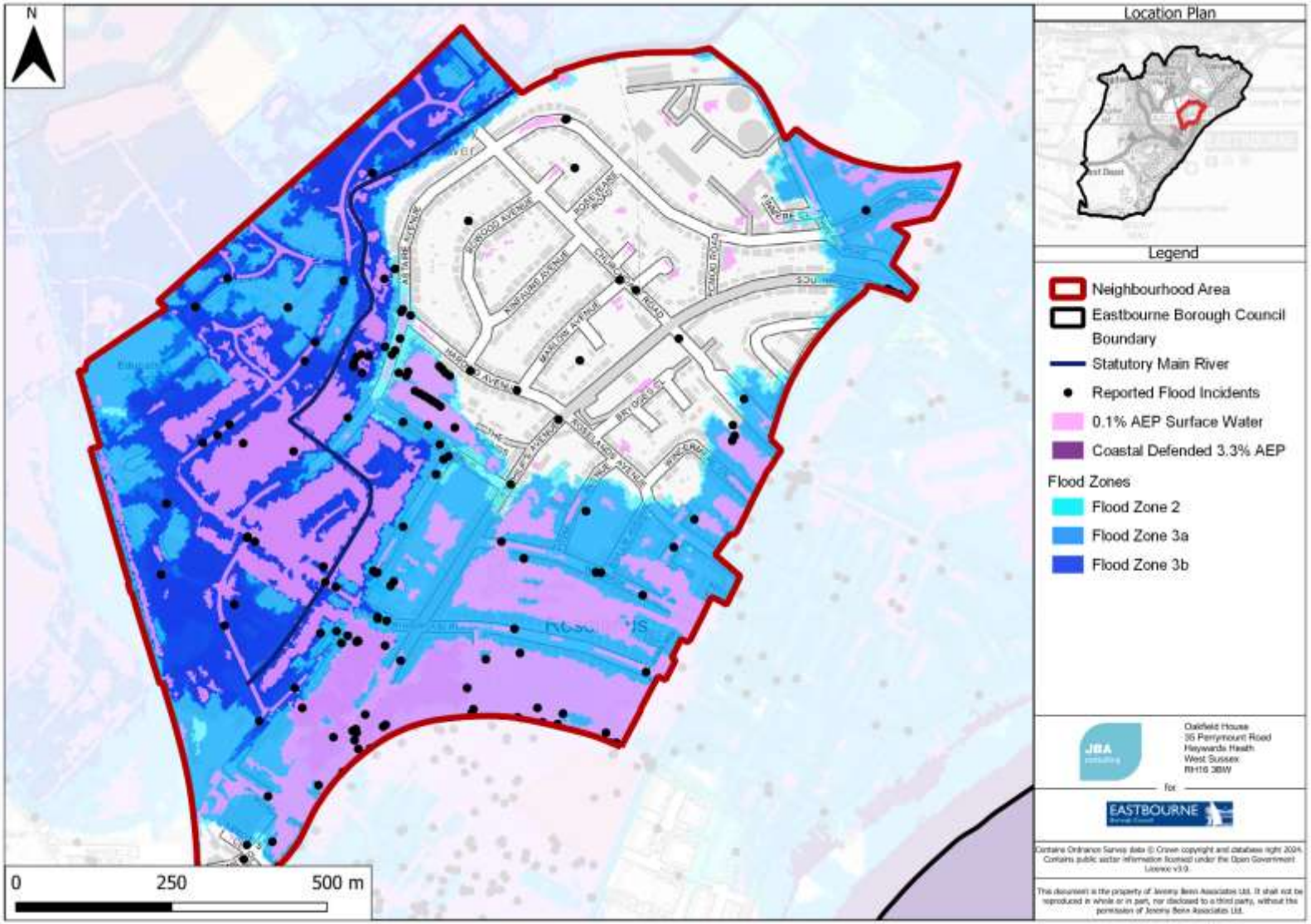


Figure 6-6: Flood risk in the Roselands and Bridgemere neighbourhood area

6.7 Neighbourhood Area 7 – Hampden Park

Hampden Park neighbourhood area is in the northwest of the Eastbourne catchment. The neighbourhood area contains a series of industrial, commercial, residential, recreational and transportation land use. The railway line cuts through the centre of the neighbourhood, travelling north-south. There is a general downwards slope from west to east, from 27.63m AOD to 1.39m AOD. The south and east regions are situated in flood zones 2, 3a and 3b, whereas the north is situated in Flood Zone 1.

6.7.1 Key flood risk issues

Tidal – Tidal extents concern the southeast region, with a significant proportion of the neighbourhood area affected in the Upper End climate change scenario.

Fluvial – Fluvial flood risk concerns the south region, following the Brickfield main river and the Decoy Stream, including subsequent small water networks extending off this river.

Surface water – Surface water hazard is 'Danger for most' from Decoy Drive down to St Wilfrid's Hospice in the south of the area and across the residential area by Holly Park in the north of the neighbourhood area.

Groundwater – This zone is deemed as having a negligible risk from groundwater flooding due to the nature of the local geological deposits. The site is not located in a SPZ.

Flood risk follows the general trend of water networks in the neighbourhood area.

6.7.2 Recommendations for development

Reliance on defences - The area is dependent on the presence of fluvial and coastal flood defences to reduce flood risk. Development must ensure there is a suitable commitment to maintain these defences throughout the entire lifetime of the proposed development.

Residual flood risk – the area is dependent on the presence of fluvial and coastal flood defences to mitigate flood risk, proposed development should consider the potential implications for development in the event that these defences were exceeded, breached or overtopped.

PCWLMB requirements – the eastern side of this area borders the Pevensey and Cuckmere Water Level Management Board district, the PCWLMB may have additional requirements regarding discharge rates (directly or indirectly) into its district. The PCWLMB should be consulted during the detailed design of the site to establish the Board's requirements and determine whether there will be a need to apply for surface water discharge or ordinary watercourse consents.

Historic Landfill Sites – This area contains a number of Historic Landfill Sites and is within an area of contaminated land due to current and former industrial uses. If a site is located within a landfill site, infiltration techniques may not be suitable. It is therefore recommended that there is early engagement with the LLFA and the EA on the proposed SuDS measures and infiltration rate to discuss requirements on the site meeting relevant conditions. It is

also recommended that contamination assessments are undertaken to understand the risk of developing on a historic landfill site.

Cumulative Impact Assessment – The catchment is located within a medium-risk cumulative impact area. If the site is located within a medium risk area, Cumulative Impact Assessment policy documents must be understood, and the cumulative impact of development should be considered.

Climate resilience and adaption area – More than half of the area is located within a Climate resilience and adaption area, therefore development should consider the relevant policies and requirements.

6.7.3 Strategic opportunities

Climate Resilience and Adaptation – This majority of this area is within the Climate Resilience and Adaptation Area defined in the Level 1 SFRA. Proposed development should be implemented so as to be safe and resilient to future shocks from all sources and combined events. Development proposals must set out the intended benefit to the wider community and include clear, costed commitments to measures and resilience actions that make development safe for the intended life.

SuDS retrofit – Opportunities to retrofit SuDS, could be explored to reduce the impact of surface water flood risk. This could include features to store or convey surface water flows whilst providing multiple benefits. The SuDS for Schools initiative aims to implement SuDS features to schools within the district. It is evident SuDS have already been installed at the Parkland Infant School as part of Phase 1 initiative.

Maintenance of local lakes – Hampden Park Lake requires regular maintenance to ensure that flow in the culvert watercourse is not over capacitated or backlogged.

Natural Flood Management (NFM)– Opportunities for Natural Flood Management / Nature Based Solutions could be explored further, particularly to the south west of the neighbourhood area towards Hampden Park Woods.

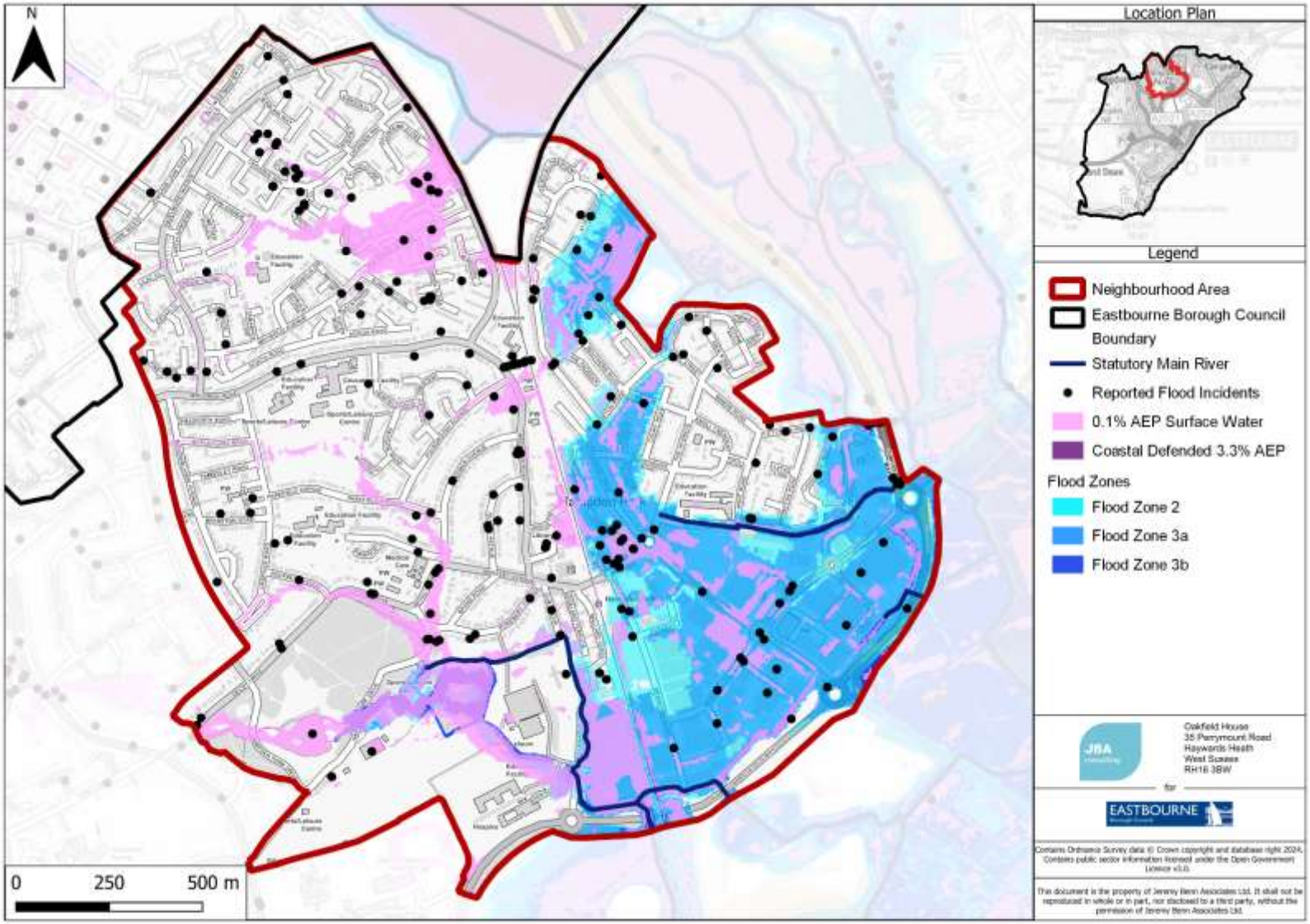


Figure 6-7: Flood risk in the Hampden Park neighbourhood area

6.8 Neighbourhood Area 8 – Langney

Langney is situated in the northeast of the Eastbourne catchment. Land is elevated in the north region, reaching 20.9m AOD, following the general location of the Langney Rise and Hide Hollow (A2101). Elevations outside of this higher topography is between 1.3m and 8.47mAOD. The Levels at East Langney are located just east of the Langney neighbourhood area.

6.8.1 Key flood risk issues

Tidal – Tidal flood risk is present across the areas of lower lying topography in this neighbourhood area, from looking at a 0.5% AEP 2125 event.

Fluvial – The Langney sewer runs through the south region of the site. This river poses a 'Danger for most' hazard, which is confined to the channel and the channel of the tributary.

Surface water – Surface water flood risk is an issue in the 1%, 0.5% and 0.1% scenarios, restricted to the areas of low topography to the east and the west. There are a series of residential properties and educational facilities situated within these areas.

Groundwater – The southeast area of the site has groundwater levels up to 0.5m below surface level, in places being at or within 0.025m of surface level.

6.8.2 Recommendations for development

Reliance on defences - The area is dependent on the presence of fluvial and coastal flood defences to reduce flood risk. Development must ensure there is a suitable commitment to maintain these defences throughout the entire lifetime of the proposed development.

Residual flood risk – the area is dependent on the presence of flood defences to mitigate flood risk, proposed development should consider the potential implications for development in the event that these defences were exceeded, breached or overtopped.

PCWLMB requirements – the eastern side of this area borders the Pevensey and Cuckmere Water Level Management Board district, the PCWLMB may have additional requirements regarding discharge rates (directly or indirectly) into its district. The PCWLMB should be consulted during the detailed design of the site to establish the Board's requirements and determine whether there will be a need to apply for surface water discharge or ordinary watercourse consents.

Historic Landfill Sites – This area contains a number of Historic Landfill Sites. If a site is located within a landfill site, infiltration techniques may not be suitable. It is therefore recommended that there is early engagement with the LLFA and the EA on the proposed SuDS measures and infiltration rate to discuss requirements on the site meeting relevant conditions. It is also recommended that contamination assessments are undertaken to understand the risk of developing on a historic landfill site.

Cumulative Impact Assessment – The catchment is located within a medium-risk cumulative impact area. If the site is located within a medium risk area, Cumulative Impact

Assessment policy documents must be understood, and the cumulative impact of development should be considered.

Climate resilience and adaption area – The majority of the area is located within a Climate resilience and adaption area, therefore development should consider the relevant policy's and requirements.

6.8.3 Strategic opportunities

Flood Attenuation – Langney shopping centre car park could provide underground storage capacity for the purposes of flood attenuation. This could mitigate residual risk of outdated and low capacity drainage systems across the Langney area.

Retention lakes – Lakes and watercourses across the West Langney Levels were excavated to provide retention areas for excess water. By regularly maintaining these, they will be able to function to their full capacity and provide the most effective water storage, as well as protecting downstream areas.

SuDS retrofit – Given the prevalence of flood risk in the east of neighbourhood area, the implementation of SuDS techniques would allow for multiple benefits including surface water attenuation, treatment of runoff, biodiversity and amenity.

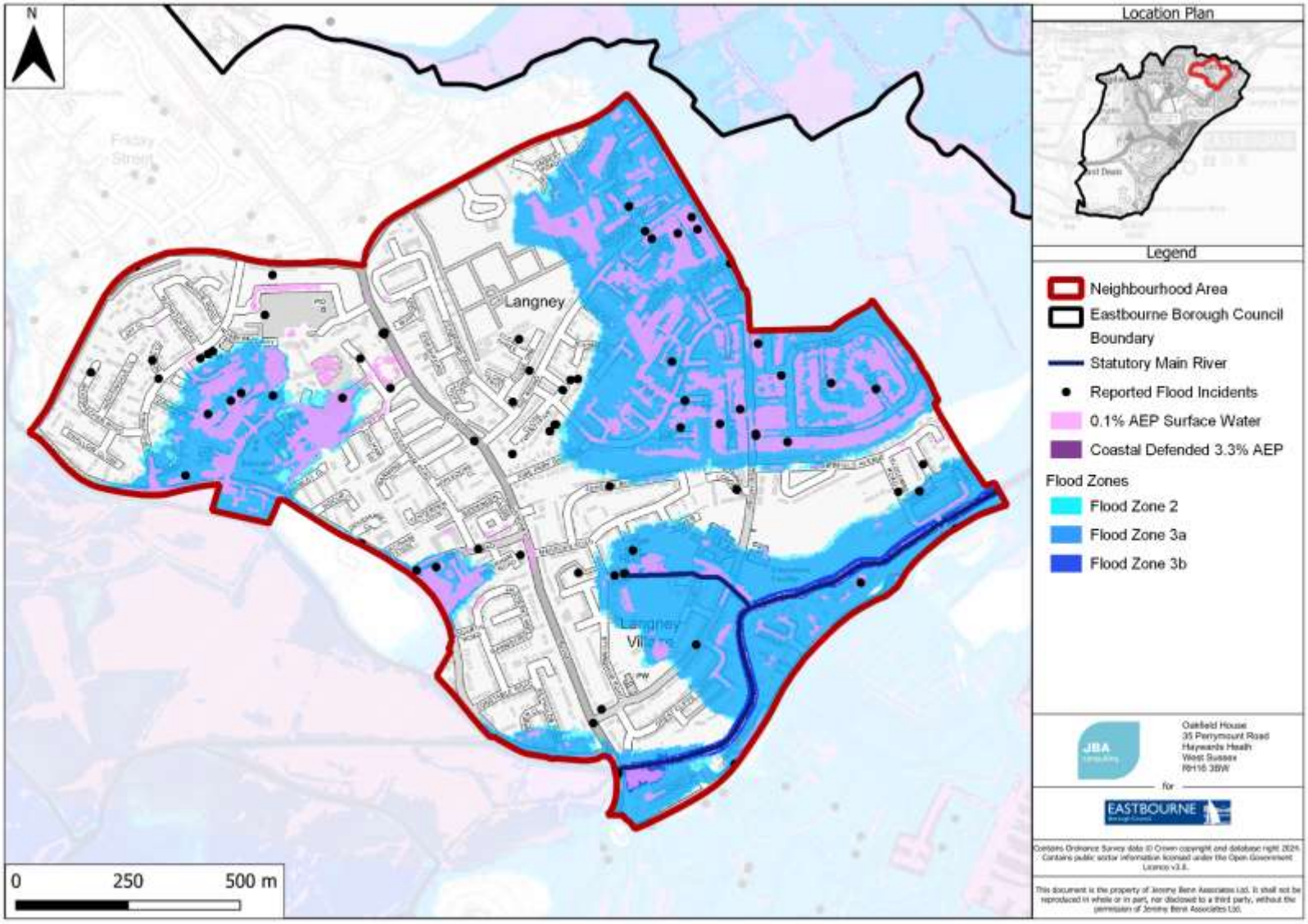


Figure 6-8: Flood risk in the Langney neighbourhood area

6.9 Neighbourhood Area 9 – Shinewater & North Langney

Shinewater and North Langney is a residential area in the north of the Eastbourne catchment. Surfaces are generally impermeable, with some recreational green spaces being dispersed among properties. Geology across the area is Wealden Group: mudstone, siltstone and sandstone. Geology of the South Downs extends into the neighbourhood area, with elevated land down the central and southern regions of the site, reaching 22.75m AOD.

6.9.1 Key flood risk issues

Tidal – To some extent, tidal flood risk is a concern. This is due to the prevalence of the Willingdon and West Langney Sewer which would be subject to water level rise in line with climate change predictions.

Fluvial – Willingdon and West Langney Sewer runs along the neighbourhood area border, flowing into a series of channels and ponds downstream. Existing development is on higher ground, however capacity in this watercourse is limited and could lead to flooding if the watercourse is not sufficiently managed.

Surface water – The topography of the neighbourhood coincided with the wide extents of impermeable land leads to surface water flows across the area. Primarily, the surface water accumulates in the low lying topography in the west region of the area, which has led to a series of past flood events in the area.

Groundwater – Bedrock geology consists of Wealden Group mudstone, siltstone and sandstone, which is subject to variable levels of permeability and may be slow draining. Groundwater levels do not pose a risk in this neighbourhood area.

6.9.2 Recommendations for development

Reliance on defences - The area is dependent on the presence of coastal flood defences to reduce flood risk. Development must ensure there is a suitable commitment to maintain these defences throughout the entire lifetime of the proposed development.

Residual flood risk – the area is dependent on the presence of flood defences to mitigate flood risk, proposed development should consider the potential implications for development in the event that these defences were exceeded, breached or overtopped.

PCWLMB requirements – the eastern side of this area borders the Pevensey and Cuckmere Water Level Management Board district, the PCWLMB may have additional requirements regarding discharge rates (directly or indirectly) into its district. The PCWLMB should be consulted during the detailed design of the site to establish the Board's requirements and determine whether there will be a need to apply for surface water discharge or ordinary watercourse consents.

Historic Landfill Sites – This area contains a Historic Landfill Site. If a site is located within a landfill site, infiltration techniques may not be suitable. It is therefore recommended that

there is early engagement with the LLFA and the EA on the proposed SuDS measures and infiltration rate to discuss requirements on the site meeting relevant conditions. It is also recommended that contamination assessments are undertaken to understand the risk of developing on a historic landfill site.

Cumulative Impact Assessment – The catchment is located within a medium-risk cumulative impact area. If the site is located within a medium risk area, Cumulative Impact Assessment policy documents must be understood, and the cumulative impact of development should be considered.

Climate resilience and adaption area – Part of the area is located within a Climate resilience and adaption area, therefore development should consider the relevant policy's and requirements.

6.9.3 Strategic opportunities

Climate Resilience and Adaptation – parts of this area are within the Climate Resilience and Adaptation Area defined in the Level 1 SFRA. Proposed development should be implemented so as to be safe and resilient to future shocks from all sources and combined events. Development proposals must set out the intended benefit to the wider community and include clear, costed commitments to measures and resilience actions that make

SuDS retrofit – Opportunities to retrofit SuDS, could be explored to reduce the impact of surface water flood risk. The SuDS for Schools initiative aims to implement SuDS features to schools within the district.

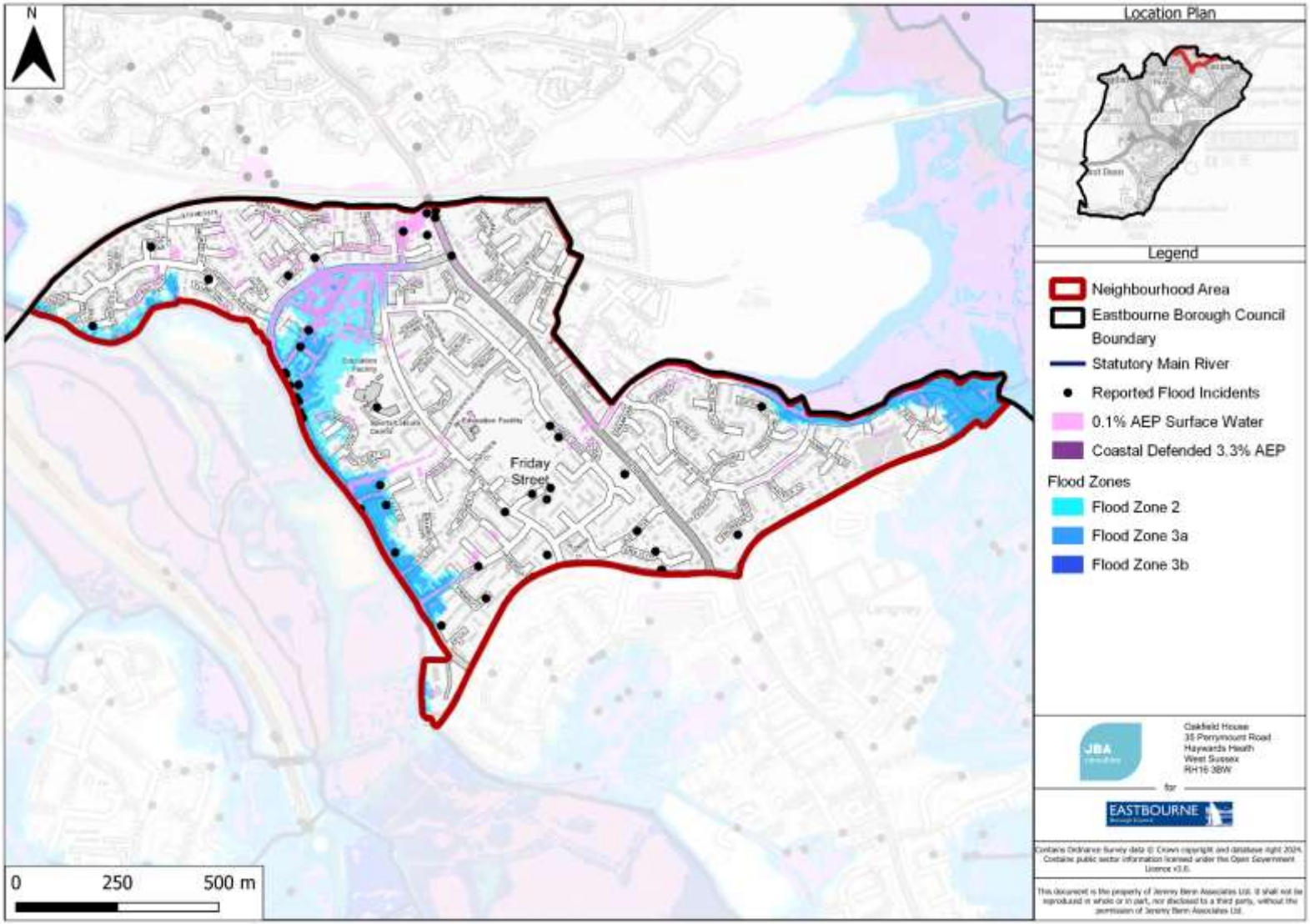


Figure 6-9: Flood risk in the Shinewater & North Langney neighbourhood area

6.10 Neighbourhood Area 10 – Summerdown & Saffrons

There is a downwards slope from west to east, with elevations of approximately 83.4mAOD in the west, to approximately 9.5mAOD in the east. The neighbourhood is bordered by the South Downs to the west, the Royal Eastbourne Golf Club to the south and by residential development to the north. Geology in the region is characterised by the South Downs Sussex White Chalk and Lower Chalk in part and River Terrace superficial deposits.

6.10.1 Key flood risk issues

Tidal – Tidal flood risk in this area is negligible, given the elevated topography across the neighbourhood.

Fluvial – Fluvial flood risk in this area is negligible, given the elevated topography across the neighbourhood.

Surface water – The area experiences surface runoff from west to east, based on the South Downs topography. Given the majority of green space, which is south of the area, there is limited hazard posed by surface runoff.

Groundwater – The neighbourhood is situated partially in an SPZ 2 and 3. Groundwater levels are more than 5m below ground surface to the west (South Downs) but between 0.5m and 5m below ground surface to the east.

Flow pathways follow the natural topography of the land.

6.10.2 Recommendations for development

PCWLMB requirements – The eastern side of this area borders the Pevensey and Cuckmere Water Level Management Board district, the PCWLMB may have additional requirements regarding discharge rates (directly or indirectly) into its district. The PCWLMB should be consulted during the detailed design of the site to establish the Board's requirements and determine whether there will be a need to apply for surface water discharge or ordinary watercourse consents.

Source Protection Zones - This area is located within a Groundwater Source Protection Zone. If a site is located within a SPZ, infiltration techniques may not be suitable and should only be used following the granting of necessary permits from the EA. Given the prevalence within SPZ 2 and 3, hydrological assessments could be carried out to understand risk to supply source. SuDS should be discussed with authorities at an early stage to discuss constraints and opportunities.

Nitrate Vulnerable Zones – This area is located within a Nitrate Vulnerable Zone. If a site is located within a NVZ there should be early engagement with the LLFA and the EA on the proposed SuDS measures and infiltration rate to discuss requirements on the site meeting relevant conditions.

6.10.3 Strategic opportunities

Nature Based Solutions – Use of NBS should be explored further, particularly in areas to the west of this neighbourhood area in the South Downs National Park as this has the potential to reduce surface water flood risk.

Maintenance of local lakes – The Eastbourne Lakes require regular maintenance to ensure that flow in the culvert watercourse is not over capacitated or backlogged.

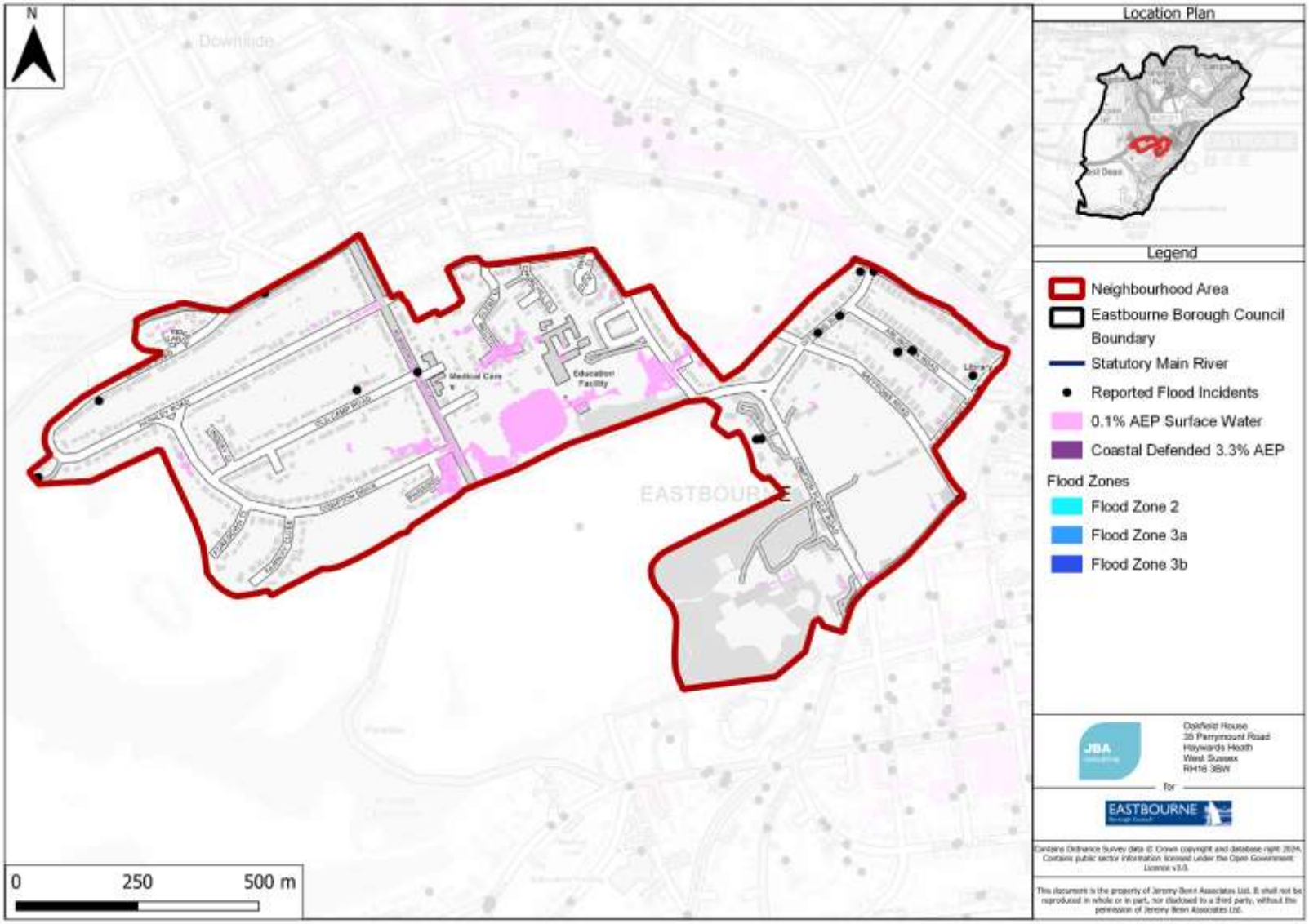


Figure 6-10: Flood risk in the Summerdown & Saffrons neighbourhood area

6.11 Neighbourhood Area 11 – Meads

This neighbourhood area is located on the coastline and adjacent to the National Park. This stretch of coastline is an SSSI, characterised by wooden groynes and the Eastbourne Promenade. The Royal Eastbourne Golf Club is situated to the north of the neighbourhood area. Land use in the area is mainly residential, with some recreational and residential functionalities. The topography is characterised by the South Downs, following a downwards slope eastwards.

6.11.1 Key flood risk issues

Tidal – The area is situated within Flood Zone 1 and is not susceptible to tidal flooding.

Fluvial – The area is not subject to flood risk as there are no proximal rivers and the land is more elevated than other areas in the catchment.

Surface water – Surface water flood risk is greatest in the east, indicating that surface water flows in line with the gradient of the land, following the pathway of impermeable roads and surfaces.

Groundwater – The west region of the neighbourhood is in SPZs 1, 2 and 3. The northeast boundary is in SPZ 2 and 3. Groundwater is deeper to the west (greater than 5m), shallowing to 0.5 to 5m below ground surface in the east. Across the coastline, groundwater is within 0.025m or at the ground surface.

6.11.2 Recommendations for development

Reliance on defences - The area is dependent on the presence of flood defences to reduce flood risk. Development must ensure there is a suitable commitment to maintain these defences throughout the entire lifetime of the proposed development.

PCWLMB requirements – the eastern side of this area borders the Pevensey and Cuckmere Water Level Management Board district, the PCWLMB may have additional requirements regarding discharge rates (directly or indirectly) into its district. The PCWLMB should be consulted during the detailed design of the site to establish the Board's requirements and determine whether there will be a need to apply for surface water discharge or ordinary watercourse consents.

Source Protection Zones - This area is located within a Groundwater Source Protection Zone. If a site is located within a SPZ, infiltration techniques may not be suitable and should only be used following the granting of necessary permits from the EA. Given the prevalence of SPZ 2, hydrological assessments should be carried out to understand risk to supply source. SuDS should be discussed with authorities at an early stage to discuss constraints and opportunities.

Nitrate Vulnerable Zones – This area is located within a Nitrate Vulnerable Zone. If a site is located within a NVZ there should be early engagement with the LLFA and the EA on the

proposed SuDS measures and infiltration rate to discuss requirements on the site meeting relevant conditions.

Climate resilience and adaption area – Part of the area is located within a Climate Resilience and Adaption Area, therefore development should consider the relevant policies and requirements.

6.11.3 Strategic opportunities

Climate Resilience and Adaptation – parts of this area are within the Climate Resilience and Adaptation Area defined in the Level 1 SFRA. Proposed development should be implemented so as to be safe and resilient to future shocks from all sources and combined events. Development proposals must set out the intended benefit to the wider community and include clear, costed commitments to measures and resilience actions that make development safe for the intended life.

Flood attenuation - Excess water storage containers could be used and located under the Eastbourne volleyball club, which is situated west of Gaudick Road in the central part of the neighbourhood area; this could control the excess surface water flow across this area during storm events. Retention ponds could be constructed in green spaces, to provide storage for excess water. It is recommended that tidal locking is considered given the proximity to the sea.

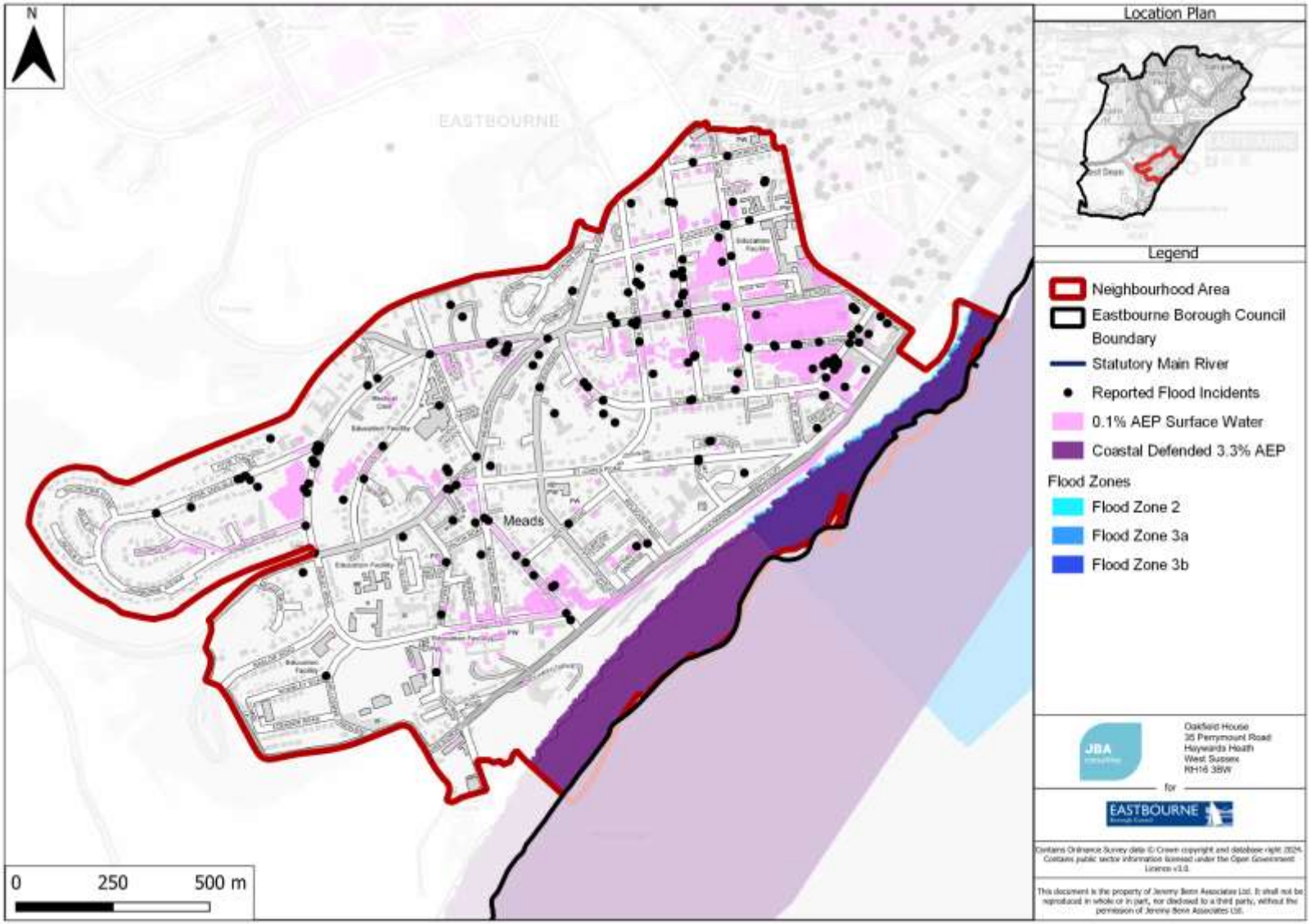


Figure 6-11: Flood risk in the Meads neighbourhood area

6.12 Neighbourhood Area 12 – Ratton & Willingdon Village

This neighbourhood area extends across Ratton Village and incorporates some of Willingdon Village. To the west of the site is Willingdon Down SSSI, a steep sloping chalk grassland. Bedrock geology in the area is partially characterised by chalk, which is permeable and allows percolation of surface water. The area is characterised by sloping topography from west to east.

6.12.1 Key flood risk issues

Tidal – Tidal flood risk is not an area of concern in this area, given the topography and the neighbourhood area's distance from the coastline.

Fluvial – Fluvial flood risk is not an area of concern in this area, given the topography and the absence of significant river networks.

Surface water – Surface water flow is shown to follow the topography of the land, flowing laterally from west to east, following pathways defined by impermeable roads and surfaces. There is heightened hazard from surface water surrounding the underground, culverted river networks that flows alongside Upper King's Drive. Surface water hazard is moderate due to flooding extents along Willingdon Roundabout, which causes significant disruption to the A2021, leading to Eastbourne District General Hospital. However, infiltration rates would be high in the area given the absence of superficial geology, and the presence of chalk bedrock geology and freely draining lime-rich loamy soils.

Groundwater – The west portion of the area has groundwater at least 5m below ground surface, to the south a region of 0.35ha has groundwater levels 0.5m to 5m below ground surface. There is no known risk from groundwater levels to the east portion of the neighbourhood. The area is not situated in any SPZs.

Sewers – Reports of flood incidents on the Willingdon Roundabout are suspected to be linked to poor drainage networks. The incidents align closely with the culvert, indicating issues with poor drainage systems in the neighbourhood.

6.12.2 Recommendations for development

PCWLMB requirements – the eastern side of this area borders the Pevensey and Cuckmere Water Level Management Board district, the PCWLMB may have additional requirements regarding discharge rates (directly or indirectly) into its district. The PCWLMB should be consulted during the detailed design of the site to establish the Board's requirements and determine whether there will be a need to apply for surface water discharge or ordinary watercourse consents.

Cumulative Impact Assessment – The catchment is located within a medium-risk cumulative impact area. If the site is located within a medium risk area, Cumulative Impact Assessment policy documents must be understood, and the cumulative impact of development should be considered.

6.12.3 Strategic opportunities

Improvement of drainage systems – Ensure that drainage systems are designed and improved to provide capacity for local housing, further development and the excess water during storm events.

Flood attenuation – Excess water storage containers could be used and situated under the Polegate Grasshoppers Football Club (located north of Westlords); this could control the excess surface water flow across this area during storm events.

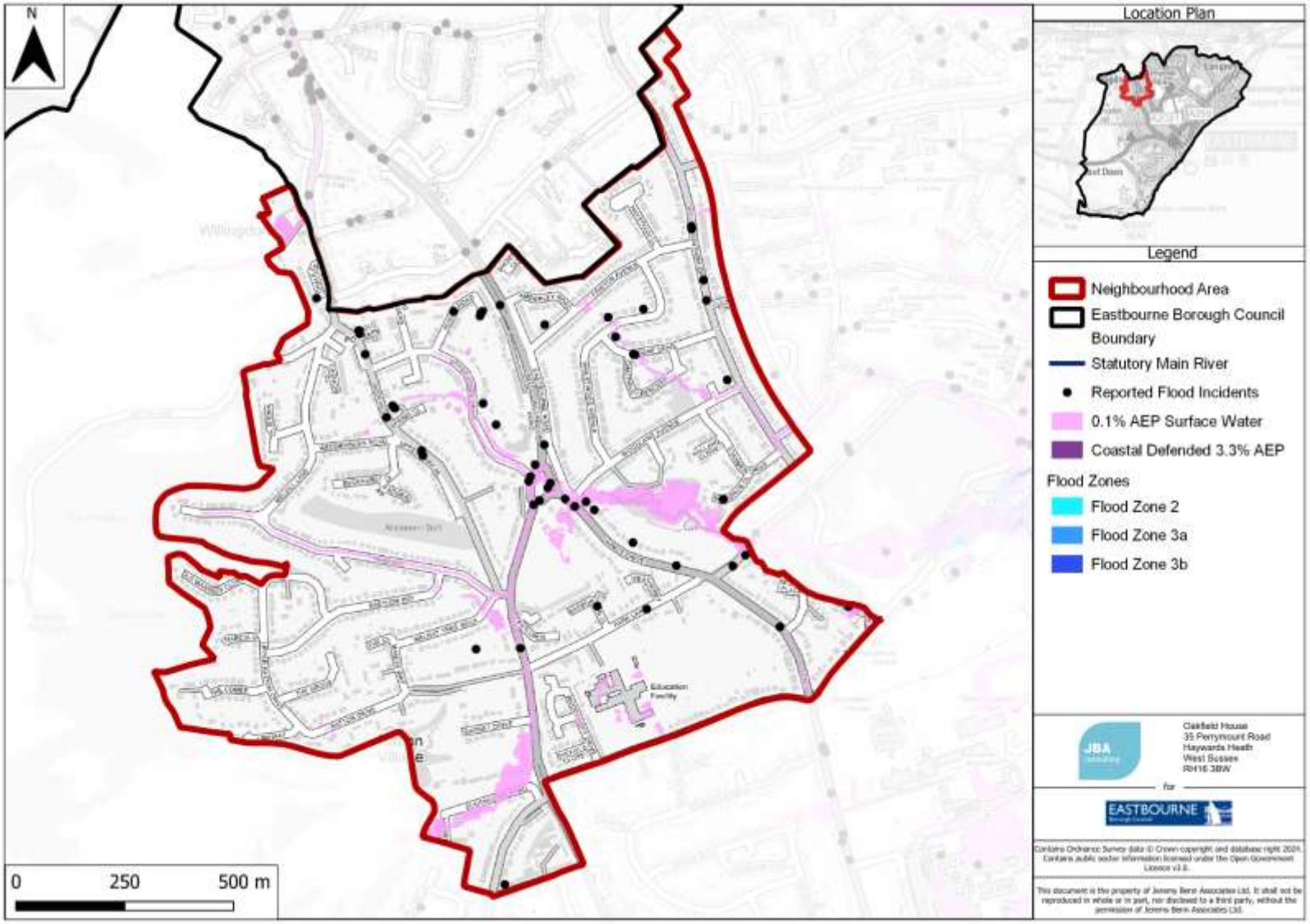


Figure 6-12: Flood risk in the Ratton & Willingdon Village neighbourhood area

6.13 Neighbourhood Area 13 – St Anthony's & Langney Point

This neighbourhood area is situated on the coastline south of West Langney Levels. The land use in the west region of the area is industrial and commercial, whereas the east is primarily residential. The Crumbles and Horsey Sewers both run through the west region of the site. Sovereign Park, extending across the coastline in this neighbourhood, is recognised as a Local Wildlife Site. Flood incident reports have highlighted the insufficient capacity and functionality of drainage systems in the area. The site is primarily in Flood Zone 3a, with areas proximal to the coast and main river being situated in Flood Zone 3b.

6.13.1 Key flood risk issues

Tidal – The neighbourhood area, excluding St Anthony's Hill, is subject to coastal flooding. This area is at reduced risk of flooding from the sea due to the presence of coastal defences.

Fluvial – Fluvial risk is evident along the proximal locations of the Horsey and Crumble's Sewer. Natural high riverbanks offer flood defence protection from both these main rivers.

Surface water – Topography is uniform, between 1.67m and 5.45m AOD and consequently the surface water extent is dispersed across the area. St Anthony's Hill is not subject to surface water flood risk, given the elevated topography.

Groundwater – Groundwater levels are 0.5m to 5m at the coastline. Further back the water table is higher, with depths 0.025m below ground surface level.

Sewers – From 2011 to 2020, historic flood incident reports have been taken which refer to slow drainage, leading to flooding on Queen's Crescent, near to the Crumbles Sewer.

6.13.2 Recommendations for development

Reliance on defences - The area is dependent on the presence of flood defences to reduce flood risk. Development must ensure there is a suitable commitment to maintain these defences throughout the entire lifetime of the proposed development.

PCWLMB requirements – the eastern side of this area borders the Pevensey and Cuckmere Water Level Management Board district, the PCWLMB may have additional requirements regarding discharge rates (directly or indirectly) into its district. The PCWLMB should be consulted during the detailed design of the site to establish the Board's requirements and determine whether there will be a need to apply for surface water discharge or ordinary watercourse consents.

Historic Landfill Sites – This area contains a number of Historic Landfill Sites and is within an area of contaminated land due to current and former industrial uses. If a site is located within a landfill site, infiltration techniques may not be suitable. It is therefore recommended that there is early engagement with the LLFA and the EA on the proposed SuDS measures and infiltration rate to discuss requirements on the site meeting relevant conditions. It is

also recommended that contamination assessments are undertaken to understand the risk of developing on a historic landfill site.

Cumulative Impact Assessment – The catchment is located within a medium-risk cumulative impact area. If the site is located within a medium risk area, Cumulative Impact Assessment policy documents must be understood, and the cumulative impact of development should be considered.

Climate resilience and adaption area – The area is located within a Climate resilience and adaption area, therefore development should consider the relevant policies and requirements.

6.13.3 Strategic opportunities

Climate Resilience and Adaptation – This area is entirely within the Climate Resilience and Adaptation Area defined in the Level 1 SFRA. Proposed development should be implemented so as to be safe and resilient to future shocks from all sources and combined events. Development proposals must set out the intended benefit to the wider community and include clear, costed commitments to measures and resilience actions that make development safe for the intended life.

Property Flood Resilience – The modification of property can protect possessions from flood damage, this includes raising electrical sockets, raising appliances, water resistant paints, hard flooring with readily removable rugs.

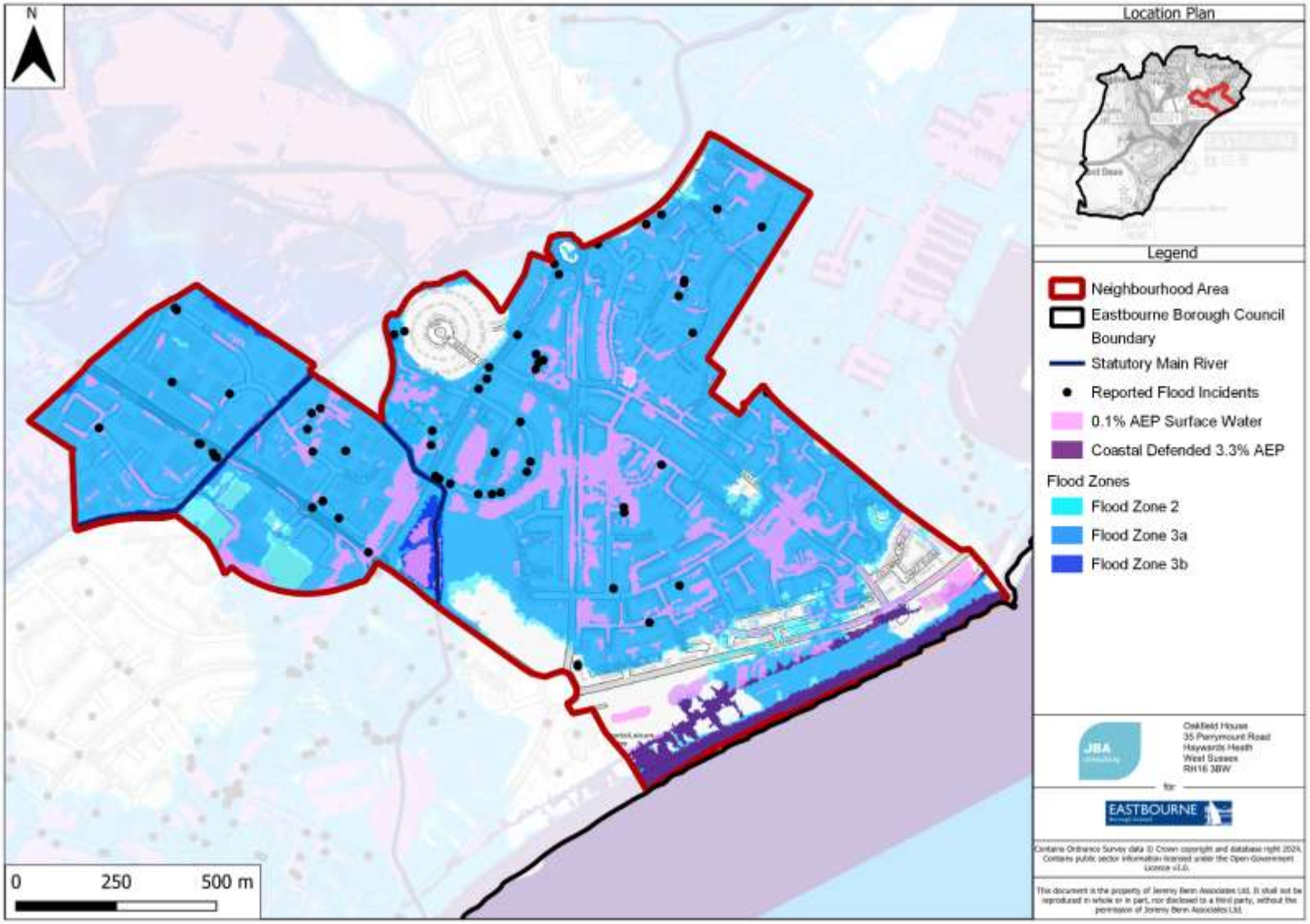


Figure 6-13: Flood risk in the St Anthony's & Langney Point neighbourhood area

6.14 Neighbourhood Area 14 – Sovereign Harbour

Sovereign Harbour comprises of several land uses, including retail, offices and residential. The topography is flat, between 3.9m and 5.07m AOD, rising on proximity to the shoreline. This uniform topography and densely developed character result in widespread surface water flood risk and significant tidal hazard, consequently putting the site for the majority in Flood Zone 3a.

6.14.1 Key flood risk issues

Tidal – Sovereign harbour would be subject to tidal locking, in high tide scenarios; alternative outflow paths would need to be utilised, or existing drainage be designed to account for this. Some defences around Sovereign Harbour including lock gates are managed by Premier Marine. The failure of these assets could cause considerable flooding.

Fluvial – A tributary of the Langney Sewer runs parallel to Pevensey Bay Road, in the north of the area. There is negligible flood risk in this area, it is contained within the natural high riverbanks.

Surface water – Flood risk extends across the area, although hazard is limited. Sovereign Harbour Retail Park is composed of impermeable material, therefore making it more susceptible to surface runoff.

Groundwater – Groundwater is situated between ground level and up to 5m below ground surface level. Levels are closer to the surface along the north-west boundary of the site.

6.14.2 Recommendations for development

Reliance on defences - The area is dependent on the presence of flood defences to reduce flood risk. Development must ensure there is a suitable commitment to maintain these defences throughout the entire lifetime of the proposed development.

Residual flood risk – the area is dependent on the presence of flood defences to mitigate flood risk, proposed development should consider the potential implications for development in the event that these defences were exceeded, breached or overtopped.

PCWLMB requirements – the eastern side of this area borders the Pevensey and Cuckmere Water Level Management Board district, the PCWLMB may have additional requirements regarding discharge rates (directly or indirectly) into its district. The PCWLMB should be consulted during the detailed design of the site to establish the Board's requirements and determine whether there will be a need to apply for surface water discharge or ordinary watercourse consents.

Historic Landfill Sites – This area contains a number of Historic Landfill Sites. If a site is located within a landfill site, infiltration techniques may not be suitable. It is therefore recommended that there is early engagement with the LLFA and the EA on the proposed SuDS measures and infiltration rate to discuss requirements on the site meeting relevant

conditions. It is also recommended that contamination assessments are undertaken to understand the risk of developing on a historic landfill site.

Cumulative Impact Assessment – The catchment is located within a medium-risk cumulative impact area. If the site is located within a medium risk area, Cumulative Impact Assessment policy documents must be understood, and the cumulative impact of development should be considered.

Climate resilience and adaption area – The area is located within a Climate Resilience and Adaption Area, therefore development should consider the relevant policies and requirements.

6.14.3 Strategic opportunities

Climate Resilience and Adaptation – This area is entirely within the Climate Resilience and Adaptation Area defined in the Level 1 SFRA. Proposed development should be implemented so as to be safe and resilient to future shocks from all sources and combined events. Development proposals must set out the intended benefit to the wider community and include clear, costed commitments to measures and resilience actions that make development safe for the intended life.

Flood attenuation – Sovereign Harbour Retail Park car park could be utilised as a flood storage in the area.

SuDS – Vegetated filter strips in areas characterised by impermeable land, such as Sovereign Harbour Retail Park, could reduce the velocity and volume of surface water flow.

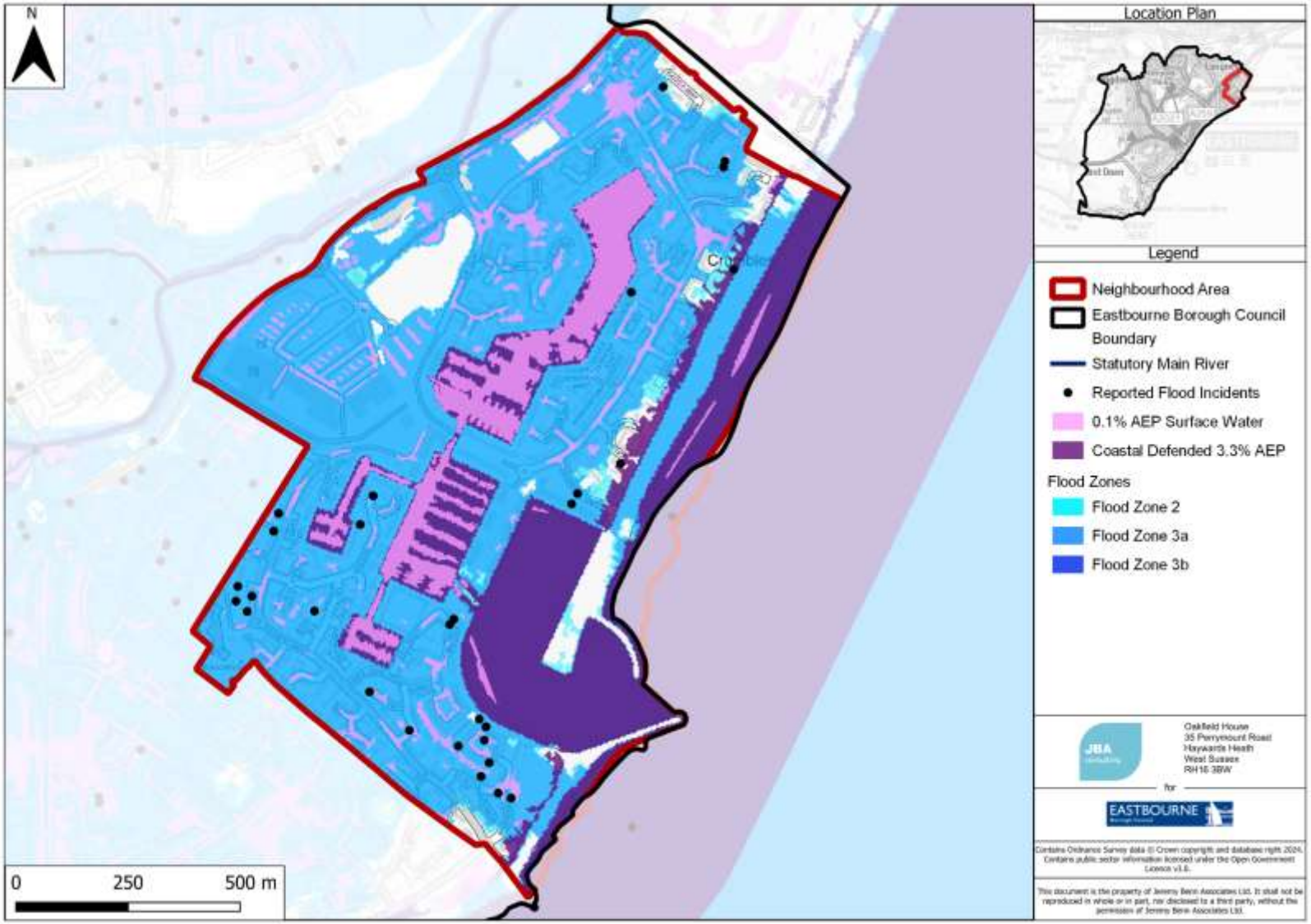


Figure 6-14: Flood risk in the Sovereign Harbour neighbourhood area

7 Summary

7.1 Overview

This Level 2 SFRA provides site-specific recommendations and guidance for a series of proposed development sites in the Eastbourne borough. This report should be read in conjunction with the Level 1 SFRA which pinpoints key sources of flooding in the area.

7.2 Recommendations

Recommendations generated in this report should be followed in conjunction with those introduced in the Level 1 SFRA. These include, but are not limited to:

- Locate new development in accordance with the Sequential test and Exception Test, where appropriate.
- Adopt a Sequential approach within the site, situating most vulnerable development in the least vulnerable area.
- Consider opportunities to move development off floodplains, to make space for water.
- Adopt suitable and sustainable drainage strategies which compliment natural drainage pathways where applicable.
- Consider the cumulative impact of multiple sources of flooding on flood risk, considering the implications of climate change on severity and frequency of flood events.
- Ensure development has dry and safe access and egress routes.
- Ensure building design complies with regulations, ensuring that Finish Floor Levels consider the prevalence of worsening weather and surface water run off with climate change.

7.3 Use of SFRA data and future updates

It is important to note that the SFRA has been formed using the best available data at the time of preparation. This is in reference to current flood risk and the potential future impacts of climate change.

The SFRA should be updated as new and updated policy, legislation and data becomes available relating to flood risk, flood warning and planning. Guidance should regularly be sought from East Sussex County Council, Eastbourne Borough Council, the Environment Agency, Southern Water and Pevensey and Cuckmere Water Level Management Board, to ensure the most relevant and up-to-date information is considered in new development assessments.

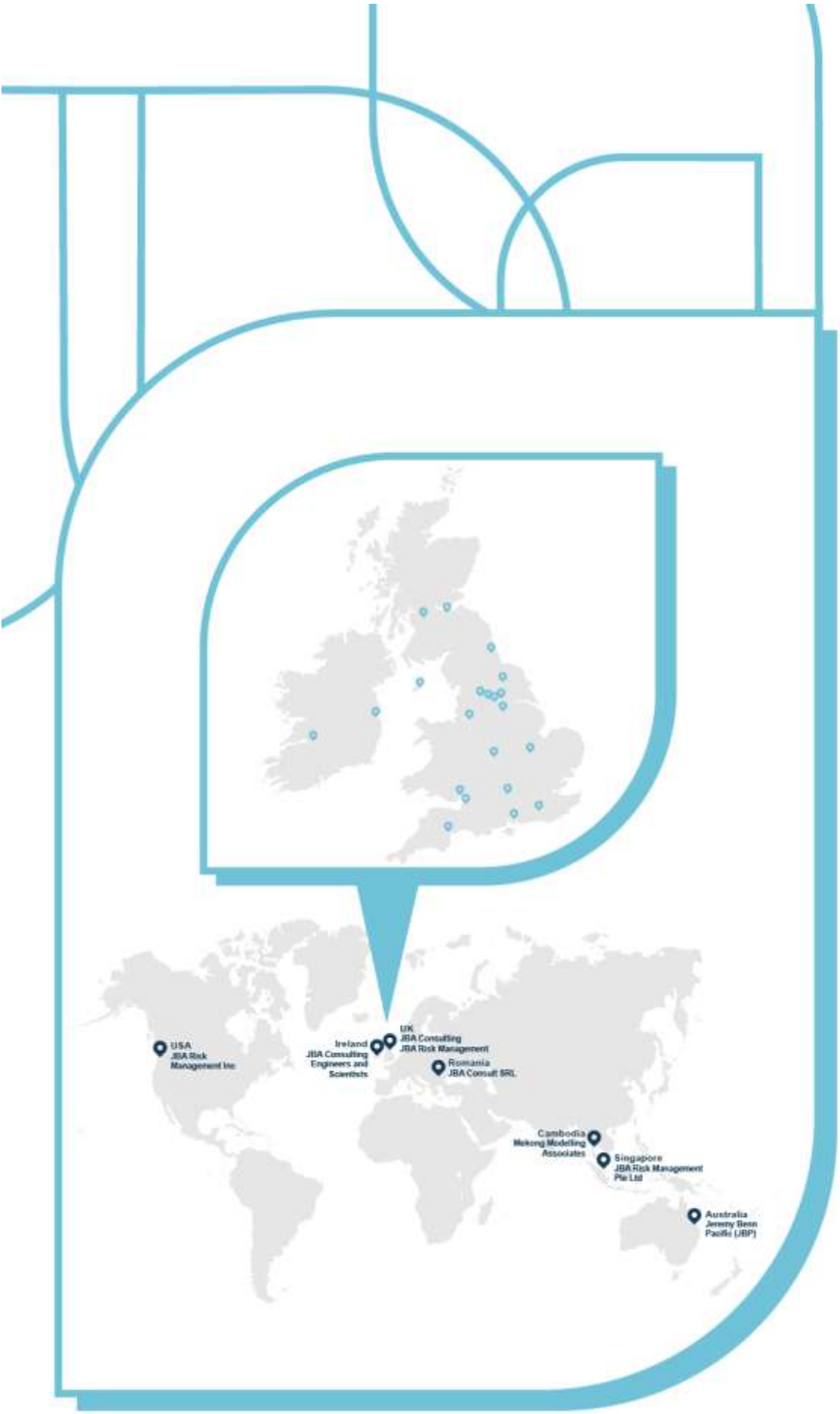
- Policy/Legislation updates
- Flood event information, following a flood event.
- New hydraulic modelling results
- Flood map updates (EA)
- New flood defences / alleviation schemes

The Environment Agency frequently updates their flood risk data and mapping. It should be confirmed with the EA that the most up-to-date information is available for use prior to completing a detailed Flood Risk Assessment. ESCC should also be approached to determine whether updated information is available.

A Site Summary Sheets

B Neighbourhood Area Flood Risk Maps

C Integrated Model Mapping



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