

Basildon Borough Council

# The Flood Risk Sequential Test for the Basildon Borough draft Local Plan

December 2015



## TABLE OF CONTENTS

1. Introduction .....	1
2. National Context .....	1
3. The draft Local Plan .....	3
4. Flood Risk Overview .....	7
5. The Sequential Test .....	9
6. Surface Water Flood Risk Assessment .....	12
7. Ground water Flood Risk Assessment .....	19
8. Conclusion .....	25

## LIST OF APPENDICES

APPENDIX 1 – Flood Risk Vulnerability Classification (as per the Planning Practice Guidance) .....	26
APPENDIX 2– Sites within Flood Zones 3a and 3b – Site H12: Land East of Noak Bridge, Wash Road, Basildon (Flood Zone 3b) .....	28
APPENDIX 3: Sites within Flood Zones 3a and 3b – Site H14: Land South of Cranfield Park Road, Wickford (Flood Zone 3a) .....	29
APPENDIX 4: Sites within Flood Zones 3a and 3b – Site H17: Land North of London Road, Wickford (Flood Zone 3b).....	30
APPENDIX 5: Sites within Flood Zones 3a and 3b – Site R5: Wickford Town Centre (Flood Zone 3b) .....	31

## LIST OF FIGURES

Figure 1: Draft Local Plan Key Diagram for Basildon .....	4
Figure 2: Draft Local Plan Key Diagram for Billericay .....	5
Figure 3: Draft Local Plan Key Diagram for Wickford .....	6
Figure 4: Flood Risk Zones across Basildon Borough.....	8
Figure 5: Surface Water Flood Risk in the Basildon Borough (Potential Surface Water Flooding Hotspots and Critical Drainage Areas) .....	13

## LIST OF TABLES

Table 1: The types of development which can be appropriately located in each flood zone and the circumstances in which the Exception Test will be required. ....	2
Table 2: Sequential Test of the draft Local Plan housing, employment and town centre regeneration allocation sites.....	10

## **1. INTRODUCTION**

- 1.1 This report sets out the Flood Risk Sequential Test for the development sites identified in the draft Local Plan. It has been prepared in accordance with the National Planning Policy Framework (NPPF)<sup>1</sup>, and Planning Policy Guidance (PPG)<sup>2</sup>.

## **2. NATIONAL CONTEXT**

- 2.1 The National Planning Policy Framework requires Local Planning Authorities (LPAs) to undertake sequential based testing on proposed locations for development within the Local Plan. The purpose of such testing is to steer development to areas with the lowest probability of flooding in order to ensure that potential flood risk to people and property is avoided where possible, and any identified residual risk is managed appropriately. LPAs must also take into account the impacts of climate change on flood risk.
- 2.2 The overall aim of the Sequential Test, as stated in the PPG, is to direct new development away from areas with the highest risk of flooding to Flood Zone 1 (low probability). Where there are no reasonably available sites in Flood Zone 1, Local Plans should take into account the flood risk vulnerability of land uses and consider reasonably available sites in Flood Zone 2 (medium probability), applying the Exception Test if required. Only where there are no reasonably available sites in Flood Zones 1 or 2 should the suitability of sites in Flood Zone 3 (3a high probability) be considered, taking account of the flood risk vulnerability of land uses and applying the Exception Test if required. Table 1 shows what development vulnerability classifications can be appropriately located in each flood zone and the circumstances in which the Exception Test will be required. The types of development falling under each of the flood risk vulnerability classifications are listed within Appendix A.
- 2.3 The NPPF recognises that following the application of the sequential test, it is not always possible or consistent with wider objectives, for certain development proposals/requirements to be located in lower 'flood risk zones'. It therefore also sets out a test that needs to be passed if certain types of development are to be exceptionally allocated in a local plan. This is known as the Exception Test.

---

<sup>1</sup> DCLG, National Planning Policy Framework, March 2012

<sup>2</sup> DCLG, Planning Policy Guidance 2014

2.4 The Exception Test comprises of two parts and new development must meet both in order to pass the test. The first part is to show that the development provides wider sustainability benefits to the community which outweighs the costs associated with flood risk, and the second part is to demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing the flood risk elsewhere and where possible, reduce flood risk overall.

**Table 1: The types of development which can be appropriately located in each flood zone and the circumstances in which the Exception Test will be required.**

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	✗	Exception Test required	✓
	Zone 3b Functional Floodplain	Exception Test required	✓	✗	✗	✗

✓ = Development is appropriate

✗ = Development should not be permitted

### **3. THE DRAFT LOCAL PLAN**

- 3.1 The draft Local Plan has been prepared in accordance with the Local Development Scheme 2015-2018<sup>3</sup>.
- 3.2 The draft Local Plan sets a housing requirement based on the objectively assessed need of 15,260 new homes, of which 14,582 remain to be built for the plan period up to 2034. There are 21 proposed housing allocations which are considered to be the most sustainable strategic areas for development.
- 3.3 An employment requirement of 49ha has been identified in the draft Local Plan. This would be achieved through intensification of 14 existing employment areas, including the existing A127 enterprise corridor, and through four additional allocated sites for employment purposes. Two of the proposed employment sites would be mixed use located at Land West of Gardiners Lane South and Land South West of A127 Dunton Interchange. The two allocated employment use only sites are Burnt Mills and Terminus Drive.
- 3.4 The draft Local Plan also seeks to create vibrant and thriving town centres by maintaining Basildon Town Centre's role as a Regional Centre and conserving the distinct identities of the Borough's other town centres, whilst improving their local community roles and functions through mixed-use developments. Regeneration and enhancements to Basildon, Laindon, Pitsea, Wickford and Billericay town centres are proposed in the draft Local Plan.
- 3.5 The housing, employment and town centre regeneration and enhancement locations are shown below in Figure 1 (Basildon), Figure 2 (Billericay) and Figure 3 (Wickford).
- 3.6 A Sequential Test is required to ensure that the proposals in the draft Local Plan are appropriate in terms of their location in relation to sources of flood risk.

---

<sup>3</sup> Basildon Borough Council, Local Development Scheme 2015-2018, Effective from 1<sup>st</sup> January 2015

Figure 1: Draft Local Plan Key Diagram for Basildon

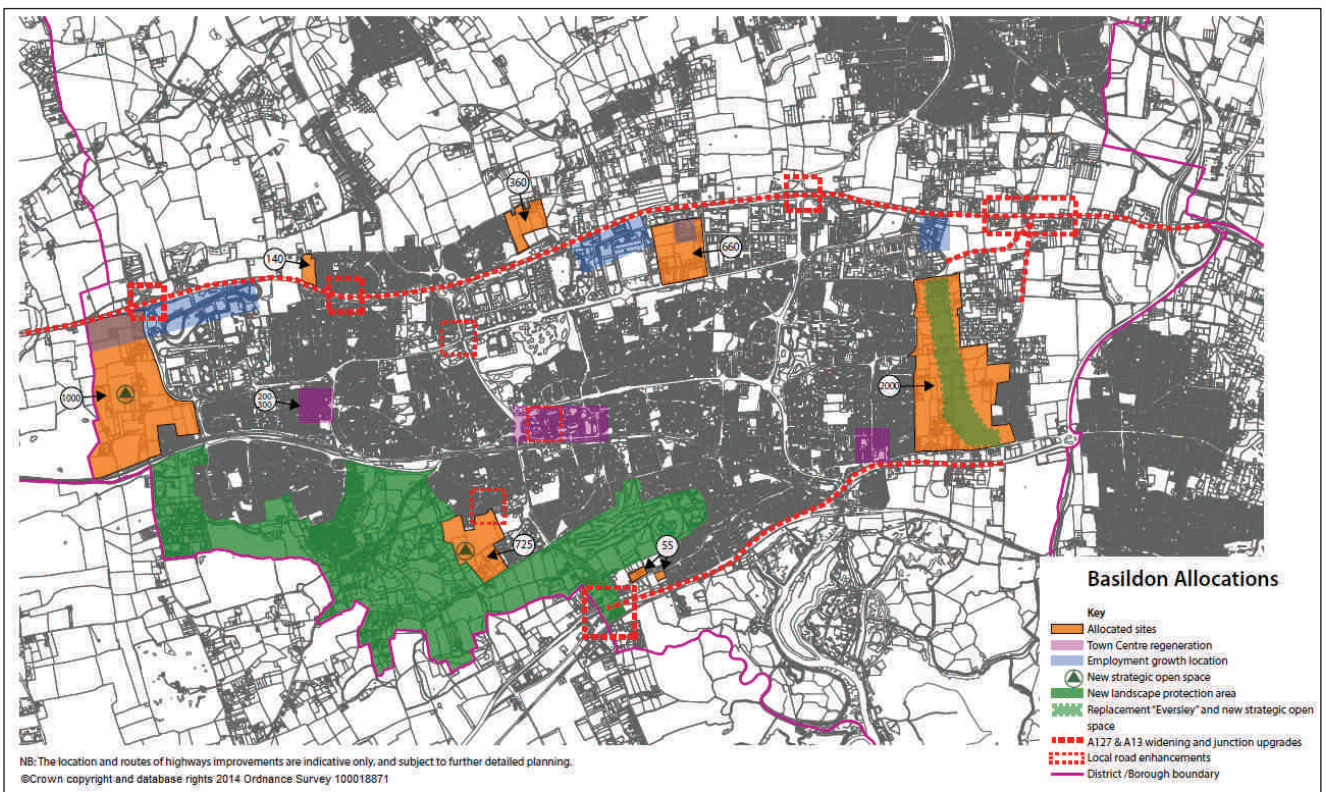


Figure 2: Draft Local Plan Key Diagram for Billericay

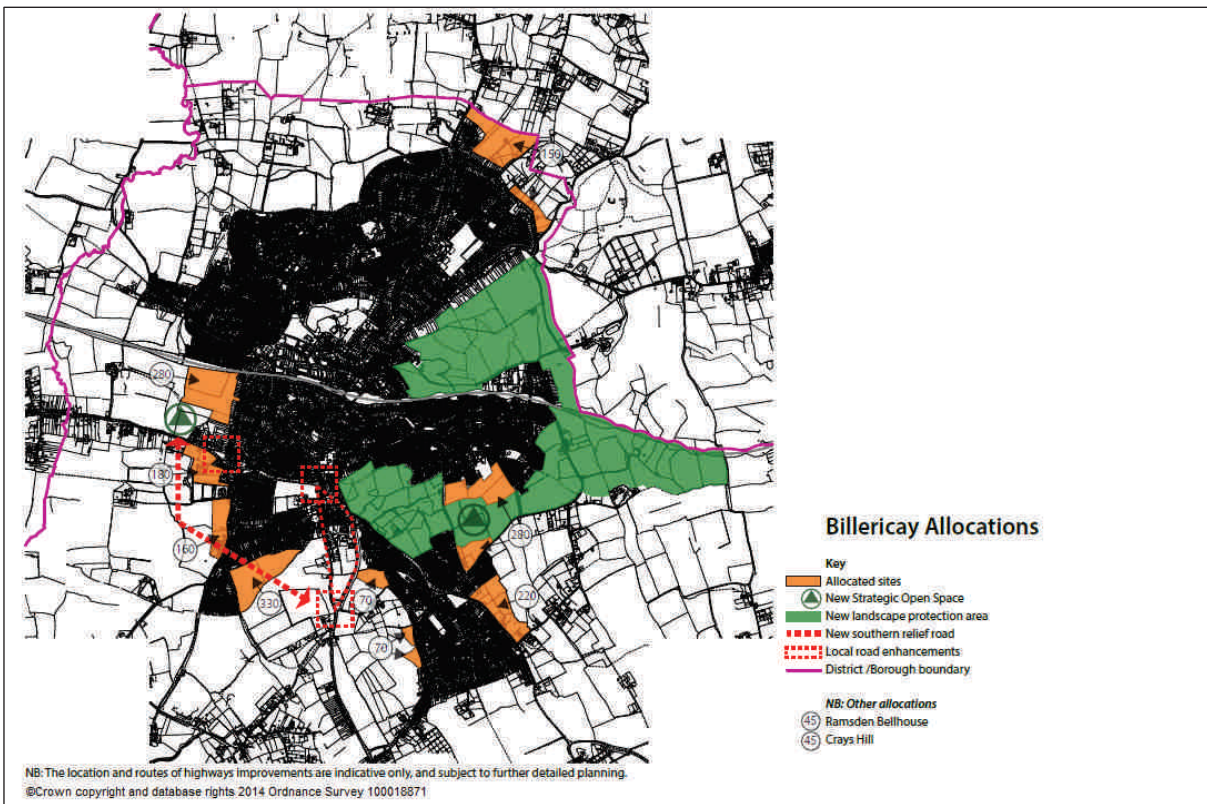
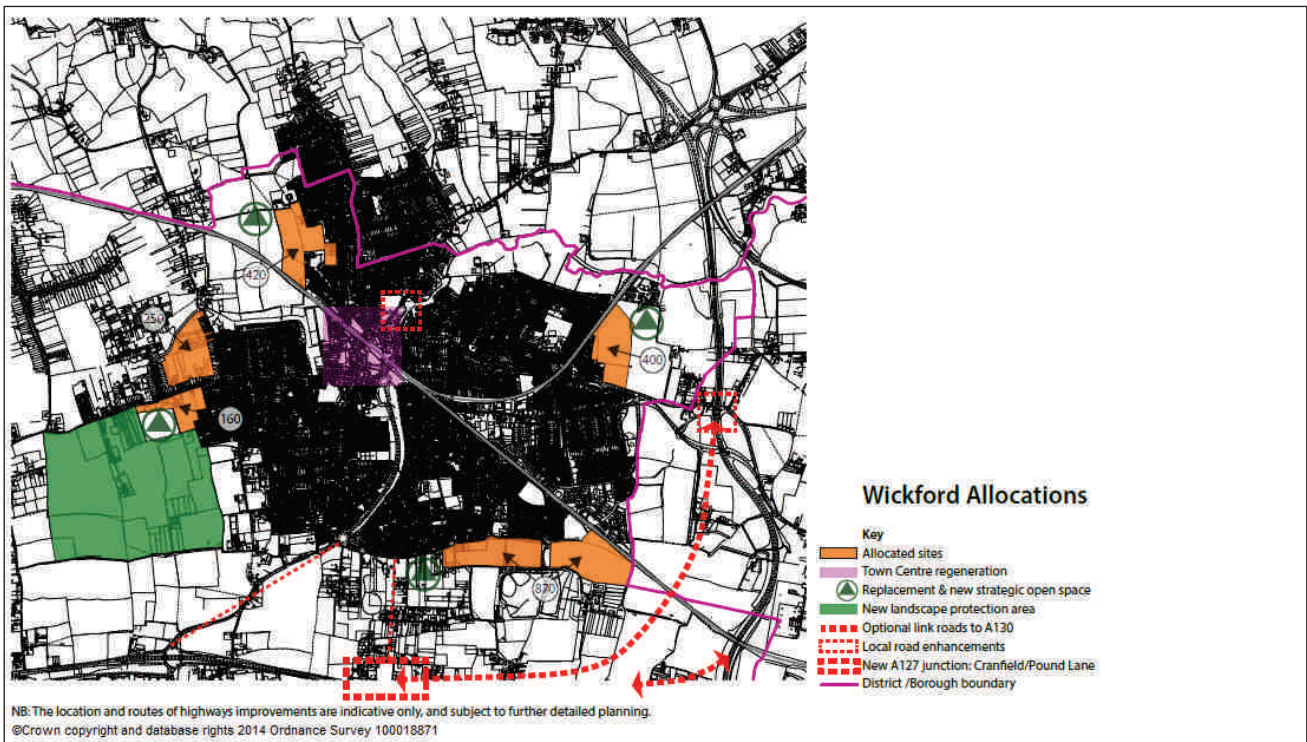




Figure 3: Draft Local Plan Key Diagram for Wickford



## 4. FLOOD RISK OVERVIEW

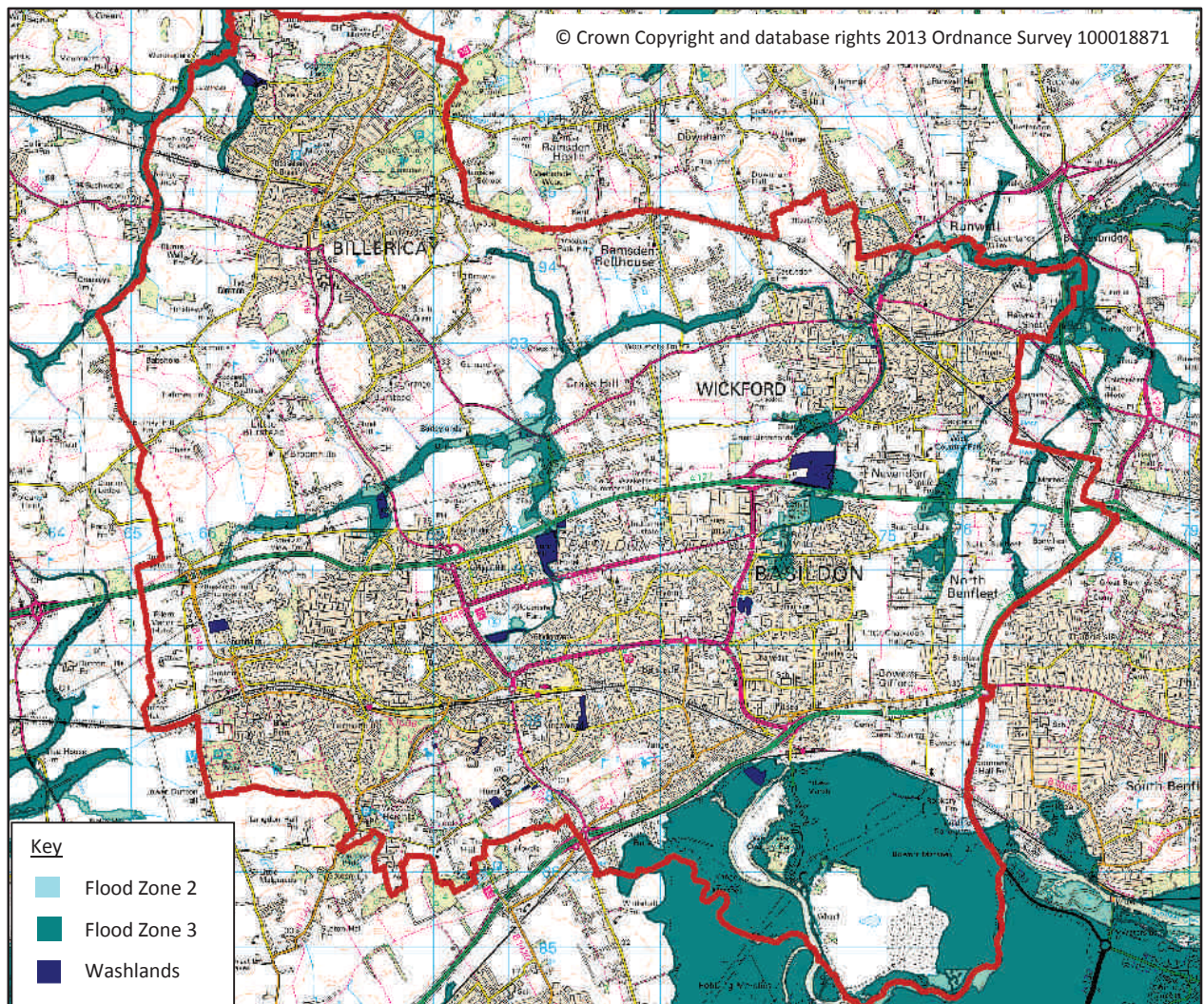
- 4.1 The primary source of flood risk within the Borough is defined in the South Essex Strategic Flood Risk Assessment (SFRA)<sup>4</sup>, as pluvial flooding (heavy rainfall) in the urban centres of Basildon, Billericay and Wickford, which leads to high levels of surface water run-off that drainage systems cannot cope with and often coincides within fluvial flooding associated with the River Crouch and its tributaries.
- 4.2 The risk of surface water flooding in the Borough is managed, in part, by a series of engineered 'washlands' connected by engineered surface and underground channels through the towns of Basildon, Billericay and Wickford. Each washland plays an important role in helping to manage the Borough's drainage network and reduce flood risk in the urban areas, and as such, have been designated as part of the functional floodplain (Zone 3b) within the SFRA. Many are also publically accessible having been incorporated into the Borough's open spaces.
- 4.3 There is also a risk of flooding from tidal sources in the southern part of the Borough, close to Vange Creek and East Haven Creek which are part of the tidal estuary of the River Thames. Whilst there are flood defences in the form of sea walls along the southern edge of the Borough and two mechanical flood barriers providing a high standard of protection, there is still a residual flood risk for parts of the Borough in the event of a barrier failing or the flood defence walls being breached by the sea.
- 4.4 The most significant fluvial flood events in the Borough tend to occur when high rainfall events in the upper catchment of the River Crouch coincide with high tide water levels to produce high volume fluvial flows and elevated water levels in the River Crouch and its tributaries. The flood zones delineating the variation in probability of fluvial flooding from these watercourses have been used to inform this Sequential Test and are shown in Figure 4. The zones show the extent of flooding across the Borough should a defence be overtopped or breached during a flood event. The defended zones are only considered as part of the Exception Test, and only once the Sequential Test has been passed.
- 4.5 The national definition of "areas at risk of flooding" is land within Flood Zones 2 and 3; or land within Flood Zone 1 which has critical drainage problems and which has been notified to the LPA by the Environment

---

<sup>4</sup> South Essex Strategic Flood Risk Assessment, 2011

Agency. Within the Borough there are 22 Critical Drainages Areas which are identified through the South Essex Surface Water Management Plan<sup>5</sup>. These areas over which rainfall accumulates giving rise to areas of pluvial flooding, which can be more severe. Although the Sequential Test, as set out in the PPG is based on flooding from fluvial and tidal sources, the flood risks associated with surface water and critical drainage areas are also considered in this assessment, and mechanisms are included within the draft Local Plan to ensure surface water flood risk is dealt with in relation to individual development proposals. Site-specific Flood Risk Assessments must be undertaken for any planning application within areas at risk of flooding as defined by national policy.

**Figure 4: Flood Risk Zones across Basildon Borough**



**Source: Environment Agency Flood Maps and the South Essex Strategic Flood Risk Assessment, 2011**

<sup>5</sup> South Essex Surface Water Management Plan Phase II, III, IV, April 2012

## 5. THE SEQUENTIAL TEST

- 5.1 This section of the report sets out the Sequential Test undertaken for all the 21 housing allocation sites, four employment allocation sites and the town centre regeneration and enhancement areas which have been identified within the draft Local Plan. It follows the steps outlined in the PPG and has been informed by South Essex SFRA.
- 5.2 Consideration has been given as to whether there are any reasonable alternative locations in lower flood zones to the proposed sites, whether the vulnerability of the proposed uses are appropriate to the flood zones identified, and whether the more vulnerable uses can be directed to parts of the sites where the risk is lower. If it is not possible, or consistent with wider sustainability objectives, for development to be located in the zones of lower flood risk which are considered appropriate to the proposed use, the Exception Test will be applied.
- 5.3 For the purposes of this assessment, all sites will be considered on the basis that they are proposed for residential development comprising bricks and mortar dwellings or residential institutions. These uses are identified in Table 2 of the PPG as being 'more vulnerable'.
- 5.4 Table 1 of the PPG identifies four different flood risk zones. These will be used when applying the sequential test. These zones are:
- Zone 1 – low probability. All uses of land are appropriate in this zone.
  - Zone 2 – medium probability. Essential infrastructure, water compatible, less vulnerable and more vulnerable uses are appropriate in this zone. Highly vulnerable uses are only appropriate in this zone if the exception test is passed.
  - Zone 3a – high probability. Water compatible and less vulnerable uses are appropriate in this zone. Highly vulnerable uses should not be permitted. The more vulnerable uses and essential infrastructure should only be permitted in this zone if the Exception Test is passed.
  - Zone 3b – functional floodplain. Only water compatible uses and essential infrastructure that has to be there should be permitted in this zone. Essential infrastructure should pass the Exception Test.
- 5.5 Each site has been allocated to a zone having regard to the Environment Agency Flood Risk Zone mapping. Where a site falls within more than one zone, it has been allocated to the zone with the highest risk of flooding, taking a precautionary approach. The results can be viewed in Table 2 below.

**Table 2: Sequential Test of the draft Local Plan housing, employment and town centre regeneration allocation sites**

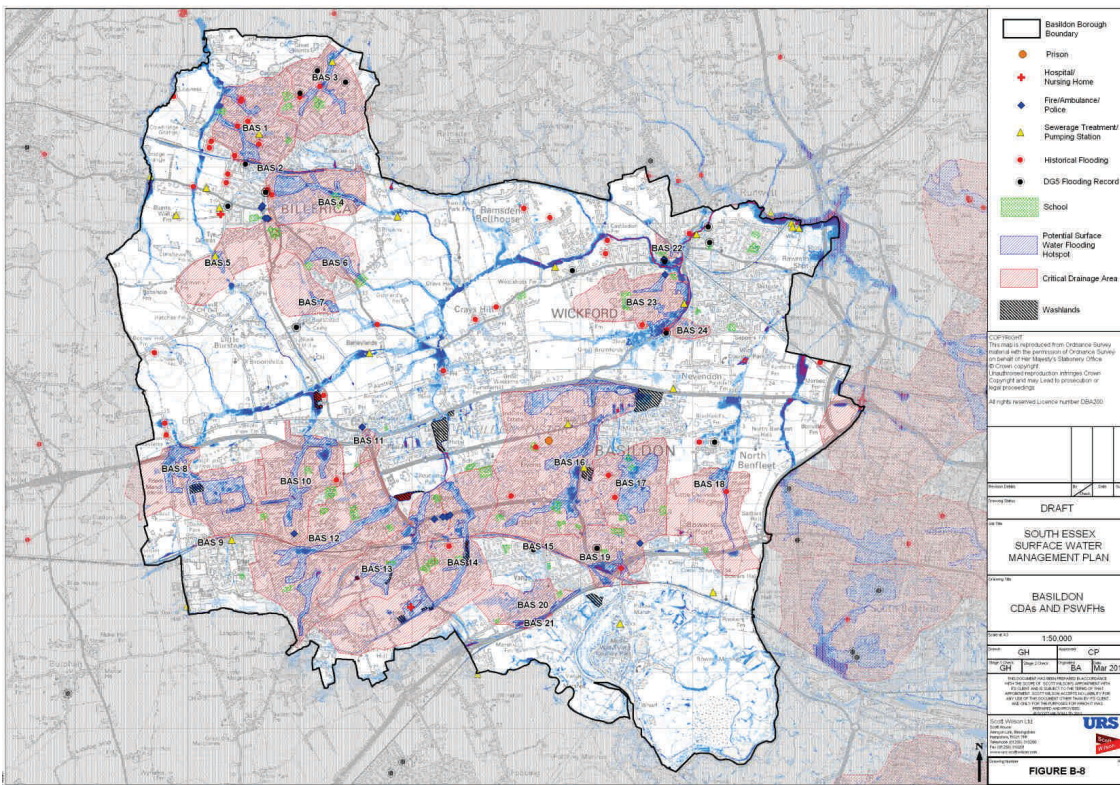
<b>Site</b>	<b>Flood Risk Zone</b>	<b>Capacity</b>
<b>H7 and E5:</b> Land West of Gardiners Lane South, Basildon	<b>1</b>	<b>660 dwellings + 12-16ha land for employment</b>
<b>H8:</b> Land North of Dry Street, Basildon	<b>1</b>	<b>725 dwellings</b>
<b>H9a and H9b:</b> Land North and South of London Road, Vange	<b>1</b>	<b>55 dwellings</b>
<b>H10a, H10b and E7:</b> Land South West of A127 Dunton Interchange, West Basildon Urban Extension	<b>1</b>	<b>2350 dwellings + 5.5ha land for employment</b>
<b>H11:</b> Land West of Steeple View, Dunton Road, Laindon	<b>1</b>	<b>140 dwellings</b>
<b>H12:</b> Land East of Noak Bridge, Wash Road, Basildon	<b>3b</b>	<b>360 dwellings</b>
<b>H13:</b> East of Basildon	<b>1</b>	<b>2000 dwellings</b>
<b>H14:</b> Land South of Cranfield Park Road, Wickford	<b>3a</b>	<b>870 dwellings</b>
<b>H15:</b> Land North of Southend Road, Shotgate	<b>1</b>	<b>400 dwellings</b>
<b>H16:</b> Land East and South of Barn Hall, Wickford	<b>1</b>	<b>420 dwellings</b>
<b>H17:</b> Land North of London Road, Wickford	<b>3b</b>	<b>460 dwellings</b>
<b>H18:</b> Land South of London Road, Wickford	<b>1</b>	<b>160 dwellings</b>
<b>H19:</b> Land North of Potash Road, Billericay	<b>1</b>	<b>150 dwellings</b>
<b>H20:</b> Land West of Tye Common Lane, Billericay	<b>1</b>	<b>160 dwellings</b>
<b>H21:</b> Land South of London Road, Billericay	<b>1</b>	<b>180 dwellings</b>
<b>H22:</b> Land West of Mountnessing Road, Billericay	<b>1</b>	<b>280 dwellings</b>
<b>H23:</b> Lane East of Frithwood Lane, Billericay	<b>1</b>	<b>330 dwellings</b>
<b>H24:</b> Land South of Windmill Heights, Great Burstead and South Green	<b>1</b>	<b>70 dwellings</b>
<b>H25:</b> Land West of Kennel Lane, Great Burstead and South Green	<b>1</b>	<b>70 dwellings</b>
<b>H26:</b> Land East of Greens Farm Lane, Billericay	<b>1</b>	<b>280 dwellings</b>
<b>H27:</b> Land East of Southend Road, Great Burstead and South Green, Billericay	<b>1</b>	<b>220 dwellings</b>
<b>E6:</b> Land at Terminus Drive, Pitsea	<b>1</b>	<b>3.5ha land for employment</b>
<b>E8:</b> Land to the east of Burnt Mills	<b>1</b>	<b>5.5ha land for employment</b>
<b>R2:</b> Basildon Town Centre	<b>1</b>	<b>1,500-2,000 dwellings</b>
<b>R3:</b> Laindon Town Centre	<b>1</b>	<b>200-300 dwellings</b>
<b>R4:</b> Pitsea Town Centre	<b>1</b>	<b>-</b>
<b>R5:</b> Wickford Town Centre	<b>3b</b>	<b>15-100 dwellings</b>
<b>R6:</b> Billericay Town Centre	<b>1</b>	<b>-</b>

- 5.6 There are four sites that are not solely within the lower flood zones 1 and 2. Maps of these sites and the extent of flood risk upon them are included within Appendices 2 to 5. These are:
- H12: Land East of Noak Bridge, Wash Road, Basildon (flood zone 3b)
  - H14: Land South of Cranfield Park Road, Wickford (flood zone 3a)
  - H17: Land North of London Road, Wickford (flood zone 3b)
  - R5: Wickford Town Centre (flood zone 3b).
- 5.7 It would be possible on the above sites to locate development away from the areas of greater flood risk, as the zones 3a and 3b only cover a small proportion of each site. Therefore it is not considered necessary to apply the exception test in this instance providing higher and more vulnerable forms of development, as identified in Appendix 1, are located within the lower flood zones and where necessary development which is less vulnerable is located within higher flood zones.

## **6. SURFACE WATER FLOOD RISK ASSESSMENT**

- 6.1 Paragraph 100 of the *NPPF* expects local planning authorities to assess the risk from all sources of flood risk. Unlike tidal and fluvial flooding, the Environment Agency does not publish definitive surface water flood risk maps, and does not define flood risk zones for surface water.
  
- 6.2 However, the Council in partnership with Castle Point Borough Council, Rochford District Council and Essex County Council had a Surface Water Management Plan prepared for South Essex. This models surface water flood risk at a local level, and maps potential surface water flooding hotspots (PSWFH), and the areas that drain to these hotspots - known as Critical Drainage Areas (CDAs). The risk of flooding within each CDA has been modelled for a 1 in 100 year event, taking into account climate change impacts. Figure 5 shows an overview of the CDAs and PSWFHs within Basildon Borough.

Figure 5: Surface Water Flood Risk in the Basildon Borough (Potential Surface Water Flooding Hotspots and Critical Drainage Areas)





- 6.3 Each of the sites has been assessed against the findings of the Surface Water Management Plan modelling in Table 3 below to determine whether:
- It is in a critical drainage area; and
  - It is within a potential surface water flooding hotspot.

**Table 3: Surface Water Flood Risk Assessment**

Site	Within a CDA?	Within a potential Surface Water Flooding Hotspot?	Surface water management options	Appropriate development site in terms of Surface Water Flooding?
<b>H7 and E5:</b> Land West of Gardiners Lane South, Basildon	Yes – majority is in BAS 14	Yes – small part to the east of the site	BAS 14 - Source Control/Attenuation, Community Awareness (PSFWH)	Yes – with appropriate Surface Water Management
<b>H8:</b> Land North of Dry Street, Basildon	Yes – the whole site is within BAS 11 and BAS 12	Yes – small part to the north and south-east of the site	BAS 12 – Further Investigation, Flood Storage and Community Awareness (PSFWH)	Yes – with appropriate Surface Water Management
<b>H9a and H9b:</b> Land North and South of London Road, Vange	Yes – the north-east part of H9a is in BAS 18 and the north part of H9b is also in BAS 18	No	Sustainable Drainage Systems (SuDS) and Washlands	Yes – with appropriate Surface Water Management and where possible avoid parts of site at risk of surface water flooding
<b>H10a, H10b and E7:</b> Land South West of A127 Dunton Interchange, West Basildon Urban Extension	Yes – northern half of H10a is within BAS 6 and a small part of site 10b is within BAS 6	Part of the northern section of site H10a is within BAS 6	Sustainable Drainage Systems (SuDS) and Washlands	Yes – with appropriate Surface Water Management and where possible avoid parts of site at risk of surface water flooding

<b>Site</b>	<b>Within a CDA?</b>	<b>Within a potential Surface Water Flooding Hotspot?</b>	<b>Surface water management options</b>	<b>Appropriate development site in terms of Surface Water Flooding?</b>
<b>H11:</b> Land West of Steeple View, Dunton Road, Laindon	Yes – very small section to the south of H11 is within BAS 12	No	BAS 12 – Further Investigation, Flood Storage and Community Awareness (PSFWH)	Yes – with appropriate Surface Water Management and where possible avoid parts of site at risk of surface water flooding
<b>H12:</b> Land East of Noak Bridge, Wash Road, Basildon	No	No	N/A	Yes
<b>H13:</b> East of Basildon	Yes – small section of site H13 to the west within BAS 15 and majority within BAS 16	Yes – very small section within BAS 16	BAS 15 – Further Investigation, Flood Storage and Community Awareness (PSFWH). BAS 16 – Further Investigation	Yes – with appropriate Surface Water Management
<b>H14:</b> Land South of Cranfield Park Road, Wickford	No	No	N/A	Yes
<b>H15:</b> Land North of Southend Road, Shotgate	No	No	N/A	Yes
<b>H16:</b> Land East and South of Barn Hall, Wickford	No	No	N/A	Yes
<b>H17:</b> Land North of London Road, Wickford	No	No	N/A	Yes
<b>H18:</b> Land South of London Road, Wickford	Yes – part of site H18 to the south within BAS 21	No	BAS 21 - Source Control/Attenuation, Flood Storage and Community Awareness	Yes – with appropriate Surface Water Management and where possible avoid parts of site at risk of surface water flooding

<b>Site</b>	<b>Within a CDA?</b>	<b>Within a potential Surface Water Flooding Hotspot?</b>	<b>Surface water management options</b>	<b>Appropriate development site in terms of Surface Water Flooding?</b>
<b>H19:</b> Land North of Potash Road, Billericay	Yes – south west section of H19 within BAS 3	Yes – very small section to the south west of H19 within BAS 3	Sustainable Drainage Systems (SuDS) and Washlands	Yes – with appropriate Surface Water Management and where possible avoid parts of site at risk of surface water flooding
<b>H20:</b> Land West of Tye Common Lane, Billericay	No	No	N/A	Yes
<b>H21:</b> Land South of London Road, Billericay	No	No	N/A	Yes
<b>H22:</b> Land West of Mountnessing Road, Billericay	No	No	N/A	Yes
<b>H23:</b> Lane East of Frithwood Lane, Billericay	No	No	N/A	Yes
<b>H24:</b> Land South of Windmill Heights, Great Burstead and South Green	Yes – northern half of H24 within BAS 5	No	Sustainable Drainage Systems (SuDS) and Washlands	Yes – with appropriate Surface Water Management and where possible avoid parts of site at risk of surface water flooding
<b>H25:</b> Land West of Kennel Lane, Great Burstead and South Green	No	No	N/A	Yes
<b>H26:</b> Land East of Greens Farm Lane, Billericay	Yes - majority of site H26 within BAS 4 and BAS 5	No	BAS 4 - Flood Storage Bund, Increased conveyance/capacity of ordinary watercourse and Community Awareness (PSFWH)	Yes – with appropriate Surface Water Management
<b>H27:</b> Land East of Southend Road, Great Burstead and South Green, Billericay	Yes – the whole of site H27 is within BAS 5	Yes – centre part of site H27 within BAS 5	Sustainable Drainage Systems (SuDS) and Washlands	Yes – with appropriate Surface Water Management

<b>Site</b>	<b>Within a CDA?</b>	<b>Within a potential Surface Water Flooding Hotspot?</b>	<b>Surface water management options</b>	<b>Appropriate development site in terms of Surface Water Flooding?</b>
<b>E6:</b> Land at Terminus Drive, Pitsea	Yes – west half of site E6 is within BAS 17	Yes – large part of the west of site E6 within BAS 17	Further Investigation	Yes – with appropriate Surface Water Management
<b>E8:</b> Land to the east of Burnt Mills	No	No	N/A	Yes
<b>R2:</b> Basildon Town Centre	Yes – whole of site R2 is within BAS 11 and BAS 12	Yes – small part to the east and west of R2 within BAS 11 and BAS 12	BAS 12 – Further Investigation, Flood Storage and Community Awareness (PSFWH)	Yes – with appropriate Surface Water Management
<b>R3:</b> Laindon Town Centre	Yes – whole of site R3 is within BAS 8	Yes – part of the site to the north and a small part of site R3 to the west is within BAS 8	Formalise Flood Storage Area, Preferential Flow Path and Community Awareness (PSFWH)	Yes – with appropriate Surface Water Management
<b>R4:</b> Pitsea Town Centre	Yes – whole of site R4 is within BAS 17	Yes – small part of site R4 to the south is within BAS 17	Further Investigation	Yes – with appropriate Surface Water Management
<b>R5:</b> Wickford Town Centre	Yes – west part of site R5 within BAS 20	Yes – centre of R5 within BAS 20	Sustainable Drainage Systems (SuDS) and Washlands	Yes – with appropriate Surface Water Management and where possible avoid parts of site at risk of surface water flooding
<b>R6:</b> Billericay Town Centre	Yes – east of site R6 within BAS 4	Yes – small section of R6 to north-east of site within BAS 4	BAS 4 - Flood Storage Bund, Increased conveyance/capacity of ordinary watercourse and Community Awareness (PSFWH)	Yes – with appropriate Surface Water Management

6.1 Where a site is within a critical drainage area, consideration has been given to the potential to use source and pathway methods of surface water management to prevent flooding elsewhere. Reference has been had to the assessment of surface water management options for each critical

drainage area in Appendix E of the Surface Water Management Plan in determining whether it is viable to use source and pathway methods in the location of the site. A site has only been considered appropriate for development, in terms of surface water flood risk, where it is possible and viable to install surface water management techniques.

- 6.2 Where a site is outside a critical drainage area, it is considered appropriate for development, in terms of surface water flood risk.
- 6.3 Where a site is within, or contains, a surface water flooding hotspot, consideration has been given to the potential to avoid the area of the site likely to be flooded in the first instance, and then where this does not resolve the issue, the potential to employ flood resistance and resilience techniques that manage surface water flood risk. A site has only been considered appropriate for development, in terms of surface water flood risk, where it is possible to avoid, or at very least manage surface water flood risk through resistance and resilience measures.

## 7. GROUND WATER FLOOD RISK ASSESSMENT

- 7.1 As with surface water, it is necessary to assess the risk of flooding from groundwater sources in order to meet the requirements of the NPPF. However, the Environment Agency do not publish definitive groundwater flood risk maps, and do not define flood risk zones for groundwater.
- 7.2 The South Essex Surface Water Management Plan did however include an intermediate assessment of groundwater flooding susceptibility using data from the British Geological Society. This intermediate assessment shows where groundwater flood risk has the potential to be an issue. It does not however include modelling of the likely extent or depth of flooding, which would need to be done on a site by site basis.
- 7.3 The South Essex Surface Water Management Plan includes a map showing the susceptibility of Basildon to Groundwater flooding. This has been compared to the allocated sites contained within this assessment and is detailed in Table 4 below. This has allowed identification of those sites where groundwater is a potential issue, and where the use of certain types of infiltration SUDS will be limited by an existing high water table.

**Table 4: Groundwater Risk Assessment**

Site	Within an area susceptible to Groundwater Flooding?	Potential to manage groundwater flood risk	Appropriate development site in terms of Groundwater Flooding?
<b>H7 and E5:</b> Land West of Gardiners Lane South, Basildon	Yes – entire site	Cannot avoid as entire site susceptible. Source control SUDS and drainage improvements required to manage interaction between surface water and groundwater.	YES, but: a) Source control SUDS and drainage improvements required. b) Properties should be designed to be resistant and resilient to groundwater flooding. No basement dwellings should be permitted.
<b>H8:</b> Land North of Dry Street, Basildon	Yes – entire site	Cannot avoid as entire site susceptible. Source control SUDS and drainage improvements required to manage interaction between surface water and groundwater.	YES, but: a) Source control SUDS and drainage improvements required. b) Properties should be designed to be resistant and resilient to groundwater flooding. No basement dwellings should be permitted.
<b>H9a and H9b:</b> Land North and South of London Road, Vange	No	N/A	Yes

Site	Within an area susceptible to Groundwater Flooding?	Potential to manage groundwater flood risk	Appropriate development site in terms of Groundwater Flooding?
<b>H10a, H10b and E7:</b> Land South West of A127 Dunton Interchange, West Basildon Urban Extension	No	N/A	Yes
<b>H11:</b> Land West of Steeple View, Dunton Road, Laindon	No	N/A	Yes
<b>H12:</b> Land East of Noak Bridge, Wash Road, Basildon	Yes – entire site	Cannot avoid as entire site susceptible. Source control SUDS and drainage improvements required to manage interaction between surface water and groundwater.	YES, but: a) Source control SUDS and drainage improvements required. b) Properties should be designed to be resistant and resilient to groundwater flooding. No basement dwellings should be permitted.
<b>H13:</b> East of Basildon	Partially	Area at risk dispersed across the site. Therefore possible to avoid. Potential to create flood storage elsewhere on site.	YES, but: a) Avoid development in areas at risk of groundwater flooding b) Installation of flood storage on-site within areas away from susceptibility.
<b>H14:</b> Land South of Cranfield Park Road, Wickford	Partially	Area at risk dispersed across the site. Therefore possible to avoid. Potential to create flood storage elsewhere on site.	YES, but: a) Avoid development in areas at risk of groundwater flooding b) Installation of flood storage on-site within areas away from susceptibility.
<b>H15:</b> Land North of Southend Road, Shotgate	Yes – entire site	Cannot avoid as entire site susceptible. Source control SUDS and drainage improvements required to manage interaction between surface water and groundwater.	YES, but: a) Source control SUDS and drainage improvements required. b) Properties should be designed to be resistant and resilient to groundwater flooding. No basement dwellings should be permitted.
<b>H16:</b> Land East and South of Barn Hall, Wickford	No	N/A	Yes

<b>Site</b>	<b>Within an area susceptible to Groundwater Flooding?</b>	<b>Potential to manage groundwater flood risk</b>	<b>Appropriate development site in terms of Groundwater Flooding?</b>
<b>H17:</b> Land North of London Road, Wickford	Partially	Area at risk peripheral to the site. Therefore possible to avoid. Potential to create flood storage elsewhere on site.	YES, but: a) Avoid development in areas at risk of groundwater flooding b) Installation of flood storage on-site within areas away from susceptibility.
<b>H18:</b> Land South of London Road, Wickford	No	N/A	Yes
<b>H19:</b> Land North of Potash Road, Billericay	Yes – entire site	Cannot avoid as entire site susceptible. Source control SUDS and drainage improvements required to manage interaction between surface water and groundwater.	YES, but: a) Source control SUDS and drainage improvements required. b) Properties should be designed to be resistant and resilient to groundwater flooding. No basement dwellings should be permitted.
<b>H20:</b> Land West of Tye Common Lane, Billericay	Yes – entire site	Cannot avoid as entire site susceptible. Source control SUDS and drainage improvements required to manage interaction between surface water and groundwater.	YES, but: a) Source control SUDS and drainage improvements required. b) Properties should be designed to be resistant and resilient to groundwater flooding. No basement dwellings should be permitted.
<b>H21:</b> Land South of London Road, Billericay	Yes – entire site	Cannot avoid as entire site susceptible. Source control SUDS and drainage improvements required to manage interaction between surface water and groundwater.	YES, but: a) Source control SUDS and drainage improvements required. b) Properties should be designed to be resistant and resilient to groundwater flooding. No basement dwellings should be permitted.



Site	Within an area susceptible to Groundwater Flooding?	Potential to manage groundwater flood risk	Appropriate development site in terms of Groundwater Flooding?
<b>H22:</b> Land West of Mountnessing Road, Billericay	Yes – over half of the site	Cannot avoid as a large proportion of the site susceptible. Source control SUDS and drainage improvements required to manage interaction between surface water and groundwater.	YES, but: a) Source control SUDS and drainage improvements required. b) Properties should be designed to be resistant and resilient to groundwater flooding. No basement dwellings should be permitted.
<b>H23:</b> Lane East of Frithwood Lane, Billericay	Yes – entire site	Cannot avoid as entire site susceptible. Source control SUDS and drainage improvements required to manage interaction between surface water and groundwater.	YES, but: a) Source control SUDS and drainage improvements required. b) Properties should be designed to be resistant and resilient to groundwater flooding. No basement dwellings should be permitted.
<b>H24:</b> Land South of Windmill Heights, Great Burstead and South Green	Yes – entire site	Cannot avoid as entire site susceptible. Source control SUDS and drainage improvements required to manage interaction between surface water and groundwater.	YES, but: a) Source control SUDS and drainage improvements required. b) Properties should be designed to be resistant and resilient to groundwater flooding. No basement dwellings should be permitted.
<b>H25:</b> Land West of Kennel Lane, Great Burstead and South Green	Yes –half of the site	Cannot avoid as a large proportion of the site susceptible. Source control SUDS and drainage improvements required to manage interaction between surface water and groundwater.	YES, but: a) Source control SUDS and drainage improvements required. b) Properties should be designed to be resistant and resilient to groundwater flooding. No basement dwellings should be permitted.

<b>Site</b>	<b>Within an area susceptible to Groundwater Flooding?</b>	<b>Potential to manage groundwater flood risk</b>	<b>Appropriate development site in terms of Groundwater Flooding?</b>
<b>H26:</b> Land East of Greens Farm Lane, Billericay	Yes – over half of the site	Cannot avoid as a large proportion of the site susceptible. Source control SUDS and drainage improvements required to manage interaction between surface water and groundwater.	YES, but: a) Source control SUDS and drainage improvements required. b) Properties should be designed to be resistant and resilient to groundwater flooding. No basement dwellings should be permitted.
<b>H27:</b> Land East of Southend Road, Great Burstead and South Green, Billericay	Yes – almost the entire site	Cannot avoid as most of the site susceptible. Source control SUDS and drainage improvements required to manage interaction between surface water and groundwater.	YES, but: a) Source control SUDS and drainage improvements required. b) Properties should be designed to be resistant and resilient to groundwater flooding. No basement dwellings should be permitted.
<b>E6:</b> Land at Terminus Drive, Pitsea	No	N/A	Yes
<b>E8:</b> Land to the east of Burnt Mills	No	N/A	Yes
<b>R2:</b> Basildon Town Centre	No	N/A	Yes
<b>R3:</b> Laindon Town Centre	No	N/A	Yes
<b>R4:</b> Pitsea Town Centre	No	N/A	Yes
<b>R5:</b> Wickford Town Centre	Yes – almost the entire site	Cannot avoid as most of the site susceptible. Source control SUDS and drainage improvements required to manage interaction between surface water and groundwater.	YES, but: a) Source control SUDS and drainage improvements required. b) Properties should be designed to be resistant and resilient to groundwater flooding. No basement dwellings should be permitted.

Site	Within an area susceptible to Groundwater Flooding?	Potential to manage groundwater flood risk	Appropriate development site in terms of Groundwater Flooding?
R6: Billericay Town Centre	Yes – entire site	Cannot avoid as entire site susceptible. Source control SUDS and drainage improvements required to manage interaction between surface water and groundwater.	YES, but: a) Source control SUDS and drainage improvements required. b) Properties should be designed to be resistant and resilient to groundwater flooding. No basement dwellings should be permitted.

- 7.1 Where a site is not within an area susceptible to groundwater flooding, it is considered appropriate for development in this regard.
- 7.2 Where a site is within an area susceptible to groundwater flooding, it is considered appropriate if alternative options for managing surface water, in addition to infiltration SUDS, are possible on the site, and the development does not contain basement dwellings.

## **8. CONCLUSION**

- 8.1 In accordance with national planning policy, Basildon Council has undertaken the Sequential Test in order to steer development proposals in the Local Plan away from areas at higher risk of flooding.
- 8.2 The assessment concludes that the vast majority of development locations identified within the Local Plan are at the lowest risk of flooding from tidal and fluvial sources. There are four sites which contain land at a higher risk of flooding from fluvial sources. However, the majority of the land within these four sites is located within flood risk zone 1, and therefore it is possible to avoid flood risk on these sites through the appropriate location of higher and more vulnerable forms of development. Surface water flood risk and ground water flood risk affects a greater number of sites, although again it is largely possible to avoid those parts of sites at greatest risk of flooding, and to install flood risk management options, as identified in the South Essex Surface Water Management Plan, to prevent increased risk on site, or to other properties nearby.
- 8.3 As it is possible to avoid the areas at greatest risk of flooding, there is no requirement for the exception test to be applied to those sites identified for development purposes within the draft Local Plan. Furthermore, there is no requirement to appraise alternative sites, which are otherwise less sustainable than those included within the draft Local Plan.
- 8.4 In conclusion the application of the Sequential Test has confirmed that the proposed development locations identified in the draft Local Plan have been directed to the most sustainable locations with the lowest flood risk.

## APPENDIX 1 – Flood Risk Vulnerability Classification (as per the Planning Practice Guidance)

### Essential Infrastructure

- Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk
- Essential utility infrastructure which has to be located in a flood risk area for operational reasons including electricity generating power stations and grid and primary substations; and water treatment works that needs to remain operational in times of flood
- Wind turbines

### Highly Vulnerable

- Police stations, ambulance stations and fire stations, and command centres and telecommunications installations required to be operational during flooding
- Emergency dispersal points
- Basement dwellings
- Caravans, mobile homes and park homes intended for permanent residential use
- Installations requiring hazardous substances consent (where there is a demonstrable need to locate such installations for bulk storage of materials with port or similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as “essential infrastructure”)

### More Vulnerable

- Hospitals
- Residential institutions such as residential care homes, children’s homes, social services homes, prisons and hostels
- Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels
- Non-residential uses for health services, nurseries and educational establishments.
- Landfill and sites used for waste management facilities for hazardous waste
- Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan

### Less Vulnerable

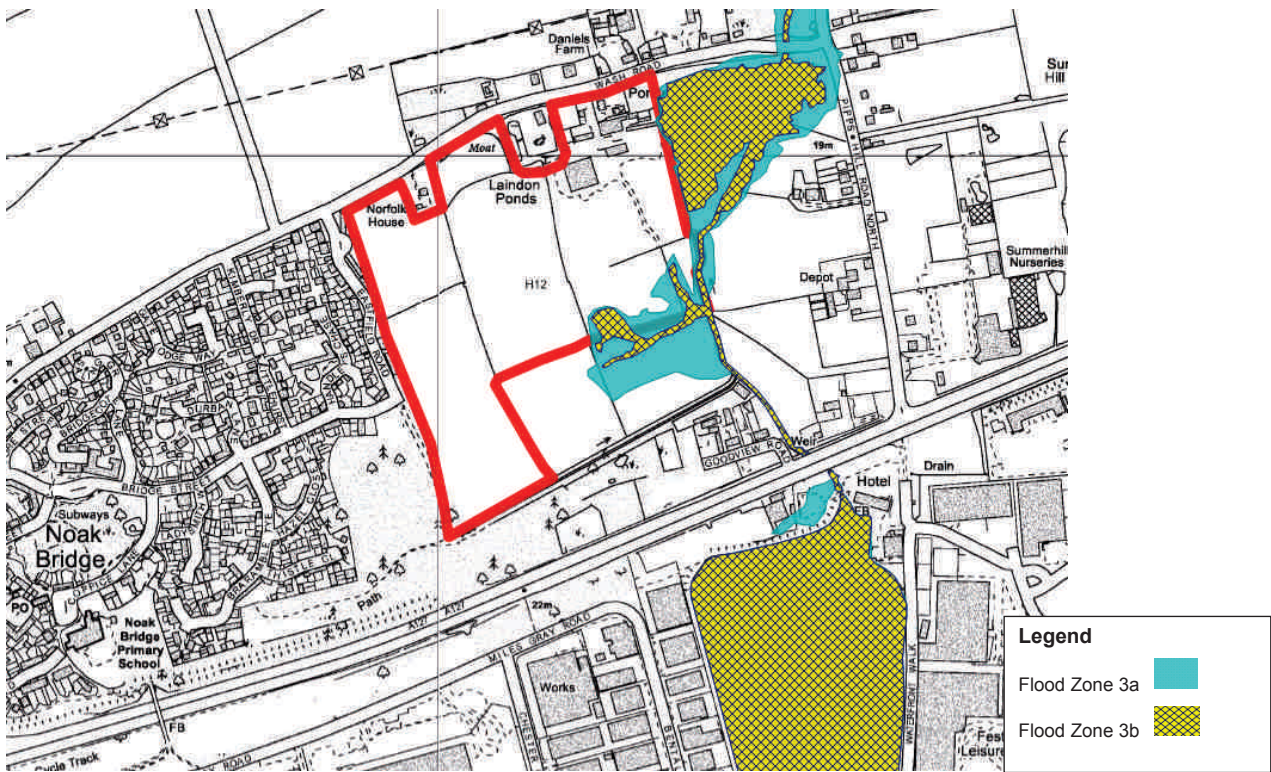
- Police, ambulance and fire stations which are not required to be operational during flooding
- Buildings used for shops, financial, professional and other services, restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non-residential institutions not included in “more vulnerable”, and assembly and leisure
- Land and buildings used for agriculture and forestry

- Waste treatment (except landfill and hazardous waste facilities)
- Mineral working and processing (except for sand and gravel working)
- Water treatment works which do not need to remain operational during times of flood
- Sewage treatment works (if adequate measures to control pollution and manage sewage during flooding events are in place)

#### **Water-Compatible Development**

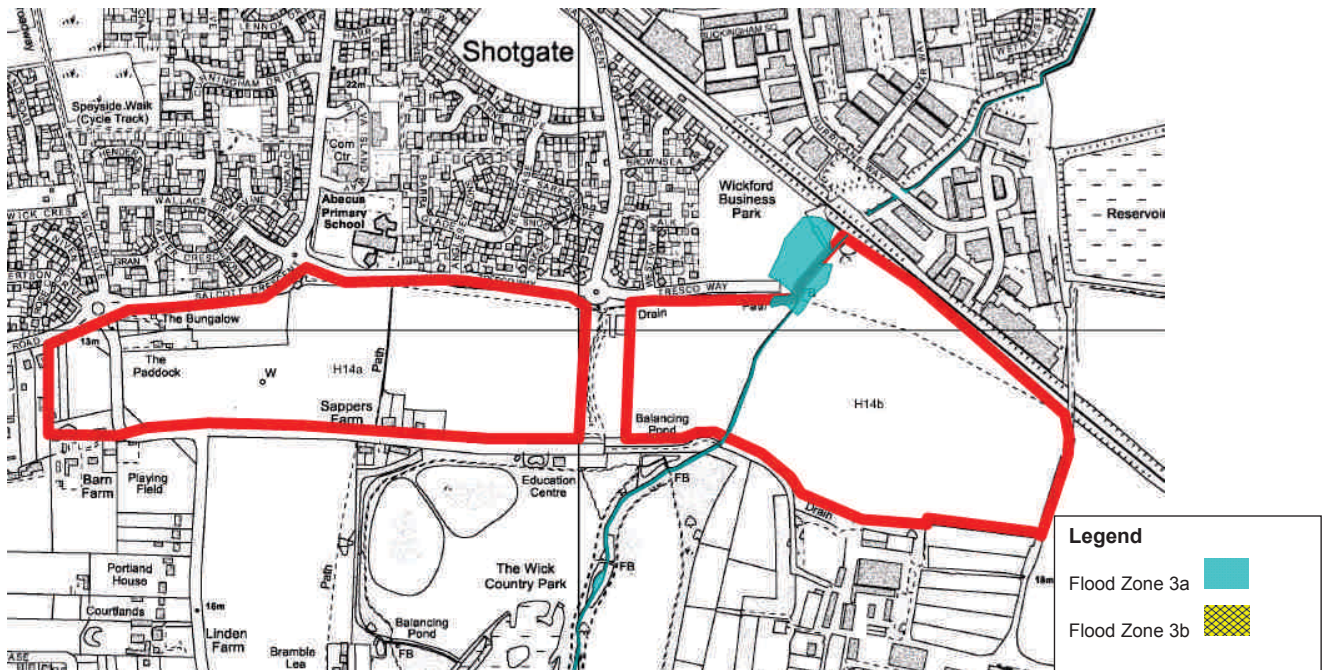
- Flood control infrastructure
- Water transmission infrastructure and pumping station
- Sewage transmission infrastructure and pumping stations
- Sand and gravel working
- Docks, marinas and wharves
- Navigation facilities
- Ministry of Defence installations
- Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location
- Water based recreation (excluding sleeping accommodation)
- Lifeguard and coastguard stations
- Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms
- Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan

**APPENDIX 2– Sites within Flood Zones 3a and 3b – Site H12: Land East of Noak Bridge, Wash Road, Basildon (Flood Zone 3b)**



**APPENDIX 3: Sites within Flood Zones 3a and 3b – Site H14: Land South of Cranfield Park Road, Wickford (Flood Zone 3a)**

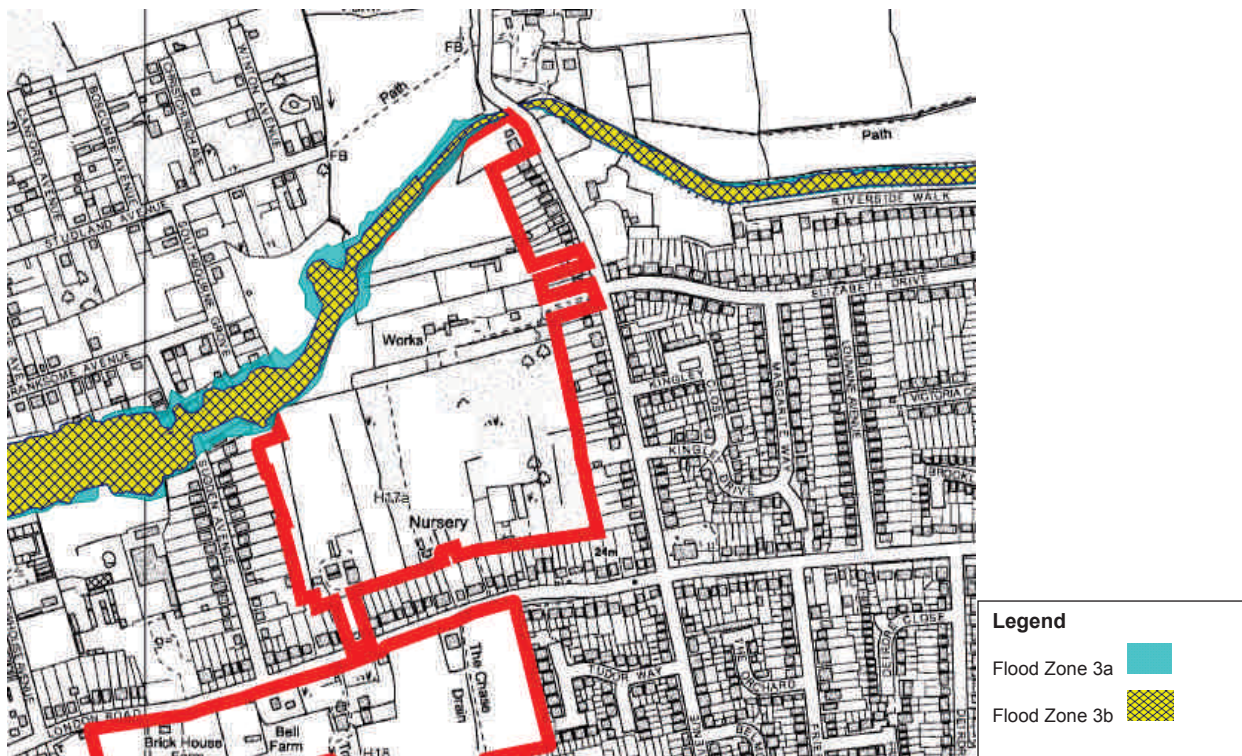
29





**APPENDIX 4: Sites within Flood Zones 3a and 3b – Site H17: Land North of London Road, Wickford (Flood Zone 3b)**

30



APPENDIX 5: Sites within Flood Zones 3a and 3b – Site R5: Wickford Town Centre (Flood Zone 3b)

