

RIVER ROAD

Area Name: River Road

Location: Barking

River Catchment: River Thames, River Roding and Buzzard Mouth Creek

NPPF Flood Zone (majority of area): Flood Zone 3a

NPPF Flood Zone (worst case): Flood Zone 3a

Introduction

The River Road strategic development site occupies an area of approximately 0.46km² and is located in the south-west of the Borough. The regeneration area is bounded to the north by the Thames Road strategic development site, to the south by the Creekmouth strategic development site, to the west by the River Roding and to east by the Barking Riverside strategic development site.

The existing land use comprises predominantly commercial and industrial properties.

The proposal for the development for the River Road strategic development site comprises the provision of residential developments.

Description of Flood Risk

Fluvial and Tidal

The primary sources of flood risk at the River Road development site are tidal flooding from the River Thames and fluvial flooding from the River Roding which flows in a north-south direction adjacent to the western boundary of the site. The site is also indicated to be at risk of flooding from the Mayes Brook located to the north of the site, although the mapped fluvial flood extents associated with this watercourse are minimal as illustrated in Figure P2B.

Review of current fluvial and tidal flood mapping indicates that the site may have also been at risk of fluvial flooding from the Buzzard Mouth Creek, a tributary of the River Thames, that is located immediately to the east of the development site. However, review of the Barking Riverside FRA¹ indicates that the alignment of Buzzard Mouth Creek has been amended as part of the Barking Riverside development to include the creation of floodplain storage compensation and enhance the amenity value of the watercourse. The residual flood risks associated with this watercourse are considered to be minimal.

The Environment Agency combined fluvial and tidal flood map (illustrated in Figure P1) indicates that the majority of the River Road development site is located within the high risk Flood Zone 3a (c. 70%) and the remaining 30% of the area in the low risk Flood Zone 1. It should be noted that the extent of the Flood Zone 3a and Flood Zone 2 are very similar, with only nominal differences within the strategic development site located along the western peripheral of the flood extent.

¹Barking Riverside Flood Risk Assessment, Barking Riverside Ltd, December 2004.

Analysis of local topography and Flood Zones indicates the flood depths are expected to reach up to approximately 2.5m in areas of Flood Zone 3a when the presence of the flood defences are not taken into account.

The functional floodplain, Flood Zone 3b, is limited to within the channel of the River Roding and is therefore behind the flood defences which form the western boundary of the River Road site.

Fluvial and tidal flooding within the River Road strategic development site is illustrated in Figures P1, P2A and P2B.

Surface Water

The Environment Agency Risk of Flooding from Surface Water map indicates that the River Road strategic development site is generally at low risk of surface water flooding. The most significant surface water flood risk within the strategic development site is along River Road, which is the main access route through the site. Flood depths of up to 0.6m are predicted for the 1 in 100 (1%) annual probability rainfall event, which has an associated flood hazard rating of "moderate" (Danger for some). Similar depths of flooding are also predicted in the vicinity of the existing industrial properties toward the south of the site.

Flood hazards associated with surface water flooding during the 1 in 100 (1%) annual probability event are illustrated in Figure P3.

Groundwater

The increased Potential for Elevated Groundwater map (iPEG), developed for the Barking and Dagenham SWMP, indicates that the River Road strategic development site is not within the area identified as having an increased potential for groundwater to interact with or rise to within 2m of the ground surface. For details of the iPEG map refer to the Level 1 SFRA Section 5.3 and Appendix I.

Defence or Reservoir Failure

The River Road strategic development site benefits from flood defences on the River Roding and from the Thames tidal defences, including the Barking Barrier. Areas identified to benefit from existing defences are illustrated in Figures P4 and P5, noting that this does not take the potential effects of climate change into account.

The Lower Roding Flood Risk Mapping study (undertaken by Capita Symonds in 2009) indicates that the defences along the River Roding provide a Standard of Protection (SoP) to River Road equivalent to a 1 in 200 (0.5%) annual probability fluvial flood. This study only assessed the fluvial flood risk from the River Roding and no assessment was undertaken of a fluvial flood event occurring when the Barking Barrier is closed or when tide levels in the River Thames are high.

The River Thames tidal defences provide a present day SoP equivalent to a 1 in 2000 (0.05%) annual probability tidal flood event. It is believed that by 2030 the SoP will decrease to approximately 1 in 1000 (0.1%).

Site-specific flood risk assessments for developments within the areas benefitting from the defences along the River Roding and the River Thames should include an assessment of the risk of overtopping of the defences, as well as the risk of a breach in the defences. This should also consider the condition of flood defences as discussed in the Level 1 SFRA.

The Environment Agency River Thames breach analysis published in 2017, and the breach analysis undertaken for the Barking and Dagenham SFRA published in 2008, indicates that the degree of flood hazard throughout the majority of the River Road strategic development site would be 'very high'

(Danger for all) should a breach in the River Roding or River Thames defences occur. Land immediately behind the River Roding defences is indicated to be at lowest risk due to localised high ground, although an assessment of breach at this location has not been undertaken and therefore it is recommended that land immediately adjacent to the defences is considered in the same manner as the rest of the site.

Mapped outputs of breach analysis relevant to the River Road strategic development site are provided in Figures P6 to P9.

Review of the available breach mapping indicates that following a breach of the flood defences along the River Roding or River Thames, flooding of the River Road strategic development site would occur rapidly with the majority of the site predicted to flood in less than 5 hours.

As discussed above, it should also be noted that no breach locations have been selected immediately adjacent to the River Road site. Whilst localised high ground immediately adjacent to the River Roding flood defences indicates a lower rate of inundation, it is recommended that that land immediately adjacent to the defences is considered in the same manner as the rest of the site.

During the most recent inspections undertaken by the Environment Agency in 2015-2016, generally, the flood defence assets protecting Barking and Dagenham are in good condition; of the 120 flood defence assets surveyed, 105 were classified as being 'Good' or 'Very Good'. However, four of the surveyed flood defence assets were classified as being 'Poor' or 'Very Poor'.

Two of the flood defence assets on the River Roding, approximately 3.4km upstream from the confluence with the Thames, were assessed as being in 'Poor' condition, (Environment Agency asset numbers 8742 and 15371). A failure of flood defence asset no. 15371 on the left bank of the river would be unlikely to affect the River Road strategic development site.

Part of the flood defences on the River Thames were also assessed as being in 'Poor' and 'Very Poor' condition during the Environment Agency's last inspections. These are located at the confluence with the River Beam (Environment Agency asset number 7391) and approximately 2.2km downstream of the confluence with the River Roding (Environment Agency asset number 14860) respectively. A failure of the 'Very Poor' flood defence asset (no. 14860) could affect the River Road strategic development site.

The Environment Agency Risk of Flooding from Reservoirs map indicates that River Road is not at risk from reservoir flooding.

Flood Warning Areas

The areas identified as being at fluvial or tidal flood risk within the River Road strategic development site are within the Environment Agency 'Tidal Thames from Mar Dyke to Barking Creek' Flood Warning Area.

Flood Warnings are issued to specific areas when flooding is expected. Flood Warnings apply to fluvial and tidal flooding, not to flooding from other sources such as sewer and surface water flooding.

Areas of the River Road strategic development site which benefit from Environment Agency Flood Warnings are illustrated in Figure P10.

Impact of Climate Change

Updated guidance for considering the potential effects of climate change for the 1 in 100 (1%) annual probability event has been considered within the fluvial modelling undertaken of the Mayes Brook to the north of the River Road site. The results of this analysis are provided in Figure P2B and indicates

no notable increase in fluvial flood risk to the River Road strategic development site from this watercourse when compared to the present day scenario.

Updated climate change analysis has not yet been undertaken for the Lower Roding that affects the River Road strategic development site. This is expected to be published by the Environment Agency in May / June 2018. Review of the mapped extents of the present day Flood Zones 2 and 3, as well as the mapped extents of flood defence breach that considers climate change effects, indicates that the impact of climate change on the extent of fluvial and tidal flood risk at this development site will be small, albeit potentially to a greater depth. However, users of this SFRA should undertake their own analysis (in accordance with the detailed and intermediate approach outlined in Section 6.4 of the Level 1 SFRA) of climate change effects if necessary

The effects of climate change will also potentially increase the frequency and intensity of surface water flood risk within the Borough. A comparison of the Environment Agency 1 in 100 (1%) annual probability and 1 in 1000 (0.1%) annual probability predicted surface water flood extents, provided in the Level 1 SFRA report, indicates that flooding of River Road (the access route through the site) is likely to be exacerbated. In addition, there is likely to be an increase in the surface water flood risk along Creek Road and Long Reach Road.

Planning Recommendations

Spatial Planning and Development Control

Development of the site should be undertaken in accordance with the principles as set out within Section 1 of the Level 2 SFRA and Section 7 of the Level 1 SFRA. It is understood that the proposed development within the River Road strategic development site comprises residential development.

Proposed development within the River Road strategic development site should be located within areas identified as Flood Zone 1 and Flood Zone 2 wherever possible. However this only accounts for a nominal proportion of the site, with the vast majority of the site in the higher risk Flood Zone 3.

Residential development may be acceptable in the high risk Flood Zone 3a following the successful application of the Exception Test. It will be necessary to demonstrate that the suitability of all other sites at lower flood risk has been considered and, if so, that the location of development in Flood Zone 3a provides wider sustainability benefits to the community that outweigh flood risk. This may include the redevelopment of derelict sites, wider benefits to the local economy and the need to meet demanding housing needs.

Development in Flood Zone 1

A site-specific flood risk assessment is required for developments in Flood Zone 1 where the development is 1 hectare or greater in area or at significant risk of flooding from other sources (i.e. surface water, sewerage systems or reservoirs). Given that the site may be at risk of flooding following a breach of the adjacent defences and that all access and egress routes will need to pass through areas at fluvial and tidal flood risk, it is recommended that any development put forward within the River Road strategic development site is supported by a flood risk assessment.

The need and scope of the site-specific flood risk assessment in Flood Zone 1 should be discussed and agreed with the Council. However, it is recommended that the same requirements are applied to those recommended for development in Flood Zones 2 and 3 as per below.

Development in Flood Zones 2 and 3

A site-specific flood risk assessment is required to support any planning application in River Road for development located within Flood Zone 2 or Flood Zone 3, including those areas that benefit from

flood defences. The site-specific flood risk assessment should be undertaken in accordance with Section 7.5 of the Level 1 SFRA.

The assessment of flood risk in areas that benefit from flood defences should include an assessment of risk following a breach in the flood defences, as informed by breach analysis completed by the Environment Agency. A sequential approach to the development layout should be adopted that locates the most vulnerable development away from the areas of the site at highest flood risk, particularly those areas at greatest risk of flooding in the event of a breach.

For development in Flood Zones 2 and 3, it is recommended that floor levels within new development are situated a minimum of 0.3m above the predicted 1 in 100 (1%) annual probability fluvial flood level or 1 in 200 (0.5%) annual probability tidal flood level, including an allowance for climate change effects, calculated assuming a breach of the raised flood defences.

The site is not indicated to be at significant risk of fluvial or tidal flooding when the presence of defences are taken into account. However, if detailed analysis indicates that there are areas of the site not protected up to the 1 in 100 (1%) annual probability fluvial flood level or 1 in 200 (0.5%) annual probability tidal flood level, including an allowance for climate change effects, it is recommended that residential development is not located within these areas.

Raising floor levels (or site-wide ground levels) to a level above the predicted flood levels taking a breach into account may not be appropriate for all areas of the site given the potential for deep flood waters following a breach. In this situation it is recommended that the developer strives to reduce the rate of inundation (i.e. through raising ground levels as high as practicable) to 10 hours or greater to provide sufficient time to facilitate evacuation of the site. It would not be considered acceptable to locate ground floor sleeping accommodation in areas that may be at risk following a breach of the defences.

Dry access should be provided above the 1 in 100 (1%) annual probability fluvial flood level or 1 in 200 (0.5%) annual probability tidal flood level, calculated assuming a breach of the raised flood defences. Where this is not possible, safe access with 'very low' flood hazard should be demonstrated. Only where neither of these is feasible, a dedicated 'safe haven' should be provided. This may be provided in the form of a sheltered communal space within the building, accessed via internal stairs. It will be necessary to ensure that the safe haven is sufficient in size to safely house all residents/users of the building.

Development proposed within Flood Zone 3a and/or development proposed in areas at 'very high' flood hazard, including that within areas identified to benefit from flood defences, should be supported by a flood evacuation plan and/or emergency response plan prepared in consultation with the local emergency planning department and emergency services. This is considered to be applicable for all areas of the River Road strategic development site.

Any loss of flood plain storage within the undefended fluvial Flood Zone 3a up to the 1 in 100 (1%) annual probability plus climate change event should be compensated for on a like-for-like basis to ensure no increased flood risk elsewhere as a result of development, unless detailed site assessment demonstrates that development within these areas causes no increased flood risk elsewhere. Compensation is not required for areas at tidal flood risk or that benefit from flood defences and allowing for the potential effects of climate change. Review of Figure P4 indicates that all areas deemed to be at fluvial flood risk up to the current 1 in 100 (1%) annual probability event benefit from flood defences, but this does not take the potential effects of climate change into account.

No basement that is to be used as a habitable dwelling or provide living accommodation is considered acceptable in Flood Zone 3a and it is advisable that basements used as a habitable dwelling are also not proposed in the medium risk Flood Zone 2.

If basements are proposed for other uses such as car parking, these are not considered appropriate where the rate of inundation is less than 5 hours. Any basement structures within the defended high risk Flood Zone 3a or medium risk Flood Zone 2 should provide safe internal access to a level 0.3m above the 1 in 200 (0.5%) annual probability tidal flood level with an allowance for climate change.

Basement structures within the defended Flood Zone 3a and in areas that are indicated to be at risk following breach of the flood defences should also be protected with a continuous secondary fixed flood defence. In practical terms, this may be a raised wall incorporated into the landscaping that will withstand the ponding of water (i.e. following a breach failure), and will prevent water surging into the basement area with little or no warning. Flood resilient design techniques should be adopted for all basement uses.

Sustainable Drainage Systems

SUDS techniques as discussed in Section 7.7 of the Level 1 SFRA should be promoted wherever possible. The site should seek opportunities to integrate SUDS within the design of the site and provide an exemplar of best practice techniques including good use of green space to accommodate a variety of SUDS features in order to control and treat runoff from the site.

The type of drainage system(s) adopted at the site may be constrained by the size of the development sites, how development will be phased (if applicable), the contamination risks posed by the sites current and historic industrial heritage and possible high ground water levels due to the sites proximity to the River Thames.

As this site is previously developed it should strive to achieve betterment over existing discharge rates for any runoff discharged to the Mayes Brook or Buzzard Mouth Creek. Minimum betterment of 20% is considered appropriate whilst also taking the potential effects of climate change into consideration, with developers striving to achieve pre-developed greenfield rates as far as practicable. A higher discharge rate may be acceptable where the outfall is directly into the River Roding although the effects of tide locking must be considered up to the 1 in 100 (1%) annual probability event.

