APPENDIX C

BARKING TOWN CENTRE

BARKING TOWN CENTRE

Area Name: Barking Town Centre
Location: Barking
River Catchment: River Roding/River Thames
NPPF Flood Zone (majority of area): Flood Zone 1
NPPF Flood Zone (worst case): Flood Zone 3a

Introduction

The Barking Town Centre strategic development site is approximately 1.9km^2 in area and is located in the west of the Borough (see Appendix A). The area is bounded by Victoria Road in the north, Barking Park and the railway line in the east, the A13 in the south and the A406 in the west.

The existing land use in the area is predominantly residential but with significant commercial areas including Barking Town Centre in the centre of the area and Abbey Retail Park and other commercial/industrial properties in the west of the area. Barking railway station is located in the east of Barking Town Centre.

The proposals for the development of the Barking Town Centre strategic development site comprise the provision of c. 4,000 homes.

Description of Flood Risk

Fluvial and Tidal

The primary sources of flood risk in Barking Town Centre are fluvial flooding from the River Roding, which flows in a north-south direction parallel to the western boundary, and tidal flooding from the River Thames. Loxford Water, a tributary of the River Roding, located near Victoria Road in the north of the area also poses a risk of fluvial flooding. The majority of Barking Town Centre (c. 65%) is located within the low risk Flood Zone 1 with c. 30% of the area within the high risk Flood Zone 3a. The remaining c. 5% of the area is within the medium risk Flood Zone 2.

Analysis of local topography and Flood Zones indicates the flood depths are expected to reach up to 2m in areas in Flood Zone 3a. Land identified to be within Flood Zone 3a includes:

- Gascoigne Road, Abbey Road and King Edwards Road in the south of the area;
- Land in the vicinity of Loxford Water in the north of the area including Victoria Road, Loxford Road and Tanners Street to the north of the Railway Line and Gurney Close and Cows Road to the south of the railway line;
- Land to the west of the River Roding in the vicinity of Hertford Road.

In the Barking Town Centre strategic development site the extents of Flood Zone 3a and Flood Zone 2 are very similar. The only significant areas within Flood Zone 2 are in the vicinity of Howard Road and St. Margarets Road in the south of the area and the land in the vicinity of Highbridge Road in the west.

The functional floodplain of the River Roding and Loxford Water within the Barking Town Centre strategic development site is limited to the watercourse channel and behind the identified flood defences.

Fluvial and tidal flooding within the Barking Town Centre strategic development site is illustrated in Figures C1 and C2A.

Surface Water

The Environment Agency Risk of Flooding from Surface Water map indicates that the Barking Town Centre strategic development site is generally at low risk of surface water flooding.

The most significant surface water flood risk as identified within the Barking and Dagenham SWMP is predicted in the vicinity of Whiting Avenue and is identified as a Local Flood Risk Zone (LFRZ). Depths of up to 1m are predicted in this area during a rainfall event with an annual probability of 1 in 100 (1%). The SWMP identifies the degree of flood hazard due to a rainfall event with an annual probability of 1 in 100 (1%) at the junction of Whiting Avenue and Bower House as 'significant' (Danger for most). Wider areas in the vicinity of Whiting Avenue are expected to have 'moderate' (Danger for some) flood hazard.

The surface water flood map also predicts a significant depth of surface water ponding between Loxford Water and Victoria Road in the north of the Barking Town Centre strategic development site. The area is predicted to have a 'significant' (Danger for most) flood hazard with surrounding areas, including Victoria Road and Tanner Street, having a 'moderate' (Danger for some) hazard rating.

Land within the New England Industrial Estate in the south of the Barking Town Centre strategic development site is predicted to be at significant surface water flood risk, with depths of up to 1.5m and a flood hazard of 'significant' (Danger for most).

Flood hazards associated with surface water flooding during the 1 in 100 (1%) annual probability event are illustrated in Figure C3.

Groundwater

The increased Potential for Elevated Groundwater map (iPEG), developed for the Barking and Dagenham SWMP, indicates the eastern boundary of the area adjacent to the Beam River, the northern boundary adjacent to Loxford Water and the south east corner of the area in the vicinity of Wheelers Cross to be located within areas 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 report Section 5.3 and Appendix I. The areas identified as being at risk of surface water flooding in the previous section, in the vicinity of Whiting Avenue and adjacent to the River Roding and Loxford Water, are within the areas highlighted on the iPEG map. Groundwater emergence could pose flood risk to basement or below ground structures, as well as generate overland flows that are likely to pond in areas of lower/flat topography or be similar in location to those discussed as part of the surface water flood analysis.

Defence or Reservoir Failure

The Barking Town Centre 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 flood defences are illustrated in Figure C4 and C5, but 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 Barking Town Centre 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 in a significant proportion of the Barking Town Centre strategic development site would be 'very high' (Danger for all) should a breach in the Barking Creek or River Thames defences occur. In general the areas shown to be at risk of flooding following a breach are broadly similar to those areas identified

to be at risk within the mapped Flood Zone 2 and 3, with the addition of land immediately adjacent to the River Roding.

Mapped outputs of breach analysis relevant to the Barking Town Centre strategic development site are provided in Figure C6 to C9.

Review of the available breach mapping indicates that following a breach of the flood defences along the Barking Creek, flooding would occur rapidly in approximately 35% of Barking Town Centre. Inundation rates are predicted to be less than 5 hours in the majority of areas at risk.

There are a number of informal (defacto) flood defences in the area. The most noticeable is the railway line, which may provide some flood protection from upstream areas of the River Roding and the Loxford Water. The likelihood of these informal defences failing is very low. The consequence of the failure of the informal defences would also be low, as the Flood Zones associated with the River Roding and the River Thames do not extend north-east of the railway line.

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 6.5km upstream from the confluence with the Thames, were assessed as being in 'Poor' condition, (Environment Agency asset numbers 8742 and 15371). A failure of either of these assets would be likely to affect the Barking Town Centre 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) would be likely to affect the Barking Town Centre strategic development site.

The Environment Agency Risk of Flooding from Reservoirs map indicates the west of the area between the River Roding and the A406 to be at risk of flooding from the Basin Reservoir in Wanstead and the Perch Pond Reservoir in Wanstead Park.

Flood Warning Areas

The south and west areas of the Barking Town Centre strategic development site are within the Environment Agency 'Tidal Thames at Becton Sewage Works' and 'River Roding at Barking' Flood Warning Areas respectively. Land identified to be at fluvial flood risk adjacent to Loxford Water is also included in the Environment Agency Flood Alert Area.

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

Mapped outputs showing the Environment Agency Flood Warning Areas relevant to the Barking Town Centre strategic development site are provided in Figure C10.

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 of the Mayes Brook that flows to the south of the A13 Alfreds Way. The mapping, provided in Figure C2B, indicates that the Barking Town Centre strategic development site will not be at risk of flooding from the Mayes Brook when the potential effects of climate change are considered.

Updated climate change analysis has not yet been undertaken for the other main rivers within Barking and Dagenham, including the Lower Roding and Loxford Water that affect the Barking Town Centre

strategic development site. This is expected to be published by the Environment Agency in December 2017. 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 not only increase the risk of flooding posed to property as a result of river and/or tidal flooding, but it 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 SFRA Level 1 report, indicates that the north area of the Barking Town Centre strategic development site, near to Loxford Water, may be vulnerable to the impacts of climate change and, in addition, a number of other roads within the site may be at risk in the future.

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 this report and Section 7 of the Level 1 SFRA. It is understood that the proposed development within the Barking Town Centre strategic development site comprises residential development of c. 4,000 homes.

Proposed development within the Barking Town Centre strategic development site should be located within areas identified as Flood Zone 1 wherever possible. Residential development (excluding basement dwellings) would be considered acceptable in the medium probability Flood Zone 2 if necessary. Residential development may also 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 location of development in Flood Zone 3a provides wider sustainability benefits to the community that outweigh flood risk, such as the redevelopment of derelict sites, wider benefits to the local economy and the need to meet demanding housing needs.

Development in Flood Zones 2 and 3

A site-specific flood risk assessment is required to support any planning application in Barking Town Centre for development located within Flood Zone 2 or Flood Zone 3, including those areas that may 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.

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 design flood level for fluvial flooding scenarios, including an allowance for climate change effects. Within tidal areas, this should be taken as the 1 in 200 (0.5%) annual probability design flood level, including an allowance for climate change effects, calculated assuming a breach of the raised flood defences.

Where possible, development should be located outside of areas identified to be at risk following breach of the flood defences, particularly those areas that may be at risk from sudden inundation with an associated ‘very high’ flood hazard due to the predicted depth and velocity of flood waters in some areas. If it is not possible to locate the ground floor level of the development above the predicted 1 in 100 (1%) annual probability fluvial flood level or 1 in 200 (0.5%) annual probability tidal flood level, 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.

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 in those areas benefitting from 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 unlikely to be required for developments only located in Flood Zone 2.

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 C4 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.

Any basement structures within the defended or undefended 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 100 (1%) annual probability fluvial flood level or 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.

Basements where the rate of inundation is less than 5 hours are not considered appropriate. Similarly, no basement that is to be used as a habitable dwelling 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.

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).

The need and scope of a site-specific flood risk assessment in Flood Zone 1 should be discussed and agreed with the Council. However, it is recommended that, at minimum, a site-specific flood risk assessment is provided for development at risk of surface water flooding up to the 1 in 30 (3.33%) annual probability event, or at risk of flooding to a depth greater than 300mm during the 1 in 100 (1%) annual probability event. It is also recommended that a site-specific flood risk assessment is provided for development at risk of flooding from reservoirs.

Within a development site, a sequential approach should be adopted that takes into account the potential effects of climate change of fluvial and tidal flood risk, and that takes into account flooding from other sources.

To ensure the flood resistance of a building, it is recommended ground floor levels are situated 300mm above adjacent ground level, or above the estimated 1 in 100 (1%) annual probability flood depth.

Basement structures are considered acceptable in Flood Zone 1, although where possible they should be designed to prevent the overland flow of water entering the basement structure up to and including the 1 in 30 (3.33%) annual probability event.

Consideration should also be given to the impact of flooding from other sources to the ability to provide safe access and egress, similar to those recommendations made for sites at risk from fluvial and tidal flooding.

Sustainable Drainage Systems

Development sites in the Barking Town Centre strategic development site are likely to comprise a number of smaller sites that may be spatially constrained.

Controlling runoff to greenfield rates can be problematic for smaller developments as this would result in the use of very small flow control structures that will be liable to blockage. Similarly, providing large attenuation structures and 'good' SUDS techniques such as swales and ponds in urban areas can be difficult to achieve given space constraints, the urban character and the value of land for development. Existing urban sites, particularly those with an industrial heritage, may also contain contaminated soils.

SUDS techniques as discussed in Section 7.7 of the Level 1 SFRA should still be promoted wherever possible. However, it is recognised that many SUDS techniques are likely to be inappropriate. Techniques such as green roofs, permeable paving and rain gardens that receive, treat and attenuate surface water runoff at source are likely to be most appropriate, with attenuation for larger events provided in below ground storage units that could be located beneath public open space and car parks. The use of lined structures in sites that may be contaminated will still offer treatment and attenuation benefits.

Previously developed sites should strive to achieve betterment over existing discharge rates. 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.

Where the peak discharge from the site is less than 5l/s, it may be acceptable to limit discharge to a minimum rate of 5 l/s up to the 1 in 100 (1%) annual probability event to reduce the risk of blockage. However, a flow control device that reduces peak flows below 5 l/s is still acceptable and should be promoted when:

- A robust maintenance regime and appropriate maintenance contract is provided by the developer; and
- An appropriate overflow device can be included within the design that will direct flows to less vulnerable areas should the flow control device block and surcharge.

Reducing the flow rate to below 2l/s is, however, considered to pose greater risk and this would be considered an appropriate minimum discharge rate for most development unless robust controls are in place for managing residual risk.

Where the development is too small to warrant the use of storage features it is essential that SUDS techniques appropriate to the development are implemented to maximise the other benefits, principally reducing discharge during small rainfall events, maximising infiltration potential, improving resilience to climate change, providing treatment and enhancing biodiversity.

Barking & Dagenham Borough Boundary

Key regeneration Sites

Main Rivers

Flood Zone 3b (defended)

Flood Zone 3a (undefended)

Flood Zone 2 (undefended)

BARKING

Little Ilford

Loxford

EAST HAM

Wallend

0 0.25 0.5 1

Kilometres

Rev	Date	Description	By	Chk	App

PARSONS BRINCKERHOFF

Kings Orchard,
1 Queen St, Bristol,
BS2 0HQ

Tel: 44-(0)117-9306200

Client:

London Borough of Barking & Dagenham

Site/Project:

STRATEGIC FLOOD RISK ASSESSMENT (SFRA) LEVEL 2

Title:

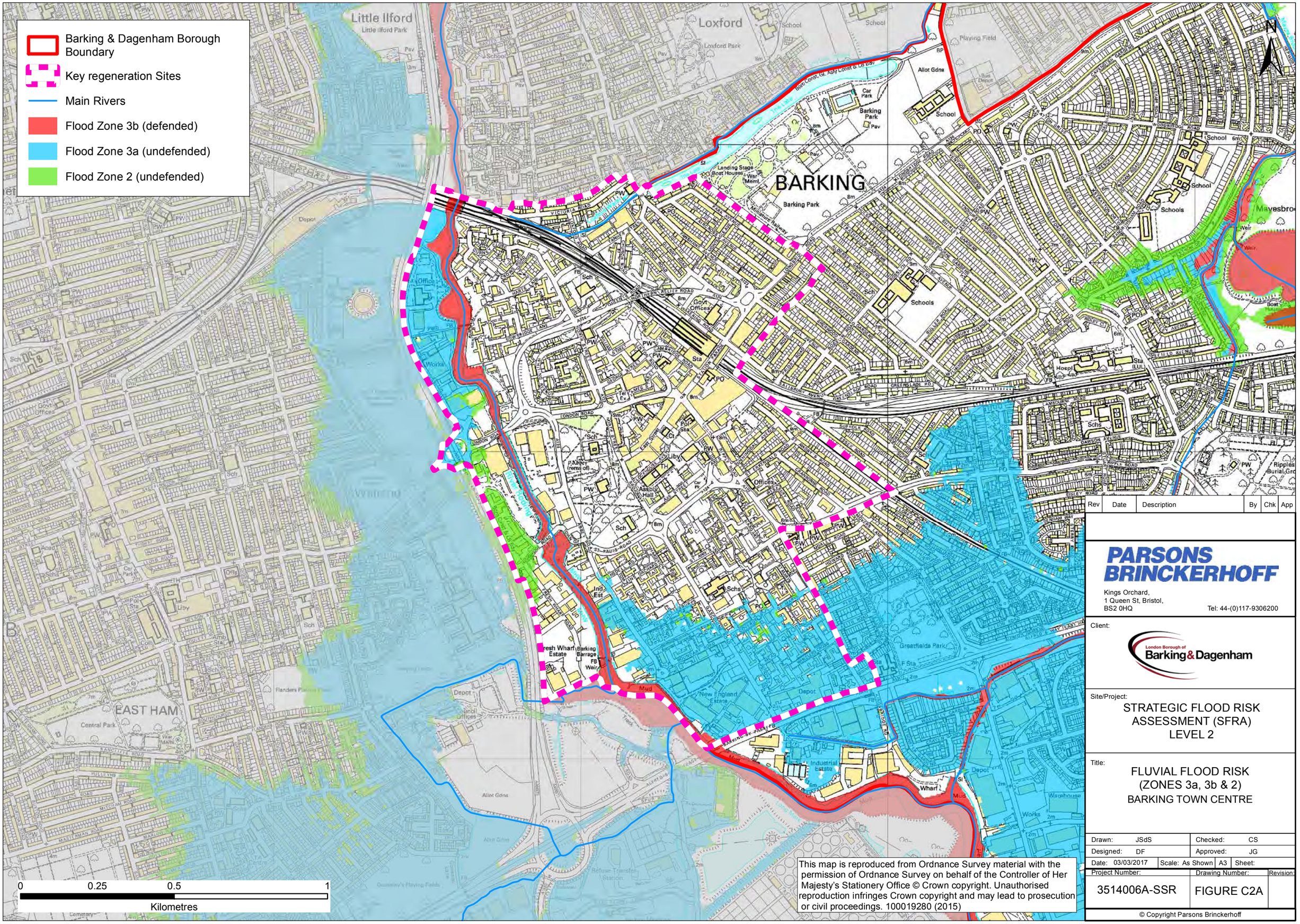
FLUVIAL AND TIDAL FLOOD RISK (ZONE 3a, 3b & 2)
BARKING TOWN CENTRE

Drawn: JSdS		Checked: CS	
Designed: DF		Approved: JG	
Date: 13/08/2015	Scale: As Shown	A3	Sheet:
Project Number:		Drawing Number:	Revision:
3514006A-SSR		FIGURE C1	

File Name: N:\Water Engineering\3514006A - LBBD SFRA_WORKING FOLDER\Y GIS\Mxd\Phase II\3514006A-SSR-Fluvial Flood Risk.mxd

Login: desouzaj

Plot Date: 13/08/2015



Rev	Date	Description	By	Chk	App

PARSONS BRINCKERHOFF
Kings Orchard,
1 Queen St, Bristol,
BS2 0HQ
Tel: 44-(0)117-9306200

Client: London Borough of Barking & Dagenham

Site/Project:
STRATEGIC FLOOD RISK ASSESSMENT (SFRA) LEVEL 2

Title:
FLUVIAL FLOOD RISK (ZONES 3a, 3b & 2)
BARKING TOWN CENTRE

Drawn: JSdS		Checked: CS	
Designed: DF		Approved: JG	
Date: 03/03/2017	Scale: As Shown	A3	Sheet:
Project Number:		Drawing Number:	Revision:
3514006A-SSR		FIGURE C2A	

File Name: \\uk.wspgroup.com\central data\Projects\62103xx\62103473 - Barking and Dagenham SFRA\E Models and Drawings\GIS\Mxd\Level 2\3514006A-SSR-Fluvial Flood Risk-C2A.mxd
Login: UKSLF003
Plot Date: 03/03/2017

Barking & Dagenham Borough Boundary

Key regeneration Sites

Main Rivers

Flood Zone 3b (defended)

1 in 100 year plus 25% Climate Change (undefended)

1 in 100 year plus 35% Climate Change (undefended)

1 in 100 year plus 70% Climate Change (undefended)

Flood Zone 2 (undefended)

0 0.25 0.5 1

Kilometres

Rev	Date	Description	By	Chk	App

PARSONS BRINCKERHOFF
Kings Orchard,
1 Queen St, Bristol,
BS2 0HQ
Tel: 44-(0)117-9306200

Client: London Borough of Barking & Dagenham

Site/Project:
STRATEGIC FLOOD RISK ASSESSMENT (SFRA) LEVEL 2

Title:
MAYES BROOK FLUVIAL FLOOD RISK WITH 25%, 35% AND 70% CLIMATE CHANGE BARKING TOWN CENTRE

Drawn: SF		Checked: PH	
Designed: DF		Approved: JG	
Date: 03/03/2017	Scale: As Shown A3	Sheet:	
Project Number:	Drawing Number:		Revision:
3514006A-SSR	FIGURE C2B		

File Name:: \\uk.wspgroup.com\central data\Projects\62103xx\62103473 - Barking and Dagenham SFRA\E Models and Drawings\GIS\Mxd\Level 2\3514006A-SSR-Fluvial Flood Risk-C2B.mxd
Login: UKSLF003
Plot Date: 03/03/2017

Barking & Dagenham Borough Boundary

Key regeneration Sites

Main Rivers

Surface water flood hazard

- Very Low - Caution
- Moderate - Danger for some
- Significant - Danger for most
- Very High - Danger for all

BARKING

Little Ilford

Loxford

Wallend

EAST HAM

0 0.25 0.5 1

Kilometres

This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. 100019280 (2015)

Rev	Date	Description	By	Chk	App

PARSONS BRINCKERHOFF

Kings Orchard,
1 Queen St, Bristol,
BS2 0HQ

Tel: 44-(0)117-9306200

Client: London Borough of Barking & Dagenham

Site/Project:

STRATEGIC FLOOD RISK ASSESSMENT (SFRA) LEVEL 2

Title:

SURFACE WATER FLOODHAZARD (1 IN 100 YEAR)

BARKING TOWN CENTRE

Drawn: JSdS		Checked: CS	
Designed: DF		Approved: JG	
Date: 13/08/2015	Scale: As Shown	A3	Sheet:
Project Number:		Drawing Number:	Revision:
3514006A-SSR		FIGURE C3	

File Name:: N:\Water Engineering\3514006A - LBBD SFRA_WORKING FOLDER\Y GIS\Mxd\Phase II\3514006A-SSR-Surface Water Flood Hazards.mxd

Login: desouzaj

Plot Date: 13/08/2015

Barking & Dagenham Borough Boundary

Key regeneration Sites

Main Rivers

Areas benefiting from Fluvial Defences

BARKING

EAST HAM

Little Ilford

Loxford

Wallend

0 0.25 0.5 1

Kilometres

This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. 100019280 (2015)

Rev	Date	Description	By	Chk	App

PARSONS BRINCKERHOFF

Kings Orchard,
1 Queen St, Bristol,
BS2 0HQ

Tel: 44-(0)117-9306200

Client:

London Borough of Barking & Dagenham

Site/Project:

STRATEGIC FLOOD RISK ASSESSMENT (SFRA) LEVEL 2

Title:

AREAS BENEFITING FROM FLUVIAL DEFENCES
BARKING TOWN CENTRE

Drawn: JSdS		Checked: CS	
Designed: DF		Approved: JG	
Date: 13/08/2015	Scale: As Shown	A3	Sheet:
Project Number: 3514006A-SSR		Drawing Number: FIGURE C4	Revision:

File Name: N:\Water Engineering\3514006A - LBBD SFRA_WORKING FOLDER\Y GIS\Mxd\Phase II\3514006A-SSR-Fluvial_defences.mxd

Login: desouzaj

Plot Date: 13/08/2015

Barking & Dagenham Borough Boundary

Key regeneration Sites

Main Rivers

Areas benefiting from Fluvial & Tidal Defences

BARKING

EAST HAM

Wallend

Little Ilford

Loxford

0 0.25 0.5 1

Kilometres

Rev	Date	Description	By	Chk	App

PARSONS BRINCKERHOFF

Kings Orchard,
1 Queen St, Bristol,
BS2 0HQ

Tel: 44-(0)117-9306200

Client: London Borough of Barking & Dagenham

Site/Project:

STRATEGIC FLOOD RISK ASSESSMENT (SFRA) LEVEL 2

Title:

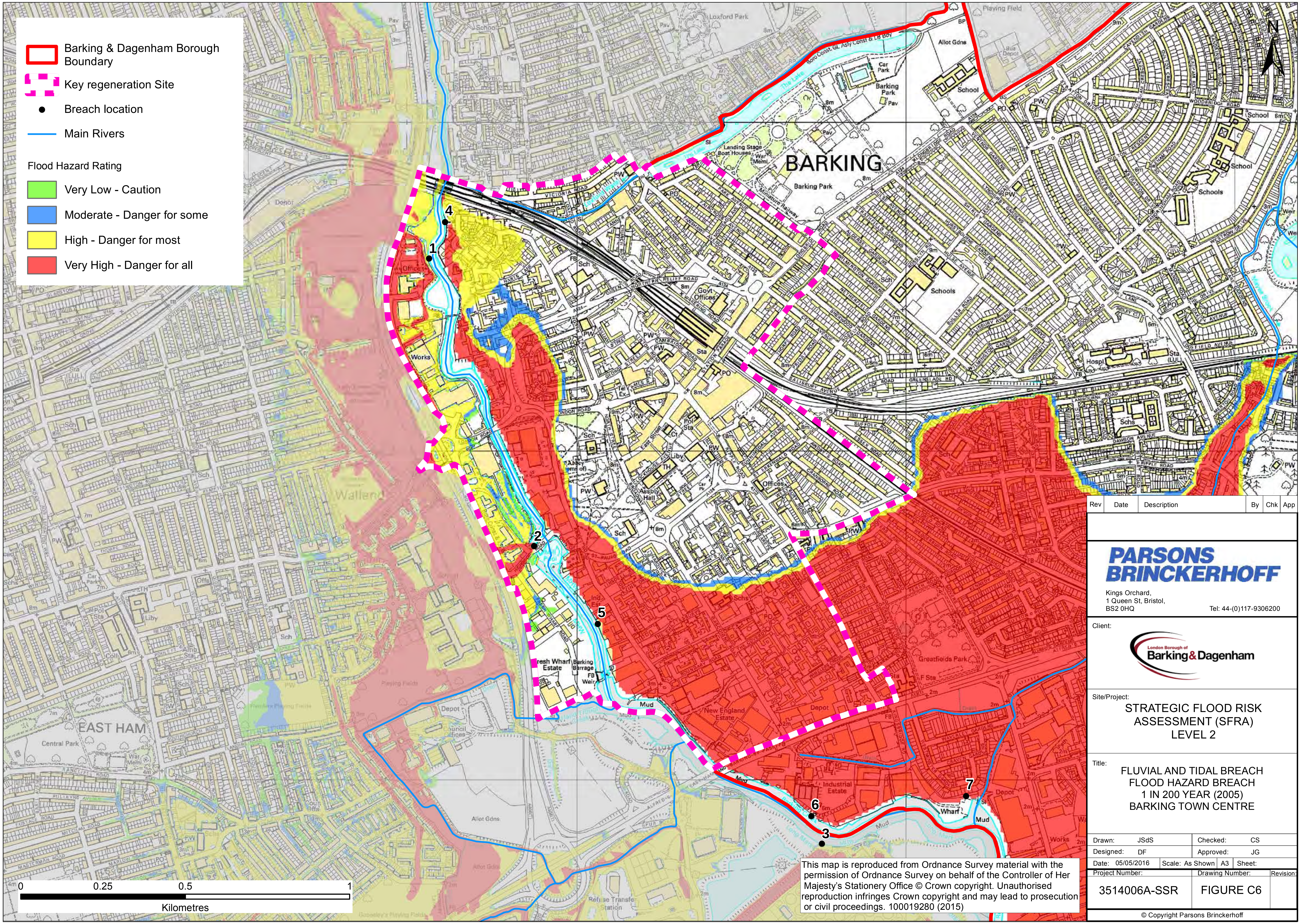
AREAS BENEFITING FROM FLUVIAL & TIDAL DEFENCES
BARKING TOWN CENTRE

Drawn: JSdS		Checked: CS	
Designed: DF		Approved: JG	
Date: 13/08/2015	Scale: As Shown	A3	Sheet:
Project Number:		Drawing Number:	Revision:
3514006A-SSR		FIGURE C5	

File Name: N:\Water Engineering\3514006A - LBBD SFRA_WORKING FOLDER\Y GIS\Mxd\Phase II\3514006A-SSR-Fluvial_Tidal_defences.mxd

Login: desouzaj

Plot Date: 13/08/2015



File Name:: N:\Water Engineering\3514006A - LBBD SFRA_WORKING FOLDER\GIS\Mxd\April 2016\3514006A-SSR-Phase_II_Flood_Hazard_2005.mxd

Login: DeSouzaJ
Plot Date: 07/06/2016

Barking & Dagenham Borough Boundary

Key regeneration Sites

Breach location

Main Rivers

Flood Hazard Rating

- Very Low - Caution
- Moderate - Danger for some
- High - Danger for most
- Very High - Danger for all

1

2

3

4

5

6

7

BARKING

EAST HAM

Climate change data for breaches 4 - 7 is not available and therefore the data from present day simulations has been used in the production of this map.

0 0.25 0.5 1

Kilometres

Rev	Date	Description	By	Chk	App

PARSONS BRINCKERHOFF

Kings Orchard,
1 Queen St, Bristol,
BS2 0HQ
Tel: 44-(0)117-9306200

Client: London Borough of Barking & Dagenham

Site/Project:
STRATEGIC FLOOD RISK ASSESSMENT (SFRA) LEVEL 2

Title:
FLUVIAL AND TIDAL BREACH FLOOD HAZARD BREACH 1 IN 200 YEAR (2100) BARKING TOWN CENTRE

Drawn: JSdS		Checked: CS	
Designed: DF		Approved: JG	
Date: 05/05/2016	Scale: As Shown	A3	Sheet:
Project Number:		Drawing Number:	Revision:
3514006A-SSR		FIGURE C7	

File Name: - N:\Water Engineering\3514006A - LBBD SFRA_WORKING FOLDER\Y GIS\Mxd\April 2016\3514006A-SSR-Phase_II_Flood_Hazard_2100.mxd

Login: DeSouzaJ

Plot Date: 07/06/2016

Barking & Dagenham Borough Boundary

Key regeneration Sites

Breach Location

Main Rivers

Rate of Inundation

- 0 to 5 hours
- 5 to 10 hours
- 10 to 15 hours
- 15 to 20 hours

BARKING

EAST HAM

Wallend

5

7

Inundation data for breaches 4 and 6 is not available. Please refer to Flood Hazard Breach Mapping to review predicted extent.

0 0.25 0.5 1

Kilometres

Rev	Date	Description	By	Chk	App

PARSONS BRINCKERHOFF

Kings Orchard,
1 Queen St, Bristol,
BS2 0HQ
Tel: 44-(0)117-9306200

Client: London Borough of Barking & Dagenham

Site/Project:
STRATEGIC FLOOD RISK ASSESSMENT (SFRA) LEVEL 2

Title:
FLUVIAL AND TIDAL
RATE OF INUNDATION BREACH
1 IN 200 YEAR (2005)
BARKING TOWN CENTRE
RODING EAST

Drawn: JSdS		Checked: CS	
Designed: DF		Approved: JG	
Date: 07/06/2016	Scale: As Shown	A3	Sheet:
Project Number:		Drawing Number:	Revision:
3514006A-SSR		FIGURE C8a	

File Name: N:\Water Engineering\3514006A - LBBD SFRA_WORKING FOLDER\Y GIS\Mxd\April 2016\3514006A-SSR-Phase_II_Rate_of_Inundation_2005.mxd

Login: DeSouzaJ

Plot Date: 07/06/2016

Barking & Dagenham Borough Boundary

Key regeneration Sites

Breach Location

Main Rivers

Rate of Inundation

0 to 4 hours

4 to 8 hours

8 to 12 hours

12 to 16 hours

16 to 20 hours

BARKING

EAST HAM

Walthamstow

1

2

3

N

0 0.25 0.5 1

Kilometres

For rate of inundation data for breaches 4-11 please see Figure C8a.

Rev	Date	Description	By	Chk	App

PARSONS BRINCKERHOFF

Kings Orchard,
1 Queen St, Bristol,
BS2 0HQ

Tel: 44-(0)117-9306200

Client: London Borough of Barking & Dagenham

Site/Project:
STRATEGIC FLOOD RISK ASSESSMENT (SFRA)
LEVEL 2

Title:
FLUVIAL AND TIDAL
RATE OF INUNDATION BREACH
1 IN 200 YEAR (2005)
BARKING TOWN CENTRE
RODING WEST

Drawn: JSdS		Checked: CS	
Designed: DF		Approved: JG	
Date: 06/06/2016	Scale: As Shown	A3	Sheet:
Project Number:		Drawing Number:	Revision:
3514006A-SSR		FIGURE C8b	

File Name: N:\Water Engineering\3514006A - LBBD SFRA_WORKING FOLDER\Y GIS\Mxd\April 2016\3514006A-SSR-Phase_II_Rate_of_Inundation_2005_Roding.mxd

Login: DeSouzaJ

Plot Date: 07/06/2016

Barking & Dagenham Borough Boundary

Key regeneration Sites

Breach Location

Main Rivers

Rate of Inundation

- 0 to 5 hours
- 5 to 10 hours
- 10 to 15 hours
- 15 to 20 hours

5

7

Inundation data for breaches 4 and 6 is not available. Please refer to Flood Hazard Breach Mapping to review predicted extent Climate change data for breaches 5 - 7 is not available and therefore the data from present day simulations has been used in the production of this map.

0 0.25 0.5 1

Kilometres

Rev	Date	Description	By	Chk	App

PARSONS BRINCKERHOFF
Kings Orchard,
1 Queen St, Bristol,
BS2 0HQ
Tel: 44-(0)117-9306200

Client: London Borough of Barking & Dagenham

Site/Project:
STRATEGIC FLOOD RISK ASSESSMENT (SFRA) LEVEL 2

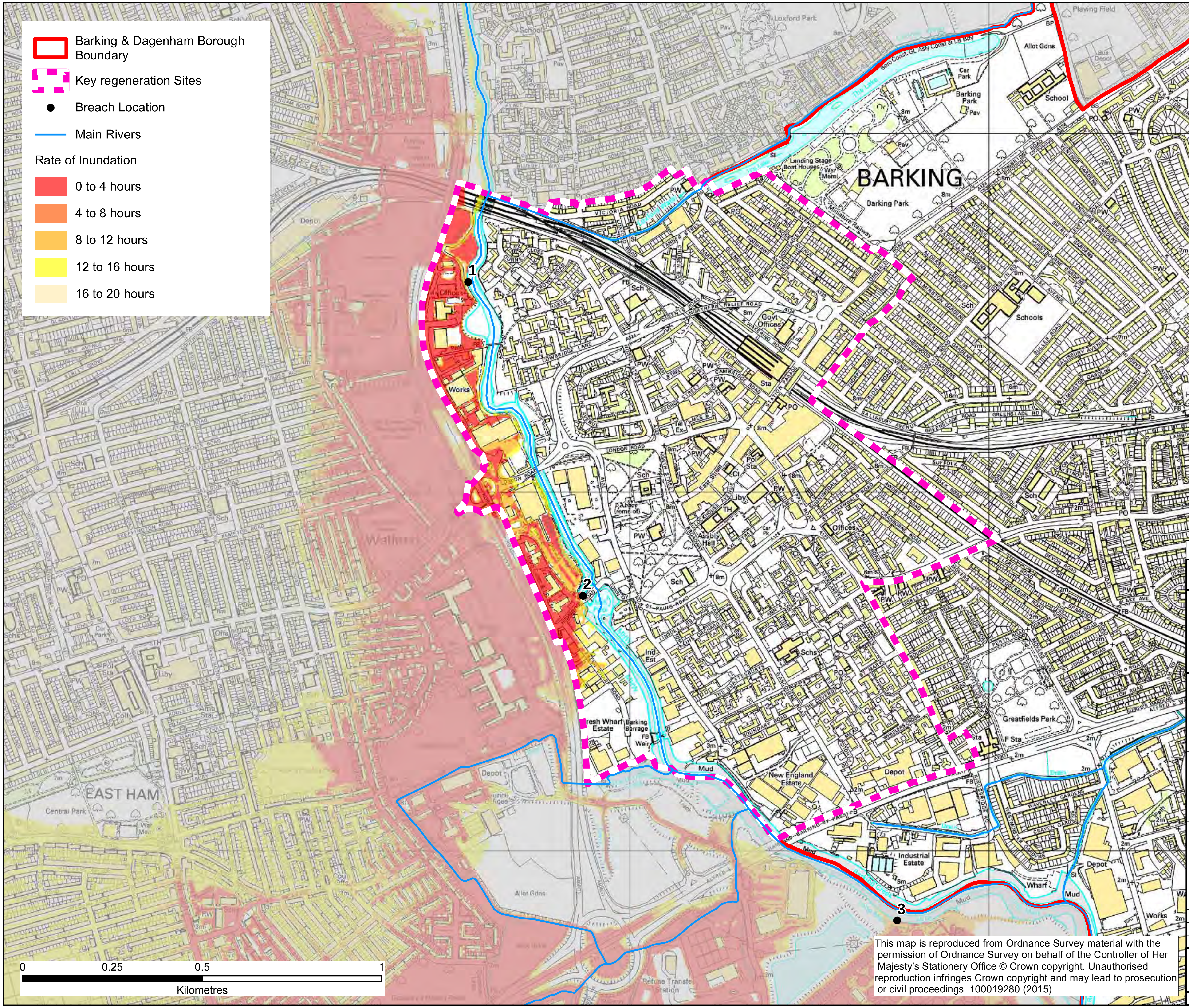
Title:
FLUVIAL AND TIDAL
RATE OF INUNDATION BREACH
1 IN 200 YEAR (2100)
BARKING TOWN CENTRE
RODING EAST

Drawn: JSdS		Checked: CS	
Designed: DF		Approved: JG	
Date: 07/06/2016	Scale: As Shown	A3	Sheet:
Project Number:		Drawing Number:	Revision:
3514006A-SSR		FIGURE C9a	

File Name:: N:\Water Engineering\3514006A - LBBD SFRA_WORKING FOLDER\Y GIS\Mxd\April 2016\3514006A-SSR-Phase_II_Rate_of_Inundation_2100.mxd

Login: DeSouzaJ

Plot Date: 07/06/2016



For rate of inundation data for breaches 4 -11 please see Figure C9a.

This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. 100019280 (2015)

Rev	Date	Description	By	Chk	App

PARSONS BRINCKERHOFF

Kings Orchard,
1 Queen St, Bristol,
BS2 0HQ
Tel: 44-(0)117-9306200

Client: London Borough of Barking & Dagenham

Site/Project: STRATEGIC FLOOD RISK ASSESSMENT (SFRA) LEVEL 2

Title: FLUVIAL AND TIDAL RATE OF INUNDATION BREACH 1 IN 200 YEAR (2100) BARKING TOWN CENTRE RODING WEST

Drawn: JSdS		Checked: CS	
Designed: DF		Approved: JG	
Date: 07/06/2016	Scale: As Shown	A3	Sheet:
Project Number: 3514006A-SSR		Drawing Number: FIGURE C9b	Revision:

File Name:: N:\Water Engineering\3514006A - LBBD SFRA_WORKING FOLDER\Y GIS\Mxd\April 2016\3514006A-SSR-Phase_II_Rate_of_Inundation_2100_Roding.mxd

Login: DeSouzaJ
Plot Date: 07/06/2016

Barking & Dagenham Borough Boundary

Key regeneration Sites

Main Rivers

Fluvial and Tidal Flood Warning Areas

BARKING

EAST HAM

Little Ilford

Loxford

Wallend

0 0.25 0.5 1

Kilometres

Rev	Date	Description	By	Chk	App

PARSONS BRINCKERHOFF
Kings Orchard,
1 Queen St, Bristol,
BS2 0HQ
Tel: 44-(0)117-9306200

Client: London Borough of Barking & Dagenham

Site/Project:
STRATEGIC FLOOD RISK ASSESSMENT (SFRA) LEVEL 2

Title:
FLOOD WARNING AREAS (FLUVIAL AND TIDAL)
BARKING TOWN CENTRE

Drawn: JSdS		Checked: CS	
Designed: DF		Approved: JG	
Date: 13/08/2015	Scale: As Shown	A3	Sheet:
Project Number: 3514006A-SSR	Drawing Number: FIGURE C10		Revision:

File Name:: N:\Water Engineering\3514006A - LBBD SFRA_WORKING FOLDER\Y GIS\Mxd\Phase II\3514006A-SSR-Flood Warning Areas (F&T).mxd
Login: desouzaj
Plot Date: 13/08/2015