APPENDIX D

BARKING RIVERSIDE

BARKING RIVERSIDE

Area Name: Barking Riverside
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 Riverside strategic development site is approximately 1.75km^2 in area and is located in the south of Barking and Dagenham (refer to Appendix A). The site is bounded by the railway line and the Thames Road strategic development site to the north, Dagenham Dock strategic development site to the east, the River Thames to the south, and Creekmouth strategic development site, Trafalgar Business Centre and River Road Business Park to the west. Barking Reach Power Station is located in the centre of Barking Riverside but is not included in the strategic development site boundary. In addition, the housing estate at Galleons Drive and Marine Drive along with a number of other smaller areas to the west of the power station are also excluded from the site boundary.

This area is currently being developed as part of the Barking Riverside Development which was granted planning permission in 2007. The Barking Riverside Development will provide more than 10,000 homes over the next 15 years with over 650 homes completed to date and a further 698 units due for completion in 2017.

A total of 175 acres of land within the Barking Riverside area was raised to protect future residents from flooding from the River Thames and the creeks in the area. Flood storage areas are incorporated into the parklands to reduce the risk of fluvial flooding due to the tide locking of the creeks.

Description of Flood Risk

Fluvial and Tidal

The primary sources of flood risk in Barking Riverside are tidal flooding from the River Thames and fluvial flooding from the River Roding. There is also a risk of fluvial flooding from the Gores Brook at the eastern boundary of the area, Buzzard Mouth Creek that flows through the west of the area, and a number of smaller drains which flow through the site towards the Thames.

It is understood 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. Residual flood risks associated with this watercourse are considered to be minimal.

At present the Environment Agency combined fluvial and tidal flood map (illustrated in Figure D1) indicates that a significant proportion of Barking Riverside (c. 50%) is located within the low risk Flood Zone 1 with c. 45% 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. However it should be noted that the combined fluvial and tidal flood map does not currently reflect the land raising that has been undertaken as part of the Barking Riverside Development.

Analysis of the LIDAR data indicates that the ground level in many areas currently shown within Flood Zone 3a has been raised above the predicted 1 in 1000 (0.1%) annual probability flood level and should be identified as Flood Zone 1. The Environment Agency fluvial flood map (illustrated in Figure D2A) and the breach analysis mapping (as discussed below) do indicate a decreased flood risk in the western half of the site, suggesting that the fluvial assessment may take into consideration the ground level increases, at least in part. In this scenario, approximately 90% of the site would be reclassified as Flood Zone 1, with the remaining c. 10% reclassified as Flood Zone 3.

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

- The land at the western part of the site adjacent to the Trafalgar Business Centre;
- The land adjacent to Gores Brook, Choats Road and adjacent to the drain flowing from Choats Road in the north to Renwick Road to the east of the Barking Reach Power Station; and
- Renwick Road and adjacent land.

In the Barking Riverside 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 Choats Road in the north of the area and along a drainage ditch through the centre of the site.

The functional floodplain, Flood Zone 3b, is limited to within the channel of the River Thames and is therefore behind the flood defences which form the southern boundary of the Barking Riverside site. A pier is located within the channel of the River Thames that is indicated to extend from within the Barking Riverside site.

Surface Water

The Environment Agency Risk of Flooding from Surface Water map indicates that the Barking Riverside 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 in the vicinity of Minter and along Mallards Road, in the west of the site, where depths of up to 0.6m are predicted during a rainfall event with an annual probability of 1 in 100 (1%). Similar depths are also predicted along Renwick Road, which although not located within the boundary of the development site is a key route through the area.

Flood hazards associated with surface water flooding during the 1 in 100 (1%) annual probability event are illustrated in Figure D3.

Groundwater

The increased Potential for Elevated Groundwater map (iPEG), developed for the Barking and Dagenham SWMP, indicates that the land in the vicinity of the watercourse flowing through the east of the site from Choats Road to Barking Power Station, the northern boundary in the vicinity of Choats Road and Great Gallery Close and in the vicinity of De Pass Gardens at the eastern boundary are 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. 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 Riverside 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 Figures D4 and D5, 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 Riverside 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%).

It is understood that the Gores Brook and River Beam Flood Alleviation Scheme, completed in 2011, increased the SoP on the Gores Brook from a 1 in 10 (10%) to a 1 in 150 (0.67%) annual probability of flooding.

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 undertaken in 2017, and the breach analysis undertaken for the Barking and Dagenham SFRA published in 2008, indicates that the degree of flood hazard through parts of the Barking Riverside 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 along the northern boundary of the site, in particular the area near Creekmouth, with the remainder of the site benefitting from the land raising completed to support the Barking Riverside Development. As discussed above, the differences between the areas identified as being at risk in the event of a breach and the extent of the combined fluvial and tidal mapping of Flood Zone 2 and 3 are understood to be as a result of the ground raising completed as part of the Barking Riverside development.

Mapped outputs of breach analysis relevant to the Barking Riverside strategic development site are provided in Figures D6 to D9. Review of the available breach mapping indicates that following a breach of the flood defences along the Barking Creek, flooding of the Barking Riverside strategic development site would occur rapidly with parts of the site predicted to flood in less than 5 hours. Inundation rates would also be less than 5 hours following a breach of the River Thames tidal defences.

It should also be noted that the number of modelled breach locations is relatively limited along this stretch of the Thames and that no locations have been selected immediately adjacent to the Barking Riverside site. It is therefore recommended that this is taken into consideration by potential developers, although a qualitative assessment based on the results of adjacent breach locations should suffice.

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 flood defence asset no. 15371 would be likely to affect the Barking Riverside 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 Riverside strategic development site.

The Environment Agency Risk of Flooding from Reservoirs map indicates the east of the area, in the vicinity of the Gores Brook, to be at risk of flooding from the Basin Reservoir in Wanstead and the Perch Pond Reservoir in Wanstead Park.

Flood Warning Areas

The areas identified as being at fluvial or tidal flood risk within the Barking Riverside 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 Barking Riverside strategic development site which benefit from Environment Agency Flood Warnings are illustrated in Figure D10. These maps currently include the area of land that has been raised within the Barking Riverside Development that may no longer be within an area considered to be at risk.

Potential 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, Gores Brook and Beam River. The mapping, provided in Figure D2B and Figure D2C, indicates no notable increase in fluvial flood risk from these watercourses when compared to the present day scenario.

Updated climate change analysis has not yet been undertaken for the Lower Roding that affects the Barking Riverside 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 fairly 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 (1%) annual probability predicted surface water flood extents, provided in the Level 1 SFRA report, indicates that a number of areas to the south-east and south-west of the development area, as well as adjacent to the existing drains which pass through the site, may be vulnerable to the impacts of climate change.

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 Riverside strategic development site comprises residential development of c. 10,000 homes.

Proposed development within the Barking Riverside 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 it is not possible to locate the development within areas at lower flood risk (especially given that much of the site is located at a lower flood risk) and 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. If the residential development proposed within Barking Riverside is likely to include smaller pockets of lower vulnerability development (for example local retail or commercial opportunities) these may be more appropriate to locate within areas at higher flood risk.

Development in Flood Zones 2 and 3

A site-specific flood risk assessment is required to support any planning application in Barking Riverside 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.

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. It is understood that any loss of the fluvial Flood Zone 3a associated with the land raising of this site was compensated for through the provision of flood storage areas in the parklands. 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 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 of the Barking Riverside strategic development site has already begun with 650 homes completed to date and a further 698 units due for completion in 2017. As the site is being developed in phases, if not already in place it is recommended that a strategic surface water drainage assessment for the site as a whole is completed to enable an overall drainage strategy to be formulated and then followed on a plot by plot basis.

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 management of water on the ground's surface could assist with the challenging low lying nature of the site and possible difficulties achieving a gravity discharge.

Existing urban sites, particularly those with an industrial heritage, may also contain contaminated soils. The type of SUDS techniques employed at the site may also be constrained by possible high ground water levels due to the site's proximity to the River Thames. The principles of SUDS should still be promoted, for example the use of lined SUDS features.

As this site is previously developed it 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. A higher discharge rate may be acceptable where the outfall is directly into the River

Thames, although the effects of tide locking must be considered up to the 1 in 100 annual probability event.

Barking & Dagenham Borough Boundary

Key regeneration Sites

Main Rivers

Flood Zone 3b (defended)

Flood Zone 3a (undefended)

Flood Zone 2 (undefended)

0 0.225 0.45 0.9

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 RIVERSIDE

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 D1		

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Login: desouzaj
Plot Date: 13/08/2015

Barking & Dagenham Borough Boundary

Key regeneration Sites

Main Rivers

Flood Zone 3b (defended)

Flood Zone 3a (undefended)

Flood Zone 2 (undefended)

N

0 0.225 0.45 0.9

Kilometres

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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 RIVERSIDE

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 D2A	

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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 0.225 0.45 0.9

Kilometres

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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 RIVERSIDE

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 D2B	

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Login: UKSLF003

Plot Date: 03/03/2017

Key regeneration Sites

Barking & Dagenham Borough Boundary

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)

N

0 0.225 0.45 0.9

Kilometres

Rev	Date	Description	By	Chk	App

PARSONS BRINCKERHOFF
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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:
BEAM RIVER FLUVIAL FLOOD RISK WITH 25%, 35% AND 70% CLIMATE CHANGE
BARKING RIVERSIDE

Drawn: SF		Checked: PH	
Designed: DF		Approved: JG	
Date: 24/03/2017	Scale: As Shown	A3	Sheet:
Project Number:		Drawing Number:	Revision:
3514006A-SSR		FIGURE D2C	

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Login: ukshj003

Plot Date: 24/03/2017

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

0 0.225 0.45 0.9

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:

SURFACE WATER FLOODHAZARD (1 IN 100 YEAR)

BARKING RIVERSIDE

Drawn: JSdS		Checked: CS	
Designed: DF		Approved: JG	
Date: 13/08/2015	Scale: As Shown	A3	Sheet:
Project Number: 3514006A-SSR		Drawing Number: FIGURE D3	Revision:

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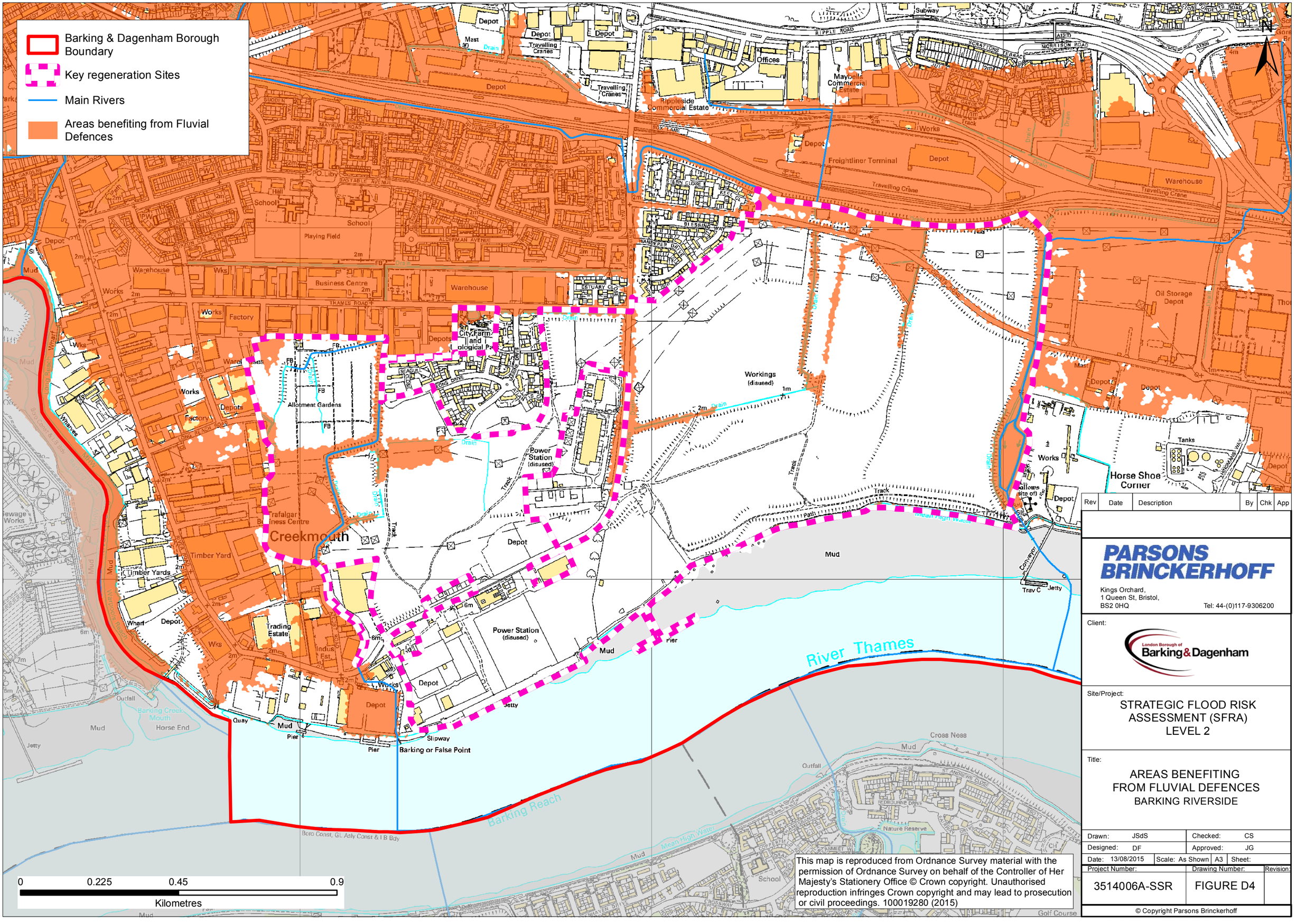
Login: desouzaj

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

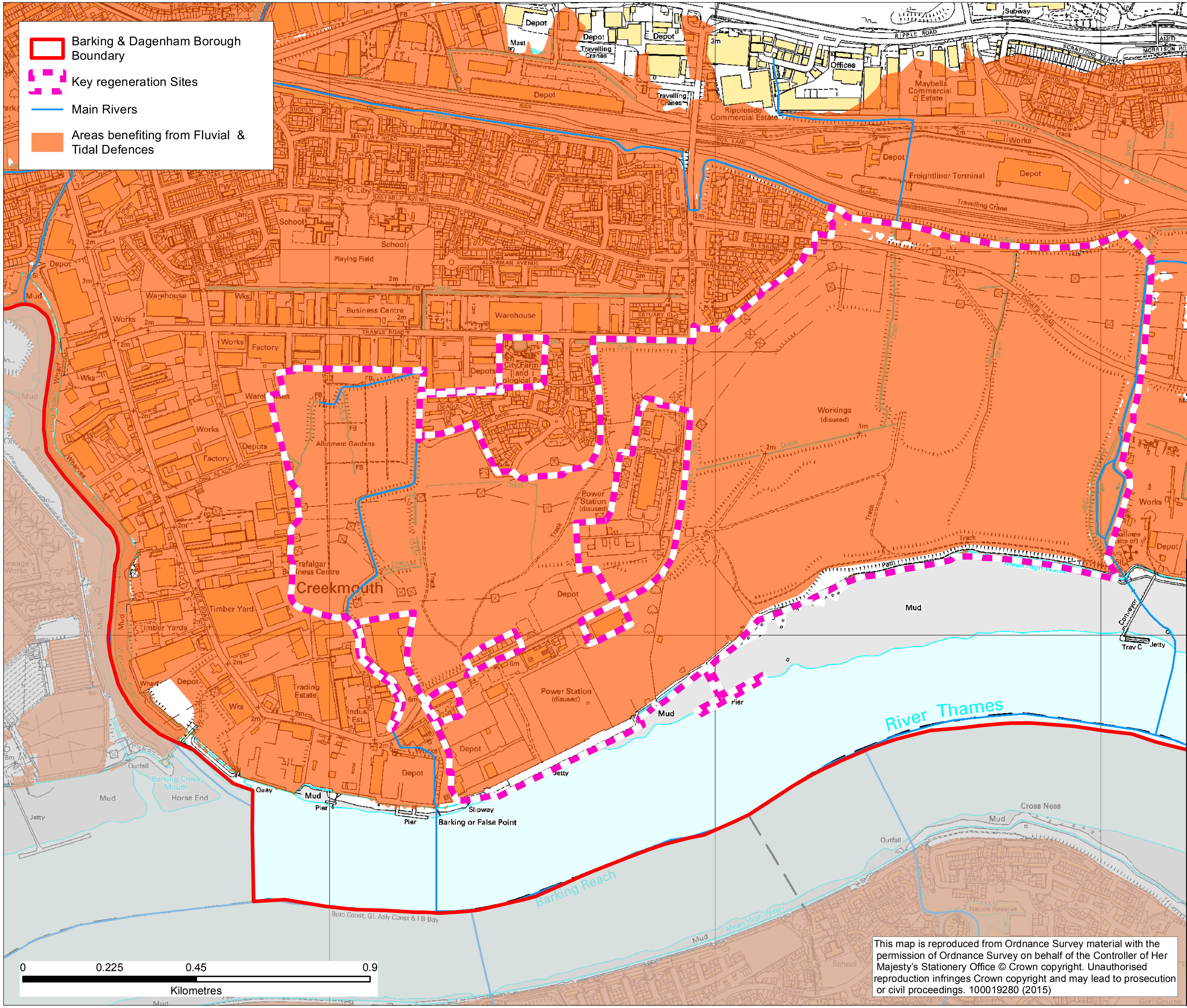
Client: London Borough of Barking & Dagenham

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

Title:
AREAS BENEFITING FROM FLUVIAL DEFENCES
BARKING RIVERSIDE

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 D4		

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



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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 RIVERSIDE

Drawn: JSdS		Checked: CS	
Designed: DF		Approved: JG	
Date: 13/08/2015	Scale: As Shown	A3	Sheet:
Project Number: 3514006A-SSR		Drawing Number: FIGURE D5	Revision:

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

Barking & Dagenham Borough Boundary

Key regeneration Site

Breach location

Main Rivers

Flood Hazard Rating

Very Low - Caution

Moderate - Danger for some

High - Danger for most

Very High - Danger for all

0 0.2 0.4 0.8

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 (2005) BARKING RIVERSIDE

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 D6	

File Name:: N:\Water Engineering\3514006A - LBBD SFRA_WORKING FOLDER\Y 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

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 0.2 0.4 0.8

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 RIVERSIDE

Drawn: JSdS		Checked: CS	
Designed: DF		Approved: JG	
Date: 05/05/2016	Scale: As Shown	A3	Sheet:
Project Number: 3514006A-SSR		Drawing Number: FIGURE D7	Revision:

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

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

0 0.2 0.4 0.8

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 RIVERSIDE

Drawn: JSdS		Checked: CS	
Designed: DF		Approved: JG	
Date: 07/06/2016	Scale: As Shown	A3	Sheet:
Project Number: 3514006A-SSR		Drawing Number: FIGURE D8	Revision:

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 5 hours

5 to 10 hours

10 to 15 hours

15 to 20 hours

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 0.2 0.4 0.8

Kilometres

Rev	Date	Description	By	Chk	App

PARSONS BRINCKERHOFF

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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

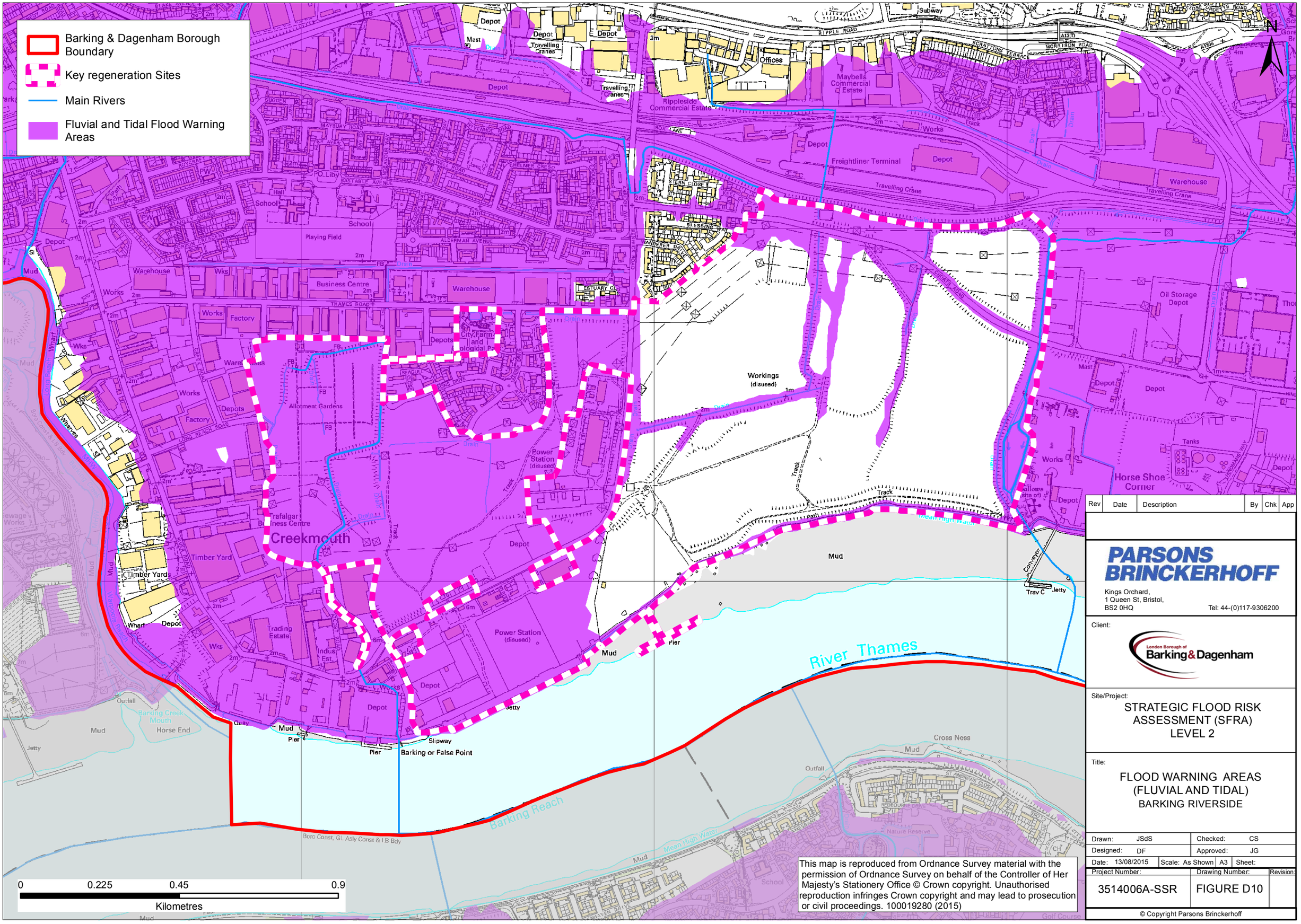
Title:
FLUVIAL AND TIDAL
RATE OF INUNDATION BREACH
1 IN 200 YEAR (2100)
BARKING RIVERSIDE

Drawn: JSdS		Checked: CS	
Designed: DF		Approved: JG	
Date: 07/06/2016	Scale: As Shown	A3	Sheet:
Project Number: 3514006A-SSR		Drawing Number: FIGURE D9	Revision:

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



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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 RIVERSIDE

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 D10	

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