Appendix B Recommendations for Policy and Practice

Adopting a holistic approach to flood risk management should help ensure that flooding is taken into account at all stages of the planning process. To aid this holistic approach, it is recommended that all key recommendations set out in this report are considered and incorporated into the emerging LB Newham Local Plan.
LB Newham is bordered by the River Thames, River Roding and the River Lee and is therefore highly reliant on flood defences. Ongoing maintenance of these defences is critical, and priority should be given to safeguarding the standard of protection provided by defences over the lifetime of any development. However, redevelopment rates in areas of the Borough are very high and may additionally offer the opportunity to reduce the current risk and the reliance on flood defences. This includes making the urban environment more resilient and with a layout that offers added options for managing future flood risk and the impacts of *climate change*. As such, it is recommended that policy options are expanded to include greater emphasis on active floodplain management, in addition to flood defence maintenance. This may include promoting more appropriate use of floodplain areas (Flood Zone 3), making space for water, improved flood preparedness and enhanced emergency planning and response measures.

B.1 Strategic Planning

When considering strategic spatial planning across the Borough, flood risk should be an early and primary consideration. A sequential approach should be taken to allocating strategic development areas in regions of lowest flood risk, taking into account vulnerability of land use. Consideration should also be given to strategic allocation of open space and preserving and expanding river corridors to create space for flooding to be managed effectively.
In particular, the following specific recommendations are made:

- Ensure the *Sequential Test* is undertaken for all strategic land allocations and check that the vulnerability classification of the proposed land use is appropriate to the Flood Zone classification;

- Pursue potential opportunities to move existing development from within the floodplain to areas with a lower risk of flooding. This should include consideration of the vulnerability of existing developments and whether there is potential for land swap with lower vulnerability uses.

- Identify opportunities to create space for water through appropriate location, layout and design of development, in order to accommodate *climate change* and assist in managing future flood risk. This can be achieved by restoring floodplain and flood flow pathways and by identifying, allocating and safeguarding open space for storage. Equally, existing flood storage areas should be identified, conserved and protected against loss through redevelopment.

- Safeguard existing corridors of land along the River Thames, River Roding, River Lee and tributaries and promote the setting back of development to enable sustainable and cost effective flood risk management, including upgrading of river walls and embankments. As a minimum, an 8 m and 16 m buffer strip should be maintained along *fluvial* and tidal river corridors, respectively.

- Consider opportunities to realign or set back defences and improve the riverside frontage to provide amenity space and environmental enhancement. A combination of defence realignment and floodplain management could reduce the impact of flooding to existing properties and other assets located in the floodable areas on the river side of realigned defences.

- The consultation and initial investigation associated with detailed site specific flood risk assessments should be undertaken at an early stage for major development locations to

ensure opportunities to reduce flood risk are identified early and maximised wherever possible.

- Ensure that developments at residual risk of flooding are designed to be flood compatible and/or flood resilient and maximise the use of open spaces within these developments to make space for water during times of flooding. Opportunities should be sought to identify a safe route for any exceedance flow of floodwaters and a suitable storage or discharge location, to avoid any risk to people.

- Strategic development allocations should specifically consider the issues of water supply and drainage infrastructure to service development proposed, taking into account regional constraints. An early and integrated approach should be taken to holistically assessing and planning for the flood risk, water supply and drainage requirements and constraints in these areas. This is likely to be an issue of particular importance in certain Opportunity Areas, where limited drainage capacity may create challenges for strategic development.

B.2 Development Control

In consulting on and determining development applications, LB Newham must ensure that all new developments have considered flood risk management from the planning stage. In general, this means that:

- Development is located in the lowest risk area where possible;

- New development is flood-proofed to a satisfactory level/standard and does not increase flood risk elsewhere; and

- Surface water is managed effectively on site using the SuDS hierarchy and the latest guidance and best practice.

When a proposed development is located within an area perceived to be at risk of flooding, then a suitably detailed FRA should determine the actual level of risk to the development and identify options to mitigate the flood risk to the development, site users and surrounding area. In particular, development located adjacent to flood defences is required to demonstrate that these defences will be safe over the lifetime of the development. The requirements for site specific flood risk assessments and their contents are further detailed in Chapter 6. Planning applications should be considered and assessed in line with the sequential approach detailed in Section 4.2. Specific recommendations and considerations for development planning are provided below:

- If development is to be constructed with less vulnerable uses on the ground level, covenants need to be put in place to prevent future alteration of these areas to ‘more vulnerable’ uses without further consideration of the associated flood risk.

- Single storey residential development should not be considered in high flood risk areas as they offer no opportunity for safe refuge.

- NPPF does not permit basement dwellings to be located within Flood Zone 3a, and as such these should not be permitted in any areas at risk of flooding. This would include the excavation of basements under existing dwellings.

- A safe means to escape via internal access to higher floors 300mm above the 1% annual probability (1 in 100 year) flood level including an allowance for *climate change* should be provided for all basement dwellings.

- Basement development may affect *groundwater* flows, and even though the displaced water will find a new course around the area of obstruction this may have other consequences for nearby receptors e.g. buildings, trees. Emerging evidence shows that even where there are a number of consecutively constructed basement developments, the *groundwater* flows will find a new path.

- *Residual flood risk* should be managed through emergency planning, site design and protection measures. The key *residual flood risks* within Newham are overtopping or breach of the River Thames, River Lee and River Roding.

- Where development within flood risk areas is necessary due to wider sustainability/regeneration objectives, flood resistance and resilience practices should be followed in the construction and operation of the buildings to minimise the impact of flooding.

- Finished floor levels of all residential accommodation should be raised above the 1 in 100 year (1% AEP) plus *Climate Change* defended level, with an allowance for *freeboard* (300 mm). For properties within the tidal flood zone associated with the River Thames, floor levels should be above the anticipated 2100 breach levels. For properties associated with the flood zone of the River Lee, floor levels should be raised above the 1 in 100 year flood level, taking into account the most updated *climate change* allowances. For properties associated with the flood zone of the River Roding, floor levels should be raised above the 1 in 1000 year flood level. Potential access and egress routes should also be considered and recommendations made for emergency response by occupants in the event of a breach occurring.

- Flood risk from all sources should be considered when identifying the perceived level of flood risk affecting a site. Robust consideration of surface water flood risk is particularly important in certain regions of the Borough.

- Opportunities should be taken to identify sites where developer contributions could be used to fund future flood risk management schemes, improvements to surface water drainage systems or flood defences in adjacent areas. However, it should be noted that developer installed defences should not wholly justify development in locations with inappropriate levels of flood risk.

- Existing flood storage areas within development areas should be identified, conserved and protected against loss through redevelopment.

- An 8 m and 16 m buffer strip should be maintained along *fluvial* and tidal river corridors, respectively, to ensure maintenance of the channel can be undertaken. As such, any new development should be avoided in existing buffer areas. A pragmatic approach should be adopted for existing development in these areas and opportunities pursued for small scale set back of development from river walls to enable these structures to be modified, raised and maintained as needed.

- For developments adjacent the River Thames, River Roding and River Lee, particular consideration should be given to facilitating the recommendations of the TE2100 plan and Thames CFMP in maintaining, enhancing and replacing flood defences, and safeguarding riverside land.

B.3 Flood Defences

The SFRA has highlighted the importance of flood defences to the Borough. As such, future policy should seek to ensure that the current high level of protection is retained (and improved where possible) by those responsible for maintaining flood defences in the area (i.e. riparian land owners, EA, others). Any development located adjacent to flood defences is required to demonstrate that these defences will be safeguarded and maintained over the lifetime of the development.

In particular, the future sustainability of the Borough (and London as a whole) is dependent to a large degree upon the retention and ongoing maintenance of flood defence infrastructure, including the TTD, River Roding and River Lee Defences. However, decisions surrounding investment of this nature in future years cannot be predicted with any certainty. Additionally, the exact impact of *climate change*, and the interaction of the resulting hydrological effects with operational and wider issues is still uncertain. Consequently other means of reducing the risk of *fluvial* flooding from the River Thames may have to be sought in the future. It is therefore imperative that planning decisions are taken with a clear understanding of the potential risks posed to property and life should things ultimately go wrong. As such, redevelopment must ensure that *residual flood risk* is reduced in areas benefiting from flood defence measures through prevention and effective mitigation.
As discussed, management of defences within the Borough will include routine inspection, maintenance, repair and replacement, in addition to eventual raising of levels to allow for the impact of *climate change*. Defences along the Thames and much of the Lee and Roding will need to be raised by up to 0.5 m before 2065 and an additional 0.5 m before 2100. However, raising the level of defences on the current footprint may introduce visual barriers and will not achieve any wider sustainability objectives. Therefore, opportunities should be pursued for subsequent improvement of the riverside through integrated design, considering public access and connectivity, amenity, landscaping and environmental enhancement.
As such, where *fluvial* defences require replacement, consideration should be given to flood defence adaptation rather than like-for-like replacement, utilising a combination of flood storage, river defences and floodplain *attenuation*.
Where new development is proposed adjacent to the TTD, River Roding and River Lee Defences (within 16 metres), consideration should be given to the specific recommendations of the TE2100 plan, in requiring reduction of current and future flood risk through:

- Raising existing flood defences to the required levels in preparation for future *climate change* impacts or otherwise demonstrate how tidal flood defences can be raised in the future, through submission of plans and cross-sections of the proposed raising;
- Demonstrating the provision of improved access to existing flood defences and safeguarding land for future flood defence raising and landscape, amenity and habitat improvements;
- Maintaining, enhancing or replacing flood defences to provide adequate protection for the lifetime of the development;
- Where opportunities exist, re-aligning or setting back flood defence walls and improving the river frontage to provide amenity space, habitat, access and environmental enhancements; and
- Securing financial contributions towards the anticipated costs of flood risk management infrastructure required to protect the proposed development over its lifetime.

In more general consideration of flood risk management infrastructure, local policy should continue to maintain and expand assets that are effective in managing current and future flood risk and promote wider sustainability.

B.4 Sustainable Drainage Systems

Sustainable Drainage Systems must be included in new developments as a way to manage surface water flood risk, improve water quality and increase amenity and biodiversity. This is of particular significance in the Isle of Dogs, where higher levels of *pluvial* flood risk are anticipated to interact with intense development.
Runoff rates from new development must be restricted to Greenfield runoff rates wherever possible. Robust justification must be provided for any sites where this is not achievable and an alternative discharge rate agreed with LB Newham.
Limiting the volume and rate of discharge, particularly for surface water entering the foul and combined surface water networks, is of critical importance within the Borough to help ensure the sewage network has the capacity to cater for population growth and the effects of *climate change*.

In line with the Sustainable Drainage Hierarchy, set out in Policy 5.13 of the London Plan (and repeated in Section 5.3), surface water should be prevented and controlled at source wherever possible through rainwater harvesting and infiltration techniques. Managed discharge of surface water to adjacent surface water bodies should also be considered. However, controls would need to be implemented to avoid any adverse harm to biodiversity and ecological habitat within receiving waters. Sustainable drainage should be delivered in accordance with the LB Newham SuDS Guidance, the London Plan, the emerging Sustainable Design and Construction SPG, the emerging London Sustainable Drainage Action Plan and CIRIA guidance C753.

Presently, there is a tendency for required *attenuation* volumes to be accommodated below ground. However, preference should be given to the installation of blue-green surface infrastructure wherever possible, as opposed to hardscape or underground solutions, due to the wider benefits for biodiversity, amenity and microclimate.

The underlying geology within Newham is likely to impose constraints on the implementation of infiltration SuDS in many areas across the Borough. This is likely to necessitate the installation of lined systems to provide *attenuation* and reduction of runoff rates, requiring reuse of runoff or discharge to local surface water bodies or drainage systems. Site specific assessment of geological conditions should be undertaken as a part of the drainage strategy for new developments.

Map 006B, Appendix A contains information on the likely suitability of infiltration SuDS across the Borough. This map delineates four subsurface categories across the Borough, in which infiltration is likely to be of varying suitability, based upon a range of hydrogeological indicators. Further detail on the four categories is included in Table 8-1below.

Table 8-1 SuDS Infiltration Suitability category descriptors

Category	Description
Highly suitable	The subsurface is likely to be suitable for free-draining infiltration SuDS.
Probably suitable	The subsurface is probably suitable for infiltration SuDS although the design may be influenced by the ground conditions.
Potentially suitable for bespoke designs	The subsurface is potentially suitable for infiltration SuDS although the design will be influenced by the ground conditions.
Unlikely to be suitable	There is a very significant potential for one or more geo-hazards associated with infiltration.

If a site falls within category 1, the subsurface is likely to be highly permeable, with a deep water table and not underlain by floodplain deposits that may respond rapidly to changes in river levels. In this environment, the installation of infiltration SuDS is likely to be straightforward. Sites that fall in category 2 may be characterised by a spatially variable permeability or a water table that may be with 1m of the base of the infiltration system, or both. The design of infiltration SuDS in these areas should take account of the local ground conditions. Sites that fall within category 3 may be poorly draining, or have a shallow water table, or are located on floodplain deposits, or have some combination of these characters. In these areas, the subsurface may potentially be suitable for infiltration SuDS, but the design will be strongly dependent on the local ground conditions. Sites within category 4 have a severe constraint that needs investigation to determine whether the potential for or the consequences of the constraint are likely to be significant[29].

B.5 Emergency Planning

It is strongly recommended that emergency planning strategies are put in place in areas deemed at actual and/or residual risk of flooding to ensure adequate preparation and response during flood events. Where a new development or change of land use is proposed, flood evacuation plans should be developed through liaison with the emergency planners and the emergency services.

[29] BGS (2016) User Guide for the Infiltration SuDS Map: Detailed

Additionally, following production of this SFRA, it is recommended that emergency planning strategies should be reviewed to determine the suitability of refuge centres and evacuation routes based on the updated flood risk mapping produced.
Emergency Planning can be broadly split into three phases, all of which should be considered in managing flood risk across the Borough:

- Before a flood – raising flood awareness, ensuring no inappropriate use of the floodplain/flow paths, preparing suitable flood emergency plans and communicating them to the wider community;
- During a flood – Flood alerts and communication, rescuing occupants, providing safe refuge and alternative accommodation;
- After the flood – providing support to help people recover and return to their homes and businesses.

Consideration of emergency planning is even more critical when it relates to vulnerable sites and essential infrastructure, as further described below.

Vulnerable Sites

Emergency service authorities responsible for hospitals, ambulance, fire and police stations as well as prisons should ensure that emergency plans, in particular for facilities in flood risk areas, are in place and regularly reviewed so that they can cope in the event of a major flood. These plans should put in place cover arrangements through other suitable facilities, if deemed needed.

The NPPF classifies police stations, ambulance stations, fire stations and command centres as Highly Vulnerable buildings. It is essential that all establishments related to these services are located in the lowest flood risk zones to ensure that in the event of an emergency those services vital to the rescue operation are not impacted by flood water. Furthermore, development control policies should seek to locate more vulnerable uses such as schools and care homes in areas at the lowest risk of flooding to minimise the impact of a flood on their vulnerable users.

Allied to this, nominated rest and reception centres should also be identified within the study area and compared with the outputs of this SFRA to ensure that these centres are not at risk of flooding, so that evacuees will be safe during a flood event. Developments that would be suitable for such uses would include leisure centres, churches, schools and community centres.

On occasions where development of vulnerable sites within flood risk areas is unavoidable, necessary measures should be implemented to ensure the site is as safe as possible.

Critical Infrastructure

In the event of a flood incident, it is essential that the evacuation and rescue routes to and from any proposed development remain safe. Floodplain management and emergency response activities must have a focus on key infrastructure such as the London Underground network and any properties that are below sea level. Essential infrastructure located in Flood Zone 3a or 3b must be operational during a flood event to assist in the emergency evacuation process.

Relevant transport authorities and operators should examine and regularly review their infrastructure including their networks, stations, and depots, for potential flooding locations and to identify the need for any flood risk reduction measures. For large stations and depots, solutions should be sought to store or disperse rainwater from heavy storms in a sustainable manner.

B.6 Water Environment

It is recommended that LB Newham take a holistic approach to flood risk management across the Borough within the wider context of the water cycle and local environment. Within Newham, the majority of waterbodies are designated as heavily modified (as defined by the Water Framework Directive), with an absence of natural river processes leading to lost habitat diversity and poor water quality.

Additionally, it is anticipated that growing population numbers and changing climate patterns will place increased pressure on already stressed water resources across Greater London. New development can assist in alleviating this water scarcity by incorporating water efficiency measures such as grey water recycling, rainwater harvesting and water use minimisation technologies. This will also have a substantial benefit on the sewer system which will receive less wastewater from properties, potentially freeing up capacity during flood events.

Consideration should be given to maximising the benefits of surface water management infrastructure, enhance the urban environment for the benefit of communities and biodiversity. Through high quality design and installation, such infrastructure can contribute to multi-functional benefit in the following areas:

- Provision of habitat and biodiversity - when adequately planned, the delivery of diverse, high quality green spaces can provide valuable habitat to a range of flora and fauna.

- Recreation and community - provision of space for recreation and contribution to community health, wellbeing and social cohesion. Water features can create a sense of place.

- Microclimate adaptation - Reducing the impact of the urban heat island effect by providing shading to protect against radiations, reducing local temperatures through *evapotranspiration* and reducing heat absorbed and then released by surfaces.

- Public realm - street greening and the delivery of effectively landscaped open spaces can substantially improve the amenity value of neighbourhoods.

Consultation and Coordination

For future flood risk management within the Borough to be successful, it is essential that relevant partners and stakeholders, who have responsibility for flood risk management assets, work collaboratively to reduce flood risk.

In particular, LB Newham should continue to work with the EA and others to ensure ongoing maintenance and improvement of the River Thames Defences. This will include ensuring that the recommendations of the TE2100 Plan are implemented in new and existing developments, to keep communities safe from flooding in a changing climate and improving the local environment. Ongoing coordination with the Canal and Rivers Trust will additionally be required to manage the flood risk associated with canals and docks across the Borough, and the hydraulic interaction of these systems with the River Lee, River Roding and the River Thames.

Similarly, opportunities should be sought to reduce the risk of flooding from surface water and sewer surcharge through consultation with Thames Water, to determine key areas for maintenance and locations that would benefit from flood alleviation schemes.

It is further recommended that LB Newham continues to collaborate with stakeholders to maintain and expand upon the existing understanding of flood risk across the Borough and, in particular, to confirm the impact of revised *climate change* allowances on understanding of *fluvial* flood risk associated with the River Lee.

Appendix C Level 2 Site Assessment

C.1 East Ham Western Gateway

Site Assessment Summary – East Ham Western Gateway				
Location: East Ham ('Urban Newham')	**Ref:** LPR33	**Area (ha):** 1	**Proposed Use:** Residential-led, incorporating community uses.	**Vulnerability Classification:** Not yet confirmed

Fluvial / Tidal Flood Risk		
Flood Zone 1 (<0.1 AEP) : 100%	**Flood Zone 2 (0.1% AEP) :** 0%	**Flood Zone 3 (1% AEP):** 0%

Flood Zones and Flood Defences

The site is located entirely in Flood Zone 1 (<0.1 AEP) and is not located near any ordinary watercourse (Figure A).

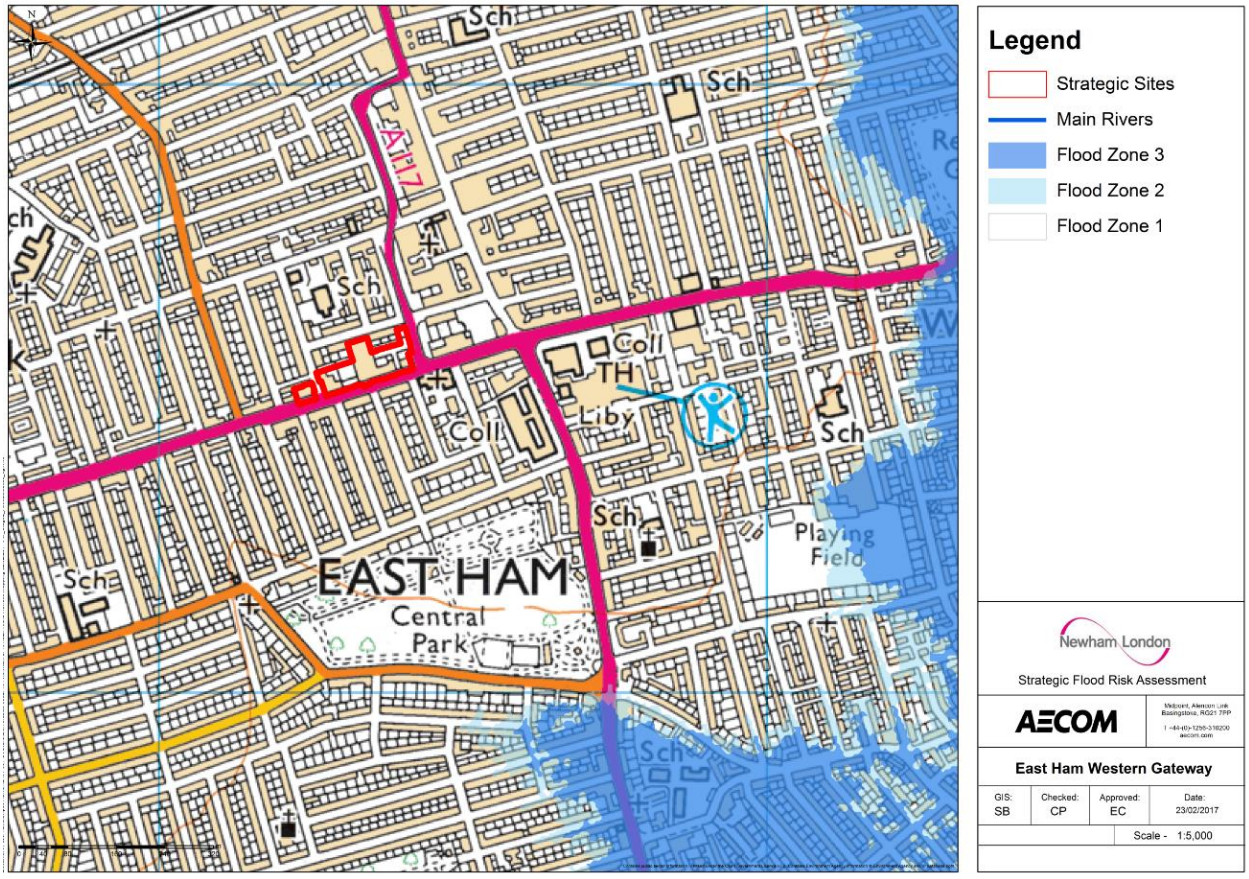

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Figure A Environment Agency Flood Zones

Site Assessment Summary – East Ham Western Gateway

Surface Water Flood Risk

Critical Drainage Area: N/A

Risk of Flooding from Surface Water (RoFSW)

The Environment Agency RoFSW mapping (Figure B) shows that the site is not at risk from surface water flooding.

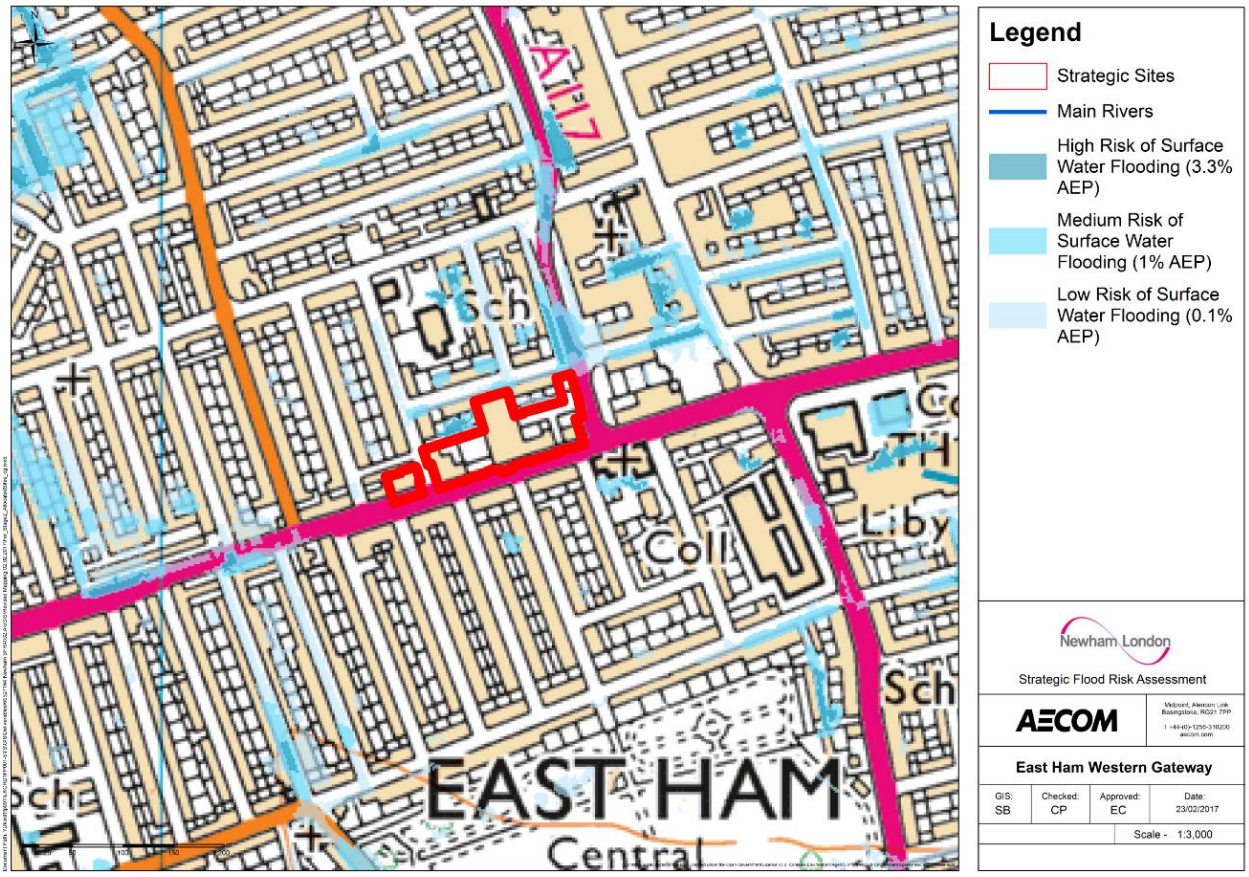

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Figure B Environment Agency's Risk of Flooding from Surface Water (RoFSW)

Historic Flood Events

The Environment Agency does not have any historic records of flooding on the site. At the time of writing, LB Newham has not provided any additional data with regard to historic flood records.

Geology and Groundwater

The bedrock geology in this area is Thames Group, comprising clay, sand and silt. Clayey soils are typically not very permeable and provide the potential for increased surface water ponding.

The AStGWF mapping (Map 06A, Appendix A) shows that the site is located within an area identified to have 'potential for groundwater flooding of property situated below ground level' i.e. basements. **This will need to be confirmed during site investigation survey.**

BGS Infiltration SuDS (sustainable urban drainage system) Map (Map 06B, Appendix A) shows that the site is located within an area where there are 'opportunities for bespoke infiltration SuDS' (see Table 8-1 of Level 1 SFRA). **A site assessment should be used to confirm the suitability for SuDS which may be suitable on this site.**

Site Assessment Summary – East Ham Western Gateway

Artificial & Sewer Sources

No risk posed by artificial sources.

The site falls into postcode E63, Thames Water has records of 35-50 internal flood incidents in this area. (Map 009a LB Newham Level 1 and 2 SFRA). **Risk of flooding from sewer sources should be investigated as part of an FRA.**

Drainage Hierarchy

Drainage Hierarchy	Infiltration to ground		With reference to BGS data there may be opportunities for bespoke infiltration SuDS which should be investigated further as part of the site design.
	Discharge to watercourse		No Watercourse located near the site.
	Discharge to surface water sewer		Possible, subject to consultation with Thames Water.

Site Specific Recommendations

Site Layout and Design

The site is currently defined as Flood Zone 1 (<0.1 AEP) and is therefore not at risk from fluvial or tidal flooding. Flood risk from other sources is also considered to be low.

Surface Water Management

Sustainable urban Drainage Systems (SuDS) should be used to reduce and manage surface water run-off to and from proposed developments as near to source as possible. These should be designed in accordance with LB Newham Local Plan policies, the London Plan drainage hierarchy, Technical Standards (published by Defra[30]) and Planning Practice Guidance published by DCLG.

The use of SuDS may be more limited at this site due to prevailing geology; however, the use of SuDS should still be included in the site drainage strategy, making use of the London Plan SuDS hierarchy (i.e. considering infiltration measures first wherever possible).

In accordance with LB Newham Local Plan, the development should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff, refer to the Local Plan for specific requirements. However, site plans should also adhere to the London Plan which includes an 'essential standard' to 'achieve 50% attenuation of the undeveloped sites surface water run-off at peak times' and the Mayors 'preferred standard' is ' Achieve 100% attenuation of the undeveloped sites surface water runoff at peak times'[31]
LB Newham has a presumption against hard standing on domestic gardens and public open space (policy SC3 Flood Risk).

LLFA (LB Newham) Consultation

It is recommended that potential developers of major schemes should engage with LB Newham as the Lead Local Flood Authority as part of the formal PREAPP process to determine whether there are any other site-specific concerns in regard to surface water flooding (i.e. whether more recent information is available').

LB Newham will presume that all development will contribute to minimising the risk of flooding in Newham and will be required to implement SuDS and maximise permeable surfaces.

[30] Sustainable drainage systems: non-statutory technical standards - https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards; PPG Flood Risk and Coastal Change - http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/reducing-the-causes-and-impacts-of-flooding/why-are-sustainable-drainage-systems-important/
[31] London Plan Polices 5.12, 5.13; https://www.london.gov.uk/what-we-do/planning/london-plan/current-london-plan/london-plan-chapter-five-londons-response/pol-12

Site Assessment Summary – East Ham Western Gateway

Summary – East Ham Western Gateway

This site is located within Flood Zone 1 and will not require completion of the Exception Test. All sites greater than 1ha located within Flood Zone 1 will require a flood risk assessment (FRA) to support the planning application process. In this instance the FRA should concentrate on the potential for the site to further reduce flood risk to the existing scenario by including SuDS at all stages of development and maximising permeable surfaces in accordance with LB Newham Policy, the London Plan and NPPF guidelines.

C.2 East Ham Northern Gateway

Site Assessment Summary – East Ham Northern Gateway				
Location: East Ham	**Ref:** LPR31	**Area (ha):** 1	**Proposed Use:** Mixed-use, town centre uses (retail, office, D uses, residential all possible)	**Vulnerability Classification:** Not yet confirmed
Fluvial/Tidal Flood Risk				
Flood Zone 1 (<0.1 AEP) : 100%	**Flood Zone 2 (0.1% AEP) :** 0%	**Flood Zone 3 (1% AEP):** 0%		

Flood Zones and Flood Defences

The site is located entirely in Flood Zone 1 (<0.1 AEP) and is not located near any ordinary watercourse (Figure A).

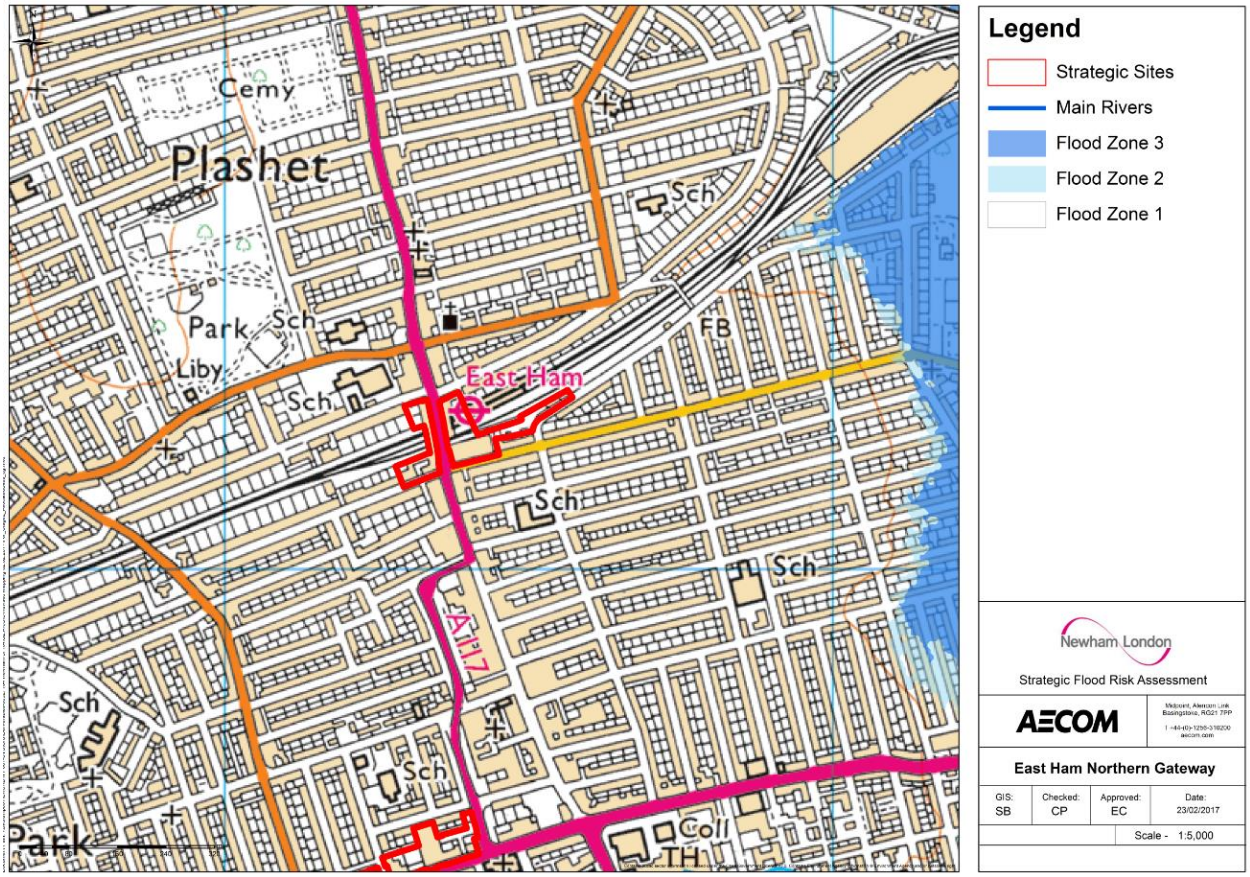

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Figure A Environment Agency Flood Zones

Site Assessment Summary – East Ham Northern Gateway

Surface Water Flood Risk

Critical Drainage Areas: N/A

Risk of Flooding from Surface Water (RoFSW)

The Environment Agency RoFSW mapping (Figure B) indicates a number of small areas of surface water ponding potentially associated with the railway embankment in the centre and north of the site. This should be considered carefully in the development of the site layout to ensure that residential dwellings are not placed at surface water flood risk, and that the position of any new development does not divert the flow path to a neighbouring area.

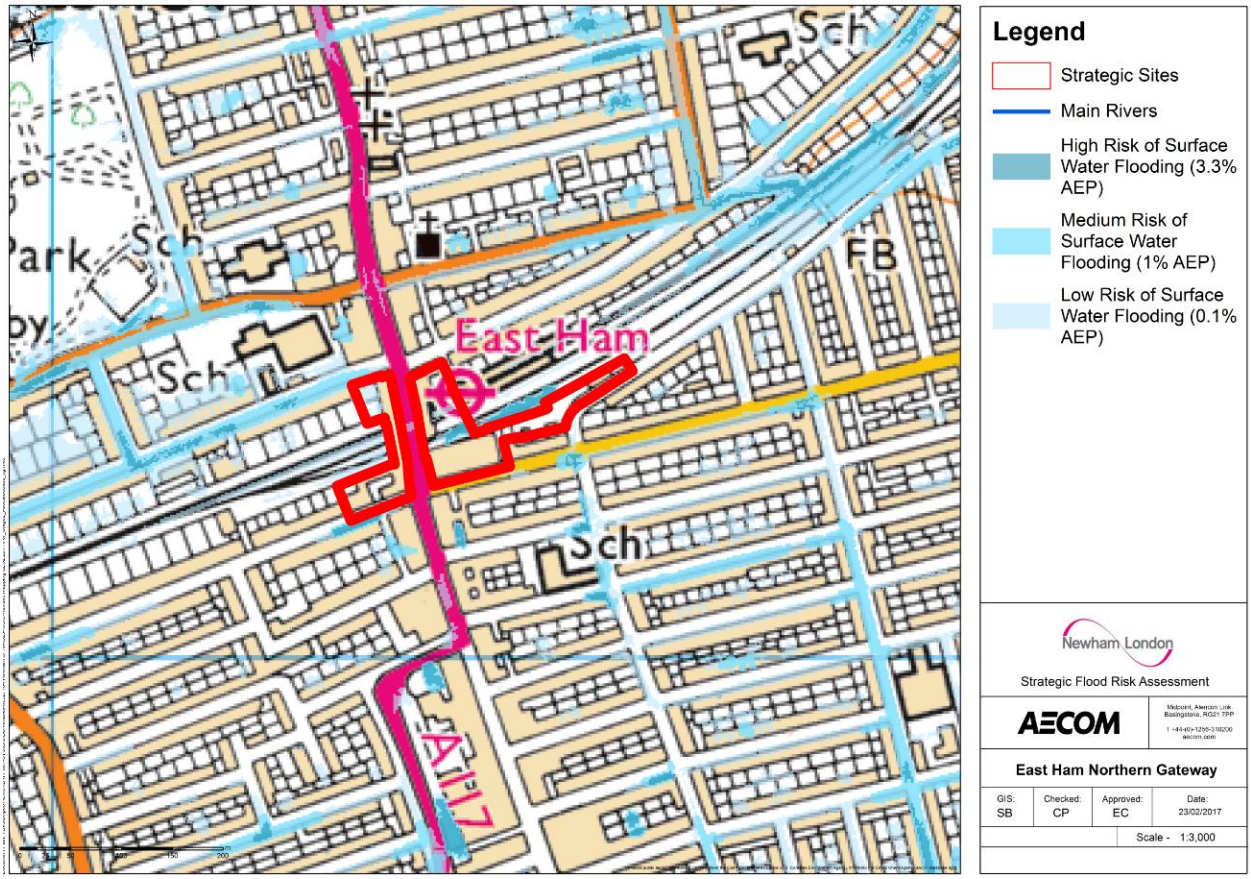

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Figure B Environment Agency's Risk of Flooding from Surface Water (RoFSW)

Historic Flood Events

The Environment Agency does not have any historic records of flooding on the site. At the time of writing, LB Newham as lead local flood authority (LLFA) has not provided any additional data with regard to historic flood records.

Geology and Groundwater

The bedrock geology in this area is Thames Group, comprising clay, sand and silt. The superficial deposits are comprised of River Terrace Deposits. Clayey soils are typically not very permeable and provide the potential for increased surface water ponding.

The AStGWF mapping (Map 06A, Appendix A) shows that the site is located within an area identified to have 'potential for groundwater flooding to occur at the surface'. **This will need to be confirmed during a site investigation survey.**

BGS Infiltration SuDS (sustainable urban drainage system) Map (Map 06B, Appendix A) shows that the site is located within an area where there are 'very significant constraints to the use of SuDS are indicated' (see Table 8-1 of Level 1 SFRA). **A site assessment should be used to confirm the suitability for SuDS on**

Site Assessment Summary – East Ham Northern Gateway

site.

Artificial & Sewer Sources

The site falls into post code E6 2 where Thames Water has 0-3 records of internal flooding. (Map009a LB Newham Level 2 SFRA). **Risk of flooding from sewer sources should be investigated as part of a site-specific FRA.**

No risk posed by artificial sources.

Drainage Hierarchy

Drainage Hierarchy	Infiltration to ground		Significant constraints are indicated (BGS data)
	Discharge to watercourse		No Watercourse located near the site.
	Discharge to surface water sewer		Possible, subject to consultation with Thames Water.

Site Specific Recommendations

Site Layout and Design

The site is currently defined as Flood Zone 1 (<0.1 AEP) and is therefore not at risk from fluvial or tidal flooding.

Surface Water Management

Sustainable urban Drainage Systems (SuDS) should be used to reduce and manage surface water run-off to and from proposed developments as near to source as possible. These should be designed in accordance with LB Newham Local Plan policies, the London Plan drainage hierarchy, Technical Standards (published by Defra[32]) and Planning Practice Guidance published by DCLG.

There is a very significant potential for one or more geo-hazards associated with infiltration SuDS; however, the use of SuDS should still be included in the site drainage strategy, making use of the London Plan SuDS hierarchy (i.e. considering infiltration measures first wherever possible)[31].

In accordance with LB Newham Local Plan, the development should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff, refer to the Local Plan for specific requirements However, site plans should also adhere to the London Plan which includes an 'essential standard' to 'achieve 50% attenuation of the undeveloped sites surface water run-off at peak times' and the Mayors 'preferred standard' is ' Achieve 100% attenuation of the undeveloped sites surface water runoff at peak times'

LB Newham has a presumption against hard standing on domestic gardens and public open space (policy SC3 Flood Risk).

LLFA (LB Newham) Consultation

It is recommended that potential developers contact LB Newham as the LLFA (Lead Local Flood Authority) for further information prior to taking forward site specific plans.

LB Newham will presume that all development contributes to minimising the risk of flooding in Newham and will be required to implement SuDS and maximise permeable surfaces.

Summary – East Ham Northern Gateway

This site is located within Flood Zone 1 and will not require completion of the Exception Test. All sites greater than 1ha located within Flood Zone 1 will require a flood risk assessment (FRA) to support the planning application process. In this instance the FRA should concentrate on the potential for the site to further reduce flood risk to the existing scenario by including SuDS at all stages of development and maximising permeable surfaces in accordance with LB Newham Policy, the London Plan and NPPF guidelines.

[32] Sustainable drainage systems: non-statutory technical standards - https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards; PPG Flood Risk and Coastal Change - http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/reducing-the-causes-and-impacts-of-flooding/why-are-sustainable-drainage-systems-important/

C.3 Silvertown Landing

Site Assessment Summary – Silvertown Landing				
Location: Beckton & Royal Docks	**Ref:** LPR49	**Area (ha):** 5.62	**Proposed Use:** Employment led-Mixed use	**Vulnerability Classification:** More Vulnerable (to account for the mixed use, potentially residential element of the development)
Fluvial/Tidal Flood Risk				
Flood Zone 1 (<0.1 AEP) : 0%	**Flood Zone 2 (0.1% AEP- 0.5% AEP) :** 0%	**Flood Zone 3 (<0.5% AEP):** 100%		

Flood Zones and Flood Defences

100% of the site is located within Flood Zone 3, being at risk of tidal flooding from the River Thames. Environment Agency data (AIMS database) identifies the site to be protected from fluvial / tidal flooding by the presence of a 'raised, man-made, privately owned flood defence wall' which is located along the south western boundary of the site. The wall will protect the site from a 0.1% AEP (1 in 1000 year) tidal flood event. The risk of flooding at this site is therefore a *residual risk*, in the unlikely event that flood defences were to fail, or if the level of protection was exceeded. It is the riparian owners responsibility to ensure the maintenance of defences in this location, however the Environment Agency inspect them twice a year to ensure that they remain fit for purpose.

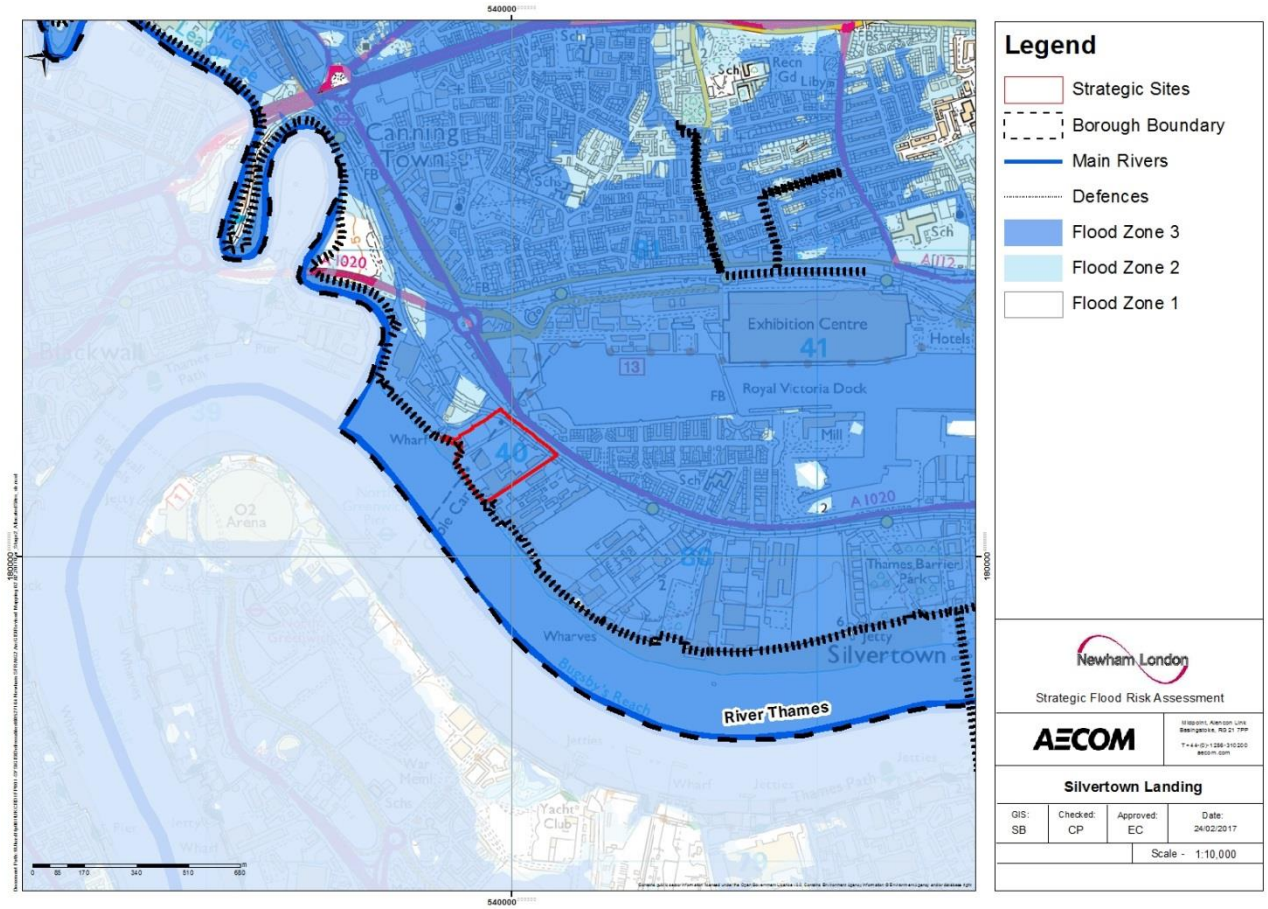

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Figure A Environment Agency Flood Zones

Site Assessment Summary – Silvertown Landing

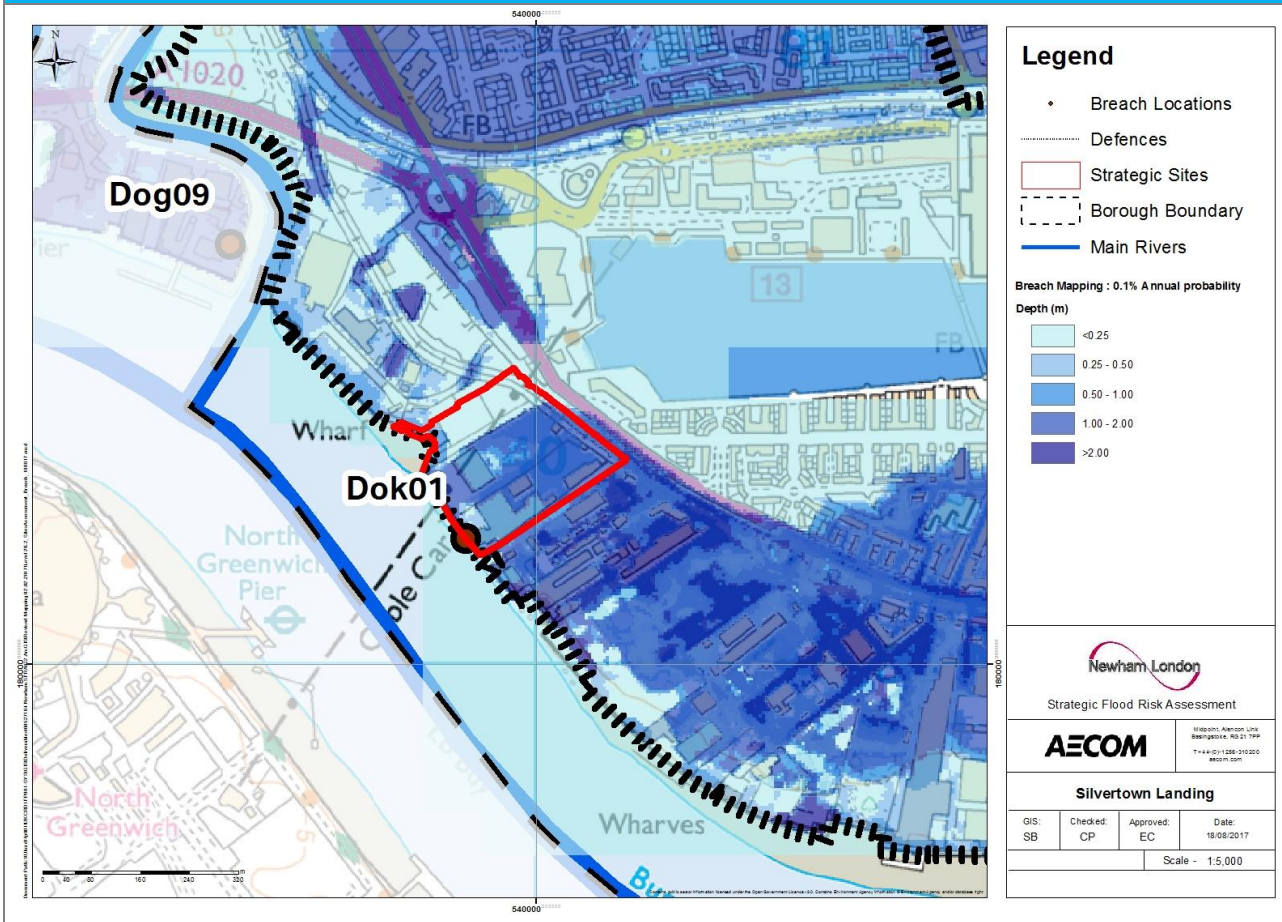

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Figure B Environment Agency Breach locations and potential flood depth for the 1 in 200 year event

Reference to Thames Tidal breach modelling has been used to inform the potential risk of tidal flooding within the site boundary if existing flood defences were to fail. The EA study includes a breach location at the site as shown in figure B above (DOK 01). The results are based on a breach width of 20m and are modelled for a tidal flood event with a return period of 0.5% (1 in 200 year) and 0.1% (1 in 1000 year).

Results show that if a breach were to occur at this location, flood water may reach a depth on site of up to 1.5m during the 1 in 200 year return period. As the site is located adjacent to flood defences, flood water would be fast flowing and have a high corresponding Flood Hazard of 'Danger for Most'. With reference to Figure B, flood waters are released onto the site through the breach and pond in the low-lying areas to the northeast of the site.

Site Assessment Summary – Silvertown Landing

Surface Water Flood Risk

Critical Drainage Area: N/A

Risk of Flooding from Surface Water (RoFSW)

The Environment Agency RoFSW mapping (Figure C) indicates a number of small areas of ponding in the centre and north of the site. This should be considered carefully in the development of the site layout to ensure that residential dwellings are not placed at surface water flood risk, and that the position of any new development does not divert the flow path to a neighbouring area.

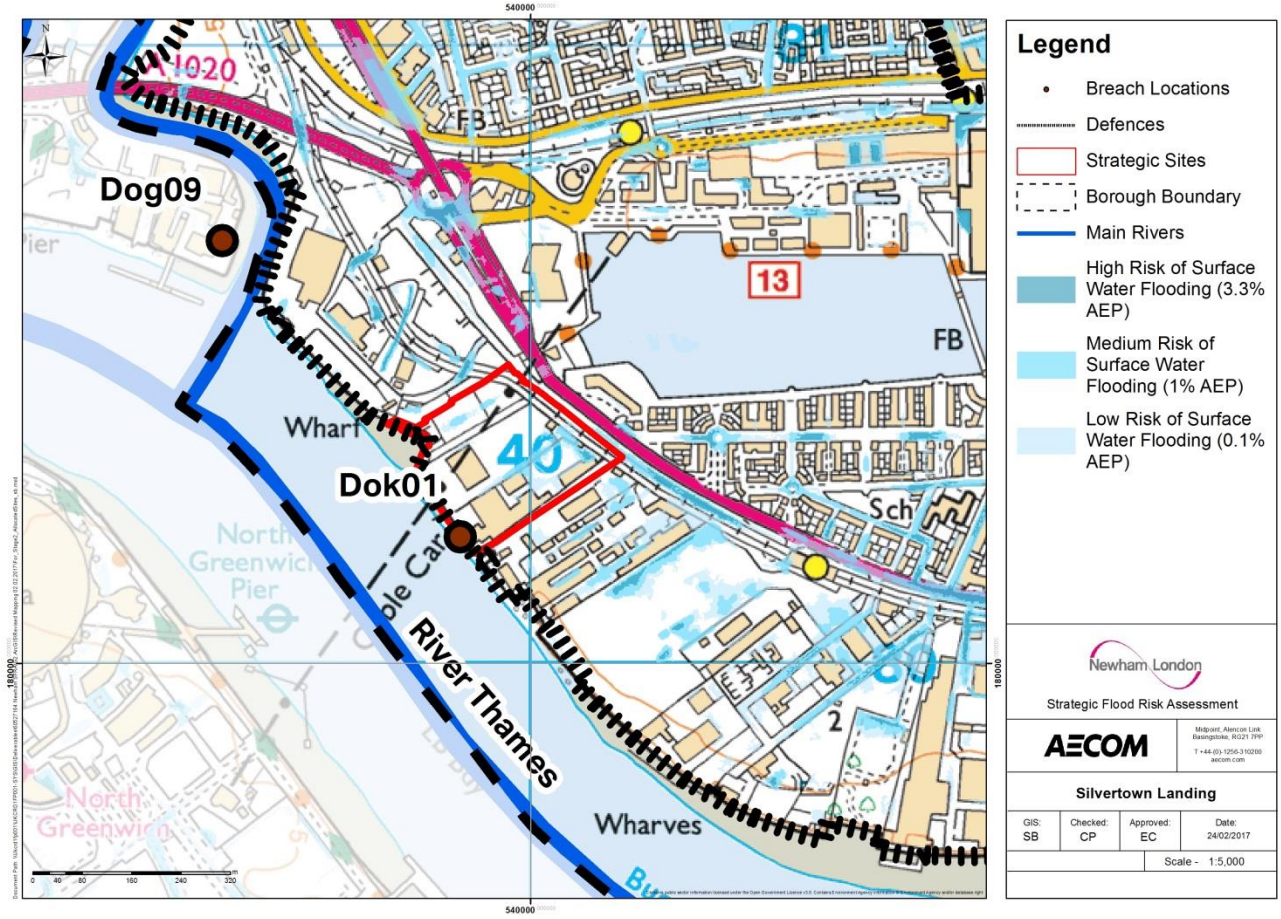

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Figure C Environment Agency's Risk of Flooding from Surface Water (RoFSW)

Historic Flood Events

The Environment Agency Historic Flood Map shows that the site has been previously flooded (Map 03, Appendix A).

At the time of writing, LB Newham as lead local flood authority (LLFA) has not provided any additional data with regard to historic flood record.

Geology and Groundwater

Site Assessment Summary – Silvertown Landing

The bedrock geology in this area is Thames Group, comprising clay, sand and silt. The superficial deposits are alluvium (a deposit of clay, silt and sand left by flowing floodwater in a river valley) associated with the River Thames. Clayey soils are typically not very permeable and provide the potential for increased surface water ponding.

The AStGWF (Map 06A, Appendix A) mapping does not cover the whole of LB Newham and this site is only partially identified as being located in an area with 'potential for groundwater flooding to occur at the surface'. In the absence of further data, it is anticipated that as the geology is consistent across the site, this groundwater risk will also be consistent across the site. **This will need to be confirmed during site investigation survey.**

BGS Infiltration SuDS (sustainable urban drainage system) Map (Map 06B, Appendix A) shows that the site is located within an area where there are 'very significant constraints' to the use of infiltration SuDS (see Table 8-1 of Level 1 SFRA). This does not prevent the use of all SuDS, and **a site assessment should be used to confirm the suitability for SuDS on this site.**

Artificial & Sewer Sources

The Environment Agency 'Risk of Flooding from Reservoirs' mapping identifies the potential risk if reservoirs in the Lee Valley including the King George and William Girling were to fail. In this scenario, water would travel southwards along the Lee Valley; however modelling shows that this flood water would not reach this site, instead it would flow to the A1020 Silvertown Way in the north western corner of the site. (Map 11, Appendix A)

The Royal Victoria Dock is located approximately 200m to the north east of the site. Water levels in the Docks are controlled by a series of lock gates and the water level is independent of the River Thames. In order for these docks to flood, a breach in the River Thames Tidal defences would need to occur, filling the docks which could then spill to adjacent land. The risk of this happening is very low. The Environment Agency have assessed this risk as part of the Thames Tidal Breach Modelling Study, results show that a breach in the dock gates at Custom House does not lead to flood water entering the Silvertown Landing site.

The site falls into post code E16 2 where Thames Water has 0-3 records of internal flooding. (Map009a LB Newham Level 1 & 2 SFRA). **Risk of flooding from sewer sources should be investigated as part of a site-specific FRA.**

Drainage Hierarchy

Drainage Hierarchy	Infiltration to ground		Significant constraints are indicated
	Discharge to watercourse		Discharge possible to the River Thames, subject to consultation with the Environment Agency.
	Discharge to surface water sewer		Possible, subject to consultation with Thames Water.

Site Specific Recommendations

Site Layout and Design

Flood risk should be considered at an early stage in deciding the layout and design of the site to provide opportunity to reduce flood risk within the development. The sequential approach should be applied within development sites to locate the most vulnerable elements of a development in the lowest risk areas (considering all sources of flooding and in this specific location, breach hazard and depth).

A site specific FRA should be informed by hydraulic breach modelling to provide a greater level of detail of flood risk posed across the site should existing flood defences fail. The scope of this assessment should be confirmed with the Environment Agency and LB Newham.

Site Assessment Summary – Silvertown Landing

Surface Water Management

Sustainable urban Drainage Systems (SuDS) should be used to reduce and manage surface water run-off to and from proposed developments as near to source as possible. These should be designed in accordance with LB Newham Local Plan policies, the London Plan drainage hierarchy, Technical Standards (published by Defra[33]) and Planning Practice Guidance published by DCLG.

The use of SuDS may be more limited at this site due to prevailing geology; however, the use of SuDS should still be included in the site drainage strategy, making use of the London Plan SuDS hierarchy (i.e. considering infiltration measures first wherever possible).

In accordance with LB Newham Local Plan, the development should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff, refer to the Local Plan for specific requirements. However, site plans should also adhere to the London Plan which includes an 'essential standard' to 'achieve 50% attenuation of the undeveloped sites surface water run-off at peak times' and the Mayors 'preferred standard' is ' achieve 100% attenuation of the undeveloped sites surface water runoff at peak times'[31].

LB Newham has a presumption against hard standing on domestic gardens and public open space (policy SC3 Flood Risk).

Set-back Distance

A 16m wide undeveloped buffer strip should be retained along main rivers to facilitate vehicular access to enable intrusive investigations or maintenance of flood defences. The Environment Agency would also ask developers to explore opportunities for riverside restoration as part of any development. The Environment Agency should be contacted to obtain an Environmental Permit (formerly called Flood Defence Consent) for any works on or near a main river or flood defence structure https://www.gov.uk/guidance/flood-risk-activities-environmental-permits

Finished Floor Levels

Applicants, as part of their flood risk assessment must provide details of indicative breach flood water levels, ground level, ground, first and second floor levels in metres AOD, and show the floor level for bedrooms and safe refuges, providing justification for the options chosen. Development must be safe through the layout, form and floor levels of the development including an appropriate allowance for climate change (see Section 3 of the Level 1 SFRA).

Access / Egress

Safe access and egress is required to enable the evacuation of people from the development, to provide emergency services with access to the development during times of flood and enable flood defence authorities access to carry out any necessary duties.

A safe access/egress route should allow occupants to safely enter and exit the buildings and be able to reach land outside the flooded area (e.g. within Flood Zone 1) using public rights of way without the intervention of emergency services or others during design flood conditions, including climate change allowances.

For developments located in areas at risk of tidal flooding from a breach of the flood defences, safe access / egress must be provided for new development as follows in order of preference:

- Safe dry route for people and vehicles.
- Safe dry route for people.
- If a dry route for people is not possible, a route for people where the flood hazard (in terms of depth and velocity of flooding) is low and should not cause risk to people.
- If a dry route for vehicles is not possible, a route for vehicles where the flood hazard (in terms of depth and velocity of flooding) is low to permit access for emergency vehicles.

In all these cases, a 'dry' access/egress is a route located above the 0.5% annual probability tidal flood level (1 in 200 year) including an allowance for climate change.

Internal access to higher floors is required and associated plans showing access routes and floor levels

[33] Sustainable drainage systems: non-statutory technical standards - https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards; PPG Flood Risk and Coastal Change - http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/reducing-the-causes-and-impacts-of-flooding/why-are-sustainable-drainage-systems-important/

Site Assessment Summary – Silvertown Landing

should be included within any site specific FRA.

Emergency Planning

The site is shown to be within an Environment Agency Flood Warning Area and occupants of the site should register to receive flood warnings.

It is advised that a Flood Warning and Evacuation Plan be prepared and included within the FRA to demonstrate what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population. This plan should include details of dry access and egress as well as areas of safe refuge.

LLFA Consultation

It is recommended that potential developers contact LB Newham as the LLFA (Lead Local Flood Authority) for further information prior to taking forward site specific plans.

Floodplain Compensation Storage

The site is at residual risk due to the presence of flood defences, therefore there will be no loss in floodplain and compensatory storage is not required at this site.

Summary – Silvertown Landing

The site is located within Flood Zone 3 and will require completion of the Exception Test informed by a site specific FRA. Results show that if a breach were to occur at this location, flood water may reach a depth on site of up to 1.5m during the 1 in 200 year return period. Therefore the site-specific flood risk assessment must follow the policy recommendations above.

C.4 Lyle Park West

Site Assessment Summary – Lyle Park West				
Location: Silvertown	**Ref:** LPR18	**Area (ha):** 7	**Proposed Use:** mixed-use, residential and commercial	**Vulnerability Classification:** Less Vulnerable
Fluvial Flood Risk				
Flood Zone 1 (<0.1 AEP) : 0%	**Flood Zone 2 (0.1%- 0.5% AEP AEP) :** 0%	**Flood Zone 3 (<0.5% AEP):** 100%		

Flood Zones and Flood Defences

100% of the site is located within Flood Zone 3, being at risk of tidal flooding from the River Thames. Environment Agency data (AIMS database) identifies the site to be protected from fluvial / tidal flooding by the presence of a 'raised, man-made, privately owned flood defence wall' which is located along the southern boundary of the site. The wall will protect the site from a 0.1% AEP (1 in 1000 year) tidal flood event. The risk of flooding at this site is therefore a **residual risk**, in the unlikely event that flood defences were to fail, or if the level of protection was exceeded. It is the riparian owners responsibility to ensure the maintenance of defences in this location, however the Environment Agency inspect them twice a year to ensure that they remain fit for purpose.

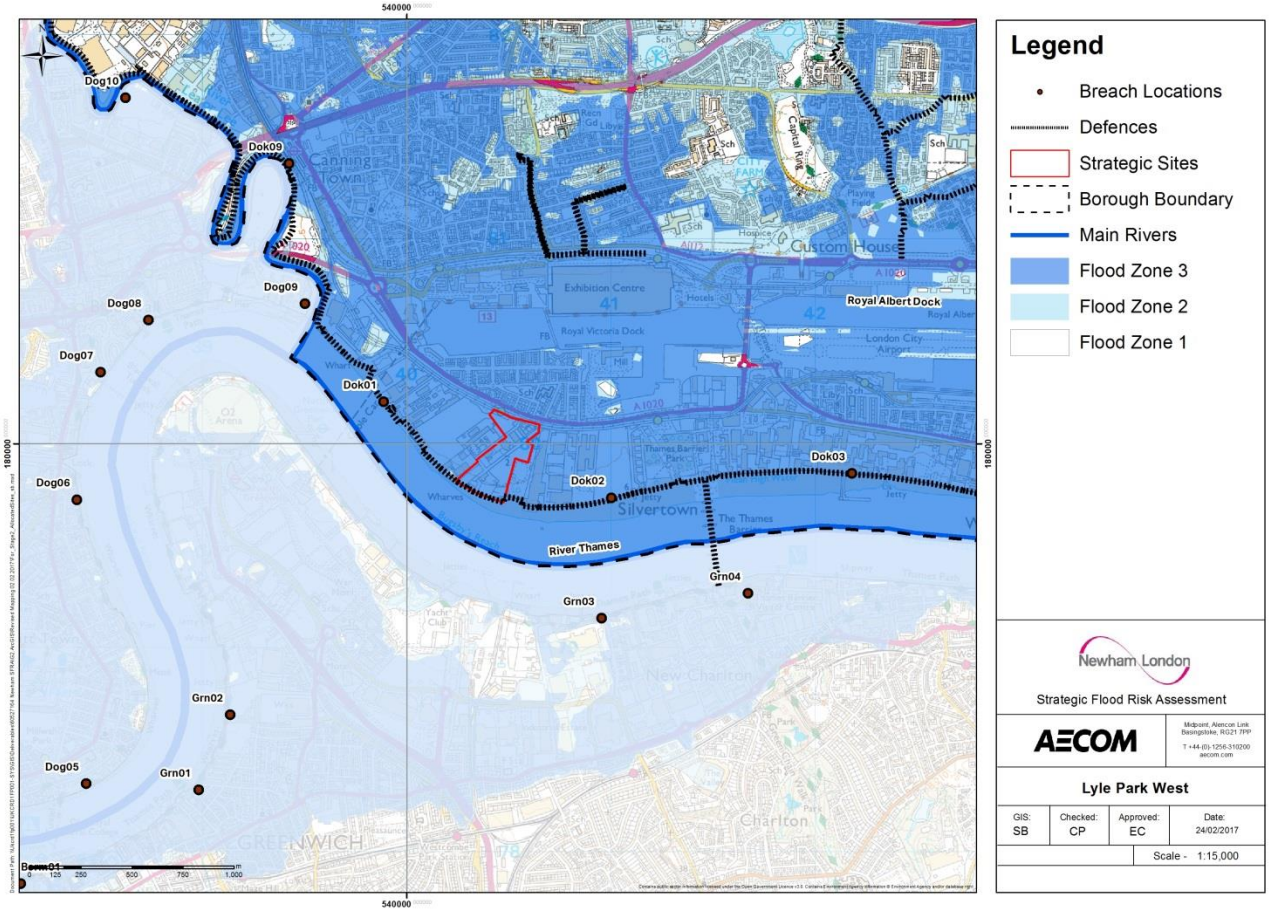

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Figure A Environment Agency Flood Zones

The site is located between two Environment Agency modelled breach location (DOK01 and DOK02). This modelling has been referenced to better understand potential tidal flood risk within the Flood Zone 3 outline in the unlikely event that existing flood defences were to fail. The results are based on a breach width of 20m and are modelled for a tidal flood event with a return period of 0.5% (1 in 200 year) and 0.1% (1 in 1000

Site Assessment Summary – Lyle Park West

year).

Results show that the northern and centre of the site is at risk from a tidal flood event with a return period of 0.5% (1 in 200 year) with a flood depth range of 0m-0.5m with a corresponding hazard rating of very low. It should be noted that this low hazard rating is due to the positioning of the breach location. If a breach were to occur adjacent to the site, flood water directly behind the breach would be fast flowing and have a high corresponding flood hazard ' danger for most'.

A site specific FRA should be informed by hydraulic breach modelling to provide a greater level of detail of flood risk posed across the site should existing flood defences fail. The scope of this assessment should be confirmed with the Environment Agency and LB Newham.

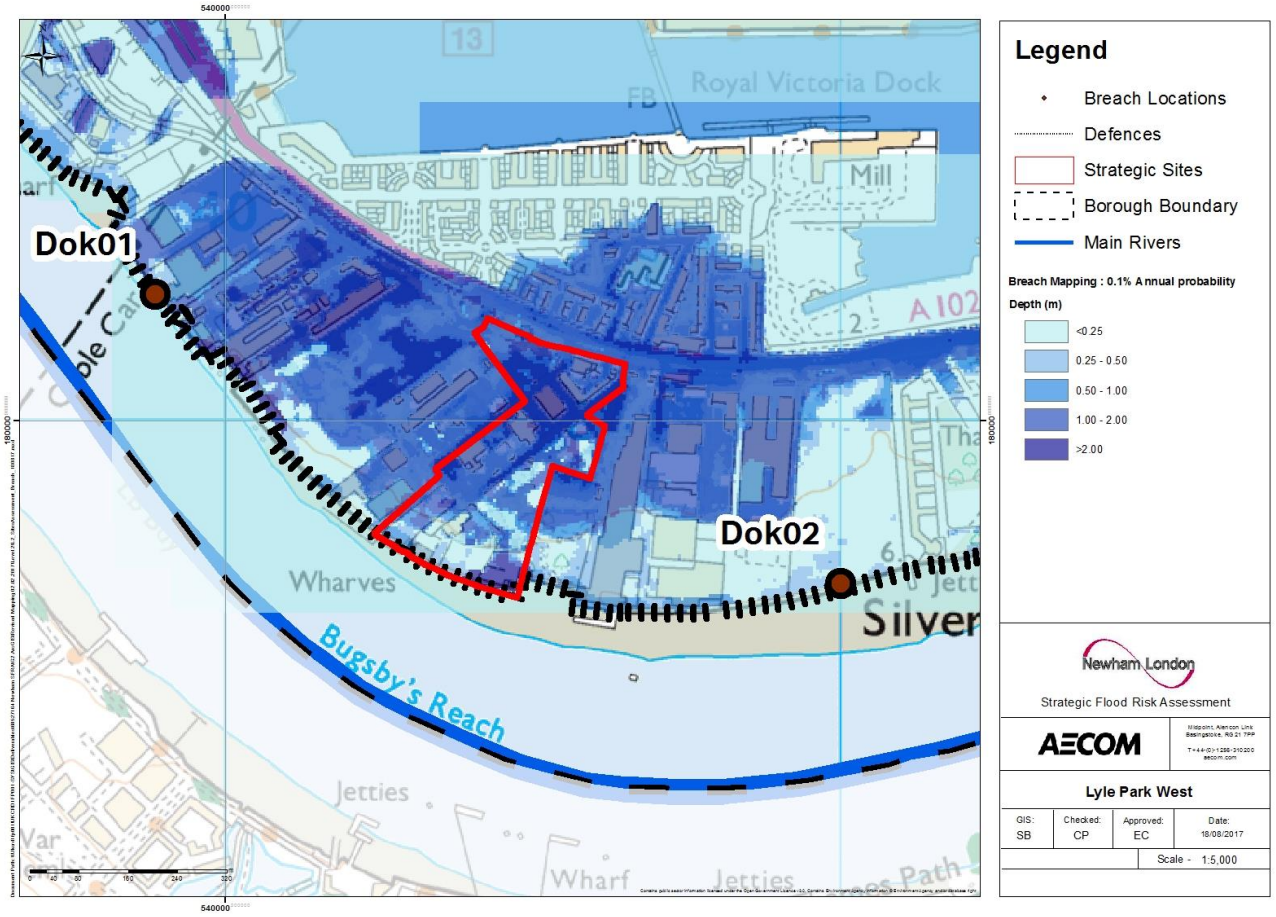

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Figure B Environment Agency Breach locations and potential flood depth for the 1 in 200 year event

Surface Water Flood Risk

Critical Drainage Area: N/A

Risk of Flooding from Surface Water (RoFSW)

The Environment Agency RoFSW mapping (Figure C) shows surface water pooling along existing highways including Knights Road and Bradfield Road reaching 'medium risk' of flooding, i.e. surface water flooding is expected in the 1% (1 in 100 year) scenario. Surface water flood risk should be considered carefully in the development of the site layout to ensure that residential dwellings are not placed at surface water flood risk, and that the position of any new development does not divert the flow path to a neighbouring area.

Site Assessment Summary – Lyle Park West

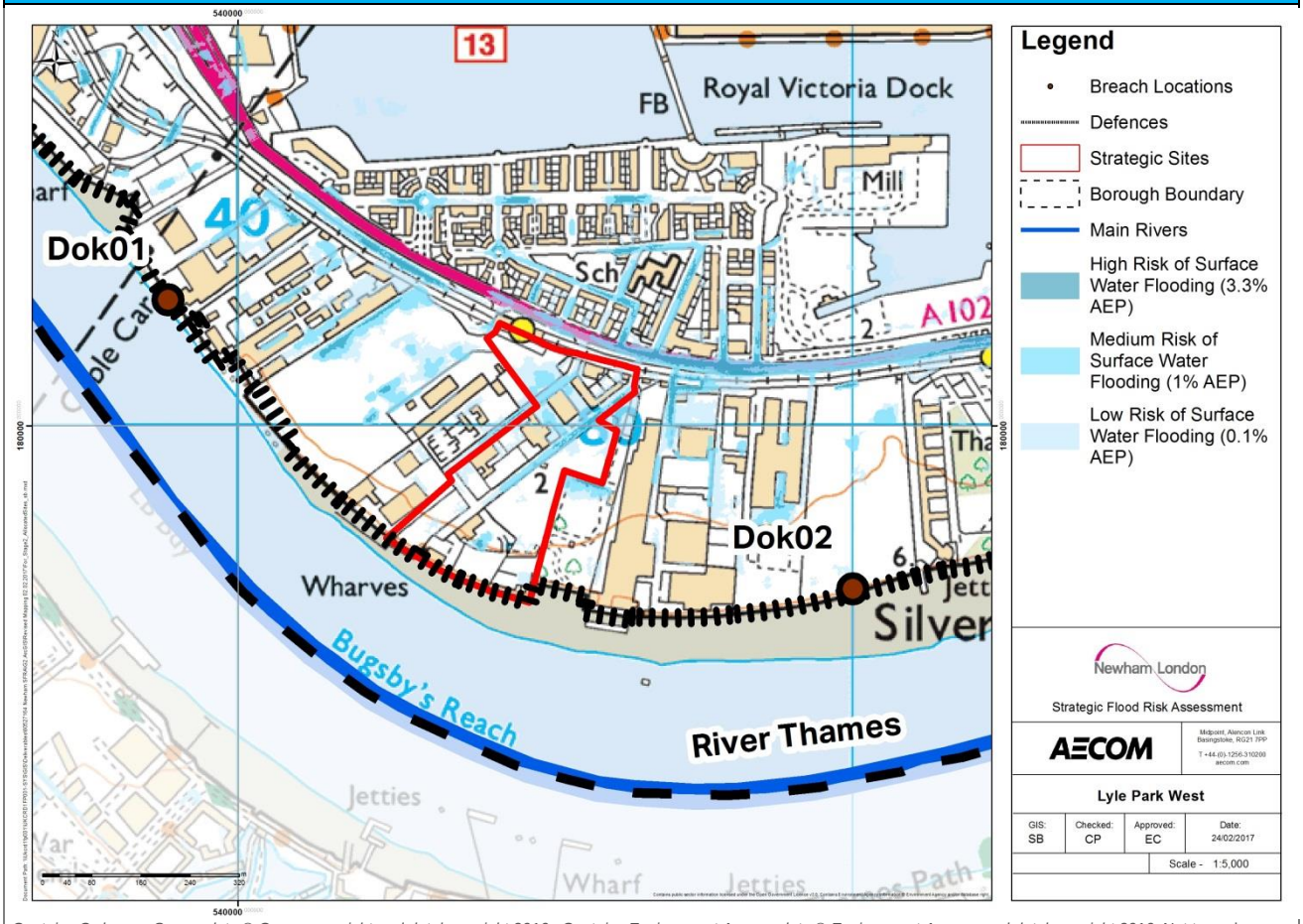

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Figure C Environment Agency's Risk of Flooding from Surface Water (RoFSW)

Historic Flood Events

The Environment Agency flood risk records show that the site has been previously flooded however the source of flooding is unknown.

At the time of writing, LB Newham as lead local flood authority (LLFA) has not provided any additional data with regard to historic flood records

Geology and Groundwater

The site is located on a boundary of Lambeth Group and Thames Group bedrock geology comprising gravels, sands, silts and clays. Clayey soils are typically not very permeable and provide the potential for increased surface water ponding.

The AStGWF (Map 06A, Appendix A) mapping shows the site to be located in an area with 'potential for groundwater flooding to occur at the surface'. **This will need to be confirmed during site investigation survey.**

BGS Infiltration SuDS (sustainable urban drainage system) Map (Map 06B, Appendix A) shows that the site is located within an area where there are 'very significant constraints' to the use of infiltration SuDS (see Table 8-1 of Level 1 SFRA). This does not prevent the use of all SuDS, and a **site assessment should be used to confirm the suitability for SuDS on this site.**

Site Assessment Summary – Lyle Park West

Artificial & Sewer Sources

Reference to the Environment Agency 'Risk of Flooding from Reservoirs' mapping identifies that the site is ***not at risk of flooding from reservoir failure*** (King George/William Girling). It should be noted that this mapping does not consider the potential risk posed by Royal Victoria Dock. (Map 11 LB Newham Level 1 & 2 SFRA)

The Royal Victoria Dock is located approximately 300m to the north of the site. Water levels in the Docks are controlled by a series of lock gates and the water level is independent of the River Thames. In order for these docks to flood, a breach in the River Thames Tidal defences would need to occur, filling the docks which could then spill to adjacent land. The risk of this occurring is very low. The Environment Agency have assessed this risk as part of the Thames Tidal Breach Modelling Study, Results show that a breach in the dock gates at Custom House does not lead to flood water entering the Lyle Park West Site (water is contained within the docks and propagates land to the north; Becton).

The site falls into post code E16 2 where Thames Water has 0-3 records of internal flooding. (Map009a LB Newham Level 1& 2 SFRA). **Risk of flooding from sewer sources should be investigated as part of a site-specific FRA.**

Drainage Hierarchy

Drainage Hierarchy	Infiltration to ground		Significant constraints are indicated
	Discharge to watercourse		Discharge possible to the River Thames that flows along the western boundary of the site, subject to consultation with the Environment Agency.
	Discharge to surface water sewer		Possible, subject to consultation with Thames Water.

Site Specific Recommendations

Site Layout and Design

Flood risk should be considered at an early stage in deciding the layout and design of the site to provide opportunity to reduce flood risk within the development. The sequential approach should be applied within development sites to locate the most vulnerable elements of a development in the lowest risk areas (considering all sources of flooding).

A site specific FRA may need to be informed by hydraulic breach modelling to provide a greater level of detail of flood risk posed across the site should existing flood defences fail. The scope of this assessment should be confirmed with the Environment Agency and LPA.

Sustainable urban Drainage Systems (SuDS) should be used to reduce and manage surface water run-off to and from proposed developments as near to source as possible. These should be designed in accordance with LB Newham Local Plan policies, the London Plan drainage hierarchy, Technical Standards (published by Defra34) and Planning Practice Guidance published by DCLG.

The use of SuDS may be more limited at this site due to prevailing geology; however, the use of SuDS should still be included in the site drainage strategy, making use of the London Plan SuDS hierarchy (i.e. considering infiltration measures first wherever possible).

In accordance with LB Newham Local Plan, the development should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff refer to the Local Plan for specific requirements. However, site plans should also adhere to the London Plan which includes an 'essential standard' to 'achieve 50% attenuation of the undeveloped sites surface water run-off at peak times' and the Mayors 'preferred standard' is ' Achieve 100% attenuation of the undeveloped sites surface water runoff at peak times'[31].

LB Newham has a presumption against hard standing on domestic gardens and public open space (policy

[34] Sustainable drainage systems: non-statutory technical standards - https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards; PPG Flood Risk and Coastal Change - http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/reducing-the-causes-and-impacts-of-flooding/why-are-sustainable-drainage-systems-important/

Site Assessment Summary – Lyle Park West

SC3 Flood Risk).

Set-back Distance

A 16m wide undeveloped buffer strip should be retained along main rivers to facilitate vehicular access to enable intrusive investigations or maintenance of flood defences. The Environment Agency would also ask developers to explore opportunities for riverside restoration as part of any development. The Environment Agency should be contacted to obtain an Environmental Permit (formerly called Flood Defence Consent) for any works on or near a main river or flood defence structure https://www.gov.uk/guidance/flood-risk-activities-environmental-permits

Finished Floor Levels

Applicants, as part of their flood risk assessment must provide details of indicative breach flood water levels, ground level, ground, first and second floor levels in metres AOD, and show the floor level for bedrooms and safe refuges, providing justification for the options chosen. Development must be safe through the layout, form and floor levels of the development including an appropriate allowance for climate change.

Access / Egress

Safe access and egress is required to enable the evacuation of people from the development, to provide emergency services with access to the development during times of flood and enable flood defence authorities access to carry out any necessary duties.

A safe access/egress route should allow occupants to safely enter and exit the buildings and be able to reach land outside the flooded area (e.g. within Flood Zone 1) using public rights of way without the intervention of emergency services or others during design flood conditions, including climate change allowances.

For developments located in areas at risk of tidal flooding from a breach of the flood defences, safe access / egress must be provided for new development as follows in order of preference:

- Safe dry route for people and vehicles.
- Safe dry route for people.
- If a dry route for people is not possible, a route for people where the flood hazard (in terms of depth and velocity of flooding) is low and should not cause risk to people.
- If a dry route for vehicles is not possible, a route for vehicles where the flood hazard (in terms of depth and velocity of flooding) is low to permit access for emergency vehicles.

In all these cases, a 'dry' access/egress is a route located above the 0.5% annual probability tidal flood level (1 in 200 year) including an allowance for climate change.

Internal access to higher floors is required and associated plans showing access routes and floor levels should be included within any site specific FRA.

Emergency Planning

The site is shown to be within an Environment Agency Flood Warning Area and occupants of the site should register to receive flood warnings.

It is advised that a Flood Warning and Evacuation Plan be prepared and included within the FRA to demonstrate what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population. This plan should include details of dry access and egress as well as areas of safe refuge.

LLFA Consultation

It is recommended that potential developers contact LB Newham as the LLFA (Lead Local Flood Authority) for further information prior to taking forward site specific plans.

Floodplain Compensation Storage

The site is at residual risk due to the presence of flood defences, therefore there will be no loss in floodplain and compensatory storage is not required at this site.

Summary - Lyle Park West

The site is located within Flood Zone 3 and will require completion of the Exception Test informed by a site specific FRA. There is no breach modelling available located adjacent to the site, the Environment Agency

Site Assessment Summary – Lyle Park West
should be consulted early in the planning process to confirm the requirements of the site specific FRA. The use of SuDS may be more limited at this site due to prevailing geology; however, the use of SuDS should still be included in the site drainage strategy, making use of the London Plan SuDS hierarchy (i.e. considering infiltration measures first wherever possible).

C.5 Connaught Riverside

Site Assessment Summary – Connaught Riverside				
Location: Silvertown	**Ref:** LPR9	**Area (ha):** 12	**Proposed Use:** Proposed mixed use site to include residential and employment and the formation of green grid connections around the site.	**Vulnerability Classification:** More Vulnerable based on mixed use proposals.
Fluvial Flood Risk				
Flood Zone 1 (<0.1 AEP) : 0%			**Flood Zone 2 (0.1%- 0.5% AEP AEP) :** 0%	**Flood Zone 3 (<0.5% AEP):** 100%
Flood Zones and Flood Defences 100% of the site is located within Flood Zone 3, being at risk of tidal flooding from the River Thames. Environment Agency data (AIMS database) identifies the site to be protected from fluvial / tidal flooding by the presence of a 'raised, man-made, privately owned flood defence wall' which is located along the southern boundary of the site. The wall will protect the site from a 0.1% AEP (1 in 1000 year) tidal flood event. The risk of flooding at this site is therefore a **residual risk**, in the unlikely event that flood defences were to fail, or if the level of protection was exceeded. It is the riparian owners responsibility to ensure the maintenance of defences in this location, however the Environment Agency inspect them twice a year to ensure that they remain fit for purpose.				

Site Assessment Summary – Connaught Riverside

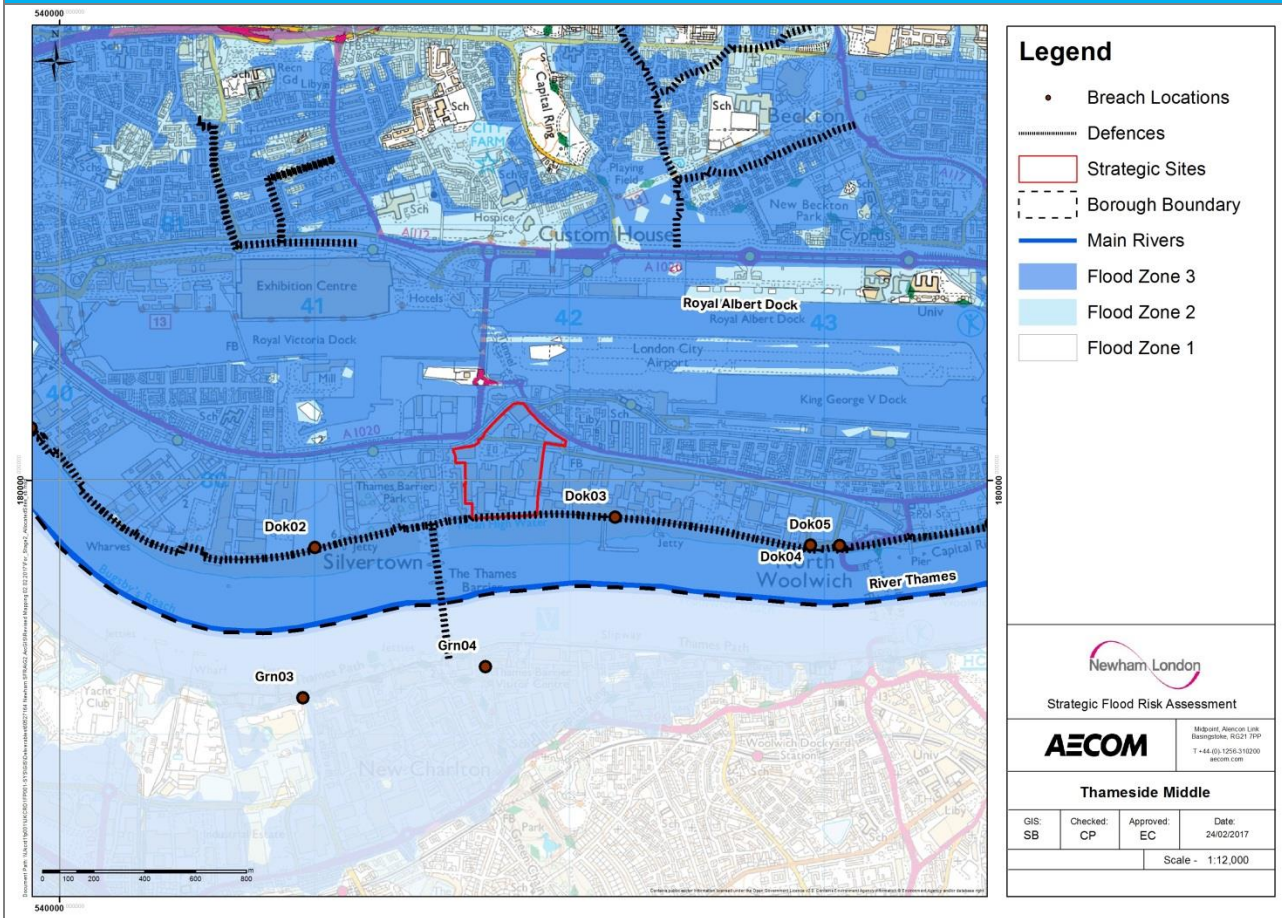

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Figure A Environment Agency Flood Zones The site is located between Environment Agency breach locations DoK02 and DoK03. This modelling has been referenced to better understand potential tidal flood risk within the Flood Zone 3 outline in the unlikely event that existing flood defences were to fail. The results are based on a breach width of 20m and are modelled for a tidal flood event with a return period of 0.5% (1 in 200 year) and 0.1% (1 in 1000 year).

Results show that the northern and centre of the site is at risk from a tidal flood event with a return period of 0.5% (1 in 200 year) with a flood depth range of 0m to 1m. This has a corresponding flood hazard rating of 'danger for some'. It should be noted that this low hazard rating is due to the positioning of the breach location. If a breach were to occur adjacent to the site, flood water directly behind the breach would be fast flowing and potentially have a high corresponding flood hazard ' danger for all'.

Site Assessment Summary – Connaught Riverside

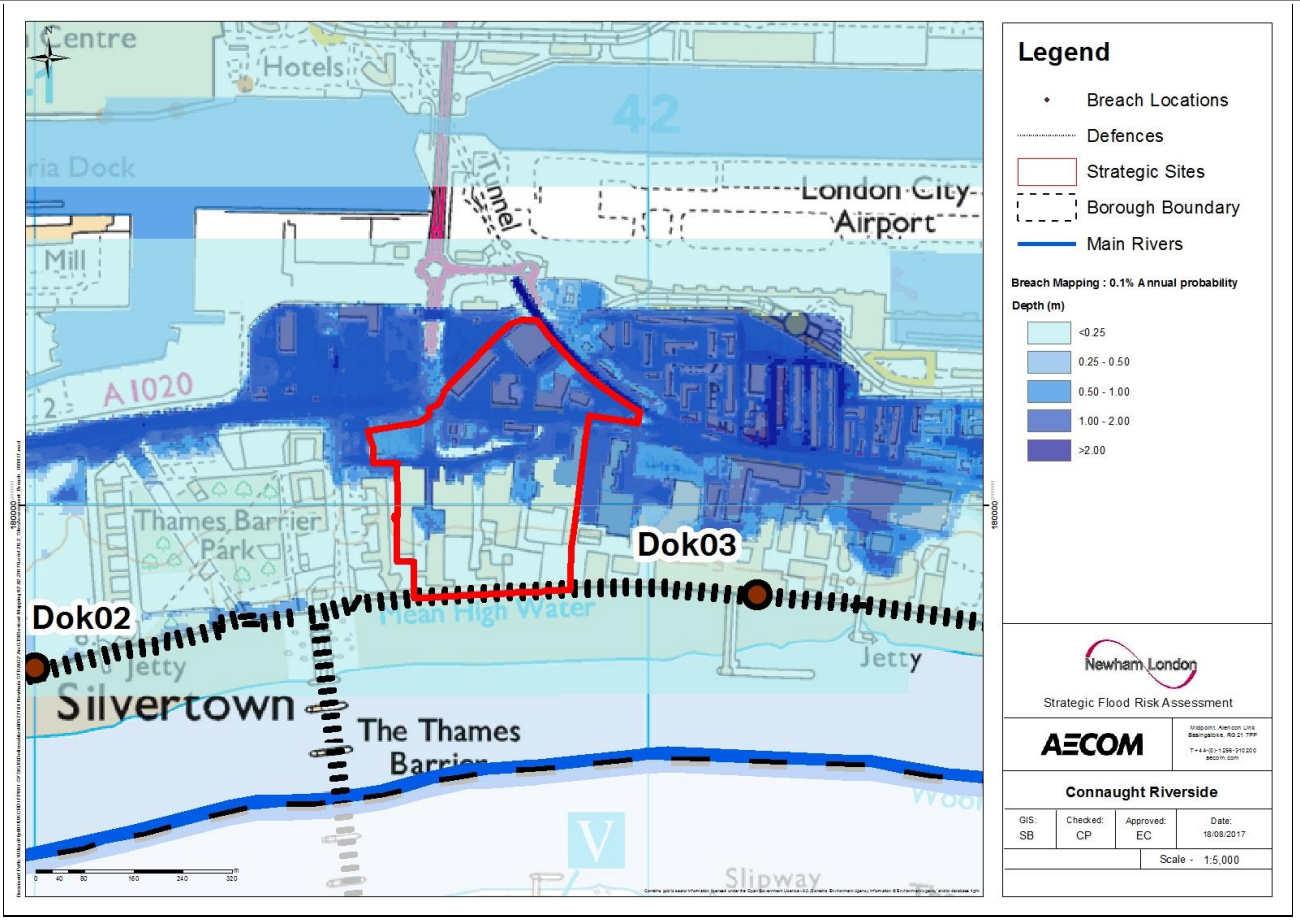

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Figure B Environment Agency Breach locations and potential flood depth for the 1 in 200 year event

Surface Water Flood Risk

Critical Drainage Area: Group4_036 (see Newham SWMP[35])

Risk of Flooding from Surface Water (RoFSW)

The Environment Agency RoFSW mapping (Figure C) indicates that parts of the site are susceptible to surface water ponding and flow. There are a number of contributing flow paths in the north and centre of the site that flows from the east. Additional areas of medium and low surface water flood risk are located around the site. This should be considered carefully in the development of the site layout to ensure that residential dwellings are not placed at surface water flood risk, and that the position of any new development does not divert the flow path to a neighbouring area.

[35] London Borough of Newham Surface Water Management Plan; Available at: https://www.newham.gov.uk/Documents/Environment%20and%20planning/SurfaceWaterManagementPlan.pdf

Site Assessment Summary – Connaught Riverside

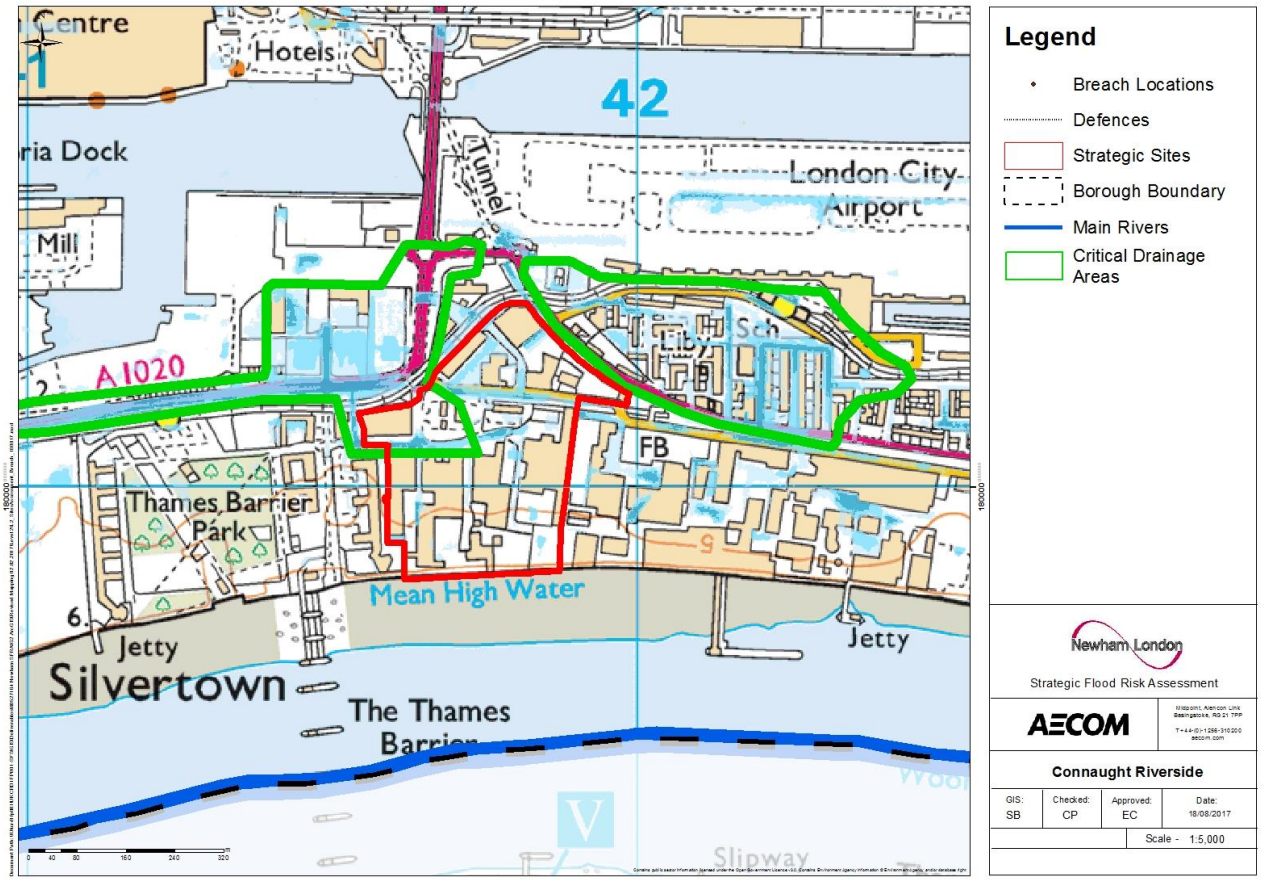

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Figure C Environment Agency's Risk of Flooding from Surface Water (RoFSW)

Historic Flood Events

The Environment Agency does not have any historic records of flooding on the site.

At the time of writing, LB Newham as lead local flood authority (LLFA) has not provided any additional data with regard to historic flood records.

Geology and Groundwater

The bedrock geology in this area is Lambeth Group, comprising clay, sand and silt.. Clayey soils are typically not very permeable and provide the potential for increased surface water ponding.

The AStGWF mapping (Map 06A, Appendix A) shows the site to be located on a boundary between two classifications being 'potential for groundwater flooding to occur at the surface' in the north of the site and 'limited potential for groundwater flooding to occur' in the south of the site. **This will need to be confirmed during site investigation survey.**

BGS Infiltration SuDS (sustainable urban drainage system) Map (Map 06B, Appendix A) shows that the site is located within an area where there are 'very significant constraints' to the use of infiltration SuDS (see Table 8-1 of Level 1 SFRA). This does not prevent the use of all SuDS, and a site assessment should be used to confirm the suitability for SuDS on this site. **A site assessment should be used to confirm the suitability for SuDS.**

Site Assessment Summary – Connaught Riverside

Artificial & Sewer Sources

Reference to the Environment Agency 'Risk of Flooding from Reservoirs' mapping identifies that the site is ***not at risk of flooding from reservoir failure*** (King George/William Girling). It should be noted that this mapping does not consider the potential risk posed by Royal Victoria Dock. (Map 11 LB Newham Level 1 & 2 SFRA).

Results show that if a breach were to occur at Dok06 (further downstream), flood water may reach a depth on site of up to 1m during the 1:200 return period. The corresponding Flood Hazard would be 'Danger for Some'.

The site falls into post code E16 2 where Thames Water has 0-3 records of internal flooding. (Map009a LB Newham Level 2 SFRA). **Risk of flooding from sewer sources should be investigated as part of a site-specific FRA.**

Drainage Hierarchy

Drainage Hierarchy	Infiltration to ground		Significant constraints are indicated
	Discharge to watercourse		Discharge possible to the River Thames that flows along the southern boundary of the site, subject to consultation with the Environment Agency.
	Discharge to surface water sewer		Possible, subject to consultation with Thames Water.

Site Specific Recommendations

Site Layout and Design

Flood risk should be considered at an early stage in deciding the layout and design of the site to provide opportunity to reduce flood risk within the development. The sequential approach should be applied within development sites to locate the most vulnerable elements of a development in the lowest risk areas (considering all sources of flooding).

A site specific FRA may need to be informed by hydraulic breach modelling to provide a greater level of detail of flood risk posed across the site should existing flood defences fail. The scope of this assessment should be confirmed with the Environment Agency and LPA.

Sustainable urban Drainage Systems (SuDS) should be used to reduce and manage surface water run-off to and from proposed developments as near to source as possible. These should be designed in accordance with LB Newham Local Plan policies, the London Plan drainage hierarchy, Technical Standards (published by Defra36) and Planning Practice Guidance published by DCLG.

The use of SuDS may be more limited at this site due to prevailing geology; however, the use of SuDS should still be included in the site drainage strategy, making use of the London Plan SuDS hierarchy (i.e. considering infiltration measures first wherever possible).

In accordance with LB Newham Local Plan, the development should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff, refer to the Local Plan for specific requirements. However, site plans should also adhere to the London Plan which includes an 'essential standard' to 'achieve 50% attenuation of the undeveloped sites surface water run-off at peak times' and the Mayors 'preferred standard' is ' Achieve 100% attenuation of the undeveloped sites surface water runoff at peak times'[31].

LB Newham has a presumption against hard standing on domestic gardens and public open space (policy SC3 Flood Risk).

Set-back Distance

A 16m wide undeveloped buffer strip should be retained along main rivers to facilitate vehicular access to enable intrusive investigations or maintenance of flood defences. The Environment Agency would also ask

[36] Sustainable drainage systems: non-statutory technical standards - https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards; PPG Flood Risk and Coastal Change - http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/reducing-the-causes-and-impacts-of-flooding/why-are-sustainable-drainage-systems-important/

Site Assessment Summary – Connaught Riverside

developers to explore opportunities for riverside restoration as part of any development. The Environment Agency should be contacted to obtain an Environmental Permit (formerly called Flood Defence Consent) for any works on or near a main river or flood defence structure https://www.gov.uk/guidance/flood-risk-activities-environmental-permits

Finished Floor Levels

Applicants, as part of their flood risk assessment must provide details of indicative breach flood water levels, ground level, ground, first and second floor levels in metres AOD, and show the floor level for bedrooms and safe refuges, providing justification for the options chosen. Development must be safe through the layout, form and floor levels of the development including an appropriate allowance for climate change.

Access / Egress

Safe access and egress is required to enable the evacuation of people from the development, to provide emergency services with access to the development during times of flood and enable flood defence authorities access to carry out any necessary duties.

A safe access/egress route should allow occupants to safely enter and exit the buildings and be able to reach land outside the flooded area (e.g. within Flood Zone 1) using public rights of way without the intervention of emergency services or others during design flood conditions, including climate change allowances.

For developments located in areas at risk of tidal flooding from a breach of the flood defences, safe access / egress must be provided for new development as follows in order of preference:

- Safe dry route for people and vehicles.
- Safe dry route for people.
- If a dry route for people is not possible, a route for people where the flood hazard (in terms of depth and velocity of flooding) is low and should not cause risk to people.
- If a dry route for vehicles is not possible, a route for vehicles where the flood hazard (in terms of depth and velocity of flooding) is low to permit access for emergency vehicles.

In all these cases, a 'dry' access/egress is a route located above the 0.5% annual probability tidal flood level (1 in 200 year) including an allowance for climate change.

Internal access to higher floors is required and associated plans showing access routes and floor levels should be included within any site specific FRA.

Emergency Planning

The site is shown to be within an Environment Agency Flood Warning Area and occupants of the site should register to receive flood warnings.

It is advised that a Flood Warning and Evacuation Plan be prepared and included within the FRA to demonstrate what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population. This plan should include details of dry access and egress as well as areas of safe refuge.

LLFA Consultation

It is recommended that potential developers contact LB Newham as the LLFA (Lead Local Flood Authority) for further information prior to taking forward site specific plans.

Floodplain Compensation Storage

The site is at residual risk due to the presence of flood defences, therefore there will be no loss in floodplain and compensatory storage is not required at this site.

Summary – Thameside Middle

The site is located within Flood Zone 3 and will require completion of the Exception Test informed by a site specific FRA. There is no breach modelling available located adjacent to the site, the Environment Agency should be consulted early in the planning process to confirm the requirements of the site specific FRA.

C.6 North Woolwich Gateway

Site Assessment Summary – North Woolwich Gateway				
Location: North Woolwich	**Ref:** LPR11	**Area (ha):** 5	**Proposed Use:** Mixed use	**Vulnerability Classification:** More Vulnerable
Fluvial Flood Risk				
Flood Zone 1 (<0.1 AEP) : 0%	**Flood Zone 2 (0.1%- 0.5% AEP AEP) :** 0%	**Flood Zone 3 (<0.5% AEP):** 100%		

Flood Zones and Flood Defences

100% of the site is located within Flood Zone 3, being at risk of tidal flooding from the River Thames. Environment Agency data (AIMS database) identifies the site to be protected from fluvial / tidal flooding by the presence of a 'raised, man-made, privately owned flood defence wall' which is located along the southern boundary of the site. The wall will protect the site from a 0.1% AEP (1 in 1000 year) tidal flood event. The risk of flooding at this site is therefore a **residual risk**, in the unlikely event that flood defences were to fail, or if the level of protection was exceeded. It is the riparian owners responsibility to ensure the maintenance of defences in this location, however the Environment Agency inspect them twice a year to ensure that they remain fit for purpose.

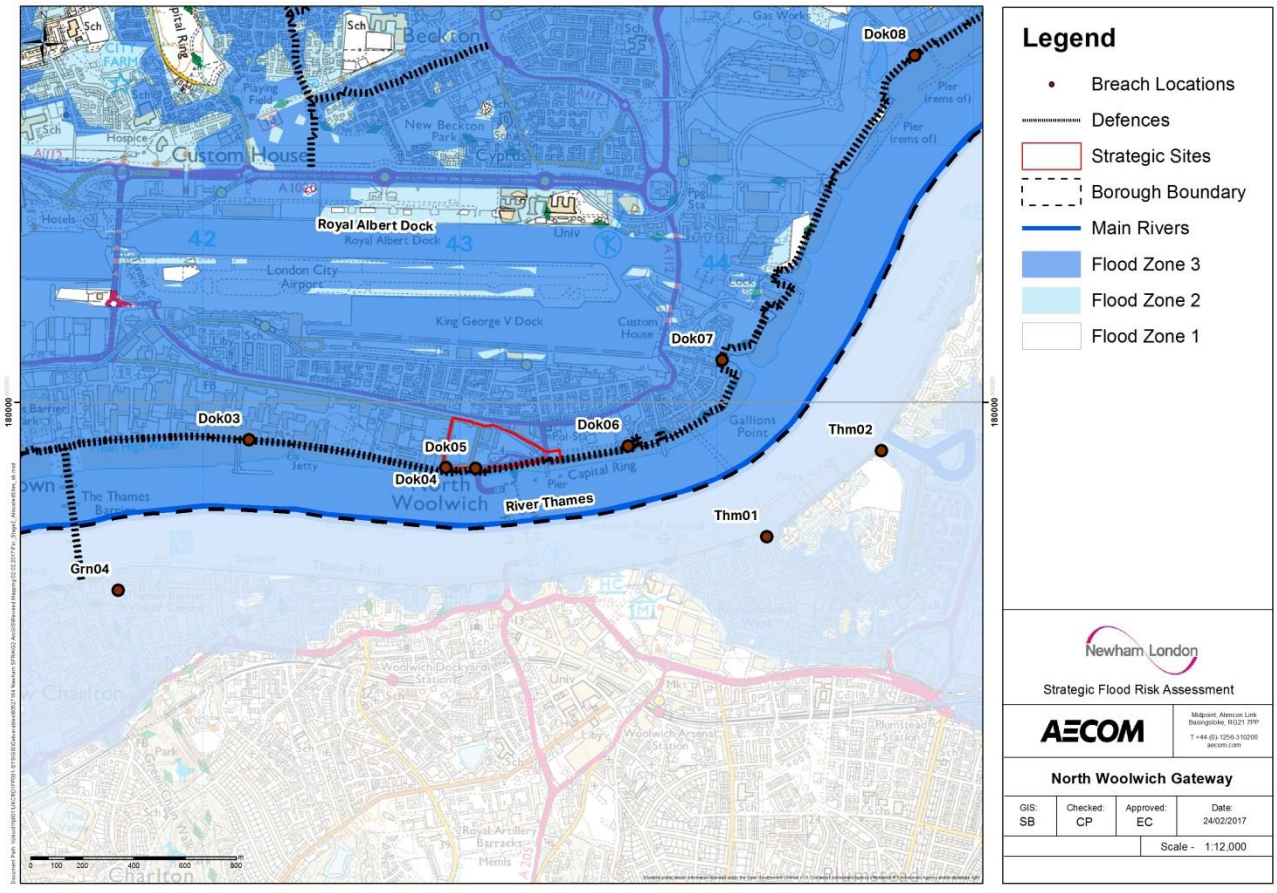

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Figure A Environment Agency Flood Zones

The Environment Agency has modelled two breach locations on the southern site boundary (Dok04 and Dok05). This modelling has been referenced to better understand potential tidal flood risk within the Flood Zone 3 outline in the unlikely event that existing flood defences were to fail. The results are based on a breach width of 20m and are modelled for a tidal flood event with a return period of 0.5% (1 in 200 year) and

Site Assessment Summary – North Woolwich Gateway

0.1% (1 in 1000 year).

Results show that if a breach at Dok06 and Dok07 were to occur, the whole site would be inundated by tidal floodwater. The majority of the site experiences depths of between 0m and 0.5m, with depths increasing in the north of the site in the vicinity of Factory Road potentially reaching 1m to 1.5m during the 1 in 200 year breach event. The corresponding Flood Hazard would be 'Danger for Most' at this location.

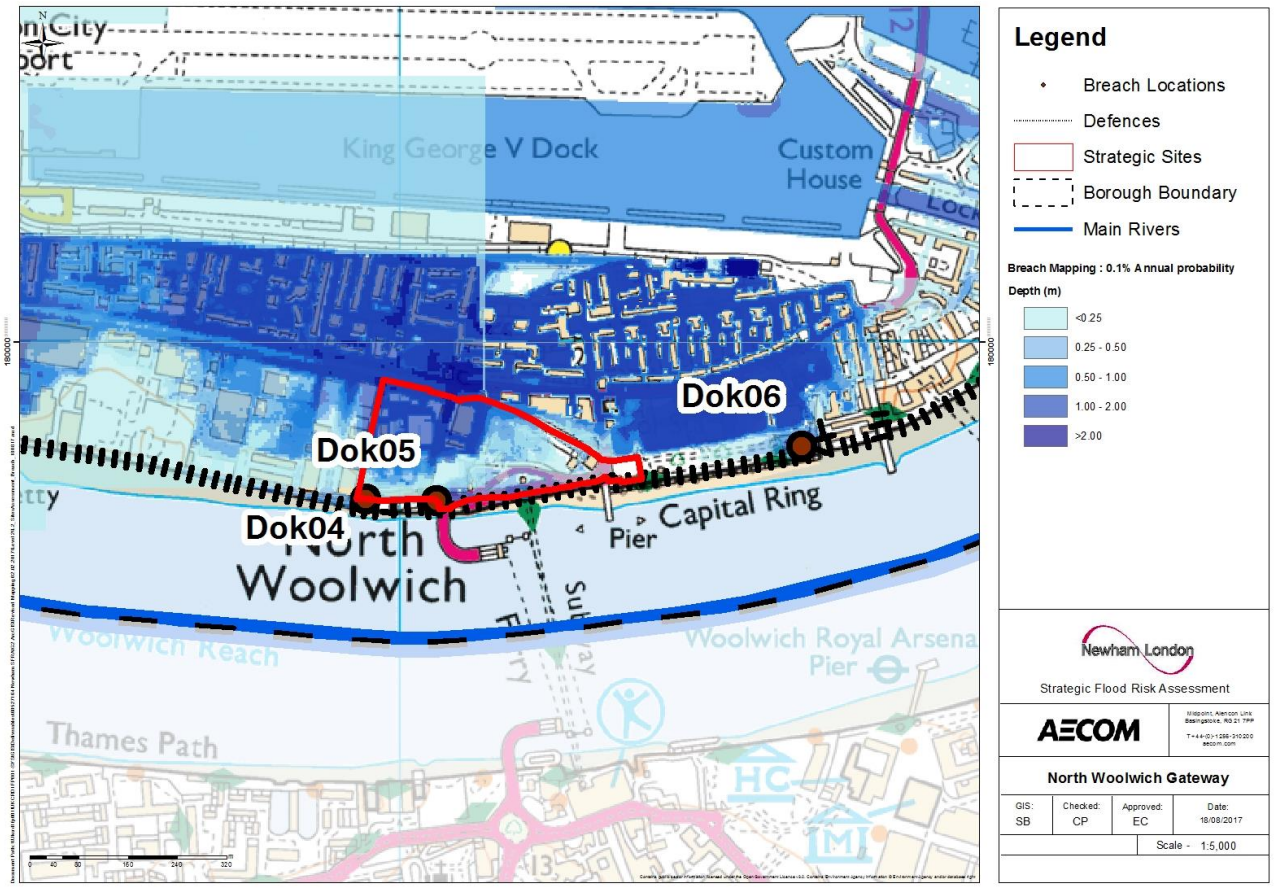

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Figure B Environment Agency Breach locations and potential flood depth for the 1 in 200 year event

Surface Water Flood Risk

Critical Drainage Area: N/A

Risk of Flooding from Surface Water (RoFSW)

The Environment Agency RoFSW mapping (Figure C) indicates that the north of the site is at greater risk of surface water flooding. There is a contributing flow path in the north of the site that enters the site from the west along Factory Road with a risk of surface water flooding in both the 3.3% AEP (1 in 30 year) and 1% AEP (1 in 100 year) events (medium to high risk).

Surface water flood risk should be considered carefully in the development of the site layout to ensure that residential dwellings are not placed at risk, and that the position of any new development does not divert the flow path to a neighbouring area.

Site Assessment Summary – North Woolwich Gateway

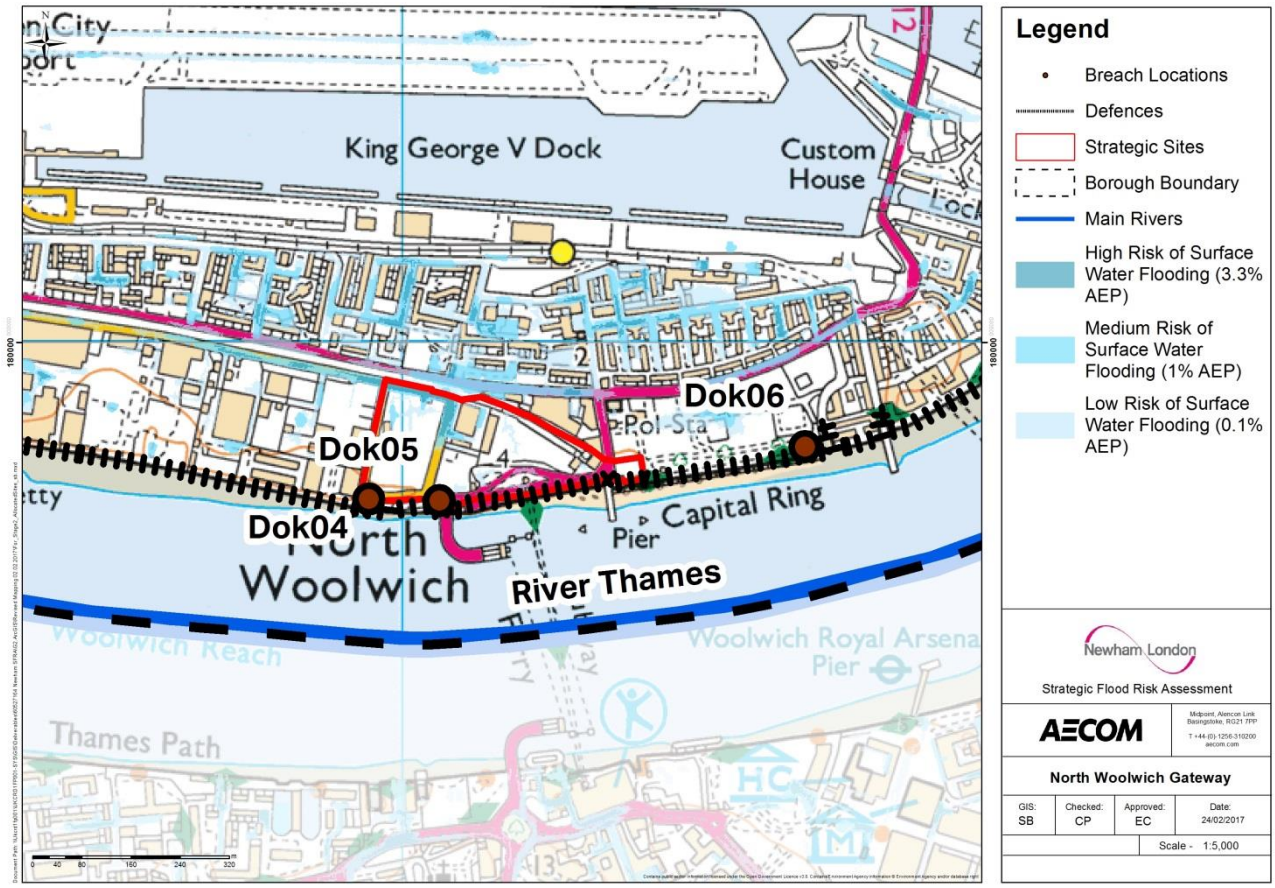

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Figure C Environment Agency's Risk of Flooding from Surface Water (RoFSW)

Historic Flood Events

The Environment Agency flood risk records show that the south of the site has been previously flooded however the source of flooding is unknown. It is anticipated that this will be a tidal source as records may include events prior to construction of the River Thames flood defences. This should be confirmed with the Environment Agency as part of the site specific FRA.

At the time of writing, LB Newham as lead local flood authority (LLFA) has not provided any additional data with regard to historic flood records

Geology and Groundwater

The bedrock geology in this area is White Chalk Subgroup overlain by alluvium superficial deposits.

The AStGWF (Map 06A, Appendix A) mapping shows that the site is located in an area with 'potential for groundwater flooding of property situated below ground level'. **This will need to be confirmed during site investigation survey.**

It is identified by the BGS Infiltration SuDS (sustainable urban drainage system) map (Map 06B, Appendix A) to have 'very significant constraints indicated' to the use of infiltration SuDS (see Table 8-1 of Level 1 SFRA); however, this does not prevent the use of all SuDS. **A site assessment should be used to confirm the suitability for SuDS on this site.**

Site Assessment Summary – North Woolwich Gateway

Artificial & Sewer Sources

Reference to the Environment Agency 'Risk of Flooding from Reservoirs' mapping identifies that the site is ***not at risk of flooding*** from reservoir failure (King George/William Girling). It should be noted that this mapping does not consider the potential risk posed by Royal Victoria Dock, Royal Albert or King George V. (Map 11 LB Newham Level 1 & 2 SFRA)

The site is located to the south of King George V Dock. Water levels in the Docks are controlled by a series of lock gates and the water level is independent of the River Thames. In order for these docks to flood, a breach in the River Thames Tidal defences would need to occur, filling the docks which could then spill to adjacent land. The risk of this occurring is very low. The Environment Agency have assessed this risk as part of the Thames Tidal Breach Modelling Study, Results show that a breach in the dock gates at Custom House (King George V) does not lead to flood water entering the North Woolwich Gateway site (water is contained within the docks and propagates land to the north; Becton).

The site falls into post code E16 2 where Thames Water has 0-3 records of internal flooding. (Map009a LB Newham Level 1 & 2 SFRA). **Risk of flooding from sewer sources should be investigated as part of a site-specific FRA.**

Drainage Hierarchy

Drainage Hierarchy	Infiltration to ground		Significant constraints are indicated
	Discharge to watercourse		Discharge possible to the River Thames that flows along the southern boundary of the site, subject to consultation with the Environment Agency.
	Discharge to surface water sewer		Possible, subject to consultation with Thames Water.

Site Specific Recommendations

Site Layout and Design

Flood risk should be considered at an early stage in deciding the layout and design of the site to provide opportunity to reduce flood risk within the development. The sequential approach should be applied within development sites to locate the most vulnerable elements of a development in the lowest risk areas (considering all sources of flooding).

A site specific FRA may need to be informed by hydraulic breach modelling to provide a greater level of detail of flood risk posed across the site should existing flood defences fail. The scope of this assessment should be confirmed with the Environment Agency and LPA.

Sustainable urban Drainage Systems (SuDS) should be used to reduce and manage surface water run-off to and from proposed developments as near to source as possible. These should be designed in accordance with LB Newham Local Plan policies, the London Plan drainage hierarchy, Technical Standards (published by Defra37) and Planning Practice Guidance published by DCLG.

The use of SuDS may be more limited at this site due to prevailing geology; however, the use of SuDS should still be included in the site drainage strategy, making use of the London Plan SuDS hierarchy (i.e. considering infiltration measures first wherever possible).

In accordance with LB Newham Local Plan, the development should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff, refer to the Local Plan for specific requirements. However, site plans should also adhere to the London Plan which includes an 'essential standard' to 'achieve 50% attenuation of the undeveloped sites surface water run-off at peak times' and the Mayors 'preferred standard' is ' Achieve 100% attenuation of the undeveloped sites surface water runoff at peak times'[31].

LB Newham has a presumption against hard standing on domestic gardens and public open space (policy

[37] Sustainable drainage systems: non-statutory technical standards - https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards; PPG Flood Risk and Coastal Change - http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/reducing-the-causes-and-impacts-of-flooding/why-are-sustainable-drainage-systems-important/

Site Assessment Summary – North Woolwich Gateway

SC3 Flood Risk).

Set-back Distance

A 16m wide undeveloped buffer strip should be retained along main rivers to facilitate vehicular access to enable intrusive investigations or maintenance of flood defences. The Environment Agency would also ask developers to explore opportunities for riverside restoration as part of any development. The Environment Agency should be contacted to obtain an Environmental Permit (formerly called Flood Defence Consent) for any works on or near a main river or flood defence structure https://www.gov.uk/guidance/flood-risk-activities-environmental-permits

Finished Floor Levels

Applicants, as part of their flood risk assessment must provide details of indicative breach flood water levels, ground level, ground, first and second floor levels in metres AOD, and show the floor level for bedrooms and safe refuges, providing justification for the options chosen. Development must be safe through the layout, form and floor levels of the development including an appropriate allowance for climate change.

Access / Egress

Safe access and egress is required to enable the evacuation of people from the development, to provide emergency services with access to the development during times of flood and enable flood defence authorities access to carry out any necessary duties.

A safe access/egress route should allow occupants to safely enter and exit the buildings and be able to reach land outside the flooded area (e.g. within Flood Zone 1) using public rights of way without the intervention of emergency services or others during design flood conditions, including climate change allowances.

For developments located in areas at risk of tidal flooding from a breach of the flood defences, safe access / egress must be provided for new development as follows in order of preference:

- Safe dry route for people and vehicles.
- Safe dry route for people.
- If a dry route for people is not possible, a route for people where the flood hazard (in terms of depth and velocity of flooding) is low and should not cause risk to people.
- If a dry route for vehicles is not possible, a route for vehicles where the flood hazard (in terms of depth and velocity of flooding) is low to permit access for emergency vehicles.

In all these cases, a 'dry' access/egress is a route located above the 0.5% annual probability tidal flood level (1 in 200 year) including an allowance for climate change.

Internal access to higher floors is required and associated plans showing access routes and floor levels should be included within any site specific FRA.

Emergency Planning

The site is shown to be within an Environment Agency Flood Warning Area and occupants of the site should register to receive flood warnings.

It is advised that a Flood Warning and Evacuation Plan be prepared and included within the FRA to demonstrate what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population. This plan should include details of dry access and egress as well as areas of safe refuge.

LLFA Consultation

It is recommended that potential developers contact LB Newham as the LLFA (Lead Local Flood Authority) for further information prior to taking forward site specific plans.

Floodplain Compensation Storage

The site is at residual risk due to the presence of flood defences, therefore there will be no loss in floodplain and compensatory storage is not required at this site.

Site Assessment Summary – North Woolwich Gateway

Summary – North Woolwich Gateway

The site is located within Flood Zone 3 and will require completion of the Exception Test informed by a site specific FRA. The Environment Agency should be consulted early in the planning process to confirm the requirements of the site specific FRA.

C.7 Beckton Riverside

Site Assessment Summary – Beckton Riverside

Location:	**Ref:**	**Area (ha):**	**Proposed Use:**	**Vulnerability Classification:**
Beckton	LPR17	76	Mixed use	More Vulnerable

Fluvial Flood Risk

Flood Zone 1 (<0.1 AEP) :	**Flood Zone 2 (0.1%- 0.5% AEP AEP) :**	**Flood Zone 3 (<0.5% AEP):**
3%	4%	93%

Flood Zones and Flood Defences

3% of the site is located within Flood Zone 1. 4% of the site is located within Flood Zone 2 and 93% of the site is located within Flood Zone 3, being at risk of tidal flooding from the River Thames.

Environment Agency data (AIMS database) identifies the site to be protected from fluvial / tidal flooding by the presence of a 'raised, man-made, privately owned flood defence wall' which is located along the southern boundary of the site. The wall will protect the site from a 0.1% AEP (1 in 1000 year) tidal flood event. The risk of flooding at this site is therefore a **residual risk**, in the unlikely event that flood defences were to fail, or if the level of protection was exceeded. It is the riparian owners responsibility to ensure the maintenance of defences in this location, however the Environment Agency inspect them twice a year to ensure that they remain fit for purpose.

Site Assessment Summary – Beckton Riverside

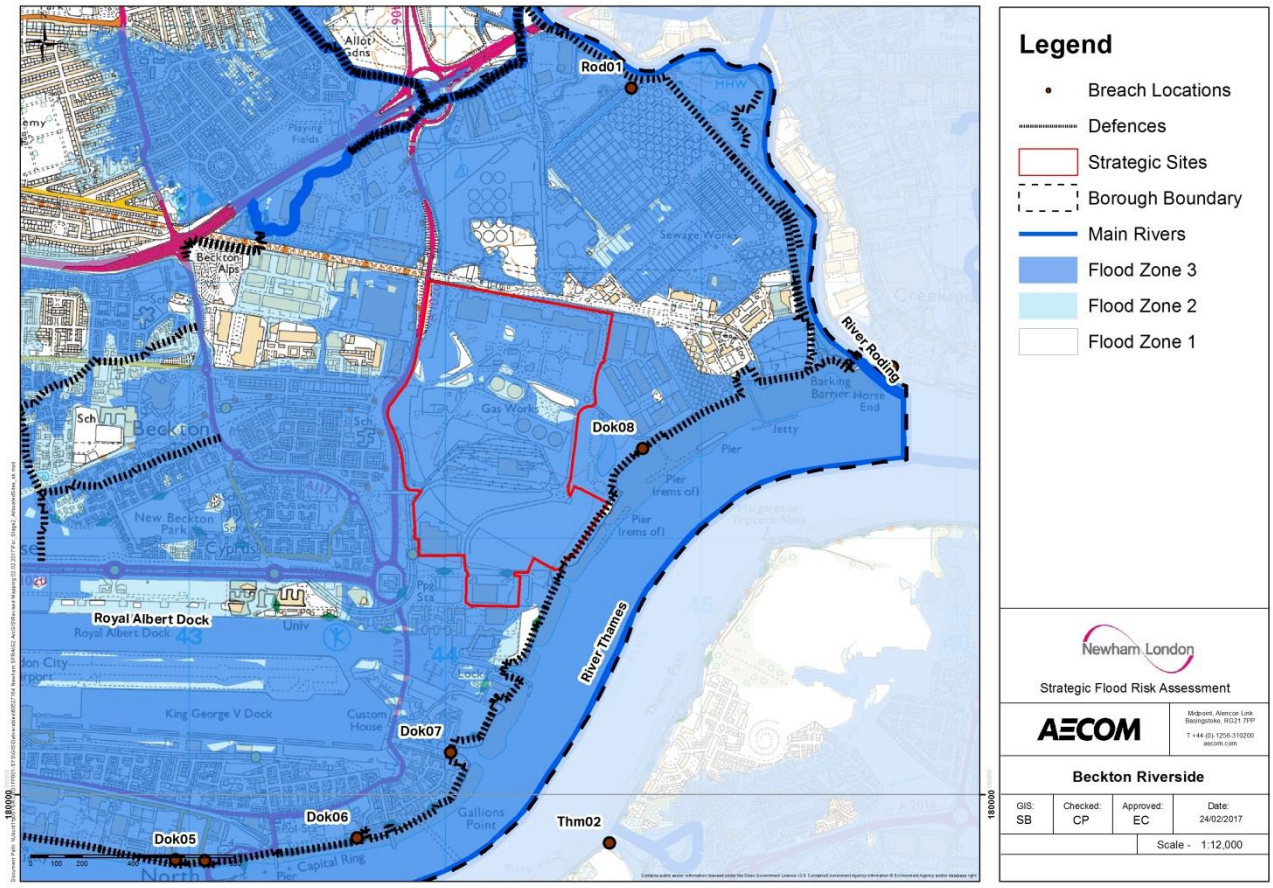

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Figure A Environment Agency Flood Zones

The site is located 290m west of Environment Agency breach Dok08. If a breach were to occur at this location, tidal floodwater would propagate across the northern section of the site reaching depths of up to 1.5m-2m, during the 1:200 year flood event. The corresponding hazard rating is 'danger for most'.

The Environment Agency should be consulted as part of the site planning application process to determine the scope of hydraulic breach modelling required to inform site plans. Existing data highlights that there is a potential gap in understanding the risk posed to the south of the site if a breach were to occur in the vicinity of Atlantis Avenue. The corresponding Flood Hazard would be 'Danger for Most' at this location.

Site Assessment Summary – Beckton Riverside

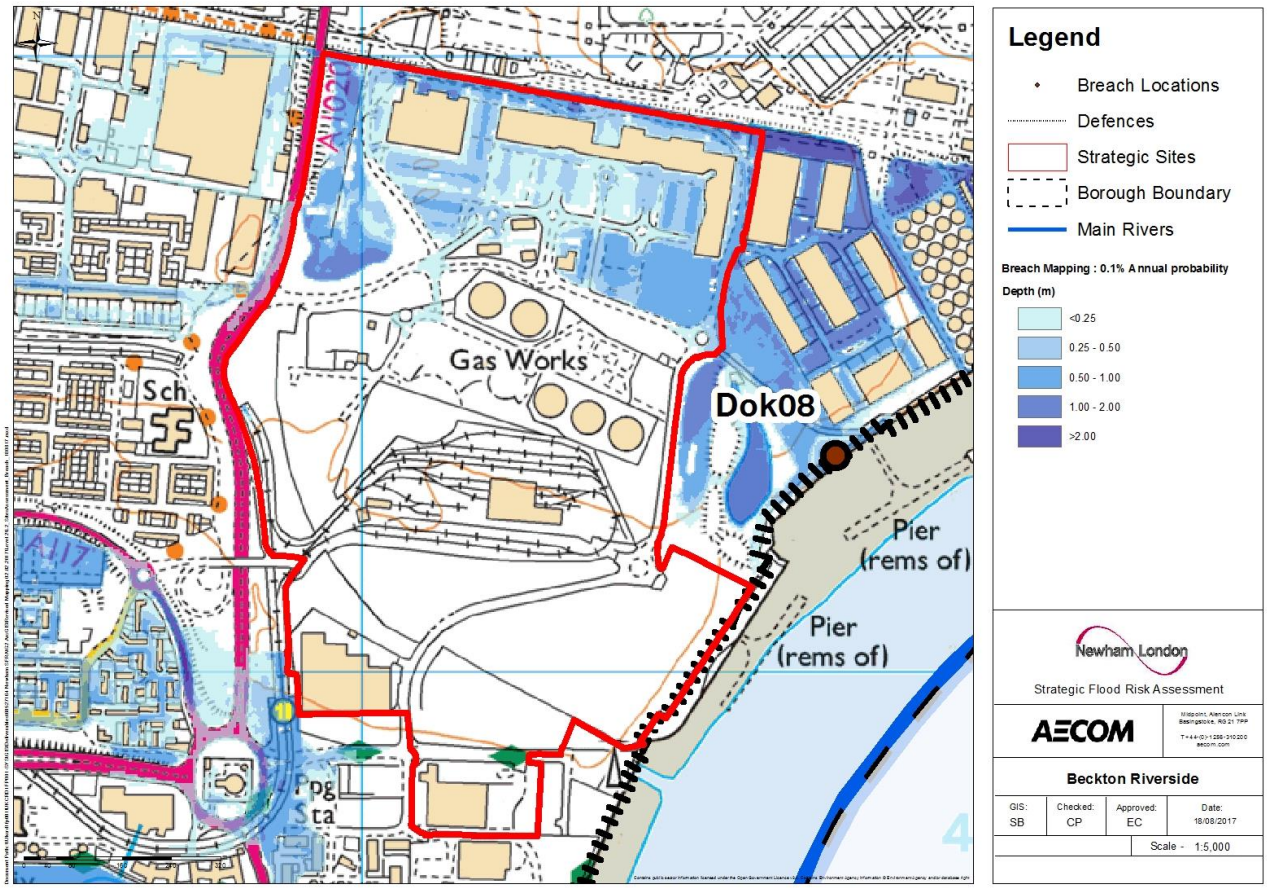

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Figure B Environment Agency Breach locations and potential flood depth for the 1 in 200 year event

Surface Water Flood Risk

Critical Drainage Areas: N/A

Risk of Flooding from Surface Water (RoFSW)

The Environment Agency RoFSW mapping (Figure C) indicates that there are no obvious surface water flow paths crossing the site, instead surface water is shown to pool at topographical lows across the site. There is an area of slightly higher risk in the centre of the site associated with access roads.

Surface water flood risk should be considered carefully in the development of the site layout to ensure that residential dwellings are not placed at risk, and that the position of any new development does not divert the flow path to a neighbouring area.

Site Assessment Summary – Beckton Riverside

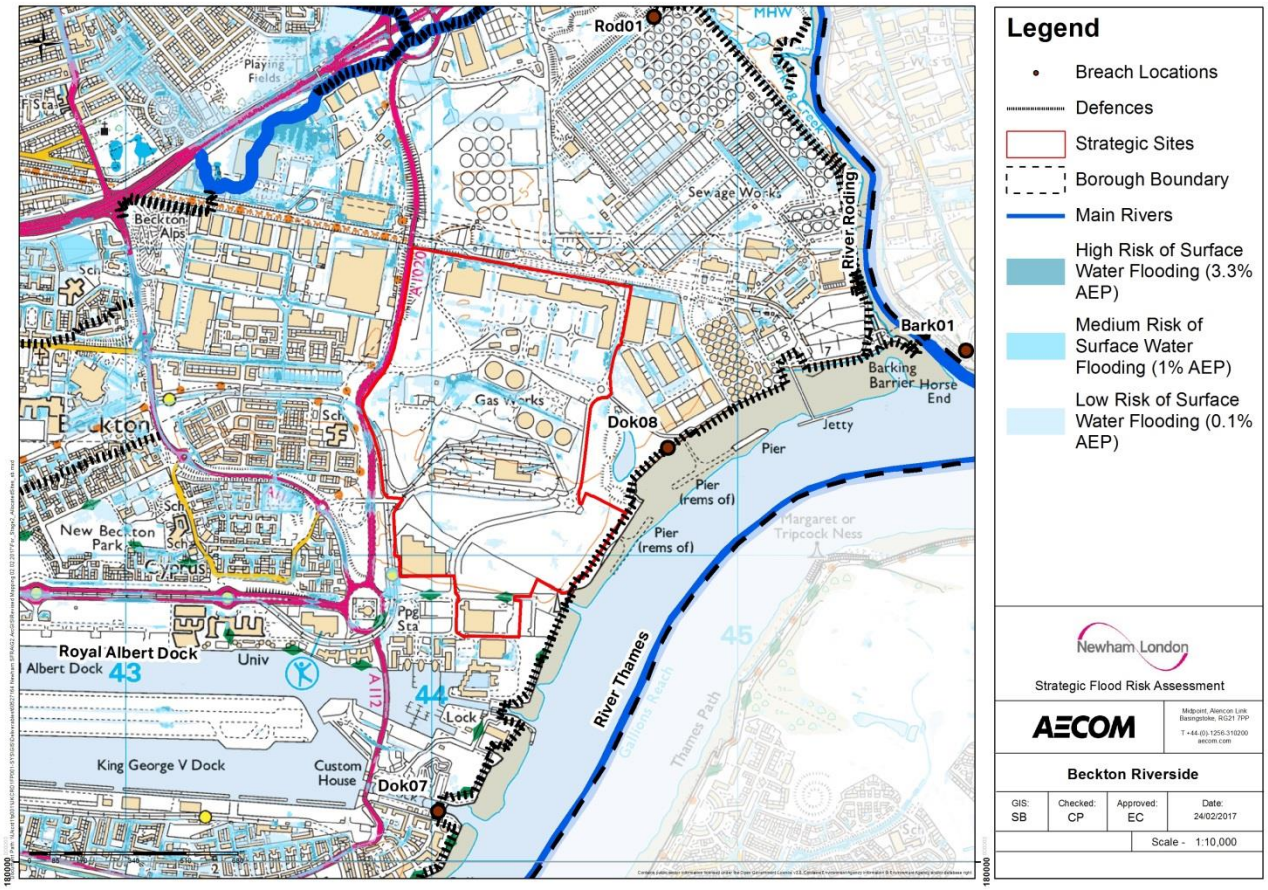

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Figure C Environment Agency's Risk of Flooding from Surface Water (RoFSW)

Historic Flood Events

The Environment Agency does not have any historic records of flooding on the site

At the time of writing, LB Newham as lead local flood authority (LLFA) has not provided any additional data with regard to historic flood records

Geology and Groundwater

This is a large site and it sits across three differing bedrock geology classifications, with a small section of white chalk subgroup on the southern site boundary, moving north into Thanet Sands Formation and then into Lambeth Ground which covers the majority of the site. Lambeth Group and Thames Group bedrock geology comprise gravels, sands, silts and clays.

The AStGWF mapping (Map 06A, Appendix A) shows that the south of the site is located in an area with 'limited potential for groundwater flooding to occur'; this area is likely to be associated with the chalk and Thanet Sands geology. The remainder of the northern section of the site is located within an area with 'potential for groundwater flooding to occur at the surface'. This is due to the Lambeth and alluvium geology. **Further ground investigation should be carried out as part of the site-specific FRA.**

The BGS Infiltration SuDS (sustainable urban drainage system) map (Map 06B, Appendix A) places the whole site in an area which has 'very significant constraints' indicated to the use of infiltration SuDS (see Table 8-1 of Level 1 SFRA). . This does not prevent the use of all SuDS, and **a site assessment should be used to confirm the suitability for SuDS on this site**, especially with the size of the site and varying geology indicated. Differing SuDS methods may be applied in different sections of the site depending on local geology.

Site Assessment Summary – Beckton Riverside

Artificial & Sewer Sources

Reference to the Environment Agency 'Risk of Flooding from Reservoirs' mapping identifies that the site is **not at risk of flooding** from reservoir failure (King George/William Girling). (Map 11 LB Newham Level 1 & 2 SFRA)

The site is located approximately 200m to the north east of the Royal Albert Dock. Water levels in the Docks are controlled by a series of lock gates and the water level is independent of the River Thames. In order for these docks to flood, a breach in the River Thames Tidal defences would need to occur, filling the docks which could then spill to adjacent land. The risk of this occurring is very low. The Environment Agency have assessed this risk as part of the Thames Tidal Breach Modelling Study, results show that a breach in the dock gates at Custom House (King George V) does not lead to flood water entering the Beckton Riverside (water is contained within the docks and propagates land to the northwest of the site flowing towards Becton).

There are no records of internal sewer flooding held by Thames Water for this location.

Drainage Hierarchy

Drainage Hierarchy	Infiltration to ground		Significant constraints are indicated
	Discharge to watercourse		Discharge possible to the River Thames, subject to consultation with the Environment Agency.
	Discharge to surface water sewer		Possible, subject to consultation with Thames Water.

Site Specific Recommendations

Site Layout and Design

Flood risk should be considered at an early stage in deciding the layout and design of the site to provide opportunity to reduce flood risk within the development. The sequential approach should be applied within development site to locate the most vulnerable elements of a development in the lowest risk areas (considering all sources of flooding).

A site specific FRA may need to be informed by hydraulic breach modelling to provide a greater level of detail of flood risk posed across the site should existing flood defences fail. The scope of this assessment should be confirmed with the Environment Agency and LPA.

Sustainable urban Drainage Systems (SuDS) should be used to reduce and manage surface water run-off to and from proposed developments as near to source as possible. These should be designed in accordance with LB Newham Local Plan policies, the London Plan drainage hierarchy, Technical Standards (published by Defra38) and Planning Practice Guidance published by DCLG.

The use of SuDS may be more limited at this site due to prevailing geology; however, the use of SuDS should still be included in the site drainage strategy, making use of the London Plan SuDS hierarchy (i.e. considering infiltration measures first wherever possible).

In accordance with LB Newham Local Plan, the development should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff refer to the Local Plan for specific requirements. . However, site plans should also adhere to the London Plan which includes an 'essential standard' to 'achieve 50% attenuation of the undeveloped sites surface water run-off at peak times' and the Mayors 'preferred standard' is ' Achieve 100% attenuation of the undeveloped sites surface water runoff at peak times'[31].

LB Newham has a presumption against hard standing on domestic gardens and public open space (policy SC3 Flood Risk).

[38] Sustainable drainage systems: non-statutory technical standards - https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards; PPG Flood Risk and Coastal Change - http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/reducing-the-causes-and-impacts-of-flooding/why-are-sustainable-drainage-systems-important/

Site Assessment Summary – Beckton Riverside

Set-back Distance

A 16m wide undeveloped buffer strip should be retained along main rivers to facilitate vehicular access to enable intrusive investigations or maintenance of flood defences. The Environment Agency would also ask developers to explore opportunities for riverside restoration as part of any development. The Environment Agency should be contacted to obtain an Environmental Permit (formerly called Flood Defence Consent) for any works on or near a main river or flood defence structure https://www.gov.uk/guidance/flood-risk-activities-environmental-permits

Finished Floor Levels

Applicants, as part of their flood risk assessment must provide details of indicative breach flood water levels, ground level, ground, first and second floor levels in metres AOD, and show the floor level for bedrooms and safe refuges, providing justification for the options chosen. Development must be safe through the layout, form and floor levels of the development including an appropriate allowance for climate change.

Access / Egress

Safe access and egress is required to enable the evacuation of people from the development, to provide emergency services with access to the development during times of flood and enable flood defence authorities access to carry out any necessary duties.

A safe access/egress route should allow occupants to safely enter and exit the buildings and be able to reach land outside the flooded area (e.g. within Flood Zone 1) using public rights of way without the intervention of emergency services or others during design flood conditions, including climate change allowances.

For developments located in areas at risk of tidal flooding from a breach of the flood defences, safe access / egress must be provided for new development as follows in order of preference:

- Safe dry route for people and vehicles.
- Safe dry route for people.
- If a dry route for people is not possible, a route for people where the flood hazard (in terms of depth and velocity of flooding) is low and should not cause risk to people.
- If a dry route for vehicles is not possible, a route for vehicles where the flood hazard (in terms of depth and velocity of flooding) is low to permit access for emergency vehicles.

In all these cases, a 'dry' access/egress is a route located above the 0.5% annual probability tidal flood level (1 in 200 year) including an allowance for climate change.

Internal access to higher floors is required and associated plans showing access routes and floor levels should be included within any site specific FRA.

Emergency Planning

The site is shown to be within an Environment Agency Flood Warning Area and occupants of the site should register to receive flood warnings.

It is advised that a Flood Warning and Evacuation Plan be prepared and included within the FRA to demonstrate what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population. This plan should include details of dry access and egress as well as areas of safe refuge.

LLFA Consultation

It is recommended that potential developers contact LB Newham as the LLFA (Lead Local Flood Authority) for further information prior to taking forward site specific plans.

Floodplain Compensation Storage

The site is at residual risk due to the presence of flood defences, therefore there will be no loss in floodplain and compensatory storage is not required at this site.

Site Assessment Summary – Beckton Riverside

Summary – Becton Riverside

The site is located within Flood Zone 3 and will require completion of the Exception Test informed by a site specific FRA. The Environment Agency should be consulted early in the planning process to confirm the requirements of the site specific FRA.

The size of the site and varying geology means that the use of SuDS will be possible.

C.8 Alpine Way Retail Park

Site Assessment Summary – Alpine Way Retail Park				
Location: Beckton	**Ref:** LPR23	**Area (ha):** 5.38	**Proposed Use:** Mixed use	**Vulnerability Classification:** More Vulnerable
Fluvial Flood Risk				
Flood Zone 1 (<0.1 AEP) : 88%		**Flood Zone 2 (0.1%- 0.5% AEP AEP) :** 5%		**Flood Zone 3 (<0.5% AEP):** 7%

Flood Zones and Flood Defences

The majority of the site (88%) is located within Flood Zone 1, 5% of the site is located within Flood Zone 2 and 7% of the site is located within Flood Zone 3, being at risk of tidal flooding from the River Thames. Reference to Environment Agency mapping shows that the small sections of Flood Zone 2 and 3 are located along the southern and western site boundaries (Winsor Terrace and Woolwich Manor Way).

The River Thames is located approximately 1.5km to the south east of the site. Environment Agency data (AIMS database) identifies the site to be protected from fluvial / tidal flooding by the presence of a 'raised, man-made, privately owned flood defence wall' which is located along the River Thames. The River Thames defences will protect the site from a 0.1% AEP (1 in 1000 year) tidal flood event. The risk of flooding at this site is therefore a **residual risk**, in the unlikely event that flood defences were to fail, or if the level of protection was exceeded. It is the riparian owners responsibility to ensure the maintenance of defences in this location, however the Environment Agency inspect them twice a year to ensure that they remain fit for purpose.

In addition, the River Roding is located approximately 1.8km to the north east of the site. There are a number of small tributaries connected to this watercourse including the Whitings Sewer and other smaller unnamed tributaries. The potential risk of fluvial flooding from these sources should be confirmed as part of a site specific FRA.

Site Assessment Summary – Alpine Way Retail Park

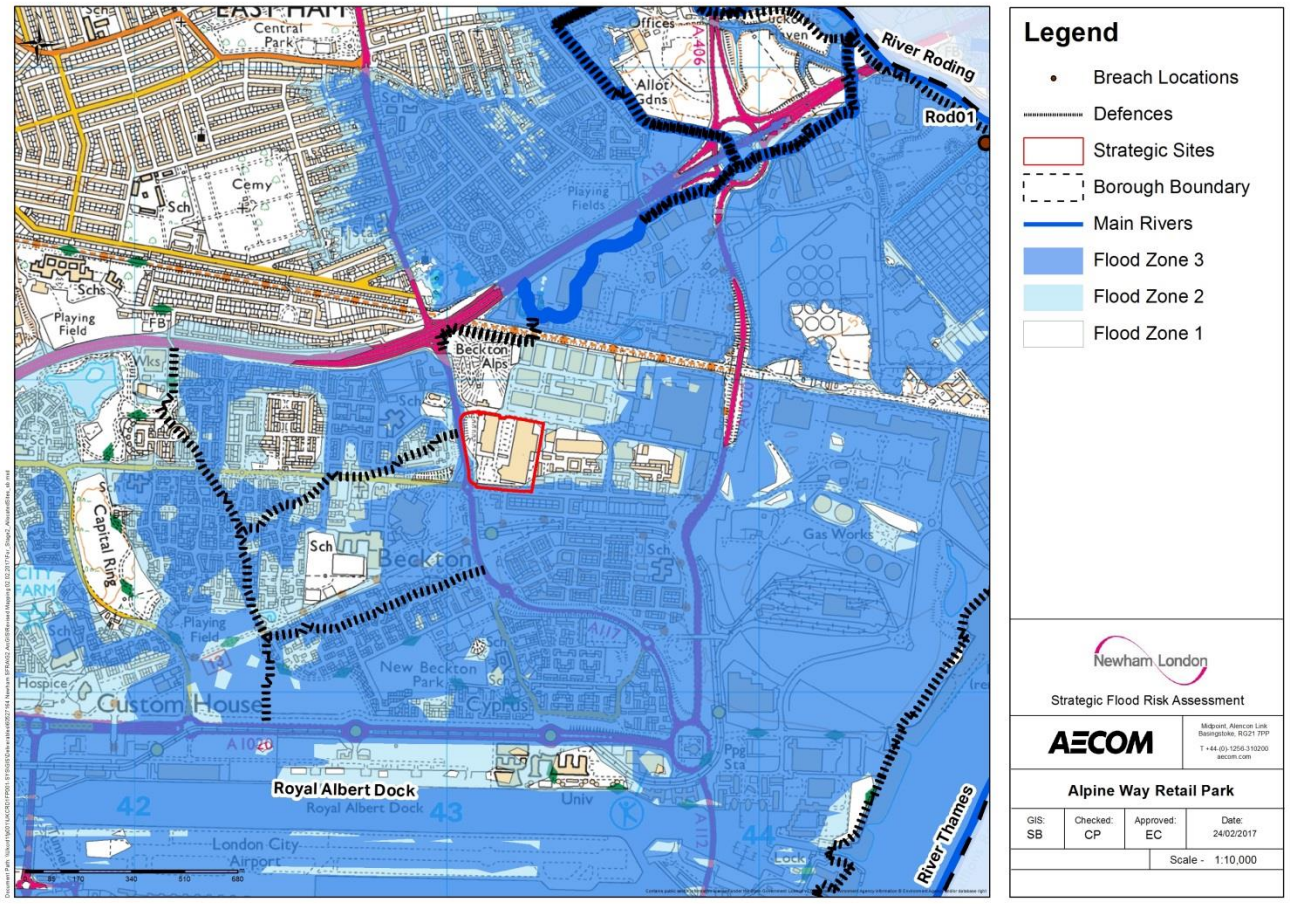

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Figure A Environment Agency Flood Zones

As noted in Figure A above, a small section of the southern and western perimeter of the site is shown to be at risk from tidal flooding during a 0.5% AEP (1 in 200 year) and 0.1% AEP (1 in 1000 year) event in the unlikely event that existing defences were to fail (see Figure B).

Reference to Environment Agency breach modelling data suggests that depths of flood water could reach 0.5m to 1m at the perimeter of the site during a 0.5% AEP (1 in 200 year) event if a breach where to occur at Dok07 or Dok08. This may have implications for site access / egress which should be considered further as part of a site specific FRA. The corresponding Flood Hazard is 'Danger for Some' at this location.

Site Assessment Summary – Alpine Way Retail Park

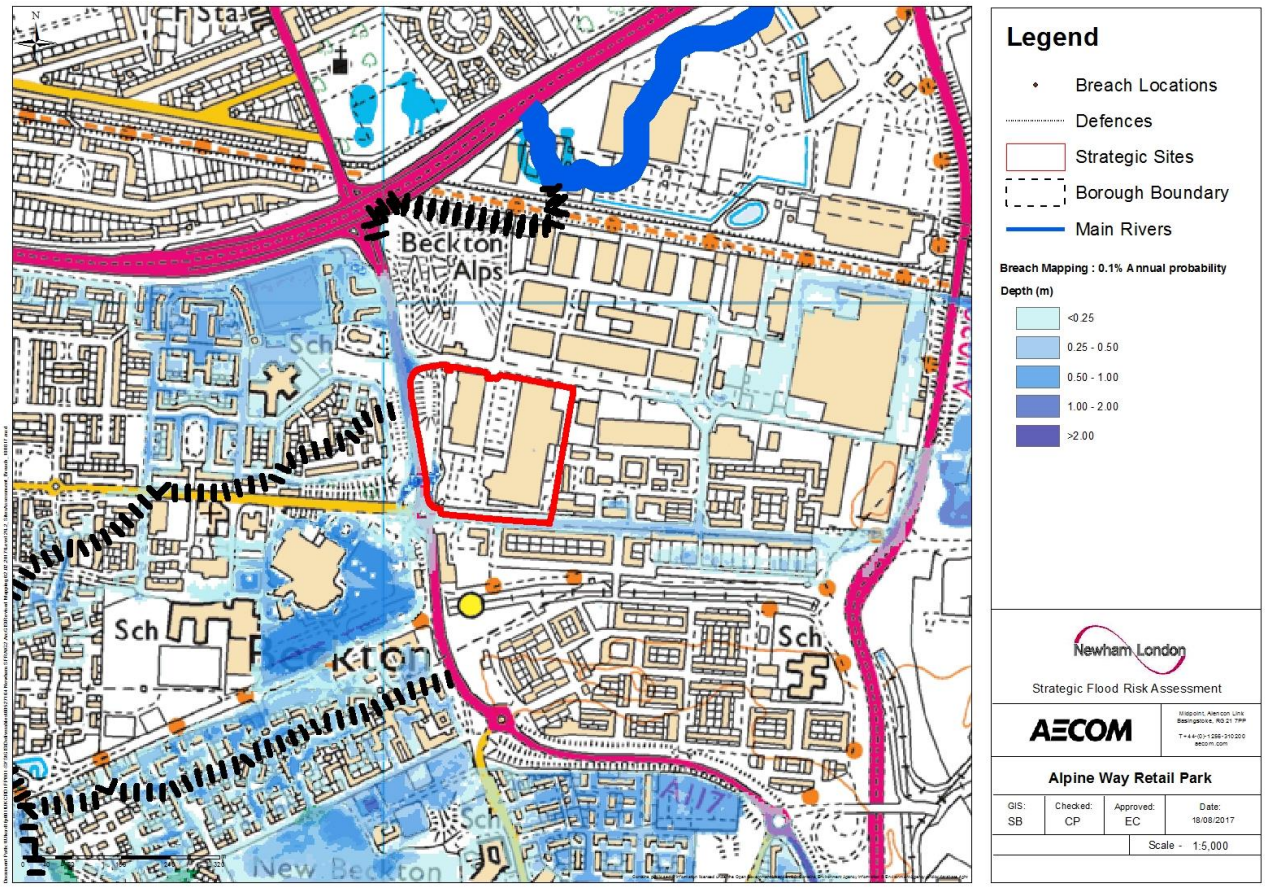

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Figure B Environment Agency Breach locations and potential flood depth for the 1 in 200 year event

Surface Water Flood Risk

Critical Drainage Area: N/A

Risk of Flooding from Surface Water (RoFSW)

The Environment Agency RoFSW mapping (Figure C) identifies surface water flow paths following the site boundary at Woolwich Manor way and Winsor Terrace. An area of higher surface water flood risk is identified in the centre of the site, potentially within a topographical low. The centre of the site may experience surface water flooding in the 1% AEP (1 in 100 year) event i.e. a medium risk of surface water flooding.

Surface water flood risk should be considered carefully in the development of the site layout to ensure that residential dwellings are not placed at risk, and that the position of any new development does not divert the flow path to a neighbouring area.

Site Assessment Summary – Alpine Way Retail Park

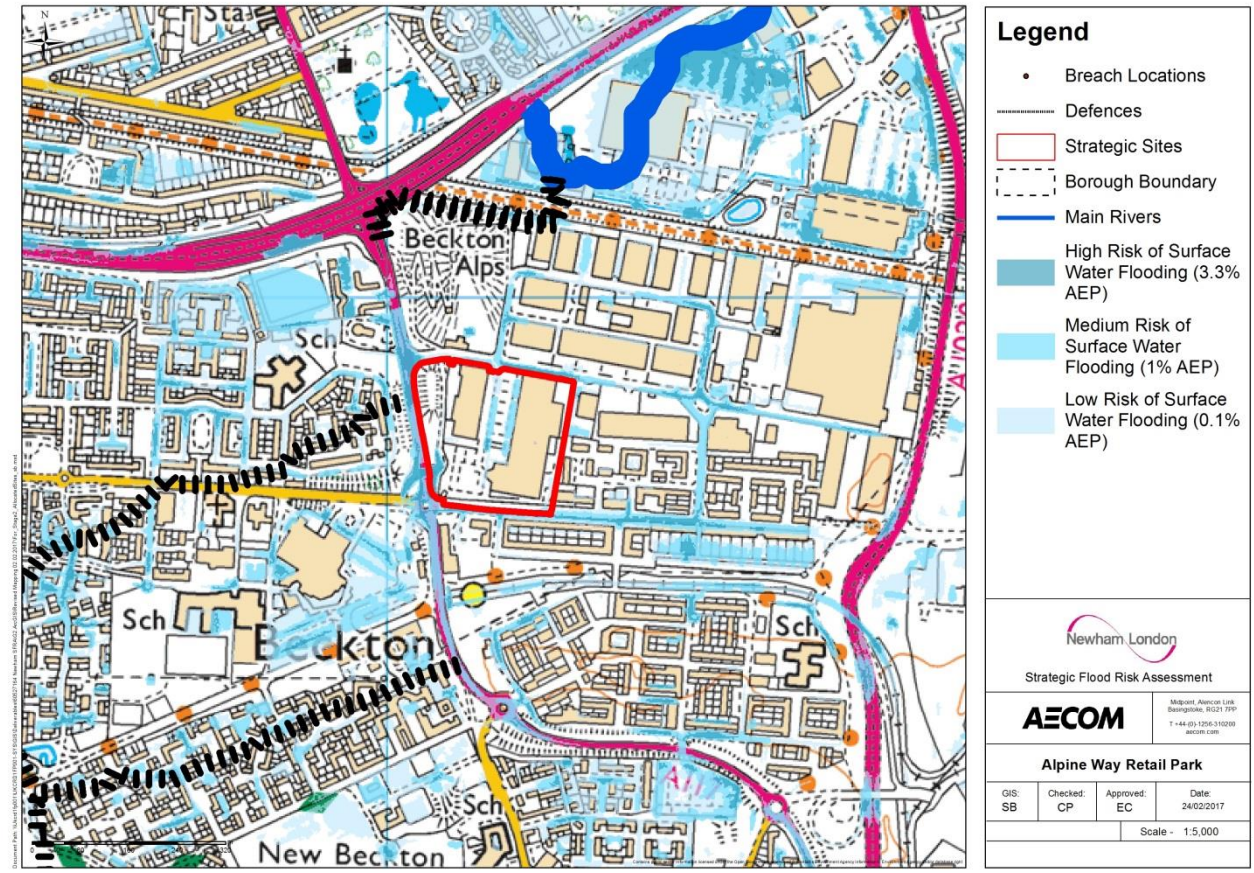

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Figure C Environment Agency's Risk of Flooding from Surface Water (RoFSW)

Historic Flood Events

The Environment Agency does not have any historic records of flooding on the site

At the time of writing, LB Newham as lead local flood authority (LLFA) has not provided any additional data with regard to historic flood records

Geology and Groundwater

The bedrock geology in this area is Thames Group, comprising clay, sand and silt. The superficial deposits are comprised of River Terrace Deposits. Clayey soils are typically not very permeable and provide the potential for increased surface water ponding.

The AStGWF mapping (Map 06A, Appendix A) shows that the site is located in an area with 'potential for groundwater flooding to occur at the surface', i.e. higher groundwater flood risk. **This will need to be confirmed during site investigation survey.**

The BGS Infiltration SuDS (sustainable urban drainage system) map (Map 06B, Appendix A) places the whole site in an area which has 'very significant constraints' indicated to the use of infiltration SuDS (see Table 8-1 of Level 1 SFRA). This does not prevent the use of all SuDS, and **a site assessment should be used to confirm the suitability for SuDS on this site.**

Artificial & Sewer Sources

The western boundary of the site forms the boundary of the Environment Agency risk of flooding from reservoir maps flood extent, however, the site is not shown to be at risk from this source. (Map 11 LB Newham Level 1 & 2 SFRA)

The site falls into post code E6 6 where Thames Water has 4-7 records of internal flooding. (Map009a LB

Site Assessment Summary – Alpine Way Retail Park

Newham Level 1 & 2 SFRA). **Risk of flooding from sewer sources should be investigated as part of a site-specific FRA.**

Drainage Hierarchy

Drainage Hierarchy	Infiltration to ground		Significant constraints are indicated
	Discharge to watercourse		No watercourse located near the site.
	Discharge to surface water sewer		Possible, subject to consultation with Thames Water.

Site Specific Recommendations

Site Layout and Design

Flood risk should be considered at an early stage in deciding the layout and design of the site to provide opportunity to reduce flood risk within the development. The sequential approach should be applied within development sites to locate the most vulnerable elements of a development in the lowest risk areas (considering all sources of flooding).

Sustainable urban Drainage Systems (SuDS) should be used to reduce and manage surface water run-off to and from proposed developments as near to source as possible. These should be designed in accordance with LB Newham Local Plan policies, the London Plan drainage hierarchy, Technical Standards (published by Defra39) and Planning Practice Guidance published by DCLG.

The use of SuDS may be more limited at this site due to prevailing geology; however, the use of SuDS should still be included in the site drainage strategy, making use of the London Plan SuDS hierarchy (i.e. considering infiltration measures first wherever possible).

In accordance with LB Newham Local Plan, the development should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff, refer to the Local Plan for specific requirements. However, site plans should also adhere to the London Plan which includes an 'essential standard' to 'achieve 50% attenuation of the undeveloped sites surface water run-off at peak times' and the Mayors 'preferred standard' is ' Achieve 100% attenuation of the undeveloped sites surface water runoff at peak times'[31].

LB Newham has a presumption against hard standing on domestic gardens and public open space (policy SC3 Flood Risk).

Finished Floor Levels

Applicants, as part of their flood risk assessment must provide details of indicative breach flood water levels, ground level, ground, first and second floor levels in metres AOD, and show the floor level for bedrooms and safe refuges, providing justification for the options chosen. Development must be safe through the layout, form and floor levels of the development including an appropriate allowance for climate change.

Access / Egress

Safe access and egress is required to enable the evacuation of people from the development, to provide emergency services with access to the development during times of flood. The majority of the site is located within Flood Zone 1 and it may be the best approach for site users to remain on site during a flood event. A site specific FRA should demonstrate what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population. This plan should include details of dry access and egress as well as areas of safe refuge.

LLFA Consultation

It is recommended that potential developers contact LB Newham as the LLFA (Lead Local Flood Authority)

[39] Sustainable drainage systems: non-statutory technical standards - https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards; PPG Flood Risk and Coastal Change - http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/reducing-the-causes-and-impacts-of-flooding/why-are-sustainable-drainage-systems-important/

Site Assessment Summary – Alpine Way Retail Park

for further information prior to taking forward site specific plans.

Floodplain Compensation Storage

The site is at residual risk due to the presence of flood defences, therefore there will be no loss in floodplain and compensatory storage is not required at this site.

Summary – Alpine Way Retail Park

7% of the site is located within Flood Zone 3 and therefore will require completion of the Exception Test informed by a site specific FRA. The Environment Agency should be consulted early in the planning process to confirm the requirements of the site specific FRA.

The size of the site and varying geology means that the use of SuDS will be limited.

C.9 Canning Town Riverside

Site Assessment Summary – Canning Town Riverside				
Location: Canning Town	**Ref:** LPR52	**Area (ha):** 2	**Proposed Use:** Mixed use	**Vulnerability Classification:** Less Vulnerable – employment with potential for More Vulnerable if residential development is included.
Fluvial Flood Risk				
Flood Zone 1 (<0.1 AEP) : 0%		**Flood Zone 2 (0.1%- 0.5% AEP AEP) :** 36%		**Flood Zone 3 (<0.5% AEP):** 64%

Flood Zones and Flood Defences

The site is located adjacent to the River Lee within the tidal reach of the River Thames. The majority (64%) of the site is located within Flood Zone 3 with the remainder (36%) located within Flood Zone 2 being at risk of fluvial/tidal flooding from the River Lee/River Thames.

Environment Agency data (AIMS database) identifies the site to be protected from fluvial / tidal flooding by the presence of a 'raised, man-made, privately owned flood defence wall' which is located along the River Lee.

The River Lee / Thames defences will protect the site from a 0.1% AEP (1 in 1000 year) tidal flood event. The risk of flooding at this site is therefore a **residual risk**, in the unlikely event that flood defences were to fail, or if the level of protection was exceeded. It is the riparian owners responsibility to ensure the maintenance of defences in this location, however the Environment Agency inspect them twice a year to ensure that they remain fit for purpose.

Site Assessment Summary – Canning Town Riverside

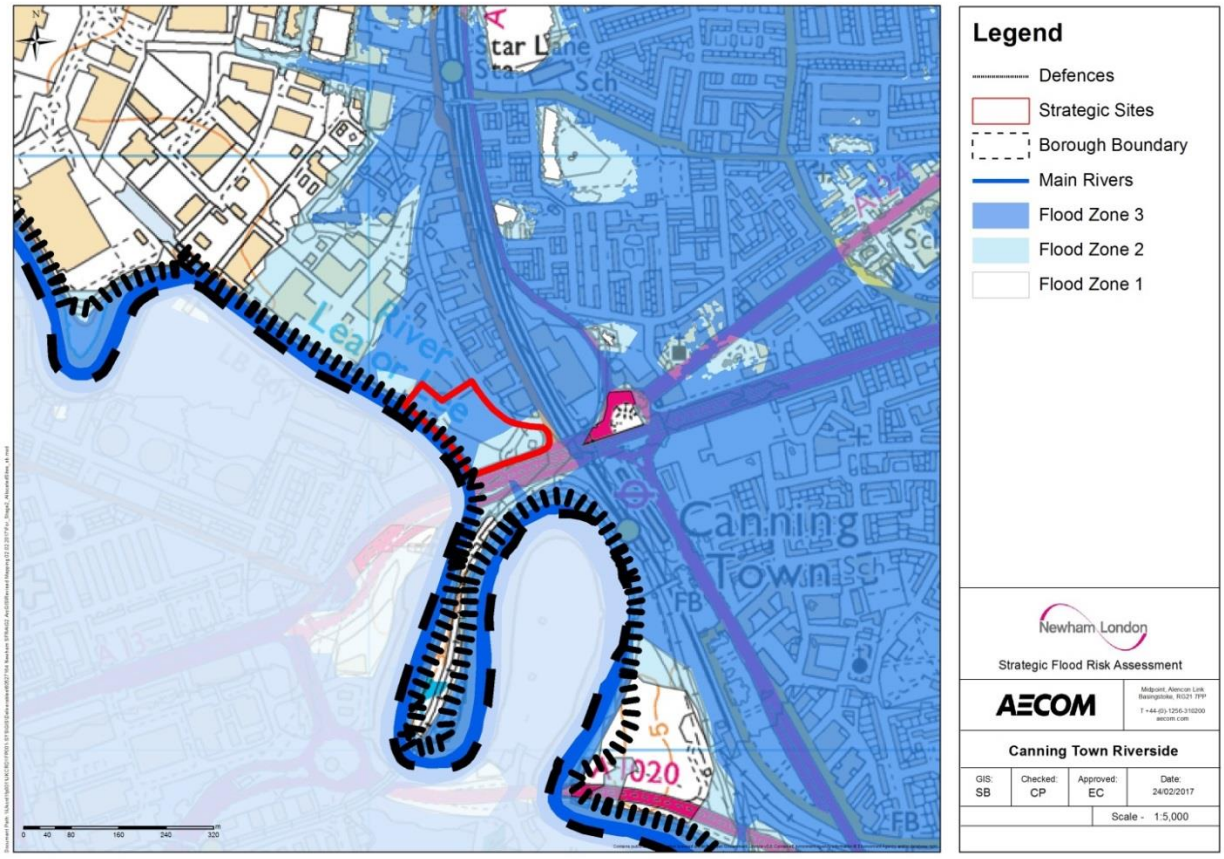

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Figure A Environment Agency Flood Zones

The Environment Agency Thames Tidal Breach Modelling includes a breach assessment at Dok09 which is located approximately 200metres to the south of the site on the River Lee. Results show that if a breach were to occur at this location, water would propagate to the north, following the railway line and Stephenson Street to the north east of the proposed development site. Only the northern boundary of the site may be potentially at risk in the 0.5% (1 in 200 year) flood event with flood waters reaching a depth of up to 0.5m corresponding hazard rating of very low.

Site Assessment Summary – Canning Town Riverside

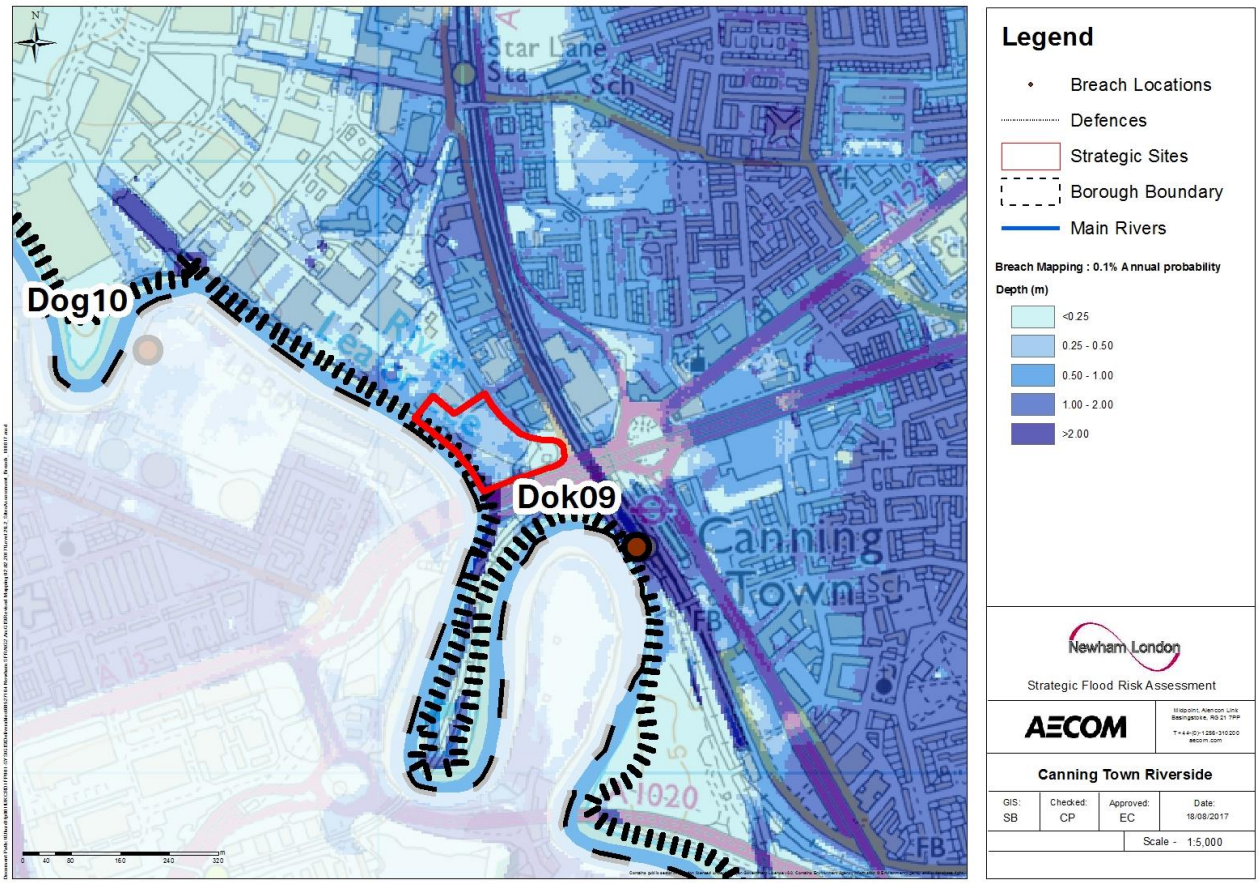

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Figure B Environment Agency Breach locations and potential flood depth for the 1 in 200 year event

Surface Water Flood Risk

Critical Drainage Area: N/A

Risk of Flooding from Surface Water (RoFSW)

The Environment Agency RoFSW mapping (Figure C) shows that the site is at low risk of surface water flooding, with a small area of surface water flooding shown in the centre of the site in the 0.1% (1 in 1000 year) event.

This risk should be considered carefully in the development of the site layout to ensure that residential dwellings are not placed at surface water flood risk, and that the position of any new development does not divert the flow path to a neighbouring area.

Historic Flood Events

The Environment Agency does not have any historic records of flooding on the site.

At the time of writing, LB Newham as lead local flood authority (LLFA) has not provided any additional data with regard to historic flood records.

Site Assessment Summary – Canning Town Riverside

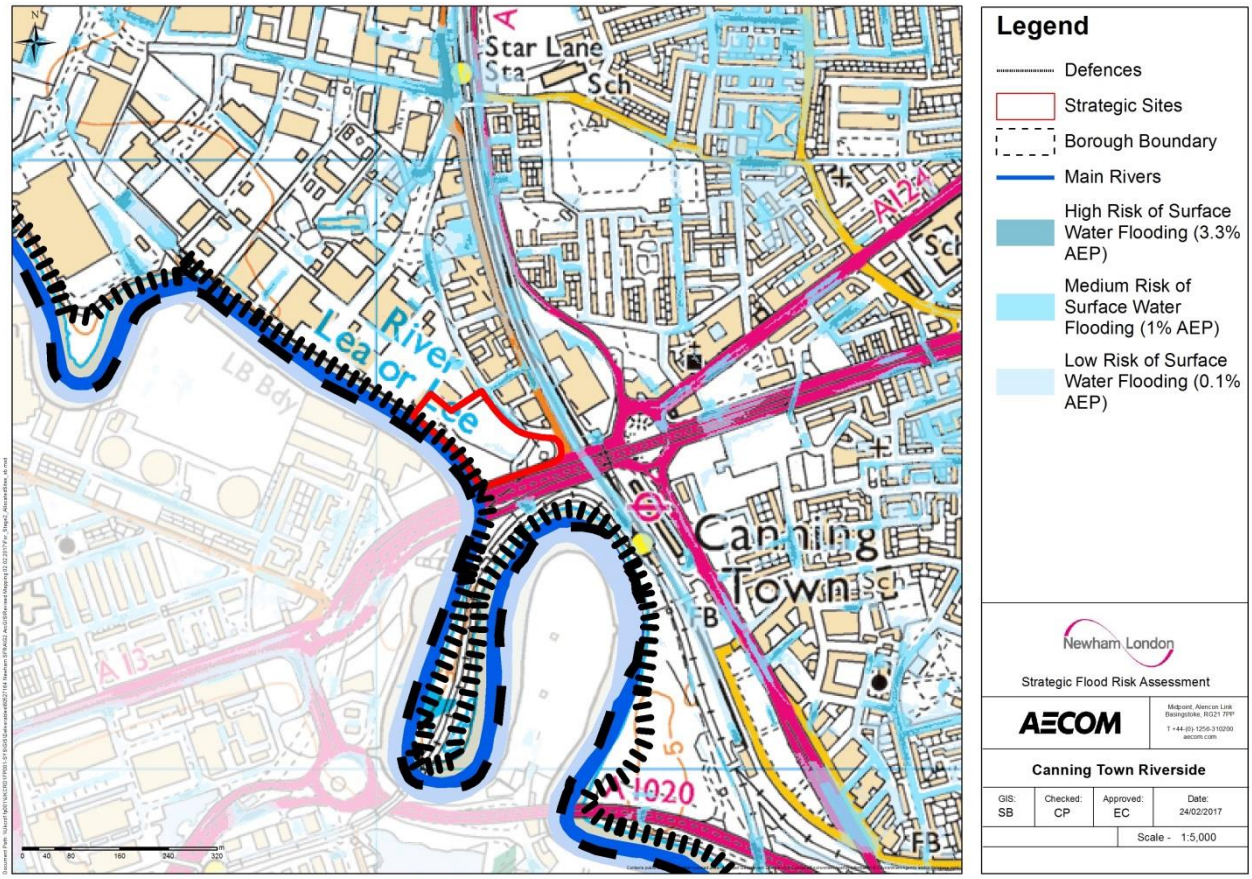

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Figure C Environment Agency's Risk of Flooding from Surface Water (RoFSW)

Geology and Groundwater

The bedrock geology in this area is Thames Group, comprising clay, sand and silt. The superficial deposits are comprised of Alluvium. Clayey soils are typically not very permeable and provide the potential for increased surface water ponding.

There is no data at this location on the Environment Agency AStGWF mapping (Map 06A, Appendix A) so the potential risk from groundwater flooding is not confirmed.

The BGS Infiltration SuDS (sustainable urban drainage system) map (Map 06B, Appendix A) places the whole site in an area which has 'opportunities for bespoke infiltration SuDS' (see Table 8-1 of Level 1 SFRA). **A site assessment should be completed at the planning application stage to confirm the depth to groundwater and suitability for SuDS on this site.**

Artificial & Sewer Sources

The Environment Agency has simulated failure of reservoirs located along the River Lee corridor to the north of LB Newham. Results show that if these reservoirs were to fail, water would propagate along the River Lee corridor and potentially inundate the site to a depth of between 0.3m and 2m (refer to Map 11 Level 1 & 2 SFRA report). This is a residual risk in the unlikely event that there is a structural failure.

The site falls into post code E16 1 where Thames Water has 0-3 records of internal flooding (Map009a LB Newham Level 1 & 2 SFRA). **Risk of flooding from sewer sources should be investigated as part of a site-specific FRA.**

Site Assessment Summary – Canning Town Riverside

Drainage Hierarchy

Drainage Hierarchy	Infiltration to ground		Opportunities for bespoke infiltration SuDS
	Discharge to watercourse		Discharge possible to the River Lea that flows along the western boundary of the site, subject to consultation with the Environment Agency.
	Discharge to surface water sewer		Possible, subject to consultation with Thames Water.

Site Specific Recommendations

Site Layout and Design

Flood risk should be considered at an early stage in deciding the layout and design of the site to provide opportunity to reduce flood risk within the development. The sequential approach should be applied within development sites to locate the most vulnerable elements of a development in the lowest risk areas (considering all sources of flooding). A site specific FRA may need to be informed by hydraulic breach modelling to provide a greater level of detail of flood risk posed across the site should existing flood defences fail. The scope of this assessment should be confirmed with the Environment Agency and LB Newham. Based on the Environment Agency Breach Modelling, flooding from the 1 in 200 year event would reach the northern boundary but not inundate the site. More Vulnerable development should be steered away from this location; site design should be mindful of site access/egress in relation to this flood extent

Surface Water Management

Sustainable urban Drainage Systems (SuDS) should be used to reduce and manage surface water run-off to and from proposed developments as near to source as possible. These should be designed in accordance with LB Newham Local Plan policies, the London Plan drainage hierarchy, Technical Standards (published by Defra40) and Planning Practice Guidance published by DCLG.

The use of SuDS may be more limited at this site due to prevailing geology; however, the use of SuDS should still be included in the site drainage strategy, making use of the London Plan SuDS hierarchy (i.e. considering infiltration measures first wherever possible).

In accordance with LB Newham Local Plan, the development should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff, refer to the Local Plan for specific requirements. However, site plans should also adhere to the London Plan which includes an 'essential standard' to 'achieve 50% attenuation of the undeveloped sites surface water run-off at peak times' and the Mayors 'preferred standard' is ' Achieve 100% attenuation of the undeveloped sites surface water runoff at peak times'[31].

LB Newham has a presumption against hard standing on domestic gardens and public open space (policy SC3 Flood Risk).

Set-back Distance

A 16m wide undeveloped buffer strip should be retained along main rivers to provide access for maintenance. The Environment Agency would also ask developers to explore opportunities for riverside restoration as part of any development. The Environment Agency should be contacted to obtain an Environmental Permit for main rivers if the development is proposed within this area https://www.gov.uk/guidance/flood-risk-activities-environmental-permits

Finished Floor Levels

All more vulnerable and highly vulnerable development within Flood Zone 3 should set finished floor levels at least 300mm above the known or modelled 1 in 100 annual probability (1% AEP) flood level including an appropriate allowance for climate change. Internal access to higher floors is required and associated plans showing access routes and floor levels should be included within any site specific FRA.

Access / Egress

[40] Sustainable drainage systems: non-statutory technical standards - https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards; PPG Flood Risk and Coastal Change - http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/reducing-the-causes-and-impacts-of-flooding/why-are-sustainable-drainage-systems-important/

Site Assessment Summary – Canning Town Riverside

Safe access and egress is required to enable the evacuation of people from the development, to provide emergency services with access to the development during times of flood and enable flood defence authorities access to carry out any necessary duties.

A safe access/egress route should allow occupants to safely enter and exit the buildings and be able to reach land outside the flooded area (e.g. within Flood Zone 1) using public rights of way without the intervention of emergency services or others during design flood conditions, including climate change allowances.

For developments located in areas at risk of fluvial flooding safe access / egress must be provided for new development as follows in order of preference:

- Safe dry route for people and vehicles.
- Safe dry route for people.
- If a dry route for people is not possible, a route for people where the flood hazard (in terms of depth and velocity of flooding) is low and should not cause risk to people.
- If a dry route for vehicles is not possible, a route for vehicles where the flood hazard (in terms of depth and velocity of flooding) is low to permit access for emergency vehicles. However the public should not drive vehicles in floodwater.

In all these cases, a 'dry' access/egress is a route located above the 1% annual probability flood level (1 in 100 year) including an allowance for climate change.

Emergency Planning

The site is shown to be within an Environment Agency Flood Warning Area and is at risk from a breach of the River Thames flood defences; it is strongly recommended that occupants of the site should register to receive the warning service for the River Thames given that proximity to the River and the risk posed to the site. A Flood Warning and Evacuation Plan should be prepared to demonstrate what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population.

LLFA Consultation

It is recommended that potential developers contact the Environment Agency and LB Newham as the LLFA for further information prior to taking forward site specific plans.

Floodplain Compensation Storage

The site is at residual risk due to the presence of flood defences, therefore there will be no loss in floodplain and compensatory storage is not required at this site.

Summary – Canning Town Riverside

The site is located within Flood Zone 3 and will require completion of the Exception Test informed by a site specific FRA. The Environment Agency should be consulted early in the planning process to confirm the requirements of the site specific FRA. Further investigation is required to assess the suitability of SuDS on the site.

C.10 Coolfin North

Site Assessment Summary – Coolfin North				
Location: Silvertown	**Ref:** N/A	**Area (ha):** 7.9	**Proposed Use:** Mixed use including school	**Vulnerability Classification:** Mixed use – More Vulnerable
Fluvial Flood Risk				
Flood Zone 1 (<0.1 AEP) : 0%		**Flood Zone 2 (0.1%- 0.5% AEP AEP) :** 11%		**Flood Zone 3 (<0.5% AEP):** 89%

Flood Zones and Flood Defences

This site is located to the east of Canning Town within the tidal flood extent of the River Thames. In addition, the site is at risk of fluvial flooding from the River Lee in the 1% AEP (1 in 100 year) including an allowance of 70% climate change.

The majority of the site (89%) is located within Flood Zone 3 with the remainder (11%) located within Flood Zone 2. This risk is a combination of fluvial and tidal flood risk.

Environment Agency data (AIMS database) identifies the site to be protected from fluvial / tidal flooding by the presence of a 'raised, man-made, privately owned flood defence wall' which is located along the River Lee.

The River Thames defences will protect the site from a 0.1% AEP (1 in 1000 year) tidal flood event. The risk of flooding at this site is therefore a **residual risk**, in the unlikely event that flood defences were to fail, or if the level of protection was exceeded. It is the riparian owners responsibility to ensure the maintenance of defences in this location, however the Environment Agency inspect them twice a year to ensure that they remain fit for purpose.

In addition to the River Lee and River Thames, there is a small culverted watercourse located on the eastern boundary of the site. LB Newham should be contacted to confirm ownership/responsibility for this watercourse.

Results from the Environment Agency's breach modelling show that the site is not inundated during a breach at Dok09, or any other breach locations further afield.

Site Assessment Summary – Coolfin North

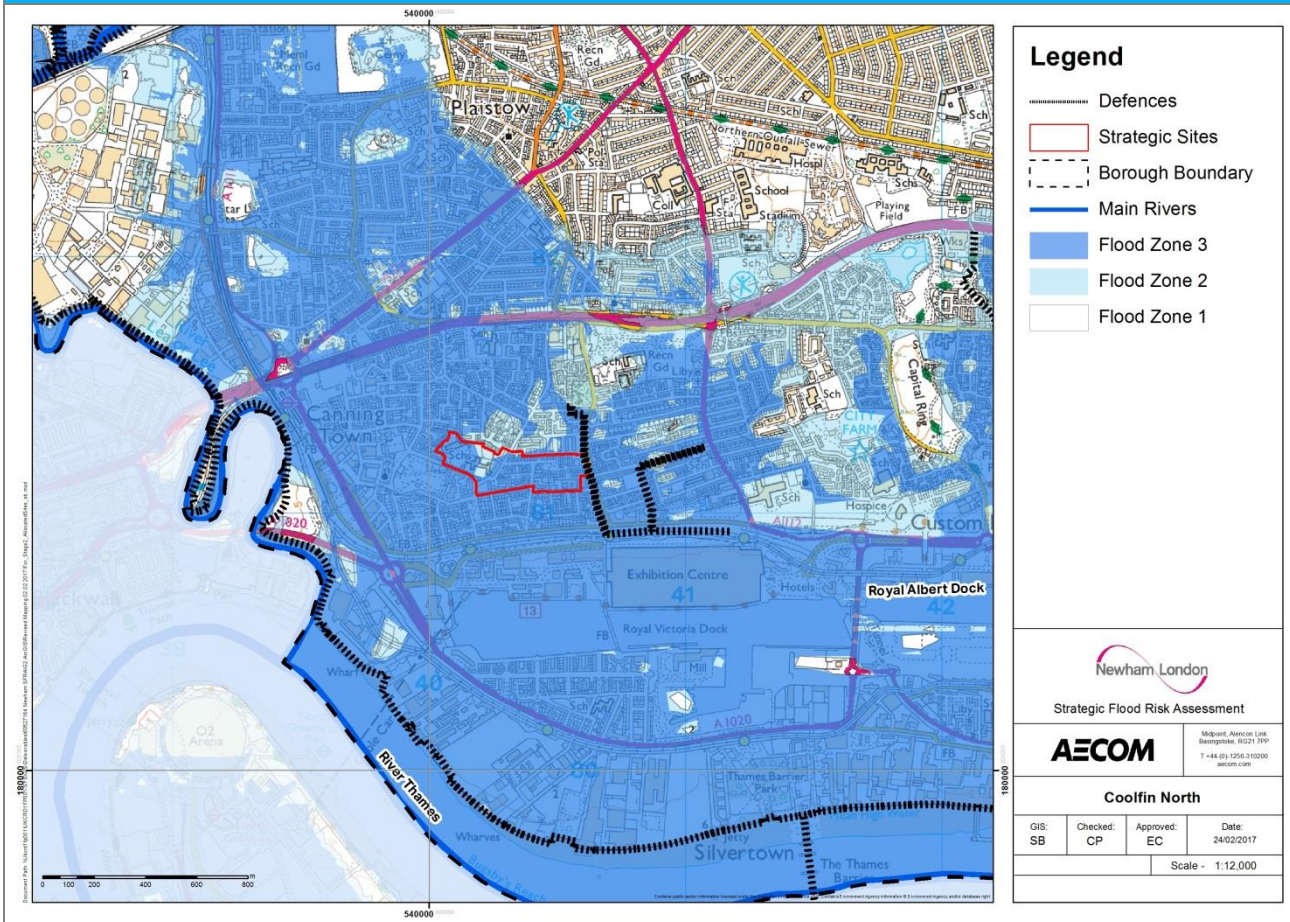

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Figure A Environment Agency Flood Zones

Surface Water Flood Risk

Critical Drainage Area: N/A

Risk of Flooding from Surface Water (RoFSW)

The Environment Agency RoFSW mapping (Figure C) shows that the site is at low risk of surface water flooding, with small areas of surface water flooding shown in the centre of the site associated with existing highways in the 0.1% (1 in 1000 year) event.

This risk should be considered carefully in the development of the site layout to ensure that residential dwellings are not placed at surface water flood risk, and that the position of any new development does not divert the flow path to a neighbouring area.

Site Assessment Summary – Coolfin North

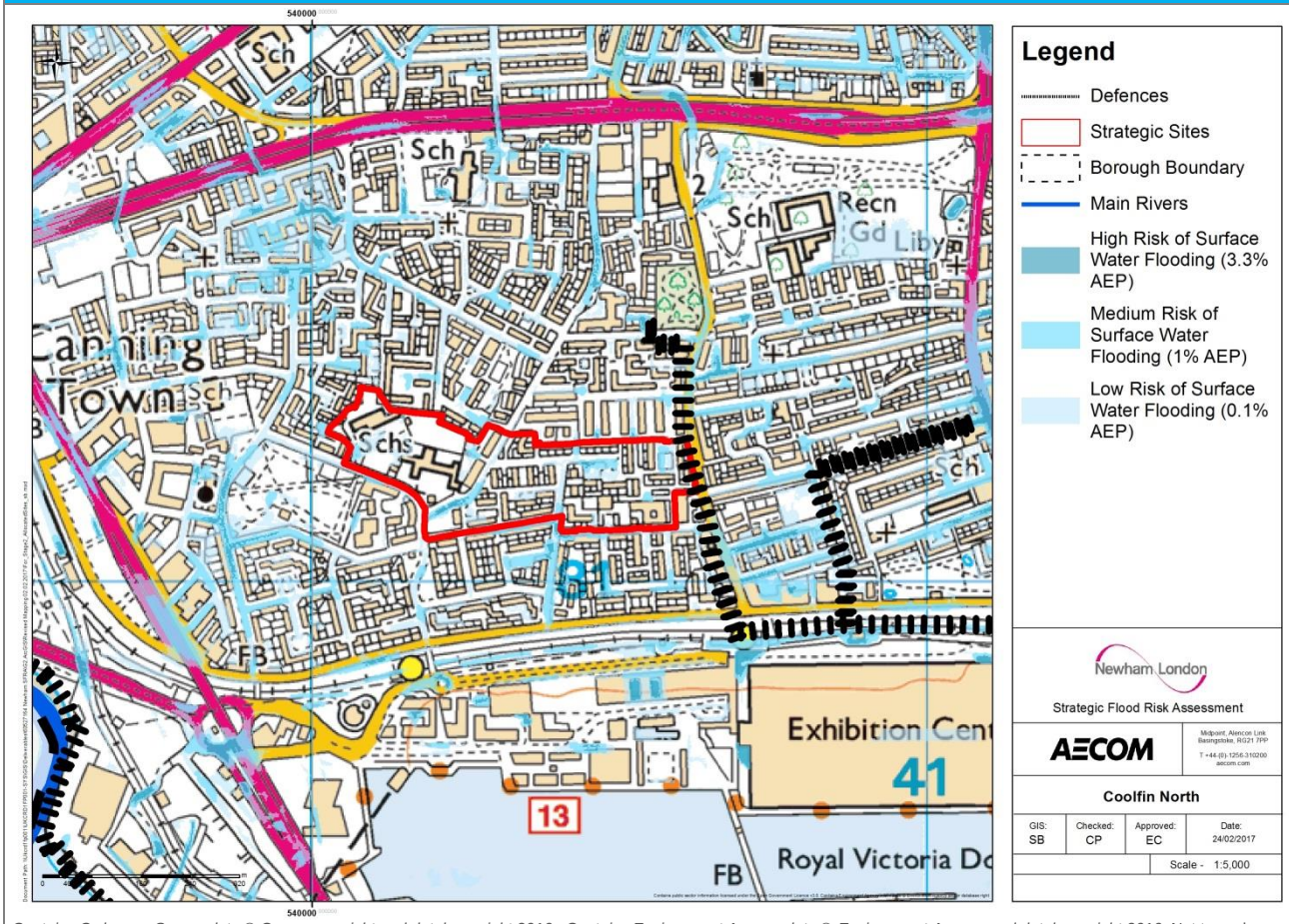

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Figure B Environment Agency's Risk of Flooding from Surface Water (RoFSW)

Historic Flood Events

The Environment Agency flood risk records show that the majority of the site has been previously flooded. The source of this flood has not been confirmed; however, it is most likely to be tidal or fluvial and may contain flood records from prior to construction of the River Thames tidal defences.

At the time of writing, LB Newham as lead local flood authority (LLFA) has not provided any additional data with regard to historic flood records.

Geology and Groundwater

The bedrock geology in this area is Thames Group, comprising clay, sand and silt. The site sits on a boundary between alluvium and river terrace deposits (superficial deposits). Clayey soils are typically not very permeable and provide the potential for increased surface water ponding.

There is no data available at this location on the Environment Agency AStGWF mapping (Map 06A, Appendix A) so the potential risk from groundwater flooding is not confirmed.

The BGS Infiltration SuDS (sustainable urban drainage system) map (Map 06B, Appendix A) places the whole site in an area which has 'opportunities for bespoke infiltration SuDS' (see Table 8-1 of Level 1 SFRA). **A site assessment should be completed at the planning application stage to confirm the depth to groundwater and suitability for SuDS on this site.**

Site Assessment Summary – Coolfin North

Artificial & Sewer Sources

The Environment Agency has simulated failure of reservoirs located to the north of the LB Newham along the River Lee corridor, mapped as part of their reservoir inundation mapping. Results show that if these reservoirs were to fail, floodwater would propagate along the River Lee corridor and would flood the site, potentially to a depth of between 0.3m and 2m. This is a residual risk. (Map 11 LB Newham Level 1 & 2 SFRA)

The Environment Agency has simulated a breach in dock gates controlling water levels in the Royal Victoria and Royal Albert Docks located to the south of the site. Results show that floodwater from this source would not reach the site.

The site falls into post code E16 3 where Thames Water has 4-7 records of internal flooding. (Map009a LB Newham Level 1 & 2 SFRA). **Risk of flooding from sewer sources should be investigated as part of a site-specific FRA.**

Drainage Hierarchy

Drainage Hierarchy	Infiltration to ground		Opportunities for bespoke infiltration SuDS
	Discharge to watercourse		Culverted watercourse located on the eastern site boundary. Ownership needs to be confirmed with LB Newham.
	Discharge to surface water sewer		Possible, subject to consultation with Thames Water.

Site Specific Recommendations

Site Layout and Design

Flood risk should be considered at an early stage in deciding the layout and design of the site to provide opportunity to reduce flood risk within the development. The sequential approach should be applied within development sites to locate the most vulnerable elements of a development in the lowest risk areas (considering all sources of flooding). A site specific FRA may need to be informed by hydraulic breach modelling to provide a greater level of detail of flood risk posed across the site should existing flood defences fail. The scope of this assessment should be confirmed with the Environment Agency and LPA.

Surface Water Management

Sustainable urban Drainage Systems (SuDS) should be used to reduce and manage surface water run-off to and from proposed developments as near to source as possible. These should be designed in accordance with LB Newham Local Plan policies, the London Plan drainage hierarchy, Technical Standards (published by Defra41) and Planning Practice Guidance published by DCLG.

The use of SuDS may be more limited at this site due to prevailing geology; however, the use of SuDS should still be included in the site drainage strategy, making use of the London Plan SuDS hierarchy (i.e. considering infiltration measures first wherever possible).

In accordance with LB Newham Local Plan, the development should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. However, site plans should also adhere to the London Plan which includes an 'essential standard' to 'achieve 50% attenuation of the undeveloped sites surface water run-off at peak times' and the Mayors 'preferred standard' is ' Achieve 100% attenuation of the undeveloped sites surface water runoff at peak times'[31].

LB Newham has a presumption against hard standing on domestic gardens and public open space (policy SC3 Flood Risk).

Finished Floor Levels

All more vulnerable and highly vulnerable development within Flood Zone 3 should set finished floor levels at

[41] Sustainable drainage systems: non-statutory technical standards - https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards; PPG Flood Risk and Coastal Change - http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/reducing-the-causes-and-impacts-of-flooding/why-are-sustainable-drainage-systems-important/

Site Assessment Summary – Coolfin North

least 300mm above the known or modelled 1 in 100 annual probability (1% AEP) flood level including an appropriate allowance for climate change. Internal access to higher floors is required and associated plans showing access routes and floor levels should be included within any site specific FRA.

Access / Egress

Safe access and egress is required to enable the evacuation of people from the development, to provide emergency services with access to the development during times of flood and enable flood defence authorities access to carry out any necessary duties.

A safe access/egress route should allow occupants to safely enter and exit the buildings and be able to reach land outside the flooded area (e.g. within Flood Zone 1) using public rights of way without the intervention of emergency services or others during design flood conditions, including climate change allowances.

For developments located in areas at risk of tidal flooding from a breach of the flood defences safe access / egress must be provided for new development as follows in order of preference:

- Safe dry route for people and vehicles.
- Safe dry route for people.
- If a dry route for people is not possible, a route for people where the flood hazard (in terms of depth and velocity of flooding) is low and should not cause risk to people.
- If a dry route for vehicles is not possible, a route for vehicles where the flood hazard (in terms of depth and velocity of flooding) is low to permit access for emergency vehicles. However the public should not drive vehicles in floodwater.

In all these cases, a 'dry' access/egress is a route located above the 1% annual probability flood level (1 in 100 year) including an allowance for climate change.

Emergency Planning

The site is shown to be within an Environment Agency Flood Warning Area; it is strongly recommended that occupants of the site should register to receive the warning service for the River Thames given that proximity to the River and the risk posed to the site. A Flood Warning and Evacuation Plan should be prepared to demonstrate what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population.

LLFA Consultation

It is recommended that potential developers contact the Environment Agency and Newham Borough Council as the LLFA for further information prior to taking forward site specific plans.

Floodplain Compensation Storage

The site is at residual risk due to the presence of flood defences, therefore there will be no loss in floodplain and compensatory storage is not required at this site.

Summary – Coolfin North

The site is located within Flood Zone 3 and will require completion of the Exception Test informed by a site specific FRA. The Environment Agency should be consulted early in the planning process to confirm the requirements of the site specific FRA.

The size of the site and varying geology means that the use of SuDS will be limited.

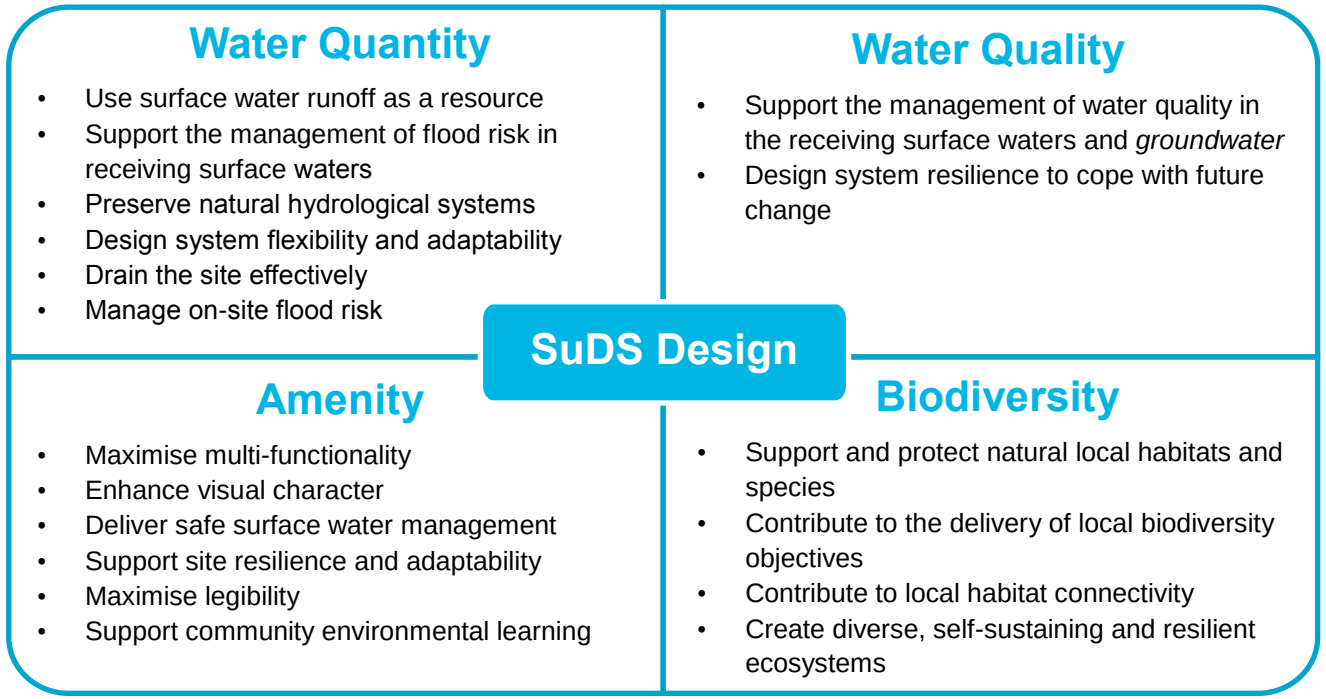
Appendix D SuDS Techniques

Guidance for SuDS in Newham

D.1 Introduction

Sustainable Drainage Systems (SuDS) are designed to maximise the opportunities and benefits of surface water management. This is particularly important in increasingly urban areas where there is less permeable ground available for natural infiltration and *evapotranspiration*, leading to increased rainfall runoff from impermeable surfaces and contributing to flooding, pollution and erosion. SuDS can counteract these impacts on the water cycle and additionally enhance urban spaces by making them more vibrant, attractive, sustainable and resilient, with improved air and water quality, microclimate and amenity.

There are four main categories of benefits which can be achieved through high quality SuDS design, as summarised below:



The installation of high quality and multi-functional SuDS is most likely to be achieved through early and multi-disciplinary consideration of surface water management. Ideally this should be integrated within the overall site planning and design, including early consultation with relevant stakeholders and consideration of ongoing operational and maintenance responsibilities.

SuDS design should be based around the general principles of:

- Harnessing surface water runoff as a resource;
- Managing rainfall close to where it falls;
- Managing runoff on the surface;
- Promoting infiltration of rainwater into the ground;
- Encouraging *evapotranspiration*;
- Attenuating runoff to mimic natural flow characteristics;
- Reducing contamination of runoff through pollution prevention and controlling the runoff at source; and
- Treating runoff to reduce the risk of urban contaminants causing environmental pollution.

The following sections provide an overview of common types of SuDS measures, which may be suitable for installation within the Borough. Generally, SuDS should not be thought of as isolated features, but delivered as an interconnected sequential train of surface water management and treatment.

Developers within Newham should make reference to the Newham Local Plan policies and London Plan for further requirements with regards to SuDS.

Further information on the philosophy of SuDS and detailed guidance on design, installation and maintenance, is provided in the CIRIA SuDS Manual (2015) and other sources described at the end of this document.

D.2 Swale

Swales are vegetated shallow depressions designed to convey and filter water. These can be 'wet' where water gathers above the surface, or 'dry' where water gathers in a gravel layer beneath the ground level. They have the ability to remove pollutants and can be used to channel surface water to the next stage of a treatment train. Check dams can be constructed along their route to control flow velocities, and promote infiltration and sediment deposition.

Advantages	Disadvantages
• Encourages *evapotranspiration* and infiltration of runoff • Provides *attenuation* to reduce peak run-off rates • Relatively simple to incorporate into landscaping • Effective removal of urban pollutants • Minimal maintenance requirements • Aesthetically pleasing • Good community acceptability	• Careful consideration of location and design is required to reduce potential health and safety hazards • May limit opportunities to use trees in landscaping • Blockages can occur in connecting pipe work • Retrofitting opportunities are limited

Effective Locations	Ineffective Locations
• Residential and commercial areas • Contaminated sites • Sites above vulnerable groundwater • Alongside roadways • Linear street garden areas • Field boundaries	• High density areas • Steeply sloping areas

Performance Criteria	Rating
Ecological Advantages	Medium
Peak Flow Reduction	Medium
Amenity Potential	Medium
Water Quality Treatment Potential	High
Surface Water Volume Reduction	Medium

In the Community **Design** **Example**

Swales can be used to replace conventional drainage systems and are particularly effective when installed adjacent roadsides or transport links, to capture and re-route surface water. They are also suitable for residential and commercial areas and may be integrated with areas of open space and landscaping, or used to create informal barriers.

D.3 Introduction

Filter strips and drains can be used to manage runoff from impermeable areas, providing conveyance and filtration. Filter Strips allow water to flow across grass or dense vegetation; whereas filter drains are hardscape systems where runoff is temporarily stored in a shallow trench filled with stone or gravel.

Advantages	Disadvantages
• Simple to design and can be incorporated into site landscaping for aesthetic benefit • Minimal public safety risks • Encourages evaporation and infiltration • Important hydraulic and water quality benefits can be achieved • Can be retrofitted into a site with ease • Low construction cost	• Vegetation must be light and can get damaged • Loose gravel can be removed • Drains relatively small catchments • High cost to replace filter materials

Effective Locations	Ineffective Location
• Residential and commercial areas • Between hard standing surfaces and grassland • High density areas • Contaminated sites • Sites above vulnerable ground water	• Steeply sloping areas

Performance Criteria	Rating
Ecological Advantages	Low
Peak Flow Reduction	Medium
Amenity Potential	Low
Water Quality Treatment Potential	High
Surface Water Volume Reduction	Low

In the Community

Filter strips or filter drains are a suitable retrofitting option for heavily trafficked or spatially constrained areas as they cause no safety hazards and can be implemented into small spaces with ease. They can be simply implemented along the edges of pathways or pavements or integrated within site landscaping.

Design

Example

D.4 Bio-Retention Areas or Rain Gardens

Bio-retention areas or rain gardens are vegetated depressions with gravel and sand layers below, designed to collect, channel, filter and cleanse water vertically. Water can infiltrate into the ground or enter a piped drainage system. These systems can be integrated with site landscaping, including tree pits, planter areas or gardens. Treatment performance can be improved through engineered soils and enhanced vegetation.

Advantages	Disadvantages
• Provides initial water treatment • Aesthetically pleasing • Provides ecological benefits • Capability to be retrofitted in heavily paved areas or existing vegetation • Effective pollutant removal • Minimal ground take with spatially flexible layout	• May be susceptible to clogging or blockage due to surrounding landscape • Regular inspection and maintenance is required to maintain effectiveness

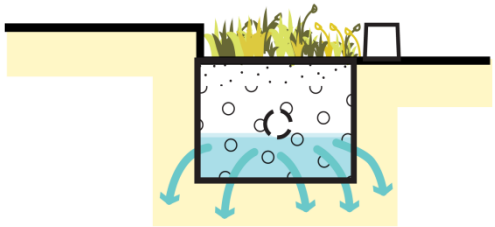
Effective Locations	Ineffective Locations
• Residential and Commercial areas • Contaminated sites • Sites above vulnerable groundwater • Seating areas • Impermeable areas • High density areas	• Steeply sloping areas

Performance Criteria	Rating
Ecological Advantages	Medium
Peak Flow Reduction	Medium
Amenity Potential	Good
Water Quality Treatment Potential	High
Surface Water Volume Reduction	Medium

In the Community

Rain gardens and bio-retention systems can be planned as aesthetically pleasing landscaped features, providing critical green space within the urban areas. These measures can be retro-fitted around existing street infrastructure, such as seating areas, and incorporated within both paved and vegetated areas.

Design



Example

D.5 Rainwater Harvesting

Rainwater harvesting involves capturing rainwater and reusing it for purposes such as irrigation or toilet flushing. Rainwater is collected from building rooftops or other paved surfaces and stored in tanks for treatment and reuse locally.

Advantages	Disadvantages
• Water can be used for variety of non-potable uses, such as toilet flushing and irrigation • Reduces potable water demand • Provides source control of storm-water run-off • Rooftop or underground tanks can minimise land take and visual impact • Can be retrofitted to existing buildings	• Potentially complex installation and high capital cost, particularly for retrofit • Ongoing energy requirement for pumping, if below ground storage is used • Careful management required to manage any health risks associated with water reuse • Above ground storage can be visually intrusive • Regular maintenance is required

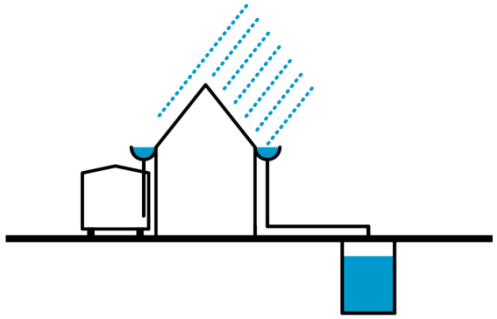
Effective Locations	Ineffective Locations
• Residential and Commercial areas • High density areas • Contaminated sites • Sites above vulnerable groundwater	• Fields or large open space

Performance Criteria	Rating
Ecological Advantages	Low
Peak Flow Reduction	High
Amenity Potential	Low
Water Quality Treatment Potential	Low
Surface Water Volume Reduction	High

In the Community

Rain-water harvesting can be implemented on a variety of scales; however, is particularly suitable for implementation in buildings with large rooftop areas, significant water consumption and defined ownership and maintenance responsibilities. Installation is generally easier when integrated into the design of new buildings; however, water butts can provide a simple means of retrofit.

Design



Example

D.6 Ponds and Basins

Ponds or Basins can be used to store and to treat water. ‘Wet’ (retention) ponds have a constant body of water and run-off water is additional to this, whilst ‘dry’ (detention) ponds are empty during periods without rainfall. Ponds can be designed to allow infiltration through its base to ground or to store water for a period of time, before it is discharged via a soakaway to ground. They can support emergent and submerged vegetation, enhancing both treatment and biodiversity.

Advantages	Disadvantages
• Pollutant removal through sedimentation and biological treatment mechanisms • Effective accommodate of large storm events • Good community acceptability • Potential for biodiversity improvement • Relatively simple construction • Has the potential for supply of irrigation to other amenities • Aesthetically pleasing • Potential recreational benefit	• Requires infiltration to achieve significant reduction in surface water runoff volumes • Significant spatial requirements • Requires control measures to prevent migration of invasive species • Consideration of public safety may require control measures in certain settings • Careful design is required to manage undesirable impacts associated with eutrophication and fluctuating water levels

Effective Locations	Ineffective Locations
• Residential and Commercial areas • Fields • Parks or areas of open space • Areas with feature requirements	• High density areas • Locations with vulnerable people

Performance Criteria	Rating
Ecological Advantages	High
Peak Flow Reduction	High
Amenity Potential	High
Water Quality Treatment Potential	High
Surface Water Volume Reduction	Low

In the Community

Ponds can be aesthetically pleasing, and can be used to support urban amenity, recreation and ecology. They can provide central features within areas of community space. However, careful design consideration is required to ensure they do not pose a health and safety risk to the public.

Design

Example

D.7 Soakaway

Soakaways and other infiltration systems collect and store runoff, allowing it to rapidly soak into permeable layers of soil. Constructed like a dry well, an underground pit is dug and then filled with gravel and rubble, or specially designed structures. Surface water can be directed into a soakaway using a number of above or below ground methods, with overlying vegetation and underlying soils providing treatment benefits.

Advantages	Disadvantages
• Minimal land take • Provides recharge of natural ground water levels • Good storm volume reduction and peak flow *attenuation* • Simple operation and maintenance • Relatively simple to construct • Effective retrofitting solution • Good community acceptability	• Not always practicable near to structural foundations • Long term performance is uncertain and difficult to guarantee if property owner is responsible for maintenance • Requires good subsurface drainage • Infiltration rates need to be investigated

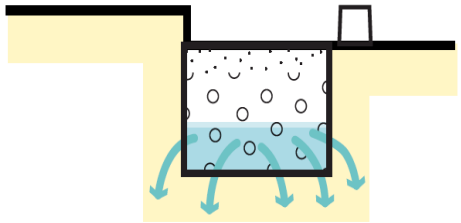
Effective Locations	Ineffective Locations
• Residential and commercial areas • High density areas • Fields • Small grassed/planted areas	• Contaminated sites • Sites above vulnerable groundwater • Sites with shallow groundwater • Sites underlain by impermeable ground

Performance Criteria	Rating
Ecological Advantages	Low
Peak Flow Reduction	High
Amenity Potential	Low
Water Quality Treatment Potential	Medium
Surface Water Volume Reduction	High

In the Community

Soakaways are effective in areas with good infiltration potential and where the water table is relatively low. Soakaways can be covered over by suitable permeable materials and be used for a variety of purposes at ground level. Caution should be taken when implementing these techniques in tightly constrained areas as they should not be built within a close proximity to structural foundations.

Design



Example

D.8 Living Roofs

A planted soil layer is constructed on the roof of a building to create a living medium. Following rainfall, water is stored in the soil layer and absorbed by planted vegetation. They may be designed to be accessible and landscaped to provide biodiversity and amenity benefit. Blue roofs can also be used to store water, without the use of vegetation.

Advantages	Disadvantages
• High potential to reduce surface run off • Suitable for high density development • Can deliver building insulation and sound proofing • Inaccessible to general public • Can provide biodiversity benefits to the local area • Improved air quality • Assists in amelioration of the urban heat island effect • Can be retrofitted	• Additional structural loading to roof (compared with most traditional rooftops) • Irrigation may be required during drought • Replacement and maintenance of plants is required on a regular basis

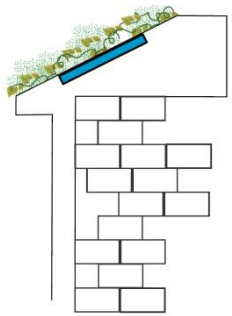
Effective Locations	Ineffective Locations
• Residential and Commercial areas • High density areas • Contaminated sites • Sports centres	• Roofs with inadequate access • Steep pitched roofs • Rooftops with inadequate structural support

Performance Criteria	Rating
Ecological Advantages	High
Peak Flow Reduction	Medium
Amenity Potential	High
Water Quality Treatment Potential	High
Surface Water Volume Reduction	Medium

In the Community

Living roofs provide an opportunity to attenuate and store rainwater in spatially constrained areas, while providing potential benefits for local biodiversity, air quality, microclimate and amenity. They have controlled access, which means the associated risk of misuse or vandalism is low.

Design



Example

D.9 Permeable / Porous Paving

This is paving which allows water to soak into the underlying ground. It can be in the form of paving blocks with gaps in between or porous mediums where water filters through the paving itself. Water can be stored in the sub-base beneath or be allowed to infiltrate into the ground below.

Advantages	Disadvantages
• Good potential for water quality treatment • High potential for surface water run off • Very efficient • Good community acceptability • Requires minimal maintenance • Effectively requires no space, as it allows for a dual usage • It can remove the need for manholes or gully pots	• Requires closure of surfaced areas whilst SuDS are constructed • Cannot be used where high sediment loads are likely to be washed across the surface • Requires vegetation maintenance • Regular inspection of the surfaces required to ensure effectiveness • Can deflect if subject to heavy vehicular loads

Effective Locations	Ineffective Locations
• Residential and Commercial areas • Car Parks • Low speed roads (below 30 mph) • Pathways • Residential pavements • Hard courts	• High speed roads

Performance Criteria	Rating
Ecological Advantages	Low
Peak Flow Reduction	High
Amenity Potential	Low
Water Quality Treatment Potential	High
Surface Water Volume Reduction	High

In the Community

Permeable surfaces offer effective drainage solutions that integrate within residential environments. Porous paving is effective at managing runoff from paved surfaces, and this low maintenance method is particularly useful in built up environments, including city centres. Replacing hard standing with permeable surfaces could improve drainage across a site whilst creating more aesthetically pleasing environments.

Design

Example

References

For detailed information on the design and delivery of SuDS, reference should be made to the CIRIA *SuDS Manual* (2015), which is freely available online at www.ciria.org.
A range of further resources on SuDS, including case studies, videos, presentations, fact sheets and links to research can be found on the Susdrain website at http://www.susdrain.org.
Additional supporting information is available from DEFRA (www.defra.gov.uk) and the Environment Agency (www.environment-agency.gov.uk).

Developers within Newham should also refer to the London Borough of Newham publication *SuDS Guidance,* for detailed guidance on drainage strategies submitted with planning submissions.

Appendix E Maintaining the SFRA & Data Register

SFRA Management Guide

The NPPF highlights the importance of maintaining Strategic Flood Risk Assessments to ensure the decision making process by the Local Planning Authorities is based on the most up to date information and understanding of flood risk within the Borough. A summary of the key aspects to be considered to ensure that the SFRA is kept up-to-date and maintained is provided in the table below.

Table E0-1 - Summary of main aspects to be considered during maintenance of the SFRA

Area Covered	Source of Information	Provider	Comments	Next Review
Climate Change Scenarios	Environment Agency Guidance and Modelling	EA	The hydraulic modelling results considered as a part of this SFRA were based on the latest available modelling of the River Lee, River Roding and River Thames. The Environment Agency has the River Roding in their current programme for hydraulic modelling update. When new data becomes available for this watercourse, updates should be made to the SFRA including mapping within Appendix A. Specifically Map 4.	When updated hydraulic modelling becomes available, and during the next general review of the SFRA
Flood Zones	Hydraulic modelling of main rivers and the sea (Tidal Thames)	EA	Should new Flood Zone information become available, the data should be digitised and georeferenced within the GIS system	When further modelling is carried out and/or outlines reviewed by EA
*Critical Drainage Area*s	Environment Agency and London Borough of Newham	EA	There are currently no CDAs as defined by the Environment Agency within the London Borough of Newham. If this position changes, the SFRA will need reviewing. The Surface Water Management Plan for LB Newham identifies 13 *Critical Drainage Area*s and this information has been used to create a long term action plan. If the SWMP is updated it would be wise to review the SFRA to ensure that any changes are captured within both reports.	When the EA revise their *Critical Drainage Area*s or following revision of the LB Newham SWMP

Area Covered	Source of Information	Provider	Comments	Next Review
Surface Water Flood Outlines	EA Dataset	EA	The EA update the RofSW maps quarterly with information provided by Boroughs where discrete modelling has been completed. It is suggested that if LB Newham complete additional modelling of surface water flood risk then surface water flood outlines within this SFRA may need review / update.	When new relevant information becomes available
Flood Defences, Critical Water Management Structures and Areas Benefiting	EA Database and Newham SWMP	EA, LB Newham	If any new local flood defences or management structures are installed within Newham these should be added as a new point to the relevant GIS layer, including metadata. EA datasets should be updated in their entirety to replace superseded layers	When new relevant information becomes available
Flooding History	Stakeholders records	EA, LB Newham	When new flooding incidents are reported, these should be added as a new point to the relevant GIS layer, including metadata	Next general review of SFRA
Local Plan Information	Newham Local Plan	LB Newham	This SFRA has been published to include sites and information contained within the current Newham Local Plan review. If any updates are made to the Local Plan, the SFRA should be reviewed and updated as required.	On update to Newham Local Plan.
Groundwater Flood Risk	Geology and Groundwater Vulnerability	EA	The *groundwater* flood risk dataset used for this SFRA is understood to provide the best available representation of *groundwater* flood risk. Understanding of *groundwater* flood risk is still emerging and therefore it is recommended that the *groundwater* data contained within this report is reviewed if/when new BGS datasets become available.	Next general review of SFRA

Area Covered	Source of Information	Provider	Comments	Next Review
Sewer Flood Risk	Thames Water	TW	Some information on areas at risk of sewer flooding was provided during this study. Should greater information on sewer flood risk and network capacity become available, it is recommended that this is incorporated within the SFRA.	When information is available
OS Background Mapping	Ordinance Survey	LB Newham	The SFRA has made use of OS 1:25,000 digital mapping. Periodically these maps are updated. Updated maps are unlikely to alter the findings of the SFRA but should be reviewed as part of the SFRA maintenance	Next General review of SFRA
Flood Risk Policy	NPPF and PPG[21]	Gov (DCLG)	This SFRA was created using guidance that was current in May 2017, principally the NPPF. Should new flooding policy be adopted nationally, regionally or locally, the SFRA should be checked to ensure it is still relevant and updates made if necessary	When changes to relevant planning policy are adopted
Breach modelling data	Environment Agency	EA	This study has referred to hydraulic breach modelling completed by CH2M Hill in 2015 – The Thames Tidal Breach Modelling Study. In May 2017 the Environment Agency advised that new breach modelling would soon be available for the Thames catchment, with new breach modelling available at 20m intervals upstream of the Thames Barrier. When this data becomes available it should be referred to in all site specific FRAs to support planning applications. If any updates to the Flood Zone maps are made Map 4 in Appendix A should be updated. New breach data should be used to update Map 8 Appendix A.	Upon receipt of new EA Breach Modelling data

It should be noted that, prior to any data being updated within the SFRA, it is important that the licensing information is also updated to ensure that the data used is not in breach of copyright. The principal licensing bodies relevant to the SFRA at the time of publishing were the Environment Agency (Thames Region), Ordnance Survey and Thames Water. Updated or new data may be based on datasets from other licensing authorities and may require additional licenses. Generally, when updating the GIS information associated with this SFRA, it is important that the meta-data is updated in the process. This is the additional information that lies behind the GIS polygons, lines and points.

It is recommended that an interim review of the SFRA is undertaken on an annual basis, in liaison with the Environment Agency, to assess any maintenance or update work required. In particular, this would include incorporation of any major changes in terms of flood management infrastructure and any recorded flooding incidents. An overall general review of the SFRA is recommended every 3 years, to re-evaluate flood risk and planning policies according to latest legislation.
Should LB Newham decide any significant changes are necessary; the SFRA should be updated and re-issued. It is essential that any reviews and updates of the SFRA are recorded in a structured manner. To facilitate this task, the following register has been created:

STRATEGIC FLOOD RISK ASSESSMENT REVIEW				
Type of Review	Scheduled ☐	Interim ☐	**Date of Review:**	
Reviewer Name:			**Organisation:**	
Area Reviewed	**Source of Information**	**Provider**	**Maps Modified**	**Comments**

Emily Craven

AECOM Infrastructure & Environment UK Limited
Midpoint
Alencon Link
Basingstoke
Hampshire RG21 7PP
UK

T: +44(0)1256 310200
aecom.com