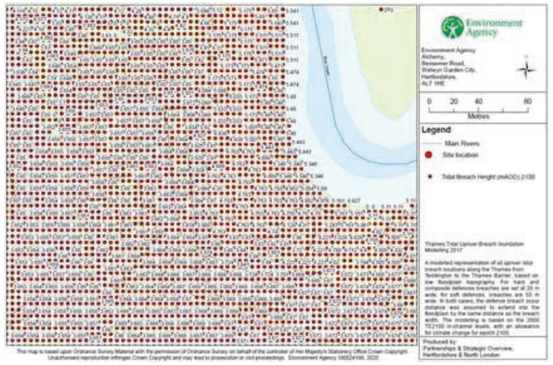
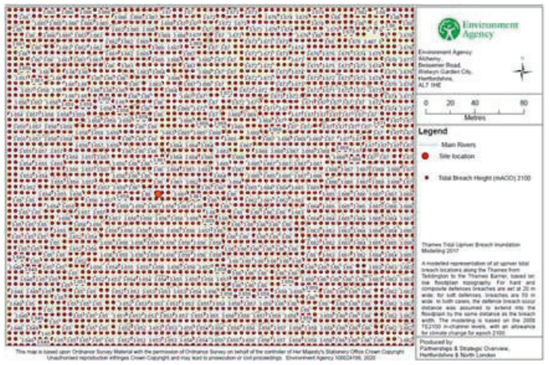
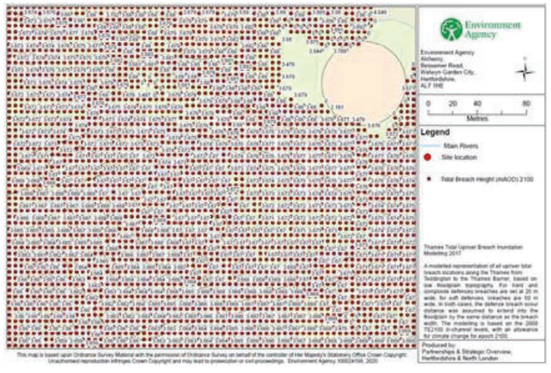


North Aberfeldy Village



South-west Aberfeldy Village



South-east Aberfeldy Village

Figure 16 – Maximum Water Level – Breach (2100). Tidal Upriver Breach Inundation Modelling Study 2017

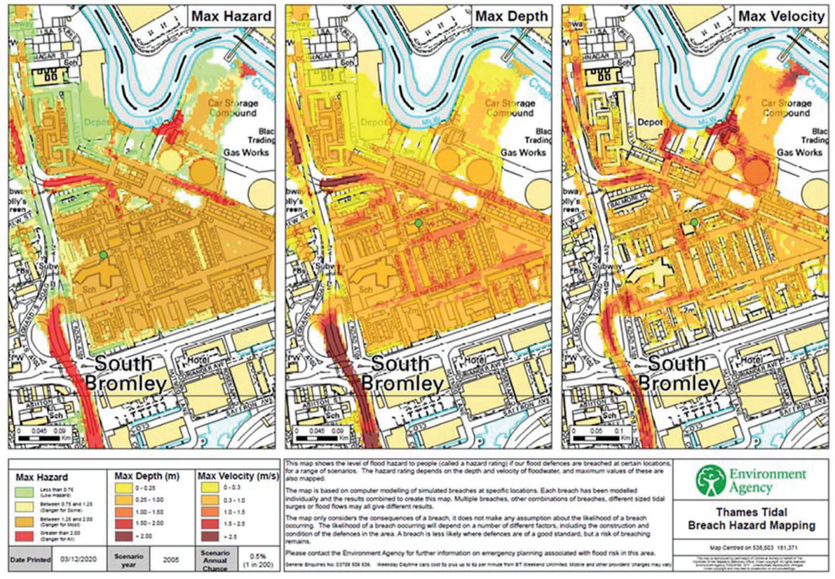


Figure 17 – River Thames Hazard Mapping Breach (2005). Tidal Upriver Breach Inundation Modelling Study 2017

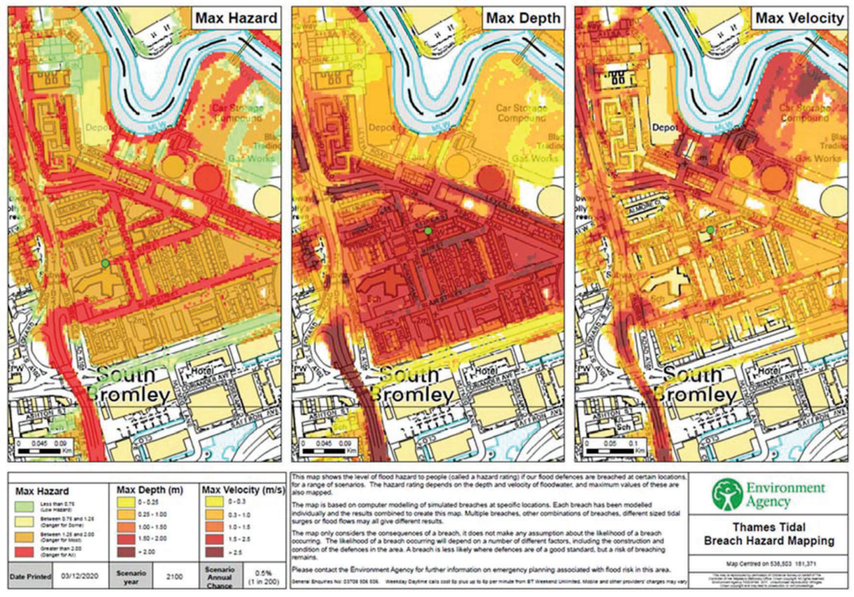


Figure 18 – River Thames Hazard Mapping Breach (2100). Tidal Upriver Breach Inundation Modelling Study 2017

4.5 Surface Water Flooding

Pluvial flooding occurs when natural and engineered systems have insufficient capacity to deal with the volume of rainfall. Pluvial flooding can sometimes occur in urban areas during an extreme, high intensity, low duration summer rainfall event which overwhelms the local surface water drainage systems. This flood water would then be conveyed via overland flow routes dictated by the local topography.

Appendix A, Map 006, of the SFRA indicates that the site is located within a Critical Drainage Area.

The Flood Risk from Surface Water map (**Figure 19**) shows the majority of the site to be at very low risk of flooding from surface water, with the site access roads identified as being at increased risk.

Potential flood depths along the site access roads for the low, medium and high risk events are presented by **Figure 19**. Flood depths are shown to be approximately 300 mm, with the exception of the A12 underpass where flood depths are expected to exceed 900 mm.

It should be noted that the modelling approach used to generate the Flood Risk from Surface Water map generally underestimates the capacity of urban drainage networks. It is typically assumed that drainage networks provide a surface water removal rate of 12 mm per hour, equivalent to 33 litres per second per hectare of impermeable area. As such, it is likely that the Flood Risk from Surface Water map overstates the risk of flooding at the site from this source.

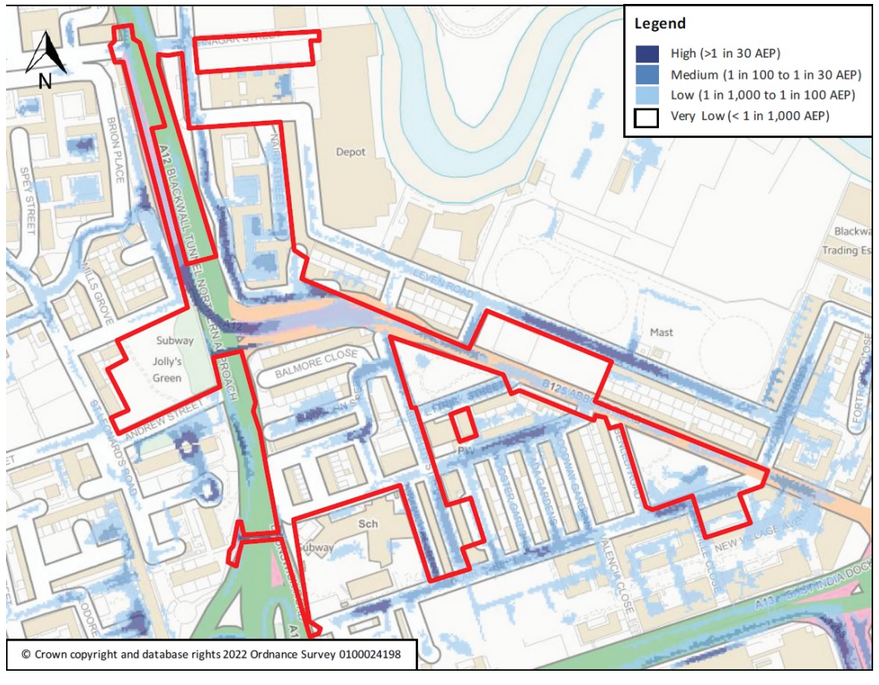


Figure 19 – EA Flood Risk from Surface Water

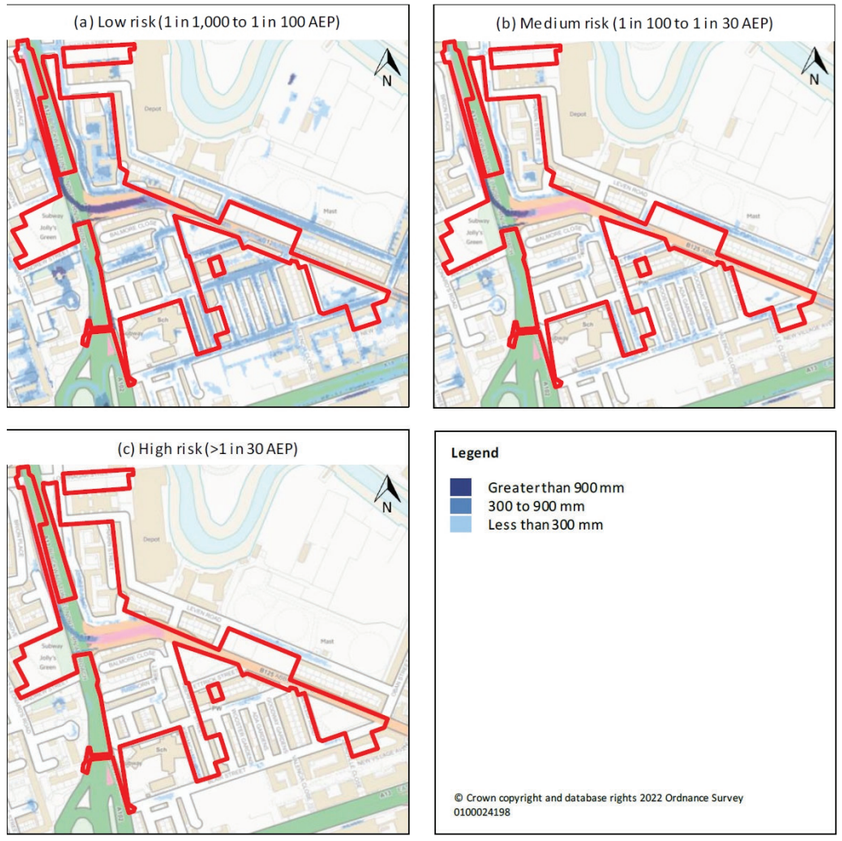


Figure 20 – EA Flood Risk from Surface Water - Depth

4.6 Sewer Flooding

The existing sewer system in London was constructed in the 19th century. The sewer system consists of combined sewers which were initially designed to collect foul waters only. However, the spare capacity of the sewers at the time and surface water flood risk incidents, resulted in a decision to use the sewers, also for the collection of surface water. Six main interceptor sewers were built and fed by 450 miles of main sewers and 13,000 miles of local sewers which historically discharged into the River Thames.

In the LB of Tower Hamlets the sewer network is a largely combined foul and surface water system managed by Thames Water. The combined sewers have brickwork culverts which outfall into the River Thames. Based on present day forecasting for heavy rainfall events, it is predicted that the culverts only have capacity for the 1 in 10 annual probability flood event. Additionally, any new surface water sewers have been designed to hold the 1 in 30 annual probability flood event. Subsequently, London experiences flooding as a result of a lack of sewer capacity, although they are generally of small consequence (mainly flooding of roads). However, climate change will result in summer storms increasing in frequency, and winter storms becoming more prolonged. This means that the current standard of protection for the existing sewer system will be reduced and more frequent localised flood events, as a result of sewer flooding, can be expected.

The data provided by Thames Water shows postcodes where properties are known to have experienced sewer flooding. The majority of the incidents of sewer flooding are clustered in the north of the borough around Bow and Victoria Park - post codes E3 2, E3 5, E9 5 and E9 7. The relatively high number of incidents reported in post code areas E3 2 and E3 5 may be the result of a shallow gradient drainage network. There are recorded 3no internal sewer flood records at the site post code E14 0.

The sewer system was not modelled for the SWMP explicitly hence interaction between the sewer system and surface water modelling was not investigated.

Sewer flooding generally results in localised short-term flooding caused by intense rainfall events overloading the capacity of the sewers. Flooding can also occur as a result of a blockage, poor maintenance or structural failure.

There are existing Thames Water adopted combined sewers in the vicinity of the proposed development. It is anticipated that the adopted sewers will be regularly maintained by Thames Water and therefore risk of failure should be considered to be minimal. Should the existing sewers flood, they will follow the proposed flood exceedance routes and existing topography.

The proposed development is a Brownfield site which discharges unrestricted surface water flows into the existing public sewers; post-development the surface water discharge rates will be heavily restricted to the Greenfield Qbar rate. Therefore, the proposed development is considered to be at low risk of sewer flooding.

4.7 Flood Risk from Reservoirs, Canals and Other Artificial Sources

The Flood Risk from Reservoirs map (Figure 21) indicates that the site may be at risk of flooding from reservoirs when there is also flooding from rivers. However, all large reservoirs are regularly inspected by reservoir panel engineers with essential safety work carried out as required. As detailed on the gov.uk website, reservoir flooding is therefore extremely unlikely to occur. There are no canals or other artificial sources located within the vicinity of the site that are expected to present a risk of flooding.

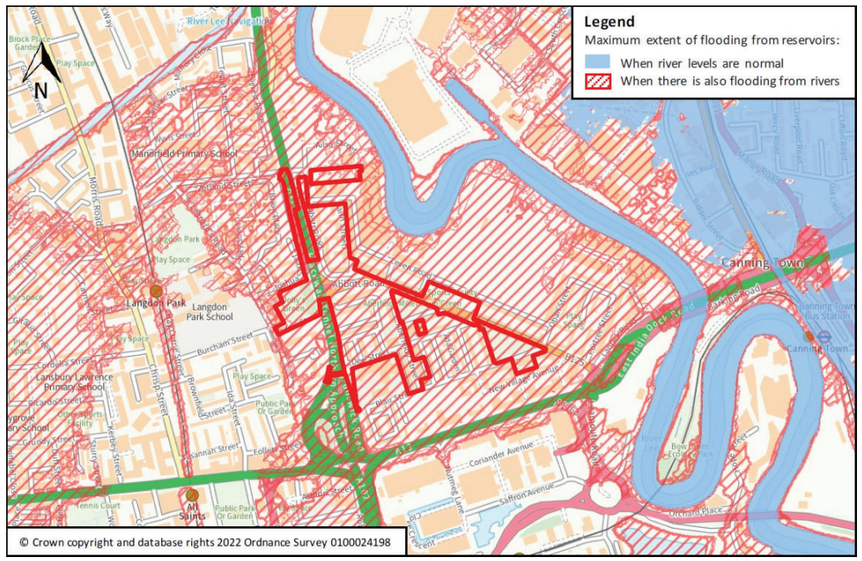


Figure 21 – Flood Risk from Reservoirs Map

4.8 Water Main Burst

A burst water main can occur at any time and can have a serious impact on both property and infrastructure.

Any pipe burst can result in flooding of roads and property however the locations at most risk are considered to be low points in the topography along roads and tunnels and locations where large water mains run along streets and open spaces. This is because flood water would accumulate at low points and burst flows are much larger for larger pipes.

Thames Water has recently undertaken a review of bursts on their trunk main network following a series of incidents in 2016. This review came to the following findings regarding the causes of bursts; 'there is no single common cause of the bursts. Whilst age and condition of the pipes is an underlying factor in the eight high-profile failures, there were no systematic failings that could be said to have consistently caused or enabled the bursts.'

At present no assessment of the risk of water main burst flooding has been undertaken as it has not been possible to obtain water main asset information, such as pipe sizes and locations. Therefore as a pre-cautionary approach and in the absence of 2d modelling or data from Thames Water, any infrastructure or property in the vicinity of the areas at high risk (low points and large water mains) can be assumed to be at high risk from this source. Good management of the infrastructure itself is the key to minimising the threat of flooding from these sources.

Thames Water outlines their plans to improve their distribution network in order to reduce leakage and the risk of burst mains; this is set out in their 'Long-Term Strategy 2015-2040' document. The programme to replace the oldest and leakiest pipes and replacement of trunk mains has already started. Thames Water will make use of latest technology to monitor and manage the performance of their system and to reduce losses of water. Information from 'smart' meters will help target key locations to improve performance. Improved knowledge of deterioration rate of trunk mains and improved monitoring will help, to better predict and prevent these bursts.

Therefore, the site is considered to be at low risk of flooding from water main burst.

4.9 Ground Water Flooding

Groundwater flooding generally occurs during intense, long-duration rainfall events, when infiltration of rainwater into the ground raises the level of the water table until it exceeds ground levels. It is most common in low-lying areas overlain by permeable soils and permeable geology, or in areas with a naturally high water table.

Flood risk due to groundwater has been assessed by reviewing the Strategic Flood Risk Assessment and borehole data available on the British Geological Survey's (BGS) website. The SFRA notes that flood risk due to groundwater is generally low; however, some areas have a significant risk for elevated groundwater levels.

In these areas, basements are most likely to obstruct groundwater flows which will increase the risk of flooding to these buildings

The British Geological Survey Groundwater Flooding Hazard map (Figure 22) indicates that the majority of the site is at low risk of flooding from this source, with the western most side of the site (Sands and Gravels superficial deposits of the Kempton Gravel Member) at a significant risk of groundwater flooding.

Typically the areas, where the secondary aquifer is thinnest in depth and are primarily covered by impermeable areas such as buildings and roads. In these areas, rainwater cannot infiltrate into the ground and subsequently raise groundwater levels. The main cause for rising groundwater levels is therefore caused by sewers leaking and the lateral transmission of high water levels from the River Thames and River Lee. Due to the impermeable surfaces in these areas, groundwater flooding is most likely to affect basements and utilities that are not waterproofed properly.

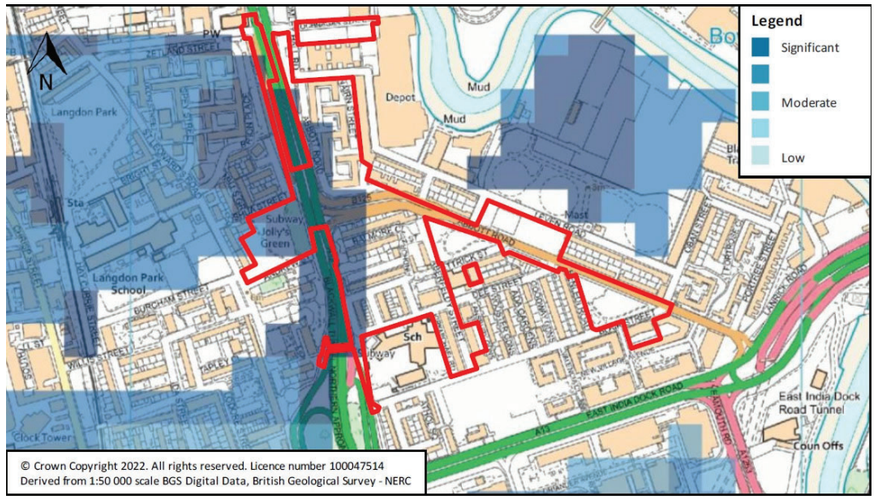


Figure 22 – Groundwater Flooding Hazard Map

In addition to the natural geology beneath the LB of Tower Hamlets, there can be a substantial depth of made ground that comprises material that has been deposited as a result of human occupation and development since settlement by the Romans in the 1st century AD. This material which sits above the other geologies is highly variable but can hold perched groundwater and therefore pose a risk of groundwater flooding to basements and other buried structures.

Groundwater flood risk is not expected to increase in the short to medium term. However, climate change is likely to increase the existing groundwater flood risk due to higher rainfall, and increased leakage from drains and sewers infiltrating into ground. Sea level rise will increase the water level within the River Thames which will also increase groundwater levels, although this will dissipate with distance from the river. Additionally, the defence improvements by the TE2100 and Thames Barrier may help to mitigate this.

Considering the BGS historic boreholes, the groundwater is likely to be present towards the base of the Kempton Gravel Member layer which extends to a depth of approximately 3 to 5m below ground level and above the impermeable London Clay (Refer to RSK Phase 1 report and RSK Intrusive Pile Assessment SI Report). Therefore, groundwater may be encountered within the proposed basement excavation.

The possibility for seasonal fluctuations in the ground water level should also be considered with the contractor being required to have suitable remediation and de-watering measures in place during works to construct the basement.

Therefore, the majority of the site is considered to be at Low risk of groundwater flooding at ground level and the western areas at Medium risk of groundwater flooding below ground.

parmarbrook

5 Flood Risk Mitigation Measures

The risk of flooding to the proposed development will be mitigated through the implementation of the measures proposed within the following section of this report.

5.1 Finished Flood Levels

For the Residential Development the Finished floor levels of the proposed units will be set a minimum of 0.15 m above adjacent ground levels and above peak flood levels in the 2100 climate change breach scenario. Where it is not practicable to raise finished floor levels to this degree, sleeping accommodation (i.e. bedrooms) will be provided at first floor level to ensure that safe refuge is available. For the Retail Development the Finished floor levels of the proposed units will be set a minimum of 0.15 m above adjacent ground levels.

5.2 New Basement

The construction for the proposed new basement should consider a cavity drain system behind the blockwork lining wall. A drainage channel behind the lining wall and at the base of the slab would then collect any groundwater which would be pumped to ground floor level and ultimately convey it into the public sewers via the existing below ground drainage network.

5.3 Safe Refuge

Evacuation of the site is unlikely to be feasible given that the risk of flooding is principally associated with defence failure, the occurrence of which cannot be predicted. As such, areas of safe refuge should be provided at first floor level for the proposed retail units.

5.4 Flood Resistant and Resilient Construction

Flood resistant and resilient construction techniques should be incorporated into the design of the buildings where appropriate, in line with the CIRIA Code of Practice for Property Flood Resilience (C790). These include design features and finish materials to minimise the entry of water and/or reduce the damage in the unlikely event of the development being inundated. The use of non-return valves should be considered given the presence of surrounding public combined sewers.

5.5 Flood Warning and Evacuation Plan

It is recommended that a Flood Warning and Evacuation Plan is prepared in consultation with London Borough of Tower Hamlets emergency planning team. The objectives of the plan would be to reduce the risk to property and life by ensuring that all residents are aware of the potential risk of flooding and the procedures that should be implemented in the event that flooding is expected or has occurred. This would be achieved by: 1) Setting out the measures that would need to be taken if flooding is forecast, during flooding and following an 'all-clear' notification; 2) Summarising the roles and responsibilities for flood response and management; and 3) Describing how flood warnings are issued, flood warning codes and what they mean, and other sources of flood information

The site is included in an Environment Agency flood alert and warning area. This provides the opportunity for the relevant response procedures set out in the Flood Plan to be invoked in response to receipt of a flood warning from the Environment Agency.

6 Sequential Test and Exception Test

6.1 Sequential Test

The NPPF requires the Local Authority to apply the Sequential Test in consideration of new development. The aim of the Test is to steer new development to areas at the lowest probability of flooding.

Given that the subject site has not been allocated as one of the London Borough of Tower Hamlets proposed future development sites, it has not been specifically assessed within the SFRA. The Sequential Test is based on the EA Flood Zones and information contained within the SFRA.

The site is located within Flood Zone 3 benefiting from flood defences and is therefore classified as being at a very low fluvial and tidal flood risk. No significant risks have been identified from any of the other sources assessed. Therefore, the site is considered to be sequentially preferable for development and passes the Sequential Test.

6.2 Exception Test

In accordance with the Flood Risk Vulnerability Classification in Table 2 of the Planning and Practice Guidance Flood Risk and Coastal Change, the proposed development is classified as 'More Vulnerable' development.

Table 3 of the Planning Practice Guidance indicates that 'more vulnerable' developments are considered appropriate within Flood Zone 3 benefitting from flood defences without the requirement to apply the Exception Test. Therefore, application of the Exception Test is not required for the proposed development.

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7 Summary and Recommendations

Parmarbrook has been instructed by Aberfeldy New Village LLP (joint venture between EcoWorld London and Poplar HARCA) to prepare a Flood Risk Assessment (FRA) in relation to the proposed redevelopment of Aberfeldy Village, East India Dock E14 within the London Borough of Tower Hamlets.

The Flood Map for Planning shows the proposed development site is located within the 1 in 100 / 1 in 200 annual probability flood outline and is therefore defined by the NPPF as being situated within flood zone 3.

The River Lee is located a minimum of approximately 160 m east of the site. The Environment Agency has confirmed that the flood defences along the River Lee prevent flooding in up to the 1 in 1,000 AEP event.

The Thames Barrier and the raised defences along the banks of the River Thames provide a present day 1 in 1,000 standard of protection. The TE2100 Plan states that the crest levels of the defences will be raised to maintain this standard of protection to the year 2100.

The site is shown to be at a residual risk of flooding in the event of a failure of the River Thames flood defences. The maximum flood levels at the site are shown to range between 3.65 and 5.10 m AOD in the 2100 climate change scenario.

The Flood Risk from Surface Water map indicates the majority of the site is at a very low risk of flooding from surface water. However, the site access roads identified as being at increased risk.

The Flood Risk from Reservoirs map indicates that the site may be at risk of flooding from reservoirs. However, all large reservoirs are regularly inspected by reservoir panel engineers with essential safety work carried out as required and reservoir flooding is therefore extremely unlikely to occur.

There may be some susceptibility to groundwater flooding at the site.

This report has demonstrated that the proposed development may be completed in accordance with the requirements of planning policy subject to the following:

- Finished floor levels of the residential units will be set a minimum of 0.15 m above adjacent ground levels;
- Finished floor levels of the residential units will be raised above the peak flood levels in the 2100 climate change breach scenario, or sleeping accommodation to be provided at first floor level;
- Finished floor levels of the proposed retail units will be set a minimum of 0.15 m above adjacent ground levels and safe refuge to be provided at first floor level;
- The construction for the proposed new basement should consider a cavity drain system behind the blockwork lining wall.
- The latest best practice flood resistant and resilient construction techniques to be incorporated into the design of the building where appropriate; The use of non-return valves should be considered given the presence of surrounding public combined sewers; and
- Flood Warning and Evacuation Plan to be developed in consultation with London Borough of Tower Hamlets.

APPENDIX A

ILLUSTRATIVE NEW ABERFELDY MASTERPLAN LAYOUT

Proposed tree

Existing tree (remained)

Existing tree (removed)

Lawn

Screening planting

Planting

River Lea or Lee

Bow Creek

Mud

Ettrick Street

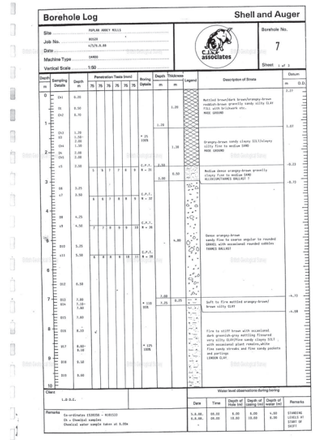
Dee Street

1:1,000

50m

APPENDIX B

BGS HISTORIC BOREHOLE LOGS



Sampling			Properties			Strata			
Depth	Type	Cu kPa	w%	SPT N	Description	Depth	Level	Legend
					MADE GROUND: Brown fine to coarse sand with occasional fine to coarse angular to rounded gravel and many brick and concrete fragments.	0.1	1.70	
0.50-0.70	B							
0.70-1.00	B							
1.40-1.78	B					1.40	0.38	
					MADE GROUND: Firm brown silty clay with a little fine to medium angular to sub-rounded gravel and many brick fragments.	1.78	0.68	
2.00-2.45	CB			3n	Dense brown silty fine to coarse SAND with a little angular to rounded fine to coarse gravel and occasional pockets of firm brown silty CLAY.	2.45	-.970	
3.00-3.45	CB			43	Dense yellow-brown slightly sandy fine to coarse angular to sub-rounded GRAVEL.			
4.00-4.45	CB			46				
5.00-5.45	CB			31				
6.00-6.45	CB			31				
6.20	D				Stiff mottled brown and orange-brown silty CLAY.	6.20	-4.42	
6.50-6.95	U1473	87		29		6.58	-4.72	
7.23	D				Stiff dark gray fossily laminated very closely fissured very silty occasionally slightly sandy CLAY with some light brown silty fine sand partings and occasional plant remains.			
8.00-8.45	U1383	107		28				
8.73	D							
9.00-9.45	U1383	96		23				

Drilling					Groundwater	Co-ordinates: TQ 33941m 181439			Ground Level 1.78m AOD		
Type	From	To	Size	Fluid	Struck	Behaviour	Sealed	Date	Hole	Cased	Water
Cable Tool	0.00	23.00	0.13		18.00	Rose to 5.43m in 20 minutes		19.08.88 20.08.88	8.00 18.00	8.00 8.00	5.43 15.43

Remarks	
Borehole Record	Project: Northern Drainage - Phase 2A - Job No. 2278 London Docklands Development Corporation
Exploration Associates	Contract: 88Dr49 — Borehole 5A (1 of 3)

Sampling			Properties			Strata			
Depth	Type	Cu kPa	w%	SPT N	Description	Depth	Level	Legend
					MADE GROUND**: Black ash fill and domestic refuse.	0.1	1.92	
1.00-1.50	B							
1.50-1.95	U1481				Stiff mottled brown and orange-brown silty CLAY with occasional fine to medium angular to sub-angular gravel and cobbles.	1.28	0.72	
						2.00	-.080	
2.00-2.45	CB			48	Dense yellow-brown sandy fine to coarse angular to rounded GRAVEL.			
3.00-3.45	CB			34				
4.00-4.45	CB			44				
5.00-5.45	CB			47				
6.20-6.35	B				Stiff grey-brown very silty slightly sandy CLAY.	6.20	-4.28	
6.50-6.95	U1481	88		24		6.50	-4.38	
7.50	D				Stiff dark grey-brown faintly laminated very closely fissured very silty occasionally slightly sandy CLAY with some light brown silty fine sand partings and plant remains.			
8.00-8.45	U1351	71		28				
8.73	D							
9.00-9.45	U1311	104		27				

Drilling					Groundwater	Co-ordinates: TQ 33941m 181439			Ground Level 1.92m AOD		
Type	From	To	Size	Fluid	Struck	Behaviour	Sealed	Date	Hole	Cased	Water
Cable Tool	0.00	23.00	0.13		18.80	Rose to 13.00m in 20 minutes		21.08.88 22.08.88 24.08.88	8.00 18.00 23.00	8.00 8.00 23.00	6.28 16.28 13.28

Remarks	Permeability tests carried out at 4.00m, 8.00m and 7.50m.
Borehole Record	Project: Northern Drainage - Phase 2A - Job No. 2278 London Docklands Development Corporation
Exploration Associates	Contract: 88Dr49 — Borehole 6A (1 of 3)

APPENDIX C

ENVIRONMENT AGENCY PRODUCT 4 DETAILED FLOOD RISK MAPS

Product 4 (Detailed Flood Risk) for: Aberfeldy Village, London, E14 0PT
Reference: HNL 195148 AS
Date: 03/12/2020

Contents

The information provided is based on the best data available as of the date of this letter.

You may feel it is appropriate to contact our office at regular intervals, to check whether any amendments/ improvements to the data for this location have been made. Should you re-contact us after a period of time, please quote the above reference in order to help us deal with your query.

Please refer to the Open Government Licence which explains the permitted use of this information.

Alchemy, Bessemer Road, Welwyn Garden City, Hertfordshire, AL7 1HE
Customer services line: 03708 506 506
Email: NETenquiries@environment-agency.gov.uk
Website: www.environment-agency.gov.uk

Flood Map for Planning (Rivers and Sea)

The Flood Map:

Our Flood Map shows the natural floodplain for areas at risk from river and tidal flooding. The floodplain is specifically mapped ignoring the presence and effect of defences. Although flood defences reduce the risk of flooding they cannot completely remove that risk as they may be over topped or breached during a flood event.

The Flood Map indicates areas with a 1% (0.5% in tidal areas), Annual Exceedance Probability (AEP) - the probability of a flood of a particular magnitude, or greater, occurring in any given year, and a 0.1% AEP of flooding from rivers and/or the sea in any given year. In addition, the map also shows the location of some flood defences and the areas that benefit from them.

The Flood Map is intended to act as a guide to indicate the potential risk of flooding. When producing it we use the best data available to us at the time and also take into account historic flooding and local knowledge. The Flood Map is updated on a quarterly basis to account for any amendments required. These amendments are then displayed on the internet at https://www.gov.uk/check-flood-risk

At this Site:

The Flood Map shows that this site lies within Flood Zone 3 - with a 1% chance of flooding from rivers (fluvial flooding) and a 0.5% chance of flooding from the sea (tidal flooding) in any given year.

Enclosed is an extract of our Flood Map which shows this information for your area.

Method of production

The Flood Map at this location has been derived using detailed modelling of the tidal River Thames through the Thames Tidal Defences Study completed in 2006 by Halcrow Ltd.

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Website: www.environment-agency.gov.uk

Thames Estuary 2100 (TE2100)

You have requested in-channel flood levels for the tidal river Thames. These have been taken from the Thames Estuary 2100 study completed by HR Wallingford in 2008. The modelled Thames node closest to your site is **2.46**; the locations of nearby nodes on the River Thames are also shown on the enclosed map.

Details about the TE2100 plan

The Plan sets out how the Environment Agency and our partners can work together to manage tidal flood risk, from now until the end of the century. It is an adaptive plan for managing the Thames Estuary, including the tidal defence system, until 2100 so that current standards of flood protection are maintained or improved taking into account climate change effects e.g. sea level rise. The Plan has 3 phases of activity:

- Until 2035 – maintain and improve current defences, safeguard areas required for future improvements, and monitor climate change indicators.
- 2035-2050 – raise existing walls, defences & smaller barriers whilst reshaping the riverside environment.
- 2050-2100 – determine and implement an option for the future of the Thames Barrier, and adapt other defences as required to work alongside this to protect the estuary.

The Thames Estuary 2100 Plan can be found at: https://www.gov.uk/government/publications/thames-estuary-2100-te2100

Details about the TE2100 in-channel levels

The TE2100 in-channel levels take into account operation of the Thames Barrier when considering future levels. The Thames Barrier requires regular maintenance and with additional closures the opportunity for maintenance will be reduced. When this happens, river levels – for which the Barrier would normally shut for the 2008 epoch – will have to be allowed through to ensure that the barrier is not shut too often. For this reason, levels upriver of the barrier will increase and the tidal walls will need to be heightened to match.

Why is there no return period for levels upriver of the barrier?

The levels upriver of the barrier are the highest levels permitted by the operation of the Thames Barrier. If levels and flows are forecast to be any higher, the Thames Barrier would shut, ensuring that the tide is blocked and the river maintained to a low level. For this reason the probability of any given water level upriver of the Barrier is controlled and therefore any associated return period becomes irrelevant. The Thames Barrier and associated defence system has a 1 in 1000 year standard which means it ensures that flood risk is managed up to an event that has a 0.1% annual probability. The probability of water levels upriver is ultimately controlled by the staff at the Thames Barrier.

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Website: www.environment-agency.gov.uk

TE2100 2008 levels:

Levels downriver of the Thames Barrier are 0.1% AEP (1 in 1000) and levels upriver are the highest levels permitted by the Thames Barrier, described as the Maximum Likely Water Levels (MLWLs). The defence levels (left defence, right defence) are the minimum levels to which the defences should be built.

Node	Easting	Northing	Extreme water level (m)	Present Day Statuatory Defence Level (Thames Left Bank) (m)	Allow for future 2100 defence raising to a level of... (Thames Left Bank)
2.46	538943	180471	4.67	5.23	6.20
2.46au	539436	180390	4.66	5.18	6.20

TE2100 climate change levels:

			2065 to 2100		2100	
Node	Easting	Northing	Design water level	Defence level (both banks)	Design water level	Defence level (both banks)
2.46	538943	180471	5.16	5.70	5.65	6.20
2.46au	539436	180390	5.15	5.70	5.64	6.20

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Email: NETenquiries@environment-agency.gov.uk
Website: www.environment-agency.gov.uk

Thames Tidal Upriver Breach Inundation Modelling

The map attached displays site-specific modelled flood levels at your site. These have been taken from the Thames Tidal Upriver Breach Inundation Modelling Study 2017 completed by Atkins Ltd. in May 2017.

We have developed a modelling approach where all upriver breach locations along the Thames are equitably modelled, to ensure a consistent approach across London. This modelling simulates 5679 continuous tidal breaches along the entire extent of the Thames from Teddington to the Thames Barrier. For hard and composite defences breaches are set at 20 m wide; for soft defences, breaches are 50 m wide. In both cases, the defence breach scour distance was assumed to extend into the floodplain by the same distance as the breach width.

For breaches upriver of the Thames Barrier, there is no return period for modelled levels as the levels are controlled by barrier closures. The levels used are referred to as Maximum Likely Water Levels (MLWLs). Therefore 2005 and 2100 epochs were modelled on that basis.

This modelling has two epochs to consider; the 2005 epoch is a representation of today's flood levels without climate change considerations taken into account, and the 2100 epoch which takes into account changes likely to be seen due to climate change.

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Defence Details

The design standard of protection of the flood defences in this area of the Thames is 0.1% AEP; they are designed to defend London up to a 1 in 1000 year **tidal** flood event. The defences are all raised, man-made and privately owned. It is the riparian owners' responsibility to ensure that they are maintained to a crest level of **5.23m** mAODN (the Statutory Flood Defence Level in this reach of the Thames). We inspect them twice a year to ensure that they remain fit for purpose. The current condition grade for defences in the area is **3 (fair),** on a scale of 1 (very good) to 5 (very poor). For more information on your rights and responsibilities as a riparian owner, please see our document 'Living on the edge' found on our website at:

https://www.gov.uk/government/publications/riverside-ownership-rights-and-responsibilities

There are no planned improvements in this area. Please see the 'Thames Estuary 2100' document on our website for the short, medium and long term Flood Risk Management strategy for London:

https://www.gov.uk/government/publications/thames-estuary-2100-te2100

Areas Benefiting from Flood Defences

This site is within an area benefiting from flood defences, as shown on the enclosed extract of our Flood Map. Areas benefiting from flood defences are defined as those areas which benefit from formal flood defences specifically in the event of flooding from rivers with a 1% (1 in 100) chance in any given year, or flooding from the sea with a 0.5% (1 in 200) chance in any given year.

If the defences were not there, these areas would be flooded. An area of land may benefit from the presence of a flood defence even if the defence has overtopped, if the presence of the defence means that the flood water does not extend as far as it would if the defence were not there.

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Recorded Flood Events Data

We hold records of historic flood events from rivers and the sea. Information on the floods that may have affected the area local to your site are provided in the enclosed map.

Due to the fact that our records are not comprehensive, we would advise that you make further enquiries locally with specific reference to flooding at this location. You should consider contacting the relevant Local Planning Authority and/or water/sewerage undertaker for the area.

We map flooding to land, not individual properties. Our historic flood event record outlines are an indication of the geographical extent of an observed flood event. Our historic flood event outlines do not give any indication of flood levels for individual properties. They also do not imply that any property within the outline has flooded internally.

Please be aware that flooding can come from different sources. Examples of these are:

- from rivers or the sea;
- surface water (i.e. rainwater flowing over or accumulating on the ground before it is able to enter rivers or the drainage system);
- overflowing or backing up of sewer or drainage systems which have been overwhelmed,
- groundwater rising up from underground aquifers

Currently the Environment Agency can only supply flood risk data relating to the chance of flooding from rivers or the sea. However you should be aware that in recent years, there has been an increase in flood damage caused by surface water flooding and drainage systems that have been overwhelmed.

Other Sources of Flood Risk

The Lead Local Flood Authority for your area are responsible for local flood risk (i.e. surface runoff, ground water and ordinary watercourse) and may hold further information .

You may also wish to consider contacting the appropriate relevant Local Planning Authority and/or water/sewerage undertaker for the area. They may be able to provide some knowledge on the risk of flooding from other sources.

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Additional Information

Use of Environment Agency Information for Flood Risk / Flood Consequence Assessments

Important

If you have requested this information to help inform a development proposal, then we recommend that you undertake a formal pre-application enquiry using the form available from our website:-

https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion

Depending on the enquiry, we may also provide advice on other issues related to our responsibilities including flooding, waste, land contamination, water quality, biodiversity, navigation, pollution, water resources, foul drainage or Environmental Impact Assessment.

In **England**, you should refer to the Environment Agency's Flood Risk Standing Advice, the technical guidance to the National Planning Policy Framework and the existing PPS25 Practice Guide for information about what flood risk assessment is needed for new development in the different Flood Zones. These documents can be accessed via:

https://www.gov.uk/flood-risk-standing-advice-frsa-for-local-planning-authorities

https://www.gov.uk/government/publications/national-planning-policy-framework-technical-guidance

https://www.gov.uk/government/publications/development-and-flood-risk-practice-guide-planning-policy-statement-25

You should also consult the Strategic Flood Risk Assessment produced by your local planning authority.

You should note that:

1. Information supplied by the Environment Agency may be used to assist in producing a Flood Risk / Consequence Assessment (FRA / FCA) where one is required, but does not constitute such an assessment on its own.
2. This information covers flood risk from main rivers and the sea, and you will need to consider other potential sources of flooding, such as groundwater or overland runoff. The information produced by the local planning authority referred to above may assist here.
3. Where a planning application requires a FRA / FCA and this is not submitted or deficient, the Environment Agency may well raise an objection.
4. For more significant proposals in higher flood risk areas, we would be pleased to discuss details with you ahead of making any planning application, and you should also discuss the matter with your local planning authority.

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