

Waterfront Leisure Centre

Summary Information	
Site Reference	P4-W3
Address	Woolwich High Street, SE18 6DL
Area (ha)	0.82
Current Use	The site is currently used as a Leisure Centre and includes the Woolwich Foot Tunnel South entrance.
Current Vulnerability	Less Vulnerable
Proposed Use	Residential led mixed-use.
Proposed Vulnerability	More Vulnerable

Current Risk Summary					
Fluvial / Tidal			Groundwater		
FZ2	9.26	% of site	Limited potential for flooding to occur	19.49	% of site
FZ3a	41.19	% of site	Potential for flooding of properties below ground level	67.47	% of site
FZ3b	0.79	% of site	Potential for flooding to occur at surface	13.04	% of site
Surface Water			Sewer Flooding		
High	36.49	% of site	Number of incidents within the predominant postcode	30 - 40	
Medium	43.71	% of site	Is the site located within the Thamesmead area?	No	
Low	95.35	% of site			
Flood Defences			Flood Warning Area		
The site is at risk of flooding from rivers taking into account the presence and condition of flood defences according to the EA's RoFRS layer.			The EA Flood Warning Service is available at this site.		
There are flood defences along the northern and eastern boundaries of the site.					

See webmap supporting assessment: [Greenwich - Level 1 and 2 SFRA](#)



1.1 Tidal

Description of Flood Mechanism
The site is at risk of tidal breach flooding from the River Thames which is located immediately adjacent to the north of the site. - During the 1 in 200 year (2005) Thames Downriver modelled event, tidal flood risk is concentrated in the northern area of the site, and around the western and eastern boundaries of the site. - During the 1 in 1000 year (2005) Thames Downriver modelled event, the 1 in 200 year (2005) extent extends further into the site from the west to cover the western half of the site, and extends into the northeastern corner of the site. - During both the 1 in 200 year (2115) and 1 in 1000 year (2115) Thames Downriver modelled events, most of the site is inundated with the exception of areas along the northern and northeastern boundaries of the site.
Mitigation / FRA Requirements
- A FRA must be submitted as part of a planning application. - Include appropriate flood resistance or resilience measures to address predicted flood depths. - See SFRA Level 2 Report mitigation requirement numbers 4.3, 4.4 and 4.5, Policies E2 and E3 of the existing Greenwich Local Plan, and Policy EN6 of the draft Local Plan for further development stipulations. - Site users should be signed up to the EA's Flood Alert and Flood Warning Service. - The development should allow for safe, dry access to high ground as the extent of inundation covers the majority of the site. - Future defence raisings may be required in line with the TE2100 Plan crest levels guidance. They must consider the lifetime of the development and the status of current flood defence crest levels in the site-specific FRA. - Sea Level Allowances, provided by the EA, should be considered to inform flood resilient construction and design measures.
Climate Change Considerations
During the Thames Breach Downriver 1 in 200 year events climate change is expected to increase the extent of tidal flood risk across most of the site. The maximum depth increases from 1.11m to 2.07m, the maximum velocity increases from 1.10m/s to 1.66m/s, the maximum flood level increases from 5.84mAOD to 6.75mAOD and the maximum hazard increases from 1.99 to 3.06. During the Thames Breach Downriver 1 in 1000 year events climate change is expected to increase the extent of tidal flood risk across most of the site. The maximum depth increases from 1.46m to 2.40m, the maximum velocity increases from 1.20m/s to 1.98m/s, the maximum flood level increases from 6.18mAOD to 7.07mAOD and the maximum hazard increases from 2.37 to 3.52.



Risk Assessment (Tidal – Thames Breach Downriver 2018)					
Parameter	2005_0200	2005_1000	2115_0200	2115_1000	Units
Max. Depth	1.11	1.46	2.07	2.40	m
Max. Velocity	1.10	1.20	1.66	1.98	m/s
Max Flood Level	5.84	6.18	6.75	7.07	m AOD
Max Ground Level	7.26	7.26	7.26	7.26	m AOD
Min Ground Level	3.06	3.06	3.06	3.06	m AOD
Max Flood Hazard	1.99	2.37	3.06	3.52	N/A

1.2 Surface Water

Description of Flood Mechanism	
Surface water flood risk is concentrated in the western area of the site, which includes a significant area of high risk.	
Mitigation – Flood Risk Requirements	Mitigation – Surface Water Drainage
Development should be directed away from the western area of the site, towards the eastern area of the site.	See SFRA Level 2 Report mitigation requirement 5.0 for further development stipulations.
Development should comply with SFRA - Level 2 Report Section 4 mitigation requirement numbers 4.3 and 4.9.	Developments should apply the Sustainable Drainage Hierarchy set out in Policy SI 13 of the London Plan as well as Policy E2 of the existing Greenwich Local Plan and Policy EN6 of the draft Local Plan. Ground investigations are required to confirm whether infiltration SuDS are suitable.
Climate Change Considerations	
During the high risk event, the extent extends eastward and westward, but remains in the western area of the site. The maximum depth, velocity and hazard remain unchanged.	
During the medium risk event, the extent extends eastward and westward in the western area of the site. A new area of medium risk forms along the northeastern corner of the site. The maximum depth, velocity and hazard remain unchanged.	
During the low risk event, there is a very small increase in extent along the eastern and western boundaries of the site. The maximum depth, velocity and hazard remain unchanged.	



Risk Assessment				
Parameter	High	Medium	Low	Units
Max. Depth	1.2	1.2	1.2	m
Max. Velocity	2.0	2.0	2.0	m/s
Max. Hazard	2.0	2.0	2.0	N/A

Risk Assessment – with Climate Change				
Parameter	High	Medium	Low	Units
Max. Depth	1.2	1.2	1.2	m
Max. Velocity	2.0	2.0	2.0	m/s
Max. Hazard	2.0	2.0	2.0	N/A

1.3 Sewer

Risk Assessment	Mitigation Requirements
The site falls within a postcode area where there are 30 - 40 reported flood incidents from sewer flooding. The site is assumed to be served by a combined and foul sewer network, given their proximity to the site.	The applicant must consult with TWUL to confirm if the development site has historically flooded. TWUL must agree to any proposed sewer connections. If historic flooding has occurred, the applicant must demonstrate how this risk will be managed throughout the development's lifetime.

1.4 Groundwater

Risk Assessment	Mitigation Requirements
This site has limited potential for groundwater flooding to occur in the southernmost area of the site, potential for groundwater for flooding to occur at surface in the northernmost area of the site and potential for groundwater flooding of property situated below ground level between these two areas in the central areas of the site. The site is underlain by Thanet Sand Formation bedrock geology in the southwestern corner of the site, whilst there is no information regarding bedrock geology for the rest of the site. There is no	For new developments that involve groundworks, especially if basements are planned, the applicant should carry out a screening study (as a minimum) to establish if there are any subterranean flood risk issues that may require further investigation. If there is a potential level of impact, mitigation actions must be proposed. This must be prepared by a chartered professional or specialist.



information regarding the underlying superficial geology.	
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1.5 Artificial

Risk Assessment	Mitigation Requirements
This site is at risk of flooding from the Banbury, King George V, Lockwood, Queen Elizabeth, Queen Mary, Walthamstow No.4, Walthamstow No.5, William Girling and Wraysbury reservoirs. The reservoir extent map predicts that if any of these reservoirs breach on both dry and wet days, the site will be at risk of flooding.	Propose appropriate and proportionate risk management measures. A suitable emergency response plan should be put in place, including an emergency warning system in the event of a reservoir flooding incident. Local Authority Emergency Planning Officers must be consulted to create a reservoir failure emergency and evacuation plan.

1.6 Planning Considerations – Safety of Development

A. Can the development be future proofed for climate change considerations?
- Climate change is expected to increase the extent of tidal flood risk to inundate most of the site in the Downriver modelled scenarios. The maximum depth, velocity, flood level and hazard increase. - Surface water flood risk extent is expected to increase, predominantly during the high and medium risk events due to climate change. The maximum depth, velocity and hazard remain unchanged during all events. - See SFRA - Level 2 Report Section 4 mitigation requirement number 4.4 for the required flood resistant / resilient building stipulations.
B. Can the development be designed safe throughout its lifetime without increasing flood risk elsewhere?
- The development must use surface water drainage techniques to manage surface water runoff onsite through above ground SuDS and / or below ground attenuation. - Green drainage infrastructure should be prioritised to provide wider ecological / biodiversity benefits as per London Plan Policy SI 13. - See SFRA Level 2 Report mitigation requirement numbers 4.1, 4.3, 4.5, 4.7, 4.8, 4.9 and 5.0, Policies E2, E3 of the Greenwich Local Plan and Policy EN6 of the draft Local Plan for further development stipulations.
C. What is the cumulative impact of the development land use change and will flood risk increase?
The development land use is changing from 'Less Vulnerable' to 'More Vulnerable'.



• The site is largely impermeable with small permeable areas along the southern and eastern borders of the existing building. • Development must mitigate any increase in impermeable area to the site with runoff storage to prevent any increase in flood risk. An increase in impermeable area coverage on site will increase surface water runoff and flood risk if not managed properly.
D. How can the development reduce risk overall?
• Development should be directed towards the eastern area of the site where there is less risk of surface water flooding. • By complying with Policy E2 of the Greenwich Local Plan and Policy EN6 of the draft Local Plan through demonstrating that the development will avoid or minimise all sources of flood risk to people and property taking climate change into account, and incorporating SuDS measures in order to manage surface water runoff as close to its source as possible and to meet the required SuDS performance standards. • By complying with SFRA - Level 2 Report Section 4 mitigation requirements 4.4.
E. Which safe access and egress routes are recommended?
• Safe access and egress routes should be directed towards Bell Water Gate where feasible where there is less risk of surface water flooding. • Given the risk of tidal flooding in a breach scenario to the available access and egress routes, the applicant should provide a Flood Risk Emergency Plan in line with Adept guidance.
F. Will development require a flood risk permit / watercourse consent?
Yes, the site is within 16m of a Tidal River.
G. Can the site pass the Exception Test?
• A small area of the site is located within Flood Zone 3b therefore 'More Vulnerable' development is not permitted in the area within this Flood Zone. • The site is located within Flood Zone 3a and the proposed vulnerability classification is 'More Vulnerable', therefore the Exception Test is required.

