

Woolwich Dockyard and Former Dry Docks

Summary Information	
Site Reference	P4-W1
Address	Land bound by Woolwich Church Street, the Thames Path, Mast Quay and Antelope Road, Woolwich
Area (ha)	10.24
Current Use	Residential and community uses, as well as the former Woolwich Dry Docks and green space.
Current Vulnerability	More Vulnerable
Proposed Use	Residential led mixed use development with commercial units and community uses at ground floor.
Proposed Vulnerability	More Vulnerable

Current Risk Summary					
Fluvial / Tidal			Groundwater		
FZ2	10.77	% of site	Limited potential for flooding to occur	89.39	% of site
FZ3a	30.82	% of site	Potential for flooding of properties below ground level	10.61	% of site
FZ3b	12.10	% of site	Potential for flooding to occur at surface	0.00	% of site
Surface Water			Sewer Flooding		
High	4.75	% of site	Number of incidents within the predominant postcode	40+	
Medium	8.41	% of site	Is the site located within the Thamesmead area?	No	
Low	18.33	% 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. There is a flood defence which runs through the northern section of the site.			The EA Flood Warning Service is available at this 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 along the northern boundary of the site. - During the 1 in 200 year (2005) Thames Downriver modelled event, tidal flood risk is concentrated across the northern, northeastern and northwestern sections of the site. - During the 1 in 1000 year (2005) Thames Downriver modelled event, tidal flood risk extends further south from the 1 in 200 year (2005) event extents. - During the 1 in 200 (2115) Thames Downriver modelled events, the extent of tidal risk increases to cover the northeastern section of the site. The extent also increases along the northern section of the site towards the central site areas. - During the 1 in 1000 year (2115) Thames Downriver modelled events, the extent of tidal risk covers the northeastern section of the site. The extent increases along the northern and northwestern sections further towards the central site areas.
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 and 4.4, 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. - Sea Level Allowances, provided by the EA, should be considered to inform flood resilient construction and design measures. - 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.
Climate Change Considerations
During the Thames Breach Downriver 1 in 200 year events, climate change is expected to increase the extent of tidal flood southwards, reaching Woolwich Church Street in the northeastern section of the site. The maximum depth increases from 1.16m to 2.05m, the maximum velocity increases from 1.18m/s to 2.56m/s, the maximum flood level increases from 5.97mAOD to 7.07mAOD and the maximum hazard increases from 2.21 to 4.60. During the Thames Breach Downriver 1 in 1000 year events, climate change is expected to increase the extent of tidal flood risk southwards, particularly in the northeastern section of the site. The maximum depth increases from 1.49m to 2.40m, the maximum velocity increases from 1.62m/s to 2.91m/s, the maximum flood level increases from 6.37mAOD to 7.42mAOD and the maximum hazard increases from 3.01 to 5.62.



Risk Assessment (Tidal – Thames Breach Downriver 2018)					
Parameter	2005_0200	2005_1000	2115_0200	2115_1000	Units
Max. Depth	1.16	1.49	2.05	2.40	m
Max. Velocity	1.18	1.62	2.56	2.91	m/s
Max Flood Level	5.97	6.37	7.07	7.42	m AOD
Max Ground Level	15.16	15.16	15.16	15.16	m AOD
Min Ground Level	2.30	2.30	2.30	2.30	m AOD
Max Flood Hazard	2.21	3.01	4.60	5.62	N/A

1.2 Surface Water

Description of Flood Mechanism	
Surface water flood risk is more prevalent in the northern section of the site, however in more localised areas, including the areas around Spindle Close, Resolution Walk and Maud Cashmore Way, which all have areas of high risk present. In the southern section of the site, surface water risk is predominantly located to the west, which also contains areas of high risk.	
Mitigation – Flood Risk Requirements	Mitigation – Surface Water Drainage
Development should be directed away from the higher risk areas in the northern section of the site, which includes areas around Spindle Close, Resolution Walk, and Maud Cashmore Way. For the southern section of the site below Woolwich Church Street, development should be directed away from part of the western section of the site where there is higher surface water risk. Development should comply with SFRA - Level 2 Report Section 4 mitigation requirement numbers 4.3 and 4.9.	See SFRA Level 2 Report mitigation requirement 5.0 for further development stipulations. 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 events, the extent increases around the pre-existing areas of high surface water flood risk in both the northern and southern sections of the site, there is one new area of high risk in the northwestern area of the site. The maximum depth, velocity and hazard remain unchanged.

During the medium risk events, the extent increases around the pre-existing areas of medium surface water risk, with some new areas of medium risk in the northwestern area of the site. The maximum depth, velocity and hazard remain unchanged.

During the low risk events, the extent expands around the pre-existing areas of low surface water risk, with additional areas at risk in the northeastern, southeastern and southwestern corners of the site, with a particular increase along Frances Street. The maximum depth, velocity, and hazard remain unchanged.

Risk Assessment				
Parameter	High	Medium	Low	Units
Max. Depth	0.6	0.6	1.2	m
Max. Velocity	1.0	1.0	2.0	m/s
Max. Hazard	1.25	1.25	1.25	N/A

Risk Assessment – with Climate Change				
Parameter	High	Medium	Low	Units
Max. Depth	0.6	0.6	1.2	m
Max. Velocity	1.0	1.0	2.0	m/s
Max. Hazard	1.25	1.25	1.25	N/A

1.3 Sewer

Risk Assessment	Mitigation Requirements
The site falls within a postcode area where there are 40+ reported flood incidents from sewer flooding. The site is assumed to be served by separate combined, surface water, and foul sewer networks, 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
The site has limited potential for groundwater flooding to occur over the majority of the site. There is a potential for flooding of properties below ground level along the northeastern boundary of the site.	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.
The site is underlain by the White Chalk Subgroup bedrock geology in the northern section of the site, and the Thanet Sand Formation in the southern section. There is no information on the superficial deposits within the site.	If there is a potential level of impact, mitigation actions must be proposed. This must be prepared by a chartered professional or specialist.

1.5 Artificial

Risk Assessment	Mitigation Requirements
This site is at risk of flooding from the Banbury, King George V and William Girling reservoirs on a dry day. On a wet day, the site is at risk of flooding from the Banbury, High Maynard, King George V, Lockwood, Queen Elizabeth II, Walthamstow No.4, Walthamstow No.5, William Girling, and Wraysbury reservoirs. The reservoir extent map predicts that if any of these reservoirs breach on the respective dry or wet day, the northern section of 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?
- Surface water flood risk extent is expected to increase in a climate change scenario. However the maximum depth, velocity and hazard remain unchanged in all risk events in a climate change scenario. - Climate change is expected to increase the extent of tidal flood risk in the Downriver modelled scenarios, which extends southwards towards Woolwich Church Street, particularly in the northeastern section of the site. The maximum depth, velocity, flood level and hazard increase in a climate change scenario.



	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 and 4.9 and 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 not changing from 'More Vulnerable'. - The site has a mix of permeable and impermeable areas throughout the site. Permeable areas are generally confined to grassed areas throughout the site between buildings and along parts of the site boundary. - 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 central and southeastern areas of the site, where surface water flood risk is lower and less extensive. - 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 requirement 4.4.
E.	Which safe access and egress routes are recommended?
	- Safe access and egress should be directed towards Leda Road and Woolwich Church Street for the northern section of the site where there is limited risk of surface water flooding and less tidal flood risk. - For the southern section of the site, safe access and egress should be directed towards Lord Warwick Street and Samuel Street where there is less surface water flood risk.
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?



- An area in the northern section 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 also located within Flood Zone 3a and the proposed vulnerability classification is 'More Vulnerable', therefore the Exception Test is required.

