Greenwich Quay

Summary Information	
Site Reference	P1-GBW4
Address	Clarence Road, SE8 3EY
Area (ha)	0.29
Current Use	Three part 3 and 4 storey brick buildings. These buildings are existing offices (with many of these spaces vacant) and residential uses (through conversion from the original office use via permitted development rights).
Current Vulnerability	More Vulnerable
Proposed Use	Residential and commercial uses.
Proposed Vulnerability	More Vulnerable

Current Risk Summary					
Fluvial / Tidal			Groundwater		
FZ2	1.98	% of site	Limited potential for flooding to occur	N/A	% of site
FZ3a	97.11	% of site	Potential for flooding of properties below ground level	N/A	% of site
FZ3b	0.12	% of site	Potential for flooding to occur at surface	N/A	% of site
Surface Water			Sewer Flooding		
High	4.89	% of site	Number of incidents within the predominant postcode	N/D	
Medium	6.79	% of site	Is the site located within the Thamesmead area?	No	
Low	15.47	% 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 are flood defences along the northern and eastern boundaries of the site.			The EA Flood Warning Service is available at the site.		

See webmap supporting assessment: Greenwich - Level 1 and 2 SFRA

1.1 Fluvial

Description of Flood Mechanism
• The site is at risk from fluvial flooding from the River Ravensbourne, which flows northward, immediately adjacent to the eastern boundary of the site and westward, immediately adjacent to the northern boundary of the site. • During the 1 in 30 year and 1 in 100 year events, fluvial flood risk is concentrated in a small area along the northern boundary of the site. • During the 1 in 100 year plus climate change event, fluvial flood risk is further extended along the northern boundary of the site. • During the undefended 1 in 100 year plus climate change event, fluvial flood risk is concentrated in a small area in the northwestern area of the site which encoraches on the existing building curtilage.
Mitigation / FRA Requirements
• Only water compatible or essential uses (subject to the Exception Test) are permitted in FZ3b, along the northern boundary of the site. • Self-contained basement dwellings and bedrooms are not permitted in FZ3a, along the northern boundary of the site. See SFRA Level 2 Report mitigation requirement numbers 4.7 and 4.8 for additional basement stipulations. • 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 4.1, 4.2, 4.3, 4.5 and 4.9, Policies E2 and E3 of the existing Greenwich Local Plan, and Policy EN6 of the draft Local Plan for further development stipulations. • Future defence raisings are 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. • Develop a Flood Risk Emergency Plan for the site. • Site users should be signed up to the EA's Flood Warning Service.
Climate Change Considerations
Climate change is expected to increase the extent of fluvial flood risk along the northern boundary of the site. The maximum depth increases from 1.12m to 1.34m, the maximum velocity increases from 0.05m/s to 0.06m/s, the maximum flood level increases from 3.98mAOD to 4.61mAOD and the maximum hazard increases from 1.41 to 1.70.

Risk Assessment (Fluvial) – Ravensbourne 2025				
Parameter	FZ3b	FZ3a	*FZ3a+CC	Units
Max. Depth	1.12	1.12	1.52	m
Max. Velocity	0.05	0.05	0.06	m/s
Max Flood Level	3.96	3.98	4.61	m AOD

Max Ground Level	6.30	6.30	6.30	m AOD
Min Ground Level	4.05	4.05	4.05	m AOD
Max Flood Hazard	1.39	1.41	1.70	N/A

1.2 Tidal

Description of Flood Mechanism
• The site is at risk of tidal breach flooding from the River Thames which is located approximately 170m north of the site. • During the 2005 Thames Upriver modelled event, tidal flood risk is concentrated in the northwestern and southwestern areas of the site. • During the 2100 Thames Upriver modelled event, the site is almost entirely inundated with the exception of small areas along the northern boundary 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 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. • The development should allow for safe, dry access to high ground as the extent of inundation in the 2100 event covers the majority of the site. • Future defence raisings are 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
Climate change is expected to increase the extent of tidal flood risk to inundate almost all of the site with the exception of small areas along the northern boundary of the site. The maximum depth increases from 0.31m to 1.24m, the maximum velocity increases from 0.81m/s to 1.99m/s, the maximum flood level increases from 4.71mAOD to 5.69mAOD and the maximum hazard increases from 1.22 to 2.98.

Risk Assessment (Tidal – Thames Breach Upriver 2017)			
Parameter	2005	2100	Units
Max. Depth	0.31	1.24	m
Max. Velocity	0.81	1.99	m/s

Max Flood Level	4.71	5.69	m AOD
Max Ground Level	6.30	6.30	m AOD
Min Ground Level	4.05	4.05	m AOD
Max Flood Hazard	1.22	2.98	N/A

1.3 Surface Water

Description of Flood Mechanism	
Surface water flooding is concentrated toward the central area of the site, which includes an area of high risk.	
Mitigation – Flood Risk Requirements	Mitigation – Surface Water Drainage
Development should be directed away from the central area of the site which is at higher risk of surface water flooding. 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 extends outwards from the central area, mainly towards the north and west. The maximum depth, velocity and hazard remain the same. During the medium risk events, the extent extends outwards from the central area, in all directions, with a new area of medium risk forming in the eastern area of the site. However, the maximum depth, velocity and hazard remain the same. During the low risk events, the extent increases around the central area. The maximum depth and hazard remain the same. The maximum velocity increases from 0m/s to 0.25m/s.	

Risk Assessment				
Parameter	High	Medium	Low	Units
Max. Depth	<0.2	0.2	0.2	m
Max. Velocity	0.0	0.25	0.0	m/s
Max. Hazard	0.5	0.5	0.5	N/A

Risk Assessment – with Climate Change				
Parameter	High	Medium	Low	Units
Max. Depth	<0.2	0.2	0.2	m
Max. Velocity	0	0.25	0.25	m/s
Max. Hazard	0.5	0.5	0.5	N/A

1.4 Sewer

Risk Assessment	Mitigation Requirements
The site falls within a postcode area where there is no data available regarding reported flood incidents from sewer flooding at the time this report was written. The site is assumed to be served by a foul sewer network, given its 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.

1.5 Groundwater

Risk Assessment	Mitigation Requirements
There is no information regarding the potential for groundwater flood risk to the site. The site is underlain by Lambeth Group bedrock geology. There is no information regarding the underlying superifical geology.	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.

1.6 Artificial

Risk Assessment	Mitigation Requirements
This site is at risk of flooding from the Banbury, King George V, Lockwood, Queen Elizabeth II, Queen Mary, South Norwood, Sutcliffe Park Flood Detention Area, William Girling, Weigall Road Flood Storage Area 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.

1.7 Planning Considerations – Safety of Development

A. Can the development be future proofed for climate change considerations?
• Climate change is expected to slightly increase the extent of fluvial flood risk onsite. The maximum fluvial flood depth, velocity, flood level and hazard increase. • Climate change is expected to increase the extent of tidal flood risk onsite to where it is almost fully inundated. The maximum depth, velocity, flood level and hazard increase. • Surface water flood risk extent is expected to increase during all events due to climate change. During the low risk events, the maximum velocity increases. • 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, 4.2, 4.3, 4.5, 4.7, 4.8, 4.9 and 5.0 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 is largely impermeable with some permeable areas in the western, southern and eastern areas of the site.

• Development must mitigate any increase in impermeable area to the site with flood plain compensation and 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 southern and eastern areas of the site where there is less risk of fluvial and 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 4.2 and 4.4.
E. Which safe access and egress routes are recommended?
• Safe access and egress routes should be directed towards Creek Road 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 8m of a Main 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.