

Thames Water Sewage Pumping Site

Summary Information	
Site Reference	P1-GBW8
Address	Greenwich Pumping Station
Area (ha)	0.31
Current Use	A mix of operational buildings, driveway access, green space and carparking area.
Current Vulnerability	Essential Infrastructure
Proposed Use	Residential-led mix-use.
Proposed Vulnerability	More Vulnerable

Current Risk Summary					
Fluvial / Tidal			Groundwater		
FZ2	23.44	% of site	Limited potential for flooding to occur	100	% of site
FZ3a	76.56	% of site	Potential for flooding of properties below ground level	0.00	% of site
FZ3b	0.00	% of site	Potential for flooding to occur at surface	0.00	% of site
Surface Water			Sewer Flooding		
High	16.32	% of site	Number of incidents within the predominant postcode	40+	
Medium	16.71	% of site	Is the site located within the Thamesmead area?	No	
Low	21.62	% 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.		

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



1.1 Fluvial

Description of Flood Mechanism
- The site is at risk of fluvial flooding from the River Ravensbourne, which flows northward, approximately 60m northwest of the site. - During the 1 in 30 year event, the site is not impacted. - During the 1 in 100 year event, fluvial flood risk is concentrated in the western corner of the site. - During the 1 in 100 year plus climate change event, fluvial flood risk is concentrated in the western area of the site, extending further into the central area of the site than the 1 in 100 year event. - During the undefended 1 in 100 year plus climate change event, fluvial flood risk is concentrated in the western area of the site, extending further into the central area of the site than the 1 in 100 year plus climate change event.
Mitigation / FRA Requirements
- Self-contained basement dwellings and bedrooms are not permitted in FZ3a which covers the western area 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 4.2, 4.3 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. - 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 to further cover the western area of the site. The maximum flood depth increases from 0.45m to 0.87m, the maximum velocity increases from 0.16m/s to 0.32m/s, the maximum flood level increases from 3.83mAOD to 4.25mAOD and the maximum hazard increases from 1.23 to 1.44.

Risk Assessment (Fluvial)				
Parameter	FZ3b	FZ3a	*FZ3a+CC	Units
Max. Depth	0.00	0.45	0.87	m
Max. Velocity	0.00	0.16	0.32	m/s
Max Flood Level	0.00	3.83	4.25	m AOD
Max Ground Level	6.64	6.64	6.64	m AOD
Min Ground Level	3.33	3.33	3.33	m AOD
Max Flood Hazard	0.00	1.23	1.44	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 700m north of the site. - During the 2005 Thames Upriver modelled event, tidal flood risk is concentrated in the western area of the site. - During the 2100 Thames Upriver modelled event, the majority of the site is inundated with the exception of an isolated area across the eastern area 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 covers the majority of the site. - 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 the majority of the site with the exception of an isolated area across the eastern area of the site. The maximum flood depth increases from 1.39m to 2.36m, the maximum velocity increases from 0.87m/s to 1.11m/s, the maximum flood level increases from 4.77mAOD to 5.76mAOD and the maximum hazard increases from 1.71 to 2.54.

Risk Assessment (Tidal – Thames Breach Upriver 2017)			
Parameter	2005	2100	Units
Max. Depth	1.39	2.36	m
Max. Velocity	0.87	1.11	m/s
Max Flood Level	4.77	5.76	m AOD
Max Ground Level	6.64	6.64	m AOD
Min Ground Level	3.33	3.33	m AOD
Max Flood Hazard	1.71	2.54	N/A



1.3 Surface Water

Description of Flood Mechanism	
Surface water is concentrated in the western 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 western area of the site, and towards the eastern and central areas.	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 events, the extent extends slightly eastward from the pre-existing area of high risk. The maximum depth increases from 0.3m to 0.6m. The maximum velocity and hazard remain unchanged.	
During the medium risk events, the extent extends slightly eastward and northward from the pre-existing area of medium risk. The maximum velocity increases from 0.25m/s to 0.5m/s. The maximum depth and hazard remain unchanged.	
During the low risk events, the extent extends eastward from the pre-existing area of low risk and further along the onsite roadway. A new area of low risk forms along the southwesternmost boundary. The maximum depth, velocity and hazard remain unchanged.	

Risk Assessment				
Parameter	High	Medium	Low	Units
Max. Depth	0.3	0.6	0.6	m
Max. Velocity	0.5	0.25	1.0	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	0.6	m
Max. Velocity	0.5	0.5	1.0	m/s
Max. Hazard	1.25	1.25	1.25	N/A

1.4 Sewer

Risk Assessment	Mitigation Requirements
The site falls predominantly within a postcode area where there are 40+ reported flood incidents from sewer flooding. The southern section of the site falls within a postcode area where there are 20-30 reported flood incidents. The site is assumed to be served by separate combined 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.

1.5 Groundwater

Risk Assessment	Mitigation Requirements
The site has limited potential for groundwater flooding to occur. The site is underlain by Thanet Sand Formation bedrock geology. The superficial geology is Alluvium.	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, Lockwood, Queen Elizabeth II, South Norwood, Sutcliffe Park Flood Detention Area, Weigall Road Flood	Propose appropriate and proportionate risk management measures.



Storage Area, William Girling and Wraysbury reservoirs. The reservoir extent map predicts that if any of these reservoirs breach on a wet day, the site will be at risk of flooding.	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.
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1.7 Planning Considerations – Safety of Development

A. Can the development be future proofed for climate change considerations?	
- Climate change expected to increase the extent of fluvial flood risk. The maximum depth, velocity, flood level and hazard increase. - Climate change expected to increase the extent of tidal flood risk in the Upriver modelled scenario. The maximum depth, velocity, flood level and hazard increase. - Climate change expected to increase the extent of surface water flood risk across the site. The maximum depth increases in a high risk event and the maximum velocity increases in a medium risk event. - 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 4.2, 4.3, 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 changing from 'Essential Infrastructure' to 'More Vulnerable'. - The site is largely impermeable with small permeable areas in the eastern, central and southern 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 toward the eastern area 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 toward Greenwich High Road where there is less risk of fluvial and surface water flooding. • Given the risk of tidal breach flooding 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?
No, the site is not within 16m of a tidal River, 8m of a Main River or 5m of an Ordinary Watercourse.
G. Can the site pass the Exception Test?
The site is located within Flood Zone 3a and the proposed vulnerability classification is 'More Vulnerable', therefore the Exception Test is required.

