

## Greenwich Peninsula Central

| Summary Information    |                                                                                                                                                                                             |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Site Reference         | P2-GP3                                                                                                                                                                                      |
| Address                | Greenwich Peninsula                                                                                                                                                                         |
| Area (ha)              | 45.6                                                                                                                                                                                        |
| Current Use            | The site includes car parking areas, industrial land, and leisure uses. It also includes the Central Park, North Greenwich tube and bus station and the London Cable Car southern terminus. |
| Current Vulnerability  | Essential Infrastructure                                                                                                                                                                    |
| Proposed Use           | Residential-led mixed use.                                                                                                                                                                  |
| Proposed Vulnerability | More Vulnerable                                                                                                                                                                             |

| Current Risk Summary                                                                                                                            |       |           |                                                         |         |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------|---------------------------------------------------------|---------|-----------|
| Fluvial / Tidal                                                                                                                                 |       |           | Groundwater                                             |         |           |
| FZ2                                                                                                                                             | 2.26  | % of site | Limited potential for flooding to occur                 | 4.23    | % of site |
| FZ3a                                                                                                                                            | 94.67 | % of site | Potential for flooding of properties below ground level | 3.46    | % of site |
| FZ3b                                                                                                                                            | 0.37  | % of site | Potential for flooding to occur at surface              | N/A     | % of site |
| Surface Water                                                                                                                                   |       |           | Sewer Flooding                                          |         |           |
| High                                                                                                                                            | 4.37  | % of site | Number of incidents within the predominant postcode     | 20 - 30 |           |
| Medium                                                                                                                                          | 7.29  | % of site | Is the site located within the Thamesmead area?         | No      |           |
| Low                                                                                                                                             | 16.16 | % 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 western and northeastern boundaries of the site.                                                             |       |           |                                                         |         |           |

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



## 1.1 Tidal

| Description of Flood Mechanism                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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| <ul style="list-style-type: none"> <li>The site is at risk of tidal breach flooding from the River Thames which is located immediately adjacent to the east and west of the site.</li> <li>During the 2005 Thames Upriver modelled event, tidal flood risk is concentrated in the central, western and southern areas of the site as well as along a section of West Park Side.</li> <li>During the 2100 Thames Upriver modelled event, the 2005 extend extends westward to cover the majority of the northwestern area of the site and eastward to extend along West Park Side with a new area of risk along the eastern site boundary.</li> <li>During the 1 in 200 year (2005) Thames Downriver modelled event, tidal flood risk is concentrated along Tunnel Avenue and Blackwall Tunnel Approach in the western area of the site as well as in the southern area of the site.</li> <li>During the 1 in 1000 year (2005) Thames Downriver modelled event, the 1 in 200 year (2005) event extends further north up Tunnel Avenue and Blackwall Tunnel Approach with new areas of tidal flood risk in the central area of the site and along Millenium Way.</li> <li>During the 1 in 200 year (2115) Thames Downriver modelled event, tidal flood risk is concentrated in the central, western and southern areas of the site.</li> <li>During the 1 in 1000 year (2115) Thames Downriver modelled event, the 1 in 200 year (2115) modelled event extends slightly westward but mostly eastward into the eastern areas of the site.</li> </ul> |
| Mitigation / FRA Requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <ul style="list-style-type: none"> <li>A FRA must be submitted as part of a planning application.</li> <li>Include appropriate flood resistance or resilience measures to address predicted flood depths.</li> <li>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.</li> <li>Site users should be signed up to the EA's Flood Alert and Flood Warning Service.</li> <li>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.</li> <li>Sea Level Allowances, provided by the EA, should be considered to inform flood resilient construction and design measures.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Climate Change Considerations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p>Although the site is impacted by both the Thames Breach Upriver and Downriver modelled events, as the Downriver model indicates the highest depths, this model was assessed. Developers should consider both models.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |



During the 1 in 200 year events, climate change is expected to increase the extent of tidal flood risk further north up Tunnel Avenue and Blackwall Tunnel Approach with new areas of tidal flood risk in the central area of the site and along Millenium Way. The maximum depth increases from 6.78m to 8.36m, the maximum velocity increases from 1.19m/s to 4.13m/s, the maximum flood level increases from 2.41mAOD to 3.64mAOD and the maximum hazard increases from 4.39 to 7.23.

During the 1 in 1000 year events, climate change is expected to increase the extent of tidal flood risk to extend slightly westward but mostly eastward into the eastern areas of the site. The maximum depth increases from 7.51m to 8.86m, the maximum velocity increases from 3.05m/s to 4.33m/s, the maximum flood level increases from 2.85mAOD to 4.09mAOD and the maximum hazard increases from 4.76 to 7.81.

| Risk Assessment (Tidal – Thames Breach Downriver 2018) |           |           |           |           |       |
|--------------------------------------------------------|-----------|-----------|-----------|-----------|-------|
| Parameter                                              | 2005_0200 | 2005_1000 | 2115_0200 | 2115_1000 | Units |
| Max. Depth                                             | 6.78      | 7.51      | 8.36      | 8.86      | m     |
| Max. Velocity                                          | 1.19      | 3.05      | 4.13      | 4.33      | m/s   |
| Max Flood Level                                        | 2.41      | 2.85      | 3.64      | 4.09      | m AOD |
| Max Ground Level                                       | 9.12      | 9.12      | 9.12      | 9.12      | m AOD |
| Min Ground Level                                       | -4.84     | -4.84     | -4.84     | -4.84     | m AOD |
| Max Flood Hazard                                       | 4.39      | 4.76      | 7.23      | 7.81      | N/A   |

## 1.2 Surface Water

| Description of Flood Mechanism                                                                                                                                                    |                                                                                                                                                                                                           |
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| Surface water flood risk is spread in localised areas across the site, but is generally concentrated along roadways and within car parks where there are also areas of high risk. |                                                                                                                                                                                                           |
| Mitigation – Flood Risk Requirements                                                                                                                                              | Mitigation – Surface Water Drainage                                                                                                                                                                       |
| Development should be directed away from roadways and car parks, towards the eastern, western and some of the southern areas 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 events, there is limited change to the extents. However, new areas of high risk form in the northern area of the site, along Black Wall Tunnel Approach (southbound), to the west of North Greenwich Station, West Parkside and East Parkside, as well as in the eastern area of the site, within one of the existing building curtilages towards Pilot Walk, and in the central area of the site in Car Park 1. The maximum depth, velocity and hazard remain unchanged.

During the medium risk events, new areas of medium risk form in the northern area of the site, within North Greenwich Station, as well as in the eastern and western areas of the site, and within two of the existing building curtilages towards Pilot Walk. The maximum depth, velocity and hazard remain unchanged.

During the low risk events, existing extents extend along West Parkside, in the eastern area of the site, along Tunnel Avenue, and in the northwestern area 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                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>The site falls within a postcode area where there are 20 - 30 reported flood incidents from sewer flooding.</p> <p>The site is assumed to be served by surface water, combined and foul sewer networks, given their proximity to the site.</p> | <p>The applicant must consult with TWUL to confirm if the development site has historically flooded. TWUL must agree to any proposed sewer connections.</p> <p>If historic flooding has occurred, the applicant must demonstrate how this risk will be managed throughout the development's lifetime.</p> |



## 1.4 Groundwater

| Risk Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Mitigation Requirements                                                                                                                                                                                                                                                                                                                                                                                                      |
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| <p>The site has limited potential for groundwater flooding in the southeasternmost corner of the site and potential for groundwater flooding of property situated below ground level in the northeastern area of the site. There is no information available for the rest of the site.</p> <p>The site is underlain by a bedrock geology of London Clay Formation, for much of the site, with Lambeth Group in the southeasternmost area of the site. No information is available for the easternmost area of the site. The superficial geology is Alluvium in the southwestern area of the site, with no information available for the rest of the site.</p> | <p>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.</p> <p>If there is a potential level of impact, mitigation actions must be proposed.</p> <p>This must be prepared by a chartered professional or specialist.</p> |

## 1.5 Artificial

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



## 1.6 Planning Considerations – Safety of Development

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| A. Can the development be future proofed for climate change considerations?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <ul style="list-style-type: none"> <li>Climate change is expected to increase the extent of tidal flood risk onsite in both the Thames Tidal Breach Upriver and Downriver modelled scenarios. The maximum depth, velocity, flood level and hazard increase.</li> <li>Surface water flood risk extent is expected to increase during all events due to climate change. The maximum depth, velocity and hazard remain unchanged during all events.</li> <li>See SFRA - Level 2 Report Section 4 mitigation requirement number 4.4 for the required flood resistant / resilient building stipulations.</li> </ul>                                                                                                                      |
| B. Can the development be designed safe throughout its lifetime without increasing flood risk elsewhere?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <ul style="list-style-type: none"> <li>The development must use surface water drainage techniques to manage surface water runoff onsite through above ground SuDS and / or below ground attenuation.</li> <li>Green drainage infrastructure should be prioritised to provide wider ecological / biodiversity benefits as per London Plan Policy SI 13.</li> <li>See SFRA Level 2 Report mitigation requirement numbers 4.1, 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.</li> </ul>                                                                                                                                 |
| C. What is the cumulative impact of the development land use change and will flood risk increase?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <ul style="list-style-type: none"> <li>The development land use is changing from 'Essential Infrastructure' to 'More Vulnerable'.</li> <li>The site is mostly impermeable with some larger permeable areas in the northwestern and southeastern areas of the site, as well as smaller permeable areas in the central and southern areas of the site.</li> <li>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.</li> </ul>                                                                                              |
| D. How can the development reduce risk overall?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <ul style="list-style-type: none"> <li>Development should be directed towards the eastern, western and some of the southern areas of the site, where there is less risk of surface water flooding.</li> <li>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.</li> <li>By complying with SFRA - Level 2 Report Section 4 mitigation requirement 4.4.</li> </ul> |
| E. Which safe access and egress routes are recommended?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |



|                                                                                                                                                                                                                                                                                                                                                                              |                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Safe access and egress routes should be directed towards West Parkside, using the routes onsite where there is less risk of surface water flooding.</li> <li>• Given the risk of tidal breach flooding within the area, the applicant should provide a Flood Risk Emergency Plan in line with Adept guidance.</li> </ul>            |                                                                     |
| 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?                               |
| <ul style="list-style-type: none"> <li>• 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.</li> <li>• The site is located within Flood Zone 3a and the proposed vulnerability classification is 'More Vulnerable', therefore the Exception Test is required.</li> </ul> |                                                                     |

