

CITY AIRPORT DEVELOPMENT PROGRAMME  
(CADP1) S73 APPLICATION

# ENVIRONMENTAL STATEMENT

VOLUME 2: APPENDICES

DECEMBER 2022



# Pell Frischmann

City Airport Development  
Programme (CADP1) S73  
Application

Volume 2: Appendices  
Appendix 13.1 Flood Risk Assessment

December 2022

# LONDON CITY AIRPORT

## Flood Risk Assessment



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## REPORT

### Quality Management

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### Approval for issue

Jonathan Morley

14 October 2022

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## Appendices

Appendix A EA Detailed Flood Data



# 1 INTRODUCTION

- 1.1 RPS was commissioned to prepare a Flood Risk Assessment (FRA) to support a Section 73 'minor-material amendment' planning application at London City Airport ('the airport'). The application primarily seeks consent for an increase in the number of passengers from the currently permitted 6.5 million passengers per annum (mppa) to 9mppa and an extension to operating hours to allow flights on Saturday afternoons. Other minor consequential modifications will also be sought, including revision to the construction phasing plan and retention of the temporary facilities currently in operation at the airport. The application will not seek permission for a change in, or any new physical infrastructure and as such as a result of the proposed changes there will be no alteration to the previously proposed / agreed drainage strategy.
- 1.2 RPS previously prepared an FRA (ref. RCEF 17455-02R) to support the planning application for the City Airport Development Programme (CADP1) in 2013. This application was approved by the Secretaries of State for Communities and Local Government and Transport in July 2016. An addendum to this FRA was prepared by RPS in 2017 (HLEF50286/002R) to support the submission of a Section 73 application for variations to the original consent and approval was sought for minor material changes to terminal buildings and associated services. A Flood Management Plan was also produced by RPS in 2017 (reference no. HLEF59524001R).
- 1.3 Due the Flood Zone classification, the sites' proximity to the River Thames and the time lapsed since the previous FRA, an updated FRA has been produced to accompany the S73 application. The aim of the FRA is to outline the potential for the site to be impacted by flooding, the impacts of the proposed development on flooding in the vicinity of the site, and the proposed measures which could be incorporated into the development to mitigate the identified risk. The report has been produced in accordance with the guidance detailed in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance (PPG). Reference has also been made to the London Borough of Newham (LBN) Strategic Flood Risk Assessment (SFRA).
- 1.4 This report has been produced in consultation with the Environment Agency (EA) and the Lead Local Flood Authority (LLFA). The site is not located within an Internal Drainage Board (IDB) District.
- 1.5 The FRA has been undertaken by reference to information provided / published by the following bodies:
- Environment Agency (EA);
  - LBN;
  - British Geological Survey (BGS); and
  - Ordnance Survey (OS).

## 2 PLANNING POLICY CONTEXT

### National Planning Policy

- 2.1 The NPPF was released in March 2012 and was updated in July 2021. The document advises of the requirements for a site-specific FRA for any of the following cases (Planning and Flood Risk paragraph 167 (footnote 55)):
- All proposals (including minor development and change of use) located within the EA designated floodplain, recognised as either Flood Zone 2 (medium probability) or Flood Zone 3 (high probability);
  - All proposals of 1 hectare (ha) or greater in an area located in Flood Zone 1 (low probability);
  - All proposals within an area which has critical drainage problems (as notified to the Local Planning Authority by the EA);
  - Land identified in a strategic flood risk assessment as being at increased flood risk in future; and
  - Where proposed development may be subject to other sources of flooding, where its development would introduce a more vulnerable use.
- 2.2 Defra published their 'Non-statutory technical standards for sustainable drainage systems' in March 2015. These are supported by the revised NPPF.

### Regional Planning Policy

- 2.3 The London Plan was published in March 2021 and contains various policies pertaining to flood risk and drainage, of the most relevant of which are reproduced below.

#### **Policy G1 Green Infrastructure**

- A. London's network of green and open spaces, and green features in the built environment, should be protected and enhanced. Green infrastructure should be planned, designed and managed in an integrated way to achieve multiple benefits.*
- B. Boroughs should prepare green infrastructure strategies that identify opportunities for cross-borough collaboration, ensure green infrastructure is optimised and consider green infrastructure in an integrated way as part of a network consistent with Part A.*
- C. Development Plans and area-based strategies should use evidence, including green infrastructure strategies, to:*
  - 1. Identify key green infrastructure assets, their function and their potential function*
  - 2. Identify opportunities for addressing environmental and social challenges through strategic green infrastructure interventions.*
- D. Development proposals should incorporate appropriate elements of green infrastructure that are integrated into London's wider green infrastructure network.*

#### **Policy G5 Urban Greening**

- A. Major development proposals should contribute to the greening of London by including urban greening as a fundamental element of site and building design, and by incorporating measures such as high-quality landscaping (including trees), green roofs, green walls and nature-based sustainable drainage.*

- B. Boroughs should develop an Urban Greening Factor (UGF) to identify the appropriate amount of urban greening required in new developments. The UGF should be based on the factors set out in Table 8.2, but tailored to local circumstances. In the interim, the Mayor recommends a target score of 0.4 for developments that are predominately residential, and a target score of 0.3 for predominately commercial development (excluding B2 and B8 uses).*
- C. Existing green cover retained on site should count towards developments meeting the interim target scores set out in (B) based on the factors set out in Table 8.2.*

### **Policy SI12 Flood Risk Management**

- A. Current and expected flood risk from all sources (as defined in paragraph 9.2.12) across London should be managed in a sustainable and cost-effective way in collaboration with the Environment Agency, the Lead Local Flood Authorities, developers and infrastructure providers.*
- B. Development Plans should use the Mayor's Regional Flood Risk Appraisal and their Strategic Flood Risk Assessment as well as Local Flood Risk Management Strategies, where necessary, to identify areas where particular and cumulative flood risk issues exist and develop actions and policy approaches aimed at reducing these risks. Boroughs should co-operate and jointly address cross-boundary flood risk issues including with authorities outside London.*
- C. Development proposals should ensure that flood risk is minimised and mitigated, and that residual risk is addressed. This should include, where possible, making space for water and aiming for development to be set back from the banks of watercourses.*
- D. Development Plans and development proposals should contribute to the delivery of the measures set out in Thames Estuary 2100 Plan. The Mayor will work with the Environment Agency and relevant local planning authorities, including authorities outside London, to safeguard an appropriate location for a new Thames Barrier.*
- E. Development proposals for utility services should be designed to remain operational under flood conditions and buildings should be designed for quick recovery following a flood.*
- F. Development proposals adjacent to flood defences will be required to protect the integrity of flood defences and allow access for future maintenance and upgrading. Unless exceptional circumstances are demonstrated for not doing so, development proposals should be set back from flood defences to allow for any foreseeable future maintenance and upgrades in a sustainable and cost-effective way.*
- G. Natural flood management methods should be employed in development proposals due to their multiple benefits including increasing flood storage and creating recreational areas and habitat.*



## Local Planning Policy

2.4 The Newham Local Plan contains the following Policies relating to flood risk and drainage:

### ***‘Flood Risk and Drainage***

2.5 *Proposals that address the following strategic principles, spatial strategy and design and technical criteria will be supported:*

#### ***1. Strategic Principles:***

- a. Taking in to account all sources, flood risk (the likelihood of flooding plus the severity of its impacts) will be reduced. Development will not increase flood risk to any location;*
- b. Development and decision making will be informed by the Strategic Flood Risk Assessment (SFRA) and best available data;*
- c. Flood Risk Assessments will be provided in line with national requirements and should be prepared in accordance with SFRA and Environment Agency advice. Consultation and initial investigation should be commenced sufficiently early in the design and planning process so that all opportunities to reduce flood risk can be identified and maximised; and*
- d. There is a presumption against impermeable hard-standing on domestic gardens and public open space.*

#### ***2. Spatial Strategy:***

- a. Development will be located in areas with the lowest risk of flooding, demonstrated via passing of the Sequential Test and, if necessary, Exceptions Test. The sequential approach applies across the Borough and within sites, such that areas of lowest risk should be identified and prioritised according to vulnerability of proposed use; and*
- b. Development (including redevelopment of existing buildings and sites) will be set back 16m from tidal flood defences and 8m from river defences (see ‘Indicative TE2100 Flood Defence Buffering’ on the Policies Map); in instances where no formal defences are present, development will be set back 8m from the top of the river bank.*

#### ***3. Design and technical criteria:***

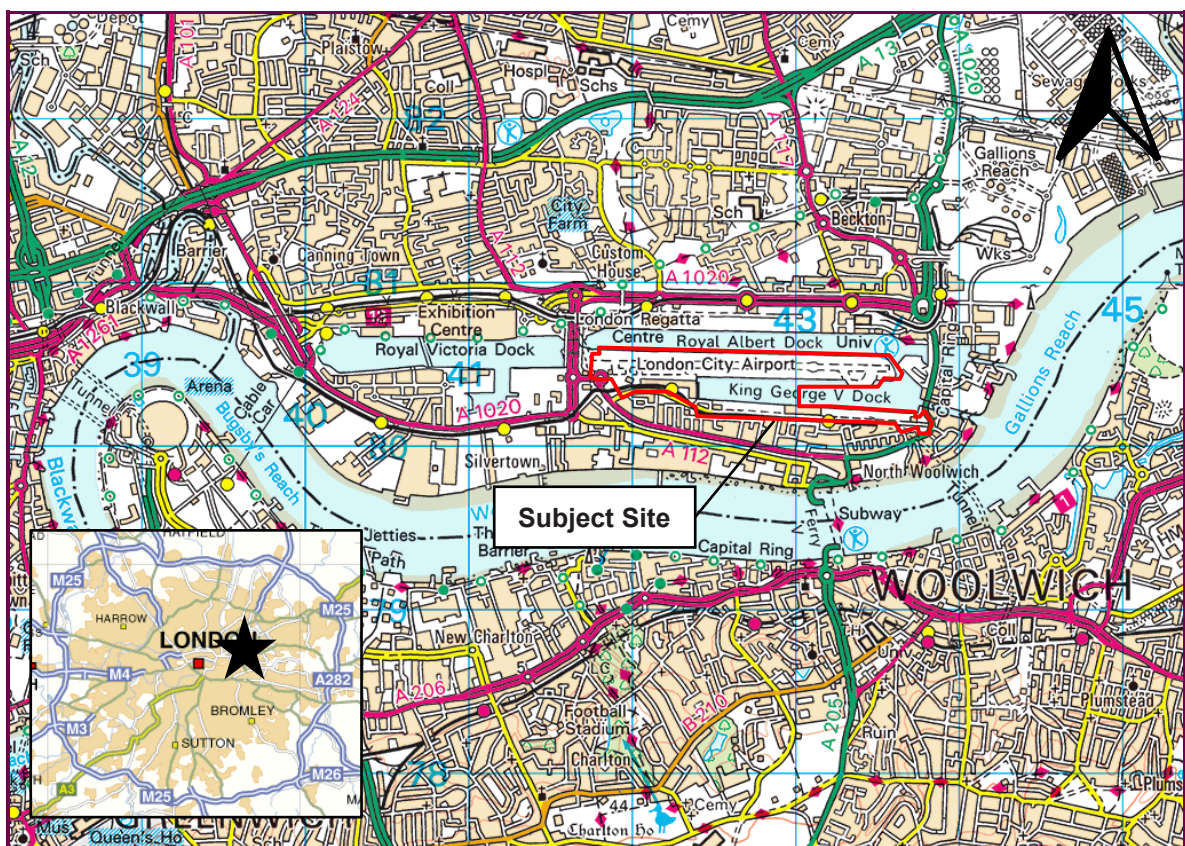
- a. Proposals adjacent to flood defences must confirm, through liaison with the Environment Agency, that defence structures are in good condition and will provide protection for the lifetime of the development with improvements made where necessary; this includes ensuring that the provisions of TE2100 can be met;*
- b. Development in Flood Zone 2 or 3 should:*
  - i. Create space for water;*
  - ii. Be designed and constructed to be flood resilient;*
  - iii. Locate vulnerable uses above ground floor level, whilst still delivering active, welcoming and functional street level design;*
  - iv. Ensure all basement locations provide internal access and egress via floors no less than 300mm above the 1% annual probability flood level + allowance for climate change, or above the 2100 tidal breach flood level where the site is within the Thames tidal breach flood extent;*
  - v. Ensure all ‘more vulnerable’, ‘highly vulnerable’ and ‘essential infrastructure’ uses have finished floor levels no less than 300mm above the 1% annual probability flood level + allowance for climate change; and*
  - vi. Provide safe access/egress, such that occupants can reach Flood Zone 1 via public rights of way’*

- 2.6 The LBN SFRA identifies and maps flood risk from all sources at a borough-wide scale as well as providing guidance on producing site specific FRAs. Relevant information from the SFRA has been referenced throughout this FRA report.

### 3 SITE DESCRIPTION AND PROPOSED DEVELOPMENT

#### Site Description and Surrounding Area

- 3.1 The site is located north of the River Thames in LBN at National Grid Reference TQ 41953 80412 and occupies an area of approximately 48.5 hectares (ha). The site location is presented in Figure 1.
- 3.2 The Airport is situated between the Royal Albert Dock to the north and the King George V (KGV) Dock to the south and is therefore surrounded by water on its northern, eastern and part of its southern boundary. The site is accessed from the south off Hartmann Road.



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**Figure 1. Site Location**

- 3.3 The site is currently occupied by London City Airport facilities and is permitted to serve 6.5mppa and 111,000 flights per annum.
- 3.4 The surrounding area comprises of a mix of residential, industrial and commercial uses. There is also a significant amount of planned development and regeneration in the vicinity of the Airport.
- 3.5 There are no designated sensitive areas (e.g. Special Area of Conservation (SAC), Special Protection Area (SPA) etc) within close proximity to the site. The Gilbert's Pit (Charlton) Site of Special Scientific Interest (SSSI) is located approximately 1.65 km south of the site.

#### Topography

- 3.6 Reference to topographic levels along the existing taxi lane (Airside), along the southern boundary of the taxi lane and adjacent to the dock edge are between 5.60 m AOD and 5.70 m AOD. The levels

raise up slightly from this point and then drop down to the runway, to between 4.80 m AOD and 5.00 m AOD.

- 3.7 Levels along the southern boundary of the dock (Landside) are shown to be typically between 5.40 m AOD and 5.70 m AOD and fall away to Hartmann Road to the south to 4.20 m AOD to 4.40 m AOD at the West Terminal Extension and Forecourt and between 5.20 m AOD and 5.50 m AOD along the southern boundary of the east development.

## **Planning Background**

- 3.8 The CADP1 planning application (13/01228/FUL) was granted planning permission by the Secretaries of State for Communities and Local Government and Transport in July 2016 following a planning inquiry. Planning permission was granted for the following development:

- a) Demolition of existing buildings and structures;*
- b) Works to provide 4 no. upgraded aircraft stands and 7 new aircraft parking stands;*
- c) The extension and modification of the existing airfield to include the creation of a taxiway running parallel to the eastern part of the runway and connecting with the existing holding point;*
- d) The creation of a vehicle access point over King George V dock for emergency vehicle access;*
- e) Laying out of replacement landside Forecourt area to include vehicle circulation, pick up and drop off areas and hard and soft landscaping;*
- f) The Eastern Extension to the existing Terminal building (including alteration works to the existing Terminal Building) to provide reconfigured and additional passenger facilities and circulation areas, landside and airside offices, immigration areas, security areas, landside and airside retail and catering areas, baggage handling facilities, storage and ancillary accommodation [Note: not including residential or sleeping facilities];*
- g) The construction of a 3 storey Passenger Pier to the east of the existing Terminal building to serve the proposed passenger parking stands;*
- h) Erection of a noise barrier at the eastern end of the proposed Pier;*
- i) Erection of a temporary noise barrier along part the southern boundary of the Application Site to the north of Woodman Street;*
- j) Western Extension and alterations to the existing Terminal to provide reconfigured additional passenger facilities and circulation areas, security areas, landside and airside offices, landside retail and catering areas and ancillary storage and accommodation ;*
- k) Western Energy Centre, storage, ancillary accommodation and landscaping to the west of the existing Terminal;*
- l) Temporary Facilitation works including erection of a noise reduction wall to the south of 3 aircraft stand, a Coaching Facility and the extension to the outbound baggage area;*
- m) Works to upgrade Hartmann Road;*
- n) Landside passenger and staff parking, car hire parking and associated facilities, taxi feeder park and ancillary and related work;*
- o) Eastern Energy Centre;*
- p) Dock Source Heat Exchange System and Fish Refugia within King George V Dock; and*
- q) Ancillary and related works”.*

- 3.9 The new aircraft stands, taxiway and other structures (i.e. most of the elements covered by items a to d above) have now been built. However, the remaining CADP1 works were put on hold in 2020 due to the outbreak of the Covid-19 pandemic and the adverse effect this had on the airport's business, flights and passenger numbers.

### Proposed Application

- 3.10 A 'minor-material amendment' planning application (Section 73 application) is being submitted to LBN to vary some of the planning conditions attached to the CADP1 planning permission. These amendments seek permission for:
- An increase in the number of passengers able to use the airport each year, from 6.5 million currently permitted to 9 million per year (expected to be achieved by around 2031).
  - An extension of operational hours on Saturday to allow flights to take place through the afternoon up to 18:00 hrs, and more aircraft to be permitted in the early morning weekday period (6:30 to 7:00), but only for cleaner, quieter, new generation aircraft.
  - Consequential modifications to daily and other limits on flights.
  - A change in the location and dimensions of already permitted) aircraft stands to allow for the wider wingspan of new generation aircraft.
- 3.11 The S 73 application will not seek permission for any new physical infrastructure or changes to the consented buildings and infrastructure. Therefore, the existing drainage system will remain as previously proposed / agreed, and no additional attenuation is required. Therefore, there is no further consideration of drainage or SuDS within this report.



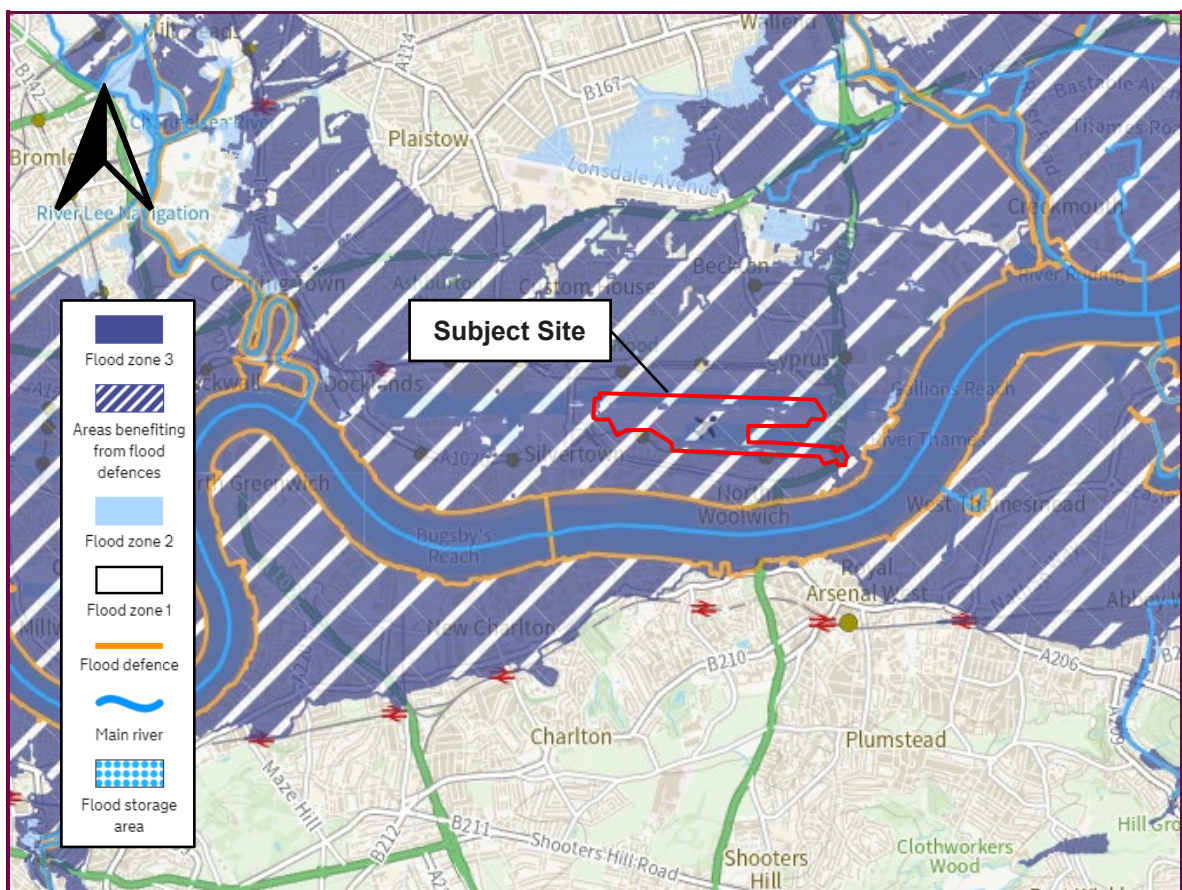
## 4 HYDROLOGICAL SETTING

### Nearby Watercourses

- 4.1 The nearest surface water features to London City Airport are KGV Dock located directly to the south and the Royal Albert Dock located directly to the north. KGV Dock joins the River Thames at Gallions Reach via a lock system located at the eastern end of the dock.
- 4.2 The Woolwich Reach of the River Thames is located approximately 460 m south of the site.

### Fluvial / Tidal Flood Risk Classification

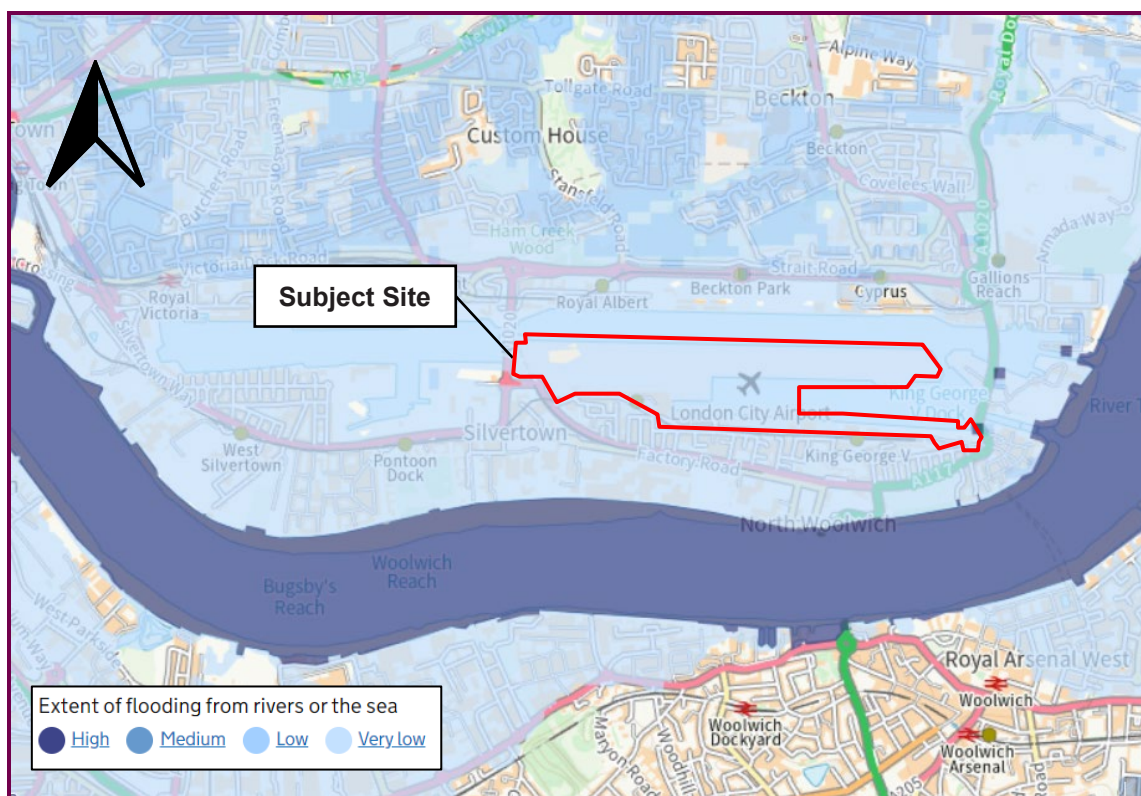
- 4.3 The EA Flood Map for Planning, which is available online, indicates that the site is located within Flood Zone 3 and an area that benefits from flood defences. Land and property in this flood zone would have a high probability of flooding without the local flood defences. These protect the area against a river flood with a 1 in 100 (1%) annual probability, or a flood from the sea with a 1 in 200 (0.5%) annual probability. EA Flood Map for Planning is provided in Figure 2 below.



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**Figure 2. EA Flood Map for Planning**

- 4.4 The EA Flood Map for Rivers and the Sea, which takes the presence of flood defences into account, identifies that the site has 'low' risk of flooding. This corresponds with an annual risk of flooding that is between 1 in 1,000 and 1 in 100 (1%). The EA Flood Map for Rivers and the Sea is provided in Figure 3.



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**Figure 3. EA Flood Map for Rivers and the Sea**

4.5

The EA was consulted for additional information relating to the fluvial/tidal flood risk to the site. They provided data derived from the Thames Estuary 2100 Study completed by HR Wallingford in 2008. A full consultation response is provided in Appendix A, together with site-specific flood maps from both the Upriver and Downriver modelling studies. Key information of relevance to this assessment is summarised below:

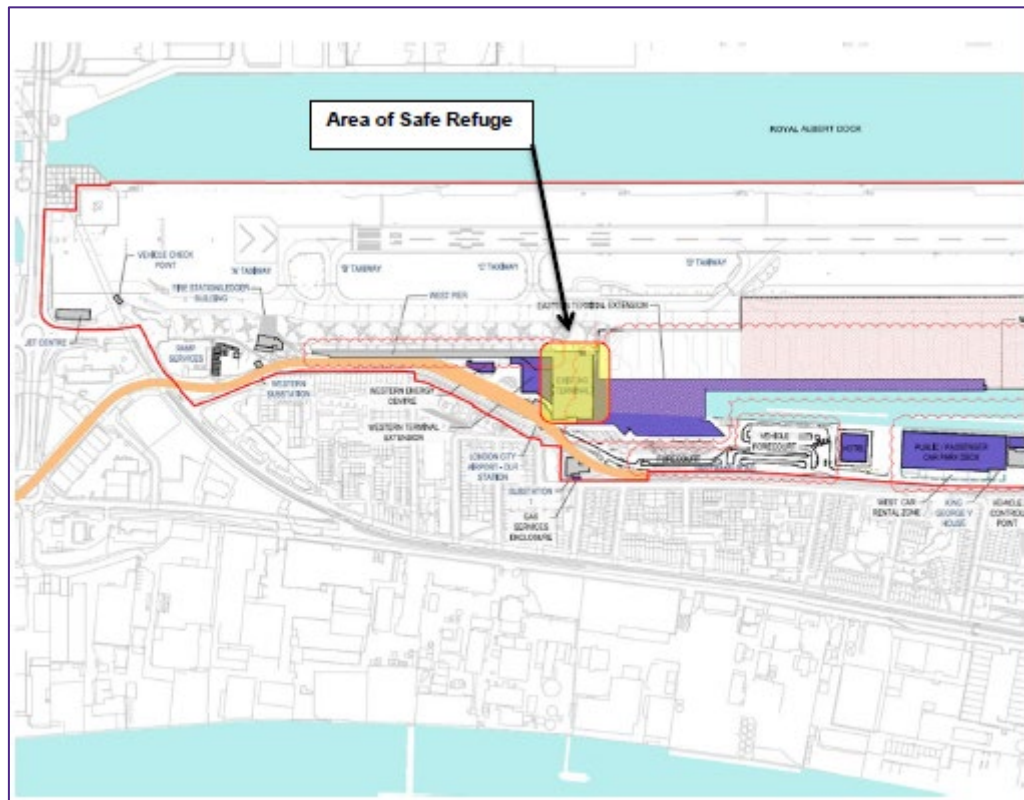
- The provided Flood Map at this location has been derived using detailed modelling of the tidal River Thames through the Thames Tidal Defences Study completed in 2006 by Halcrow Ltd for the upstream nodes, and the North Kent Coastal Modelling study completed in 2013 by JBA Consulting for the downstream nodes. The Flood Map confirms that this site lies within Flood Zone 3 - with a 0.5% chance of flooding from the Thames (tidal Thames flooding) in any given year;
- The 1928 historic flood outline does not encroach the site boundary;
- The design standard of protection of the flood defences in this area are designed to defend London up to a 1 in 1000-year tidal flood event. The defences are all raised, man-made and privately owned. They are maintained to a crest level of 7.2m m AODN (the Statutory Flood Defence Level in this reach of the Thames and at a current condition grade of 2 (good), on a scale of 1 (very good) to 5 (very poor);
- The site benefits from significant primary flood defences which include the Thames Barrier and King George V gates;
- In-channel flood levels for node points along the Gallions Reach and Woolwich Reach of the River Thames have been taken from the Thames Estuary 2100 study completed by HR Wallingford in 2008. The closest node to the site is node 3.3. The modelled flood levels are shown in Table 1 below:

Table 1. TE2100 Climate Change levels

Node	Thames Left Bank Defence Level		1000-year design River Thames water Level					
	Present Day Statutory Defence Level	Future (2100) defence raising to a level of...	2000	2040	2070	2100	2120	2170
a3.1	7.20	8.80	6.04	6.25	6.44	6.76	6.97	7.49
3.2			6.03	6.24	6.44	6.75	6.96	7.49
3.3			6.02	6.23	6.42	6.74	6.95	7.49
3.4			6.01	6.22	6.42	6.74	6.95	7.48

- The EA's Thames Tidal Downriver Breach Inundation Modelling Study 2018 was completed for the present day and the 2115 epoch.
  - During the modelled 1 in 200-year event, the present-day breach inundation extends east from King George V Dock and the remainder of the site is left unaffected. The 2115 extent extends south from the Gallions Lock and inundates the central portion of the site with flood depths mainly below 250mm. Flood levels would reach a maximum of 5.11m AOD;
  - During the modelled 1 in 1,000-year event inundation, slightly more of the site is affected. The present-day breach inundation extends east from King George V Dock with the remainder of the site unaffected. The 2115 extent extends south from the Gallions Lock and inundates the central portion of the site. During this event, flood depths would increase, in some areas ranging from 250mm to 1m. Maximum flood level at the site would reach 5.40m AOD.
- The EA's Thames Tidal Upriver Breach Inundation Modelling Study 2017 was completed for the 2005 epoch and the 2100 epoch. The 2005 epoch is a representation of today's flood levels without climate change considerations taken into account, whereas the 2100 epoch takes into account changes likely to be seen due to climate change. For breaches upriver of the Thames Barrier, there is no return period for modelled levels as the levels are controlled by barrier's closures. The levels used are referred to as Maximum Likely Water Levels (MLWLs). Therefore, 2005 and 2110 epochs were modelled on this basis.
  - During the 2005 breach inundation, the majority of the site will remain unaffected. Only a very small linear area along the south-west boundary would be impacted by flooding with shallow flood depths.
  - During the modelled 2110 epoch event, the flood extent slightly extends in the east direction. The maximum flood level recorded in this area would reach 3.20m AOD. The majority of the site is however left unaffected.
- The existing terminal building, identified as an area of safe refuge for the original application, will remain dry during all modelled flood events, as shown in the site-specific maps in Appendix A. The structural slab level is set at 5.5m AOD with the ground floor set at 5.57m AOD. The location of the safe refuge is shown in the Figure 4 below.





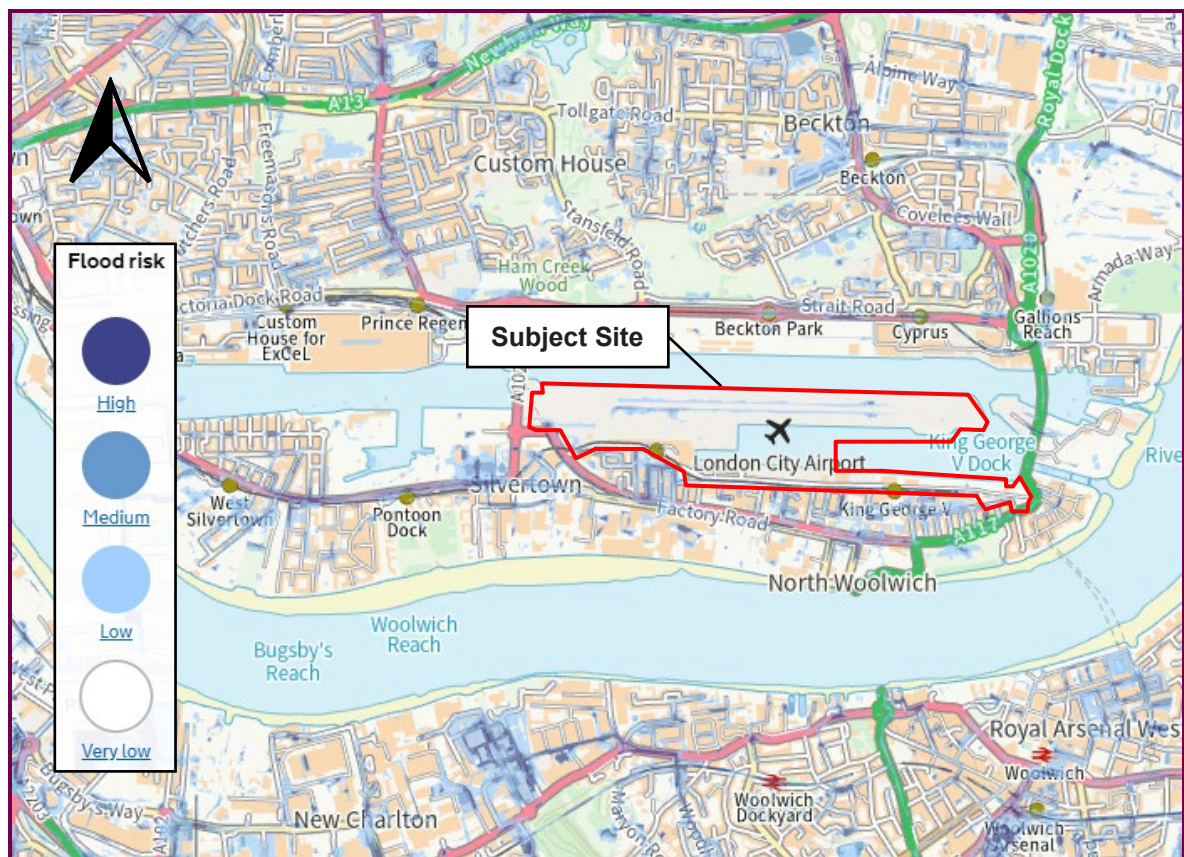
**Figure 4 - Safe Refuge Location Map**

### EA Flood Warning Area

- 4.6 The EA defines a Flood Warning Area as “geographical areas where we expect flooding to occur and where we provide a Flood Warning Service. They generally contain properties that are expected to flood from rivers or the sea and in some areas, from groundwater.”
- 4.7 The site is partially located in the Flood Warning Area “Tidal Thames at Beckton”.

### Surface Water Flood Risk Classification

- 4.8 Surface water flooding can occur during intense rainfall events, when water cannot soak into the ground or enter drainage systems.
- 4.9 The EA’s updated Flood Map for Surface Water, which is available online, indicates that the site predominately has ‘very low’ risk of surface water flooding. This corresponds with an annual probability of flooding that is less than 1 in 1,000 (0.1%). There are linear areas of mixed ‘medium’ and ‘low’ surface water flood risk in the centre of the site, with limited parts of the airfield (along the edges of the runway) indicated to have a ‘medium’ risk of surface water flooding. ‘Medium’ risk corresponds to an annual probability that is between 1 in 30 and 1 in 100 (1%). ‘Low’ risk corresponds to an annual probability that is between 1 in 100 and 1 in 1,000. The updated Flood Map for Surface Water is presented in Figure 5.



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**Figure 5. Updated Flood Map for Surface Water**

- 4.10 During both a 'low' risk and 'medium' risk event, flood depths are generally indicated to be shallow, remaining below 300 mm and at a velocity less than 0.25 m/s) and relate to areas which do not significantly impact site operations.
- 4.11 The effects of flooding on the airfield in the event of severe rainfall can therefore be considered negligible and surface water flooding is not considered further in this assessment.

### Reservoir Flood Risk Classification

- 4.12 EA mapping also indicates that the site is located within an area potentially at risk from reservoir flooding when there is also fluvial flooding. Figure 5 below shows the EA Flood Map for Reservoirs.
- 4.13 However, it should be noted that the operation of reservoirs is strictly managed. Legislation has been in place since the 1930s when a dam failure last resulted in a loss of life. This early legislation was updated by the Reservoirs Act 1975.
- 4.14 As with any urban location, there is the risk of a break in a water main causing localised flooding at the site. However, the risk at this location is no greater than at any other location served by water mains.
- 4.15 Based on the information above, the risk associated with flooding from reservoirs is considered to be low and is therefore not considered further in this assessment.

### Flood Risk from Sewers

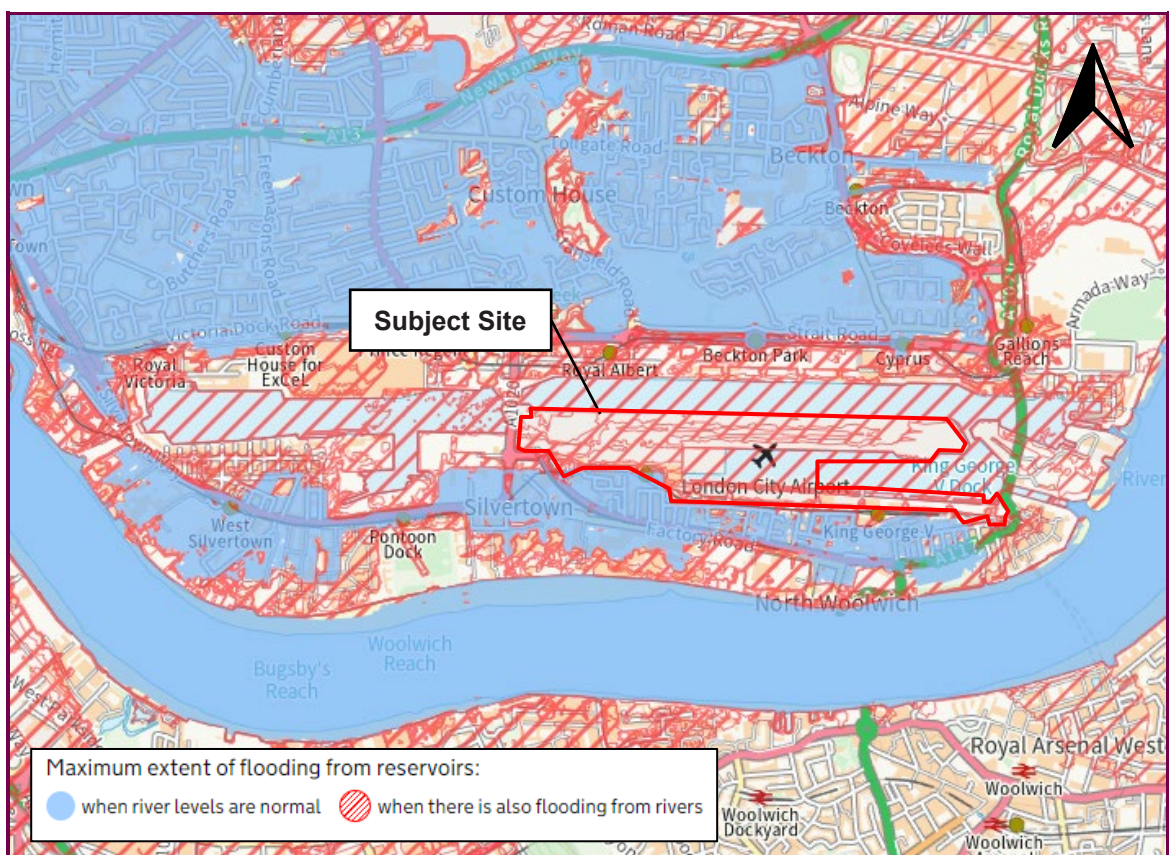
- 4.16 Sewer flooding can occur during periods of heavy rainfall when a sewer becomes blocked or is of inadequate capacity.



- 4.17 The site location is associated with 0 to 3 internal sewer flooding incidents and no external sewer flooding incidents.
- 4.18 The site is therefore considered to be at low risk of sewer flooding and this is not considered further in this report.

## Groundwater Flooding

- 4.19 This can occur in low-lying areas when groundwater levels rise above surface levels, or within underground structures.
- 4.20 The SFRA shows that the site has potential for groundwater flooding of property situated below ground level. As the site comprises no basement development, the groundwater flood risk can be considered significantly reduced.



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**Figure 6. EA Flood Map for Reservoir Flooding**

## Local Authority Flood Risk Assessment

- 4.21 The LBN SFRA was published in November 2017. It provides an overview of flood risk from various sources within the Borough. The SFRA confirms much of the baseline information provided in the preceding paragraphs, that being:
- The site is identified on Flood Zone 3a and an area benefitting from flood defences;
  - Breach mapping identifies that the site is affected by the 1 in 200 year event and 1 in 1000 year event;

- The historic flood map identifies the site has not been historically inundated;
- The 'Tidal Thames from Beckton Sewerage Works to the River Lee' flood warning area encompasses the site;
- The site is associated with 0 to 3 internal sewer flooding incidents and no external sewer flooding incidents;
- The superficial geology at the site is classified as Alluvium;
- The site has potential for groundwater flooding of property situated below ground level;
- The site is not identified to be affected by residual reservoir flooding.

## 5 HYDROGEOLOGICAL SETTING

- 5.1 Reference to the BGS online mapping indicates that the Airport is underlain by superficial Alluvium, comprising clay, silt, sand and peat. The bedrock changes across the site. The Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation underly the east of the site. The Thanet Formation comprising sand is present under the centre of the site. The Lambeth Group comprising clay, silt and sand underly the west of the site.
- 5.2 The soils are described as 'loamy and clayey soils of coastal flats with naturally high groundwater' by the National Soils Research Institute.
- 5.3 According to the EA's Aquifer Designation Mapping, the strata at the surface are classified as a Secondary (undifferentiated) Aquifer. These formations have varying characteristics in different locations. The bedrock in the west and the centre of the site is classified as Secondary A Aquifers. These formations are formed of permeable layers capable of supporting water supplies at a local scale, in some cases forming an important source of base flow to rivers. The bedrock in the east of the site (The Thanet Formation) is classified as a Principal Aquifer, which provides a high level of water storage and may support water supply and / or river base flow on a strategic scale.
- 5.4 EA online groundwater Source Protection Zone (SPZ) mapping indicates that the site is not located within a groundwater SPZ.

## 6 FLOOD RISK AND MITIGATION

### Fluvial / Tidal Flooding

- 6.1 As discussed above, the site is located in Flood Zone 3. At this location, the River Thames is not considered to be influenced by fluvial sources, and therefore tidal flooding can be considered the dominate flood risk at this site.
- 6.2 The EA provided data obtained from the Thames Estuary 2100 study. The information indicates that predicted flood levels closest to the site (node 3.3) remain below the present-day Statutory Defence Level up until the year 2120 scenario.
- 6.3 Thames Tidal Defences have a 1 in 1,000-year standard of protection. The tidal flood risk to the site is therefore residual only, associated with a breach of the defences. The defences are maintained to a crest level of 7.2m m AODN and at a current condition grade of 2 (good).
- 6.4 The EA has provided mapping of a breach of the defences for the present day and future scenarios (taking into account climate change). Mapping identifies that the site is affected by the 1 in 200-year event and 1 in 1000-year event. As no external alterations, new buildings or new areas of impermeable hardstanding are proposed as part of this planning application, the tidal flood risk is not considered to have materially changed since the submission of the 2017 FRA Addendum.
- 6.5 The previous FRA (Reference: RCEF17455-002-R, July 2013) notes that the KGV dock gate to the east of the site was considered to be the weakest point on the defence line. Previous SFRA mapping illustrated that the time for inundation of the Royal Docks basins was less than two hours, whilst the inundation time for the land adjacent to the Dock (i.e. the airport and runway) was 2 to 13 hours. Current corresponding information is not presently available, however the updated SFRA states that under the TE2100 Plan, it was recommended that the dock gates in LBN are upgraded to in order to keep up with climate change and further manage and reduce both the likelihood and consequence of flooding.
- 6.6 It should be noted that the above worse-case scenario would require (1) a breach of the flood defences and (2) this breach to occur along the stretch of defences alongside the subject site. Should a breach occur in another location, it is unlikely that the subject site would be affected to such a significant degree.
- 6.7 Whilst the EA mapping indicates that the site would remain largely unaffected by tidal flooding should a breach of the defences occur, the surrounding access roads for the site would be inundated.
- 6.8 As long as the Thames Defences remain operational, the site will be unaffected by tidal flooding and dry access and egress would remain available.

### Impact of the Proposed Amendments

- 6.9 Given that the proposed application includes no external alterations to the existing Airport or drainage system, there will be no on- or off-site increase in flood risk as a result.

### Proposed Mitigation

- 6.10 Based on the above information, the mitigation proposed as part of the original CADP1 planning application (i.e. implementation of a Flood Management Plan, adoption of flood resilient construction techniques where appropriate and registration to the EA's flood warning system) is considered to remain appropriate and no additional mitigation is considered necessary.
- 6.11 The original Flood Management Plan has been updated in October 2022 by RPS (Reference no. HLEF83265-2) to ensure the safeguarding of personnel in the event of a potential inundation and it is available as a separate document.

## 7 SEQUENTIAL TEST AND EXCEPTION TEST

### Sequential Test

- 7.1 The NPPF requires the Local Authority to apply the Sequential Test in consideration of new development. The aim of the Test is to steer new development to areas at the lowest probability of flooding.
- 7.2 Given that the subject site has not been allocated as one of the Council's proposed future development sites, it has not been specifically assessed within the SFRA. Therefore, the Sequential Test is based on the EA Flood Zones and information contained within the SFRA.
- 7.3 The site is located within an area identified as Flood Zone 3, associated with residual tidal flooding from the River Thames. Whilst not located in Flood Zone 1 or 2, the development is required at this location in order to support an existing operation..
- 7.4 Therefore, the development can be considered to pass the Sequential Test.

### The Exception Test

- 7.5 The PPG advises that 'essential infrastructure' development can be considered appropriate in Flood Zone 3a, following satisfactory application of the Exception Test. The Exception Test aims to ensure that more vulnerable property types are not allocated to areas at high risk of flooding. For the Exception Test to be passed:
- a) It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a SFRA where one has been prepared;
  - b) A site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.
- 7.6 With reference to point (a) above, the development will allow the airport to continue with its current operations into the future without the need for construction of an entire new facility at an alternative location. The increase in passenger numbers at an existing facility also helps to reduce the requirement for additional facilities at an alternative location or the creation of an entire new facility. The development allows modern aircraft with better technical, commercial and environmental performance to be used at the airport, thereby providing sustainability benefits due to the improved environmental performance. In addition, the development is proposed at an existing airport, with existing intermodal connectivity including via the adjoining Docklands Light Railway (DLR) .
- 7.7 With reference to point (b) above, this FRA demonstrates that the development will be safe, without increasing flood risk elsewhere.
- 7.8 In view of the above, it is considered that the development passes the Exception Test.



## 8 SUMMARY AND CONCLUSIONS

- 8.1 The aim of the FRA is to outline the potential for the site to be impacted by flooding, the potential impacts of the S73 application on flooding both onsite and in the vicinity, and the proposed measures which can be incorporated to mitigate the identified risks. The report has been produced in accordance with the guidance detailed in the NPPF. Reference has also been made to the SFRA and following consultation with the Environment Agency.
- 8.2 The potential flood risks to the site, and the measures proposed to mitigate the identified risks, are summarised in Table 2.

**Table 2. Proposed mitigation**

Source of Flooding	Identified Risk			Mitigation Proposed	Residual Risk		
	L	M	H		L	M	H
Fluvial	✓			Not considered to be at significant risk	✓		
Tidal		✓		Implementation of Flood Management Plan Registration to EA Flood Warnings	✓		
Sewers	✓			Not considered to be at significant risk	✓		
Surface Water	✓				✓		
Groundwater	✓				✓		
Other Sources (e.g. reservoirs, water mains)	✓				✓		

- 8.3 Overall, it has been demonstrated that the probability of tidal flooding to the site has not increased since the production of the original 2013 FRA and 2017 Addendum, as it remains residual and only associated with a breach of the defences. Should a breach occur, the majority of the site would remain unaffected by tidal flooding during the present-day scenarios both for the Upriver and Downriver Breach Modelling events. During the 1 in 200-year event and 1 in 1000-year event, 2115 epoch, the central portion of the site would experience some flooding with maximum flood levels of 5.11m AOD and 5.40m AOD respectively. The existing terminal building which is designated as safe refuge is set at 5.57m AOD and therefore would remain unaffected. This would comprise a safe refuge for the duration of any tidal flooding event. Site-specific flood maps have been produced from the outputs of both the Thames Downriver and Upriver Modelling studies. They show that the designated area of safe refuge will remain dry during all modelled flood events up to the 1 in 1000-year 2115 epoch.
- 8.4 The overall residual flood risk to the site can be appropriately mitigated through the implementation of a Flood Management Plan. The site partially lies within the EA Flood Warning Area “Tidal Thames at Beckton” and the Airport will therefore sign up for this warning system.
- 8.5 As the development seeks no external alterations or construction, the use of flood resilient construction techniques is not considered relevant. The previously approved measures sufficiently address the risk of flooding at the site and considered appropriate for this application as well.
- 8.6 Although the proposed amendments would result in an increase in the number of annual passenger movements from 6.5 to 9.0 mppa, this would not result in a significant increase in the hourly peak number of passengers. This is due to a combination of ‘peak spreading’ of flights (due to more leisure-based destinations) and the proposed change to operational hours which would distribute flights and passengers more evenly across the day and week. The maximum number of flights

permitted per hour (45 ATMs) would not change and accordingly, the proposed amendments would not result in an increase to permissible peak hourly movements. Therefore, the number of passengers that would need to be evacuated during a breach event would not be significantly greater in the Development Case than under the consented CADP1 scheme without the increased passenger cap (i.e. the Do Minimum scenario) and therefore the proposed development does not increase flood risk at the site.

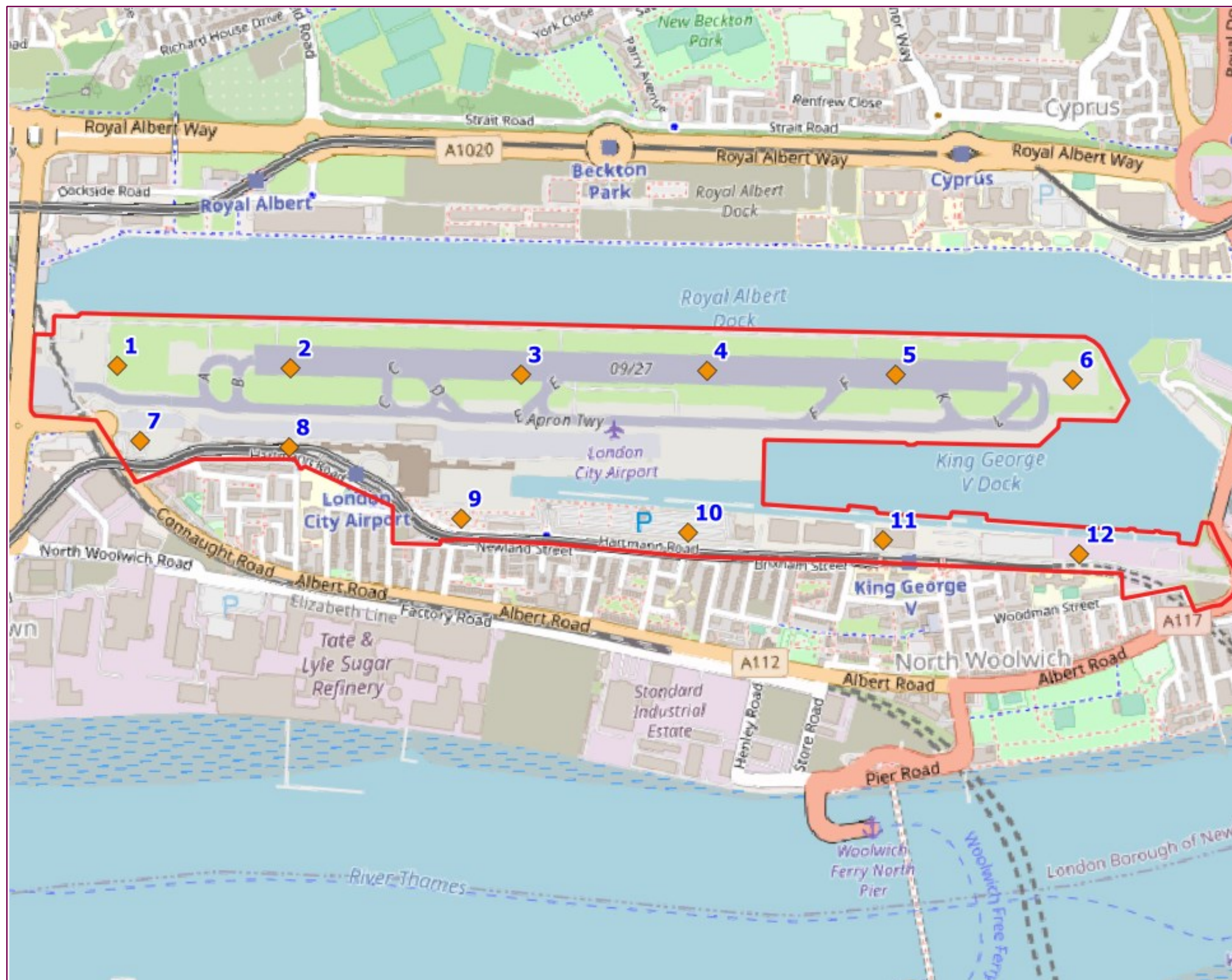
- 8.7 It has been demonstrated that the development meets the Sequential and Exception Tests imposed under the NPPF.
- 8.8 Overall, it has been demonstrated that the development would be safe, without increasing flood risk elsewhere.

**APPENDICES**

**Appendix A**

**EA Detailed Flood Data**





- Site Boundary
- ◆ Model result node point



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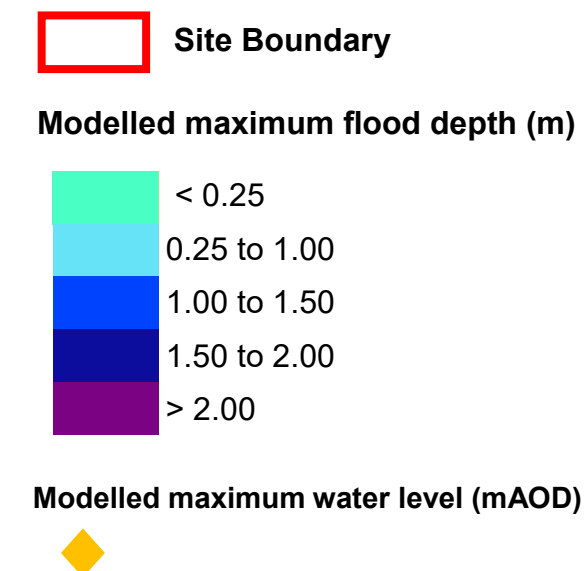
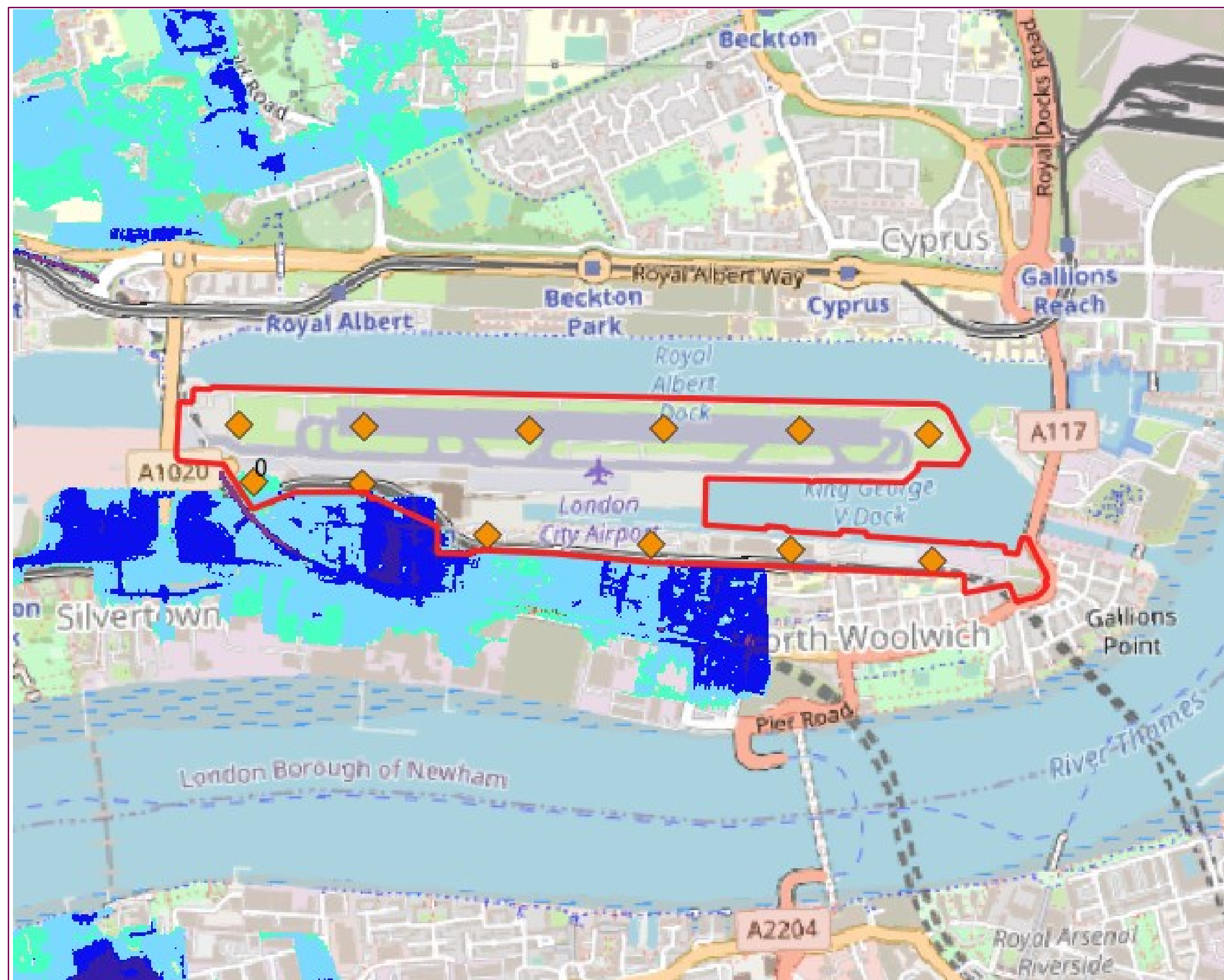
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Site: LONDON CITY AIRPORT

Date: 05.10.22

Job ref: HLEF 83265





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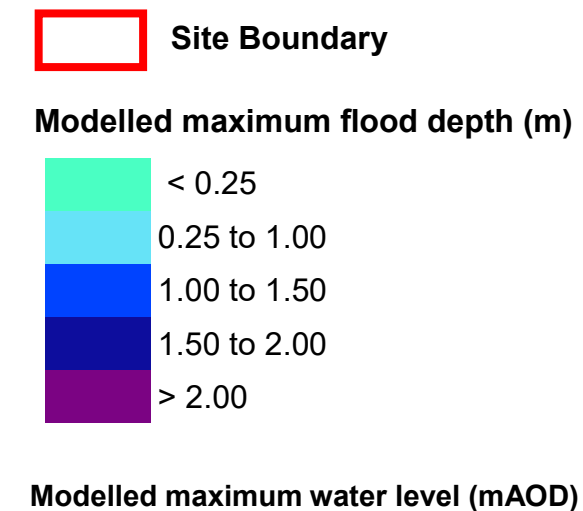
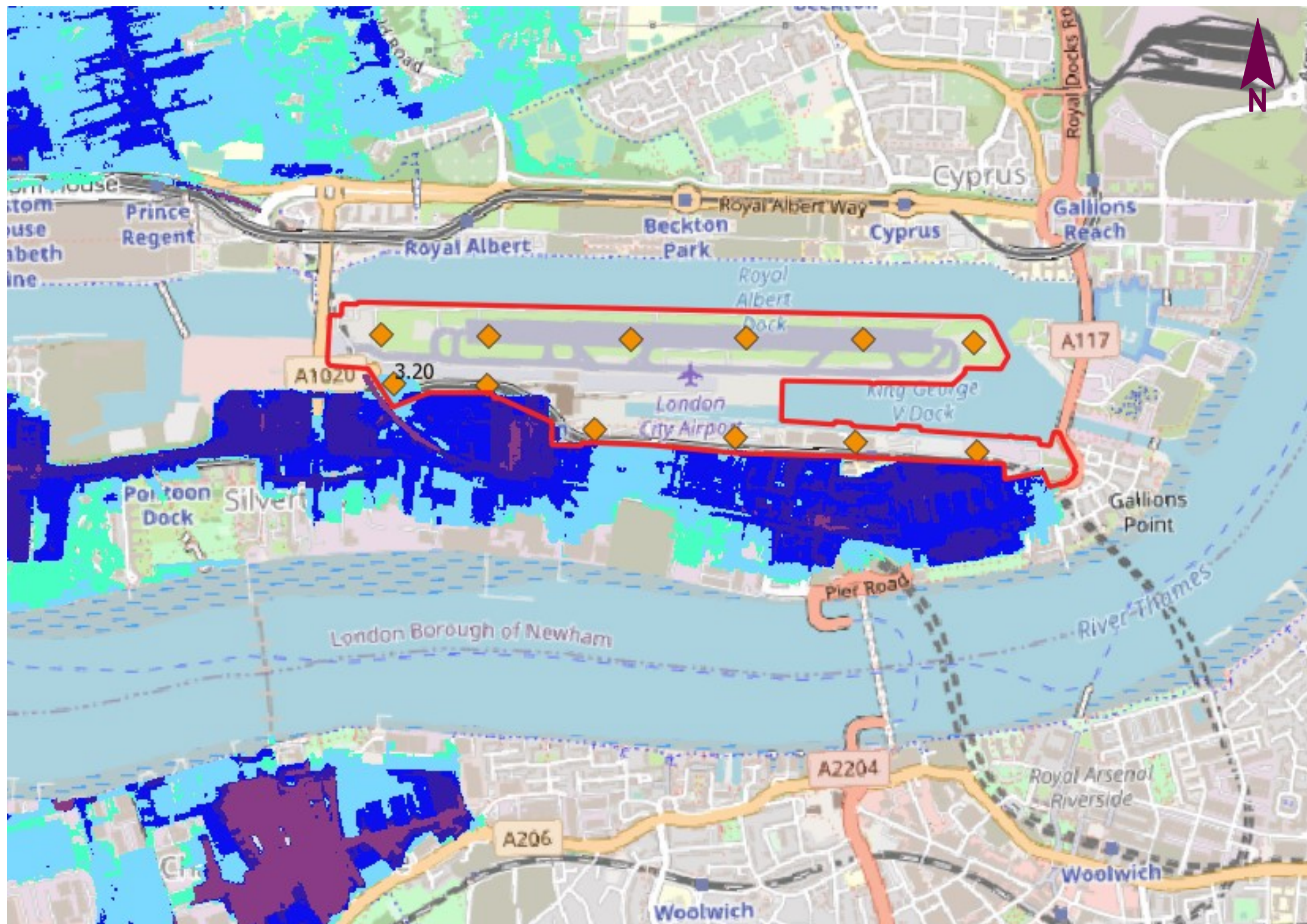
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present day

Site: LONDON CITY AIRPORT

Date: 05.10.22

Job ref: HLEF 83265





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Title: Maximum flood depth  
Thames upriver breach scenario  
2100 epoch

Site: LONDON CITY AIRPORT

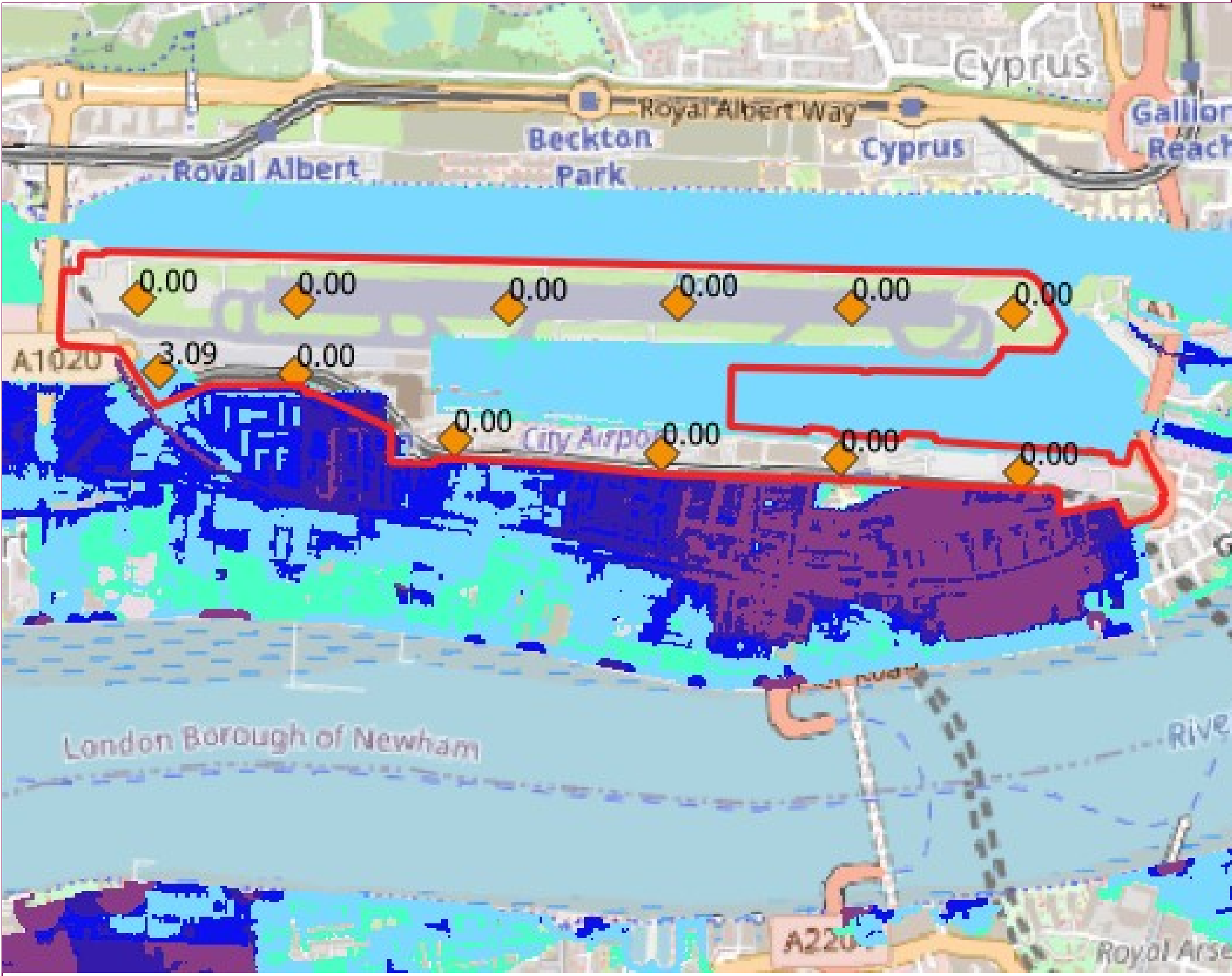
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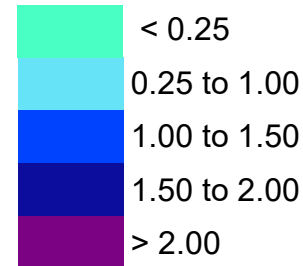
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 Site Boundary

Modelled maximum flood depth (m)



Modelled maximum water level (mAOD)



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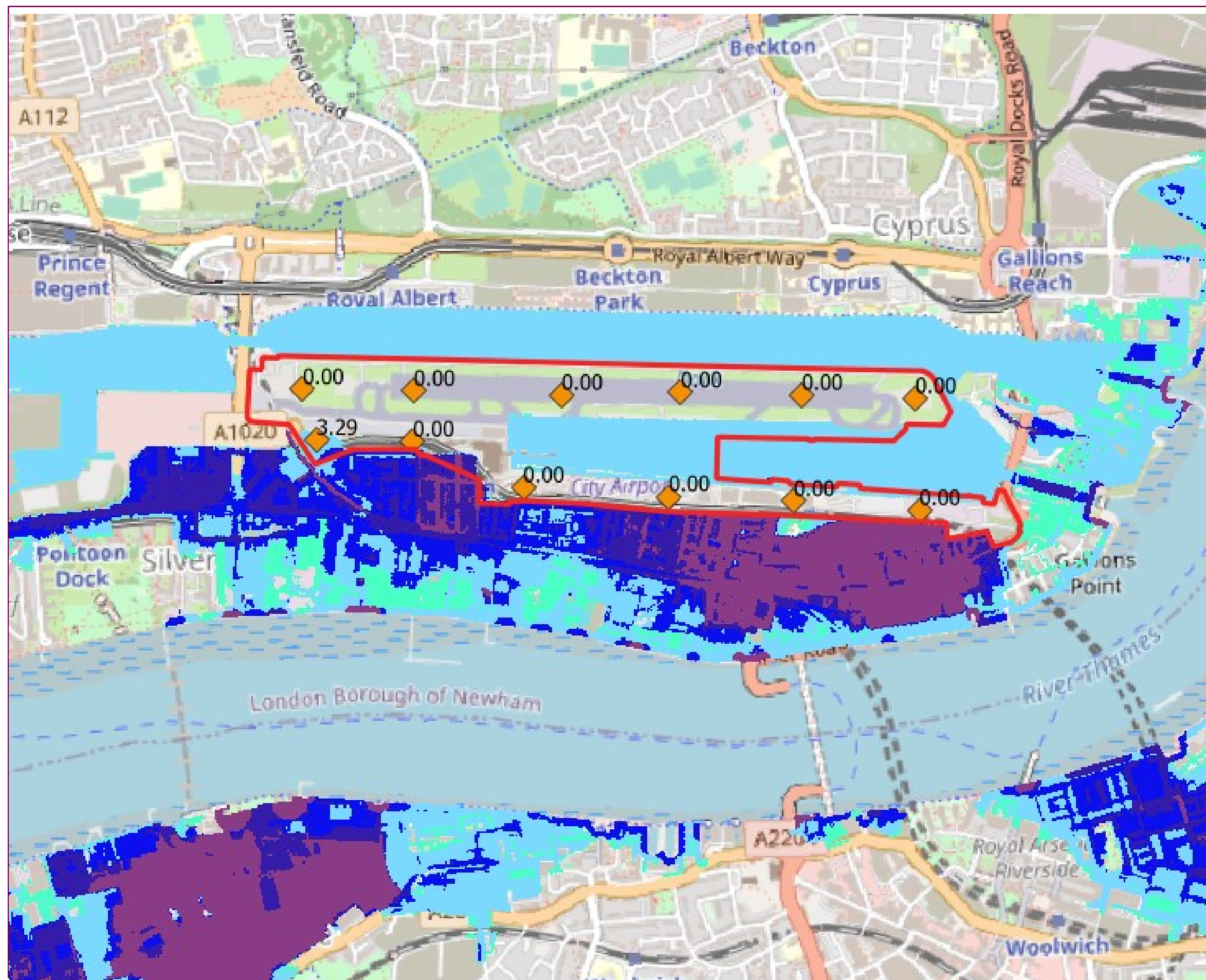
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200 year—present day

Site: LONDON CITY AIRPORT

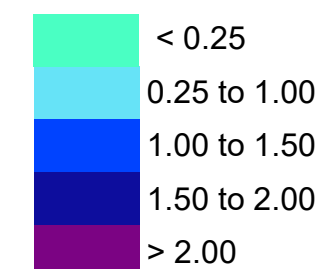
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 Site Boundary

Modelled maximum flood depth (m)



Modelled maximum water level (mAOD)



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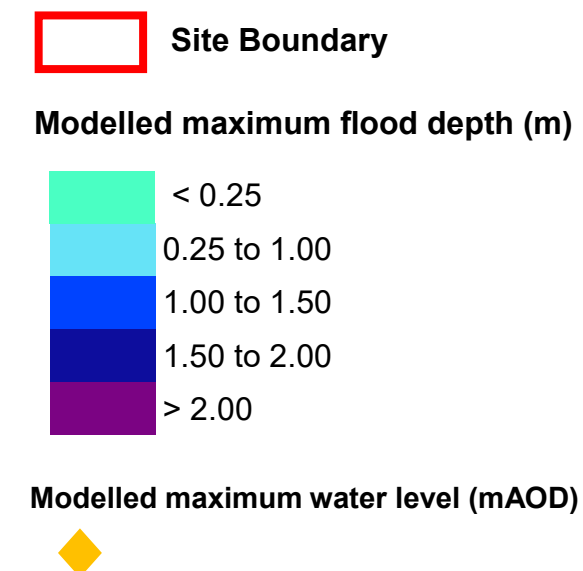
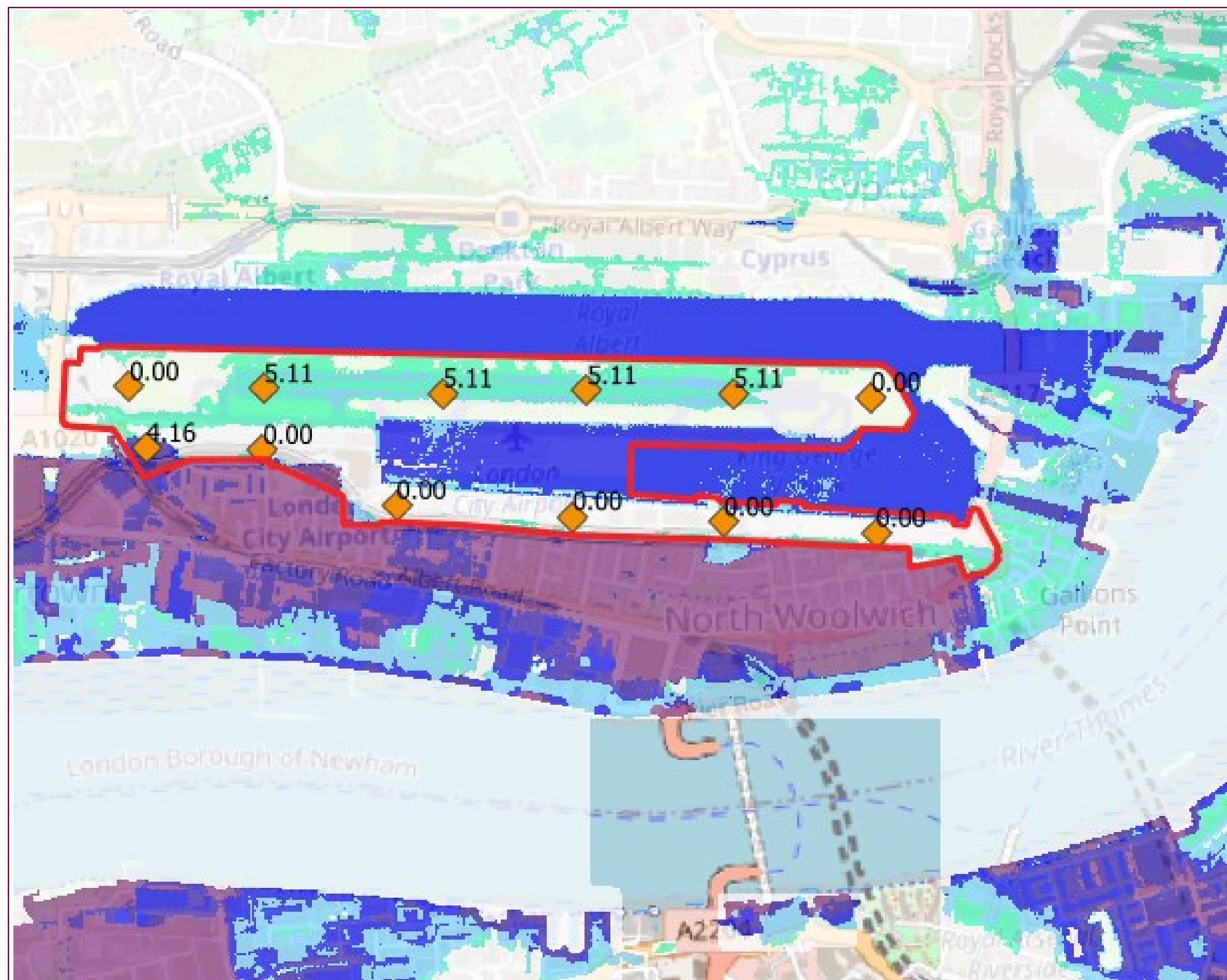
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1000 year—present day

Site: LONDON CITY AIRPORT

Date: 05.10.22

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Client: LONDON CITY AIRPORT

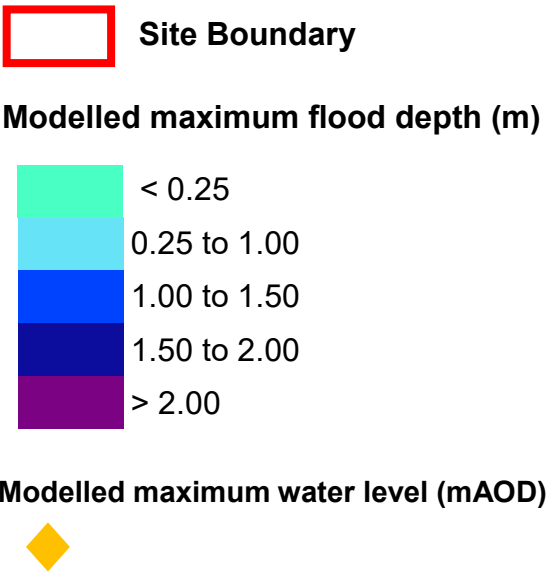
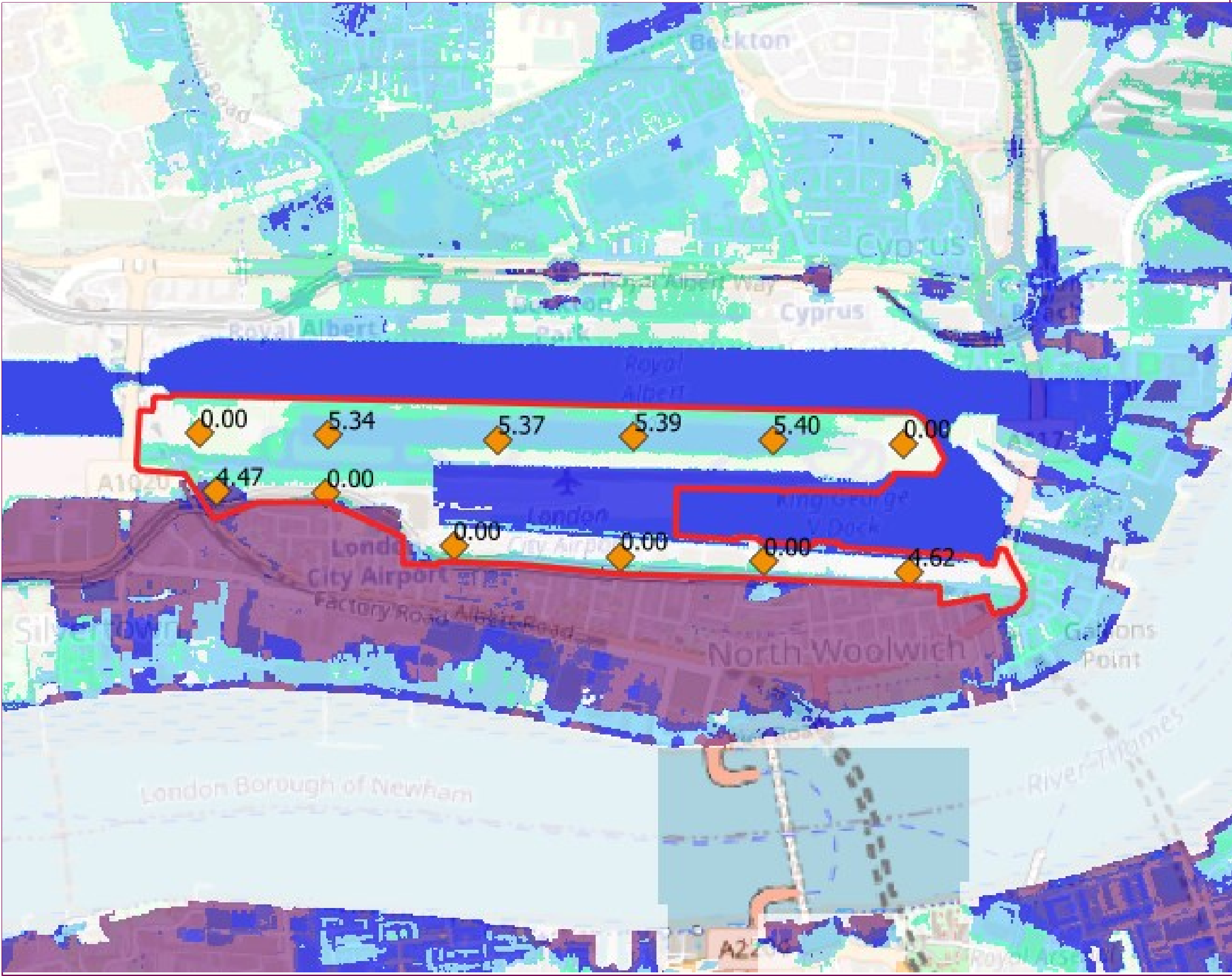
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200 year—2115 epoch

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Date: 05.10.22

Job ref: HLEF 83265







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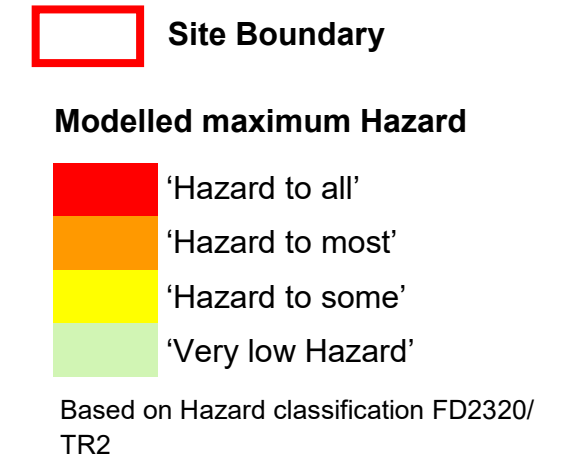
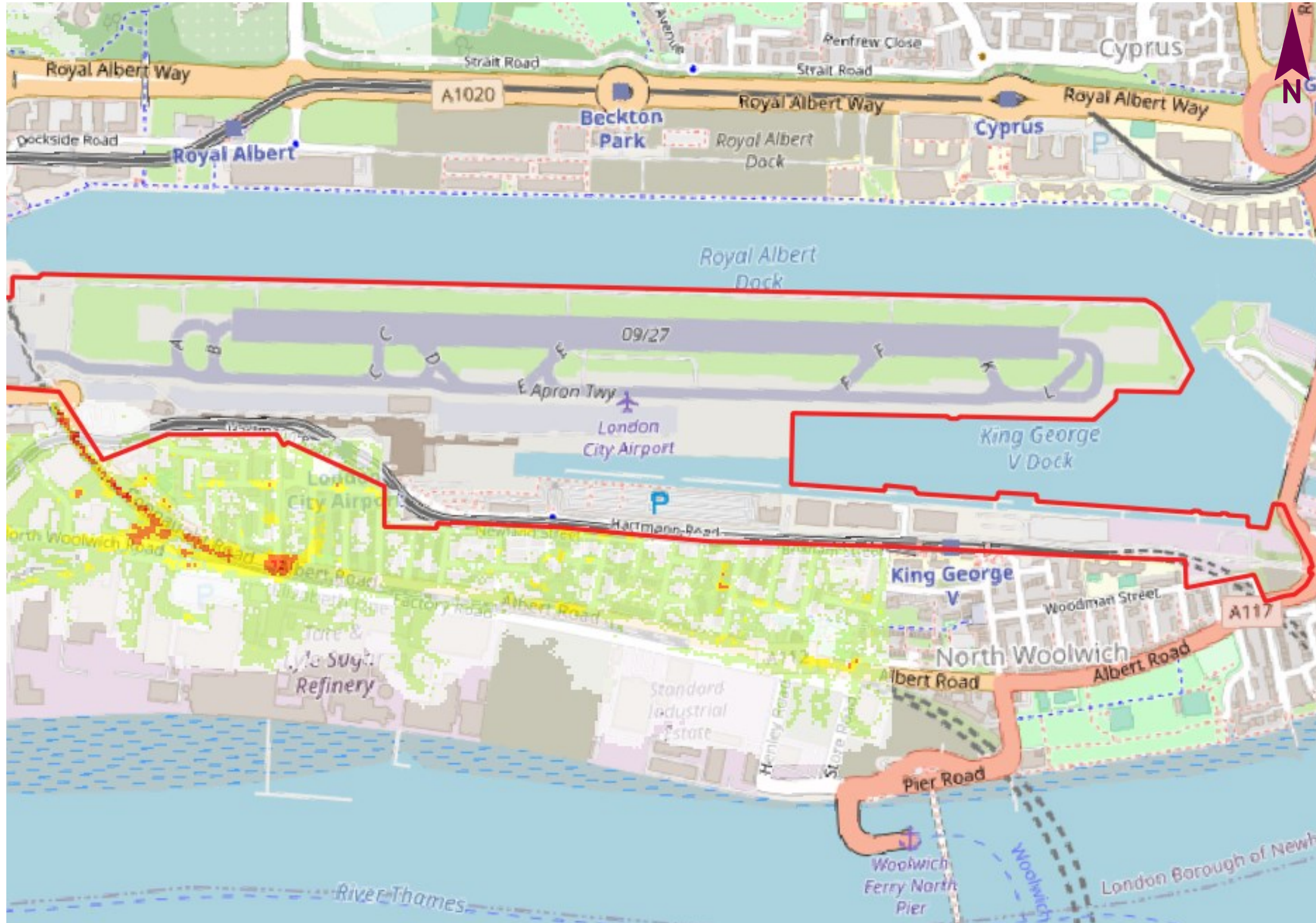
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Thames downriver breach scenario  
1000 year—2115 epoch

Site: LONDON CITY AIRPORT

Date: 05.10.22

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Title: Maximum flood hazard  
Thames upriver breach scenario  
present day

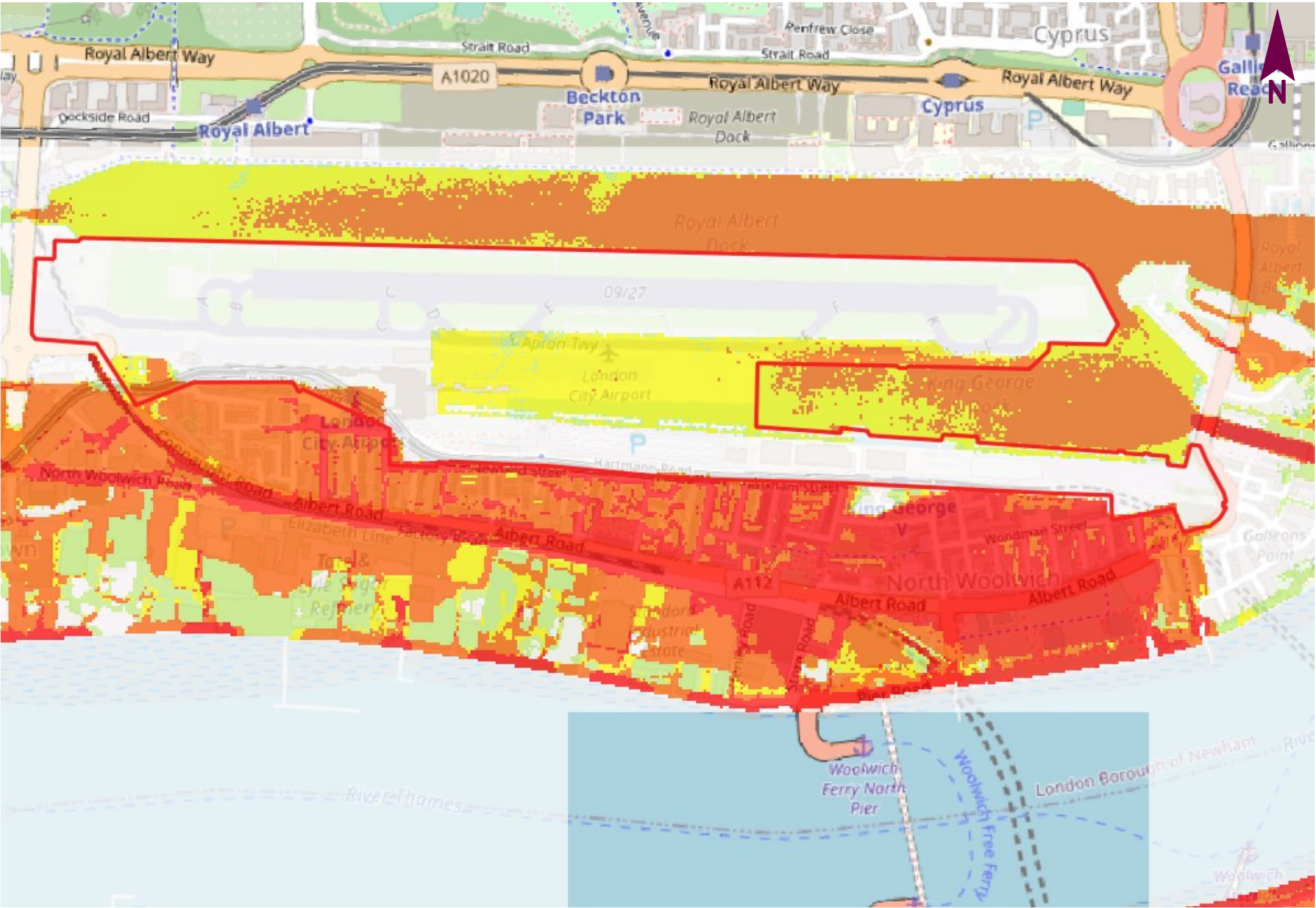
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Site Boundary

Modelled maximum Hazard

'Hazard to all'

'Hazard to most'

'Hazard to some'

'Very low Hazard'

Based on Hazard classification FD2320/  
TR2

MAKING  
COMPLEX  
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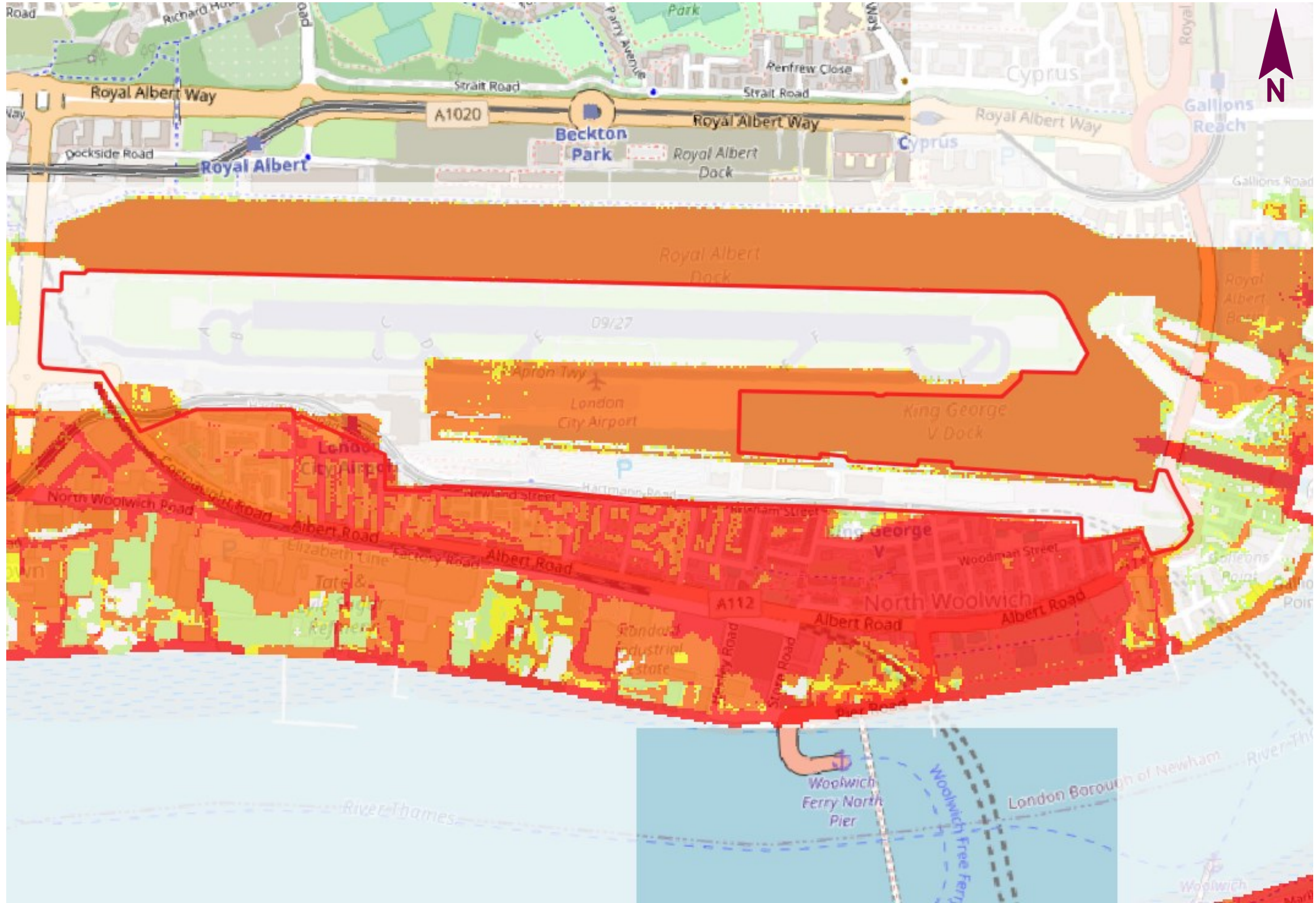
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Title: Maximum flood hazard Thames downriver breach scenario 200 year—present day
Site: LONDON CITY AIRPORT
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Site Boundary

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'Hazard to some'

'Very low Hazard'

Based on Hazard classification FD2320/  
TR2

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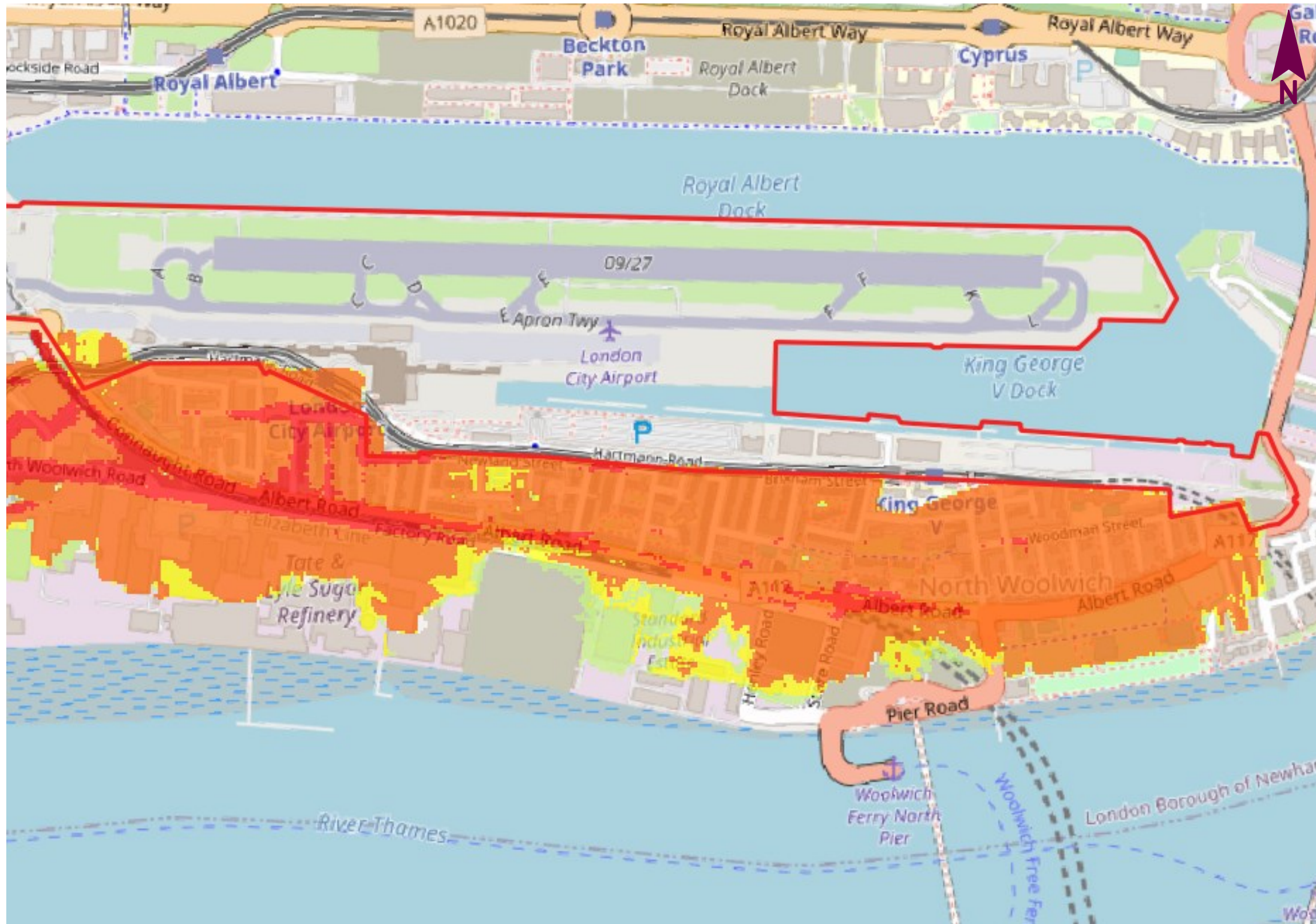
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Title: Maximum flood hazard Thames downriver breach scenario 1000 year—present day
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**Site Boundary**

**Modelled maximum Hazard**

- Hazard to all**
- Hazard to most**
- Hazard to some**
- Very low Hazard**

Based on Hazard classification FD2320/ TR2



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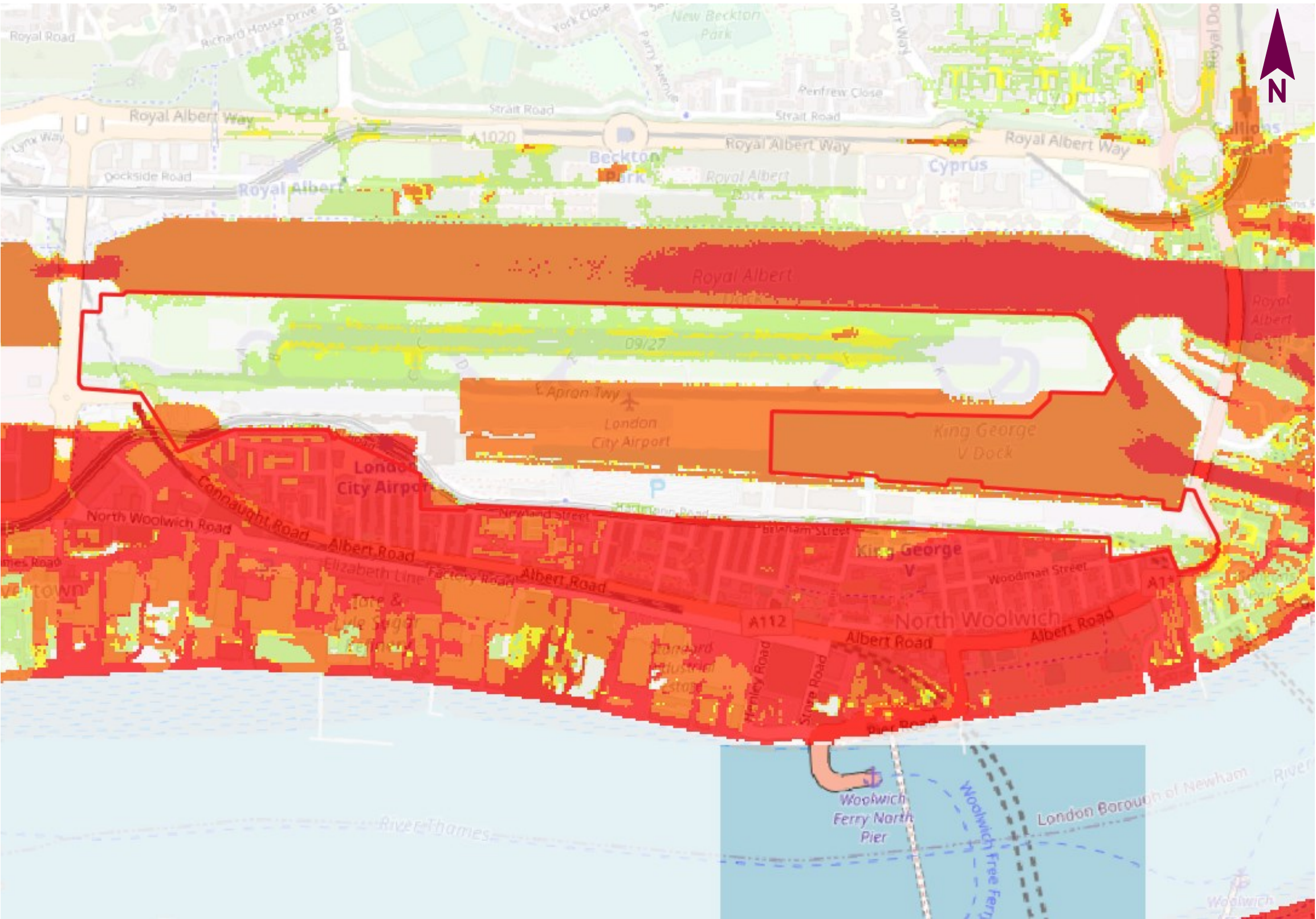
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Date: 05.10.22

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Site Boundary

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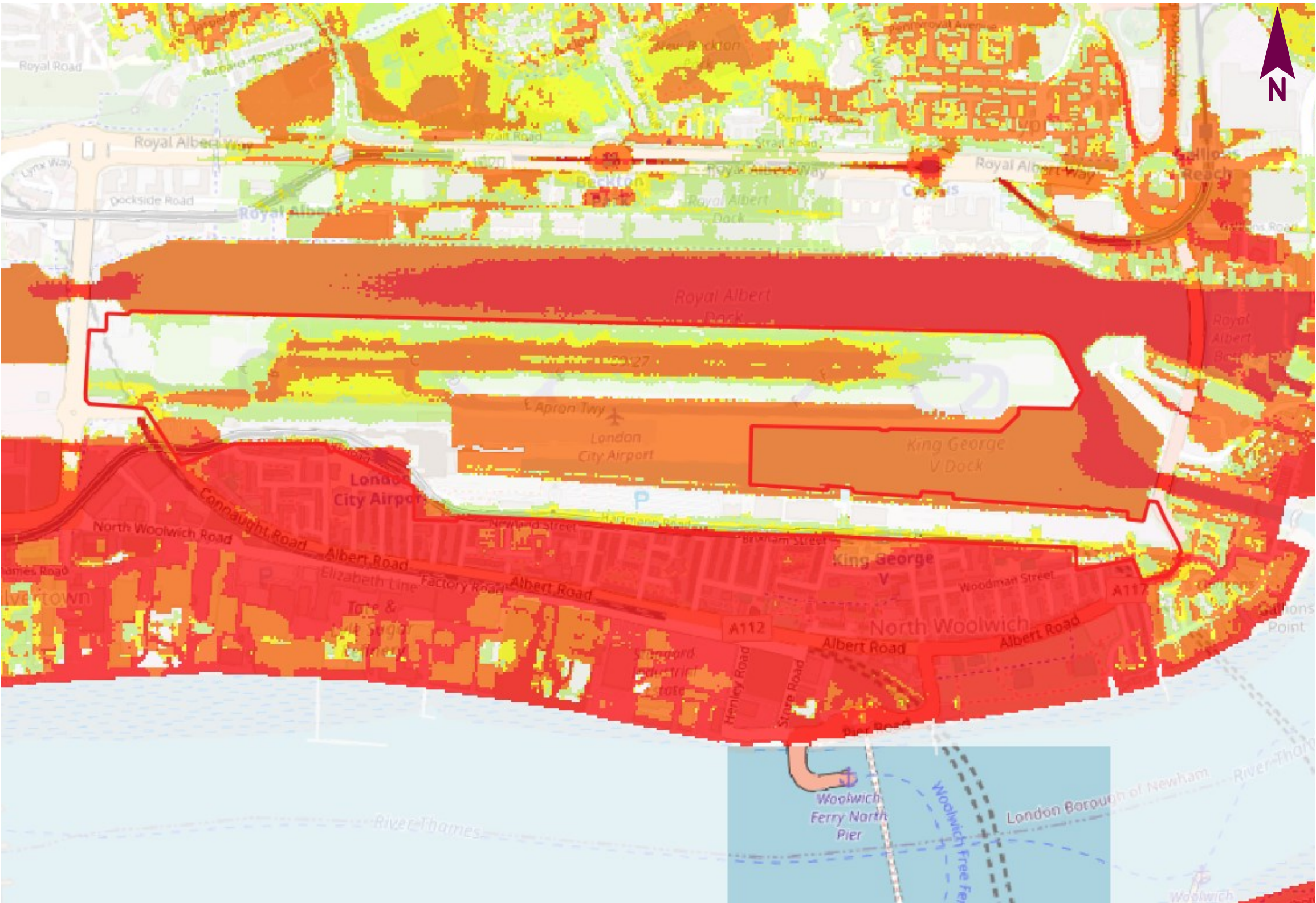
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Client: LONDON CITY AIRPORT
Title: Maximum flood hazard Thames downriver breach scenario 200 year— 2115 epoch
Site: LONDON CITY AIRPORT
Date: 05.10.22
Job ref: HLEF 83265





Site Boundary

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'Hazard to most'

'Hazard to some'

'Very low Hazard'

Based on Hazard classification FD2320/  
TR2

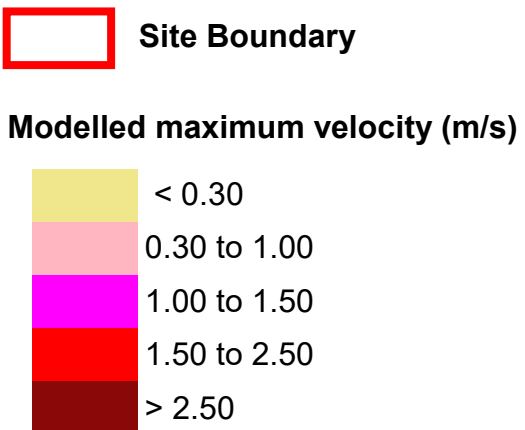
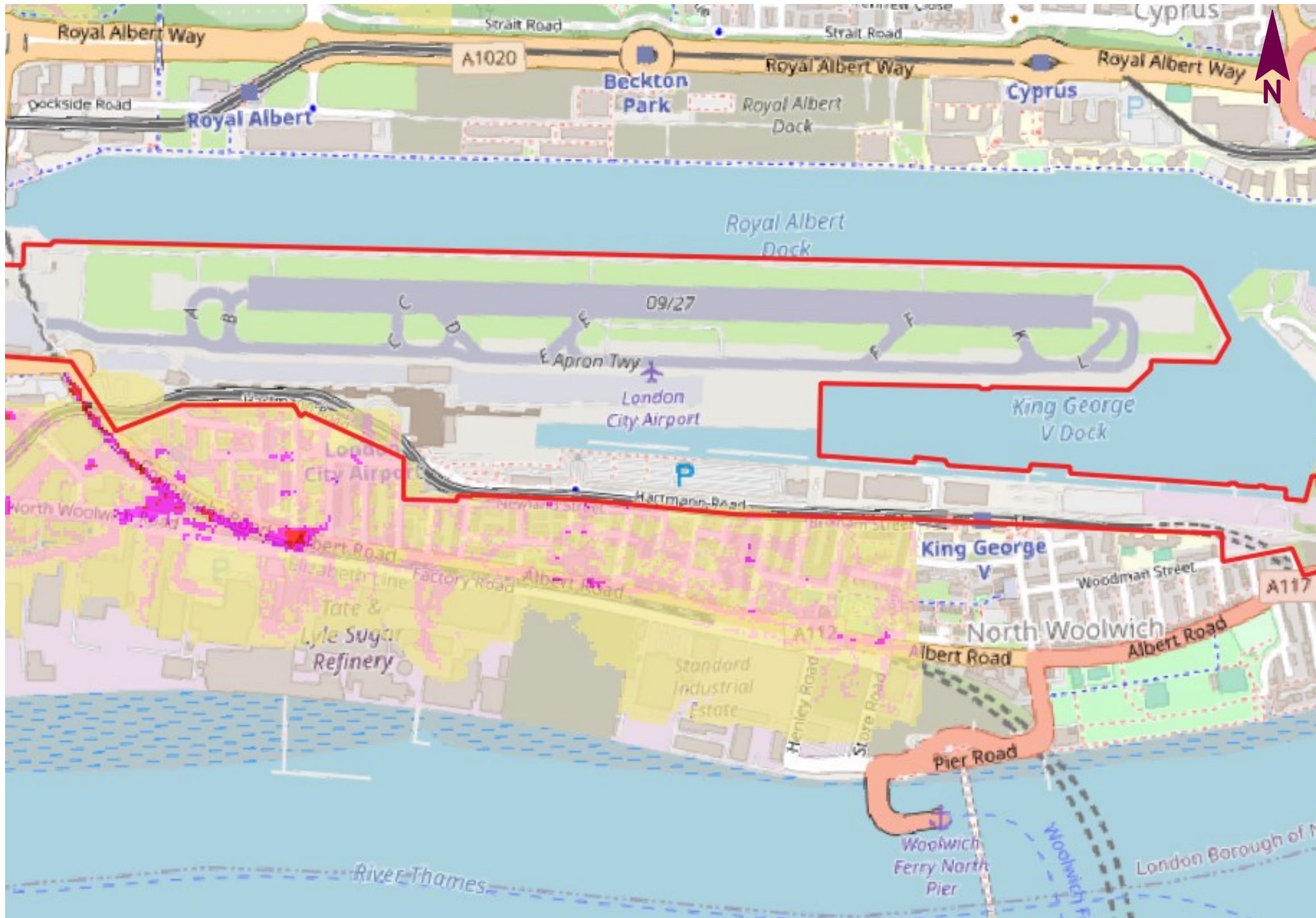
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Title: Maximum flood hazard Thames downriver breach scenario 1000 year— 2115 epoch
Site: LONDON CITY AIRPORT
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T: +44 (0)203 691 0500  
W: rpsgroup.com

Client: LONDON CITY AIRPORT

Title: Maximum flood velocity

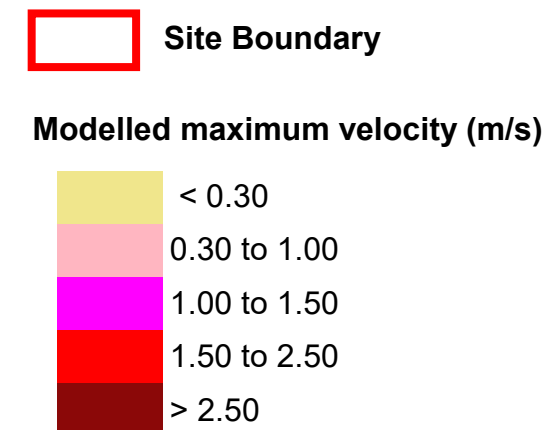
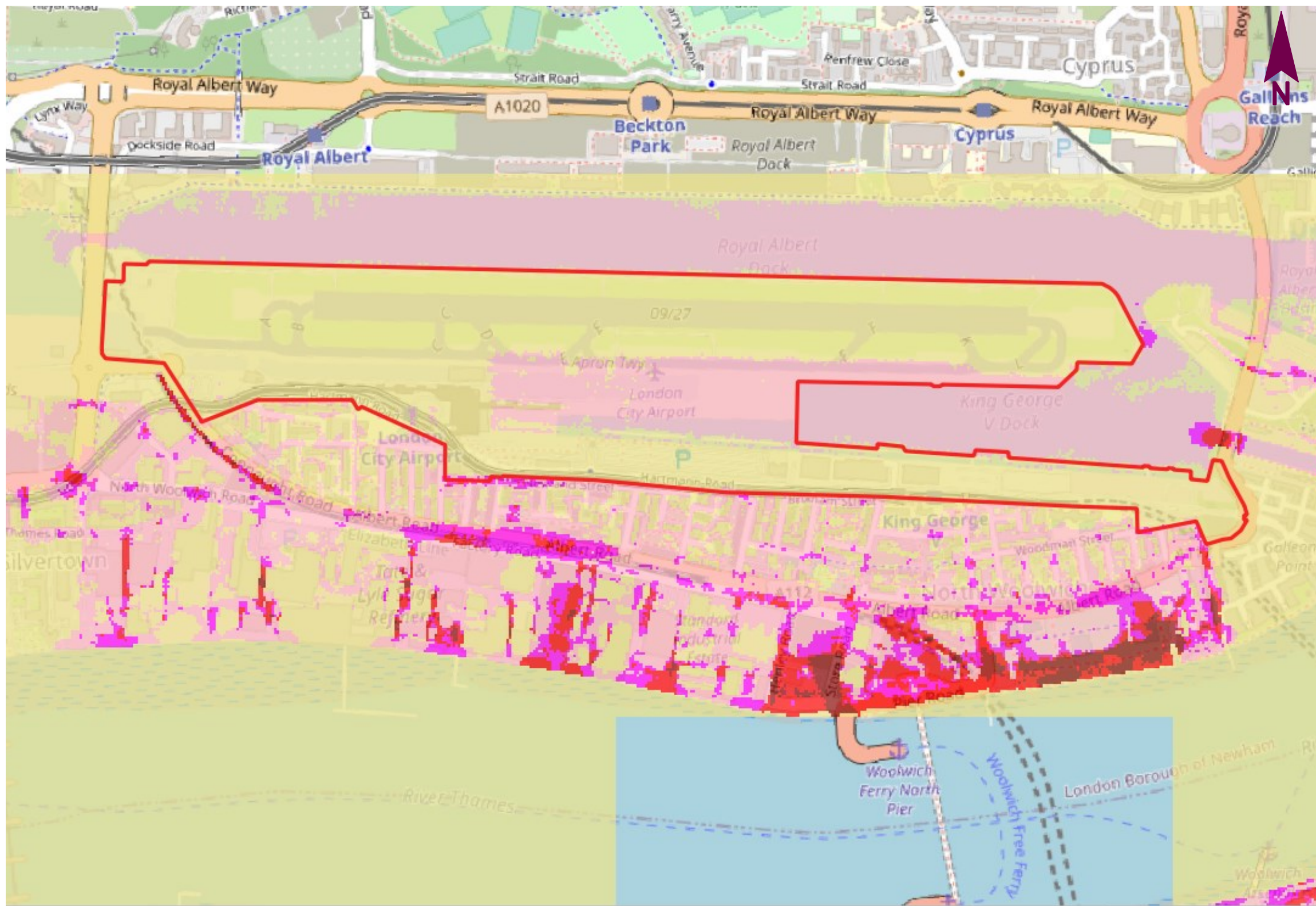
Thames upriver breach scenario  
present day

Site: LONDON CITY AIRPORT

Date: 05.10.22

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T: +44 (0)203 691 0500  
W: [rpsgroup.com](http://rpsgroup.com)

Client: LONDON CITY AIRPORT

Title: Maximum flood velocity

Thames downriver breach scenario  
200 year—present day

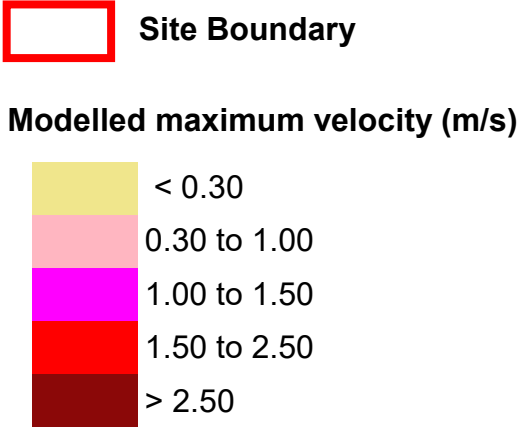
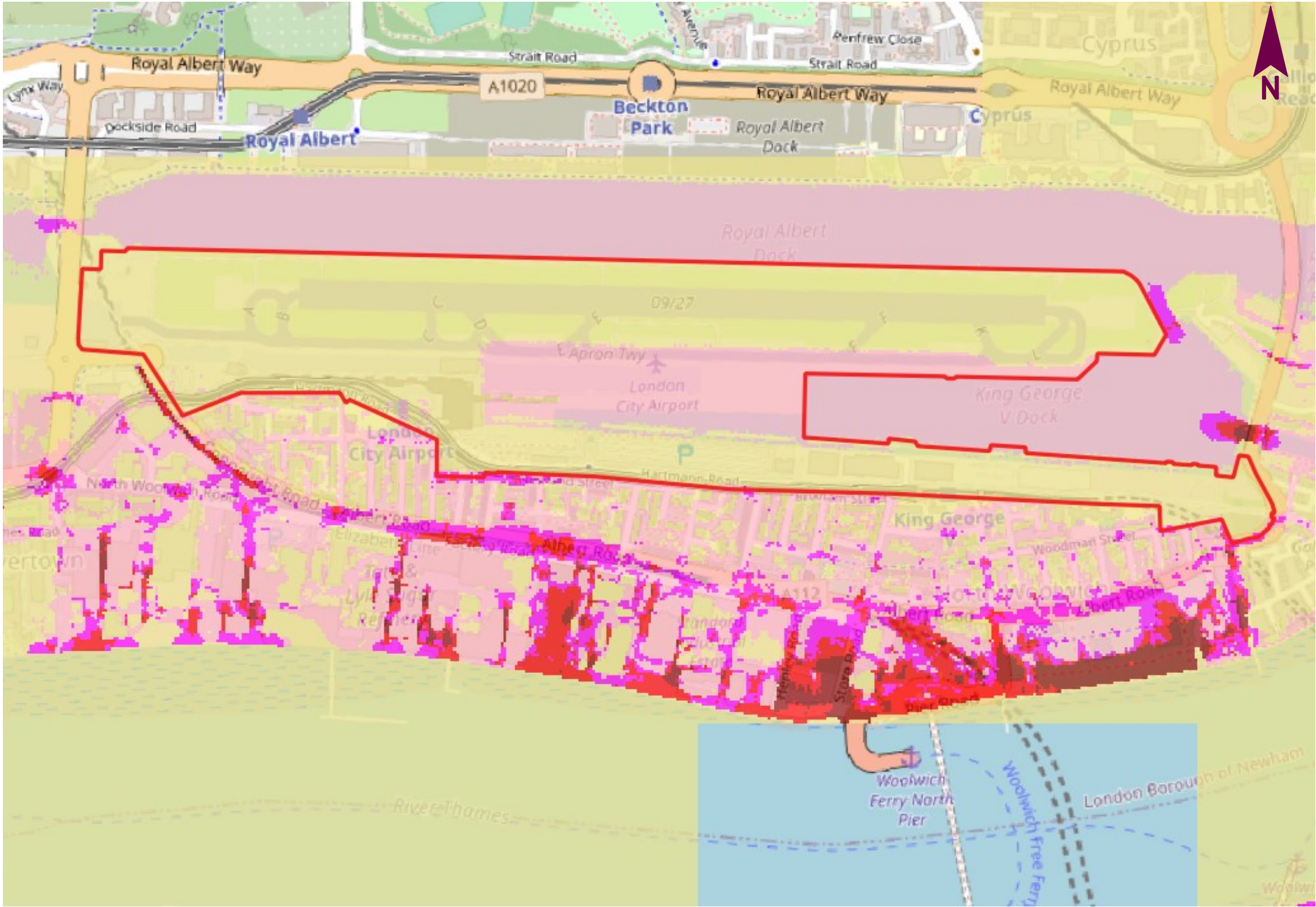
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Client: LONDON CITY AIRPORT

Title: Maximum flood velocity

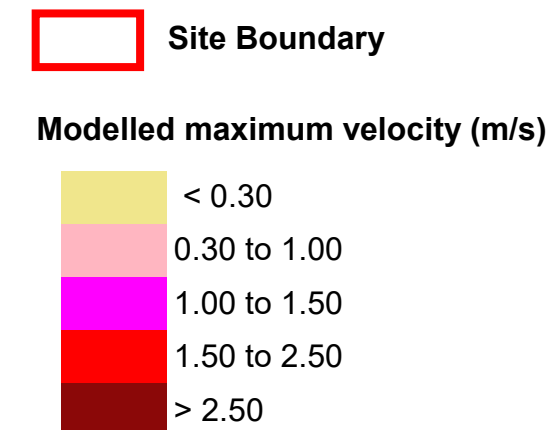
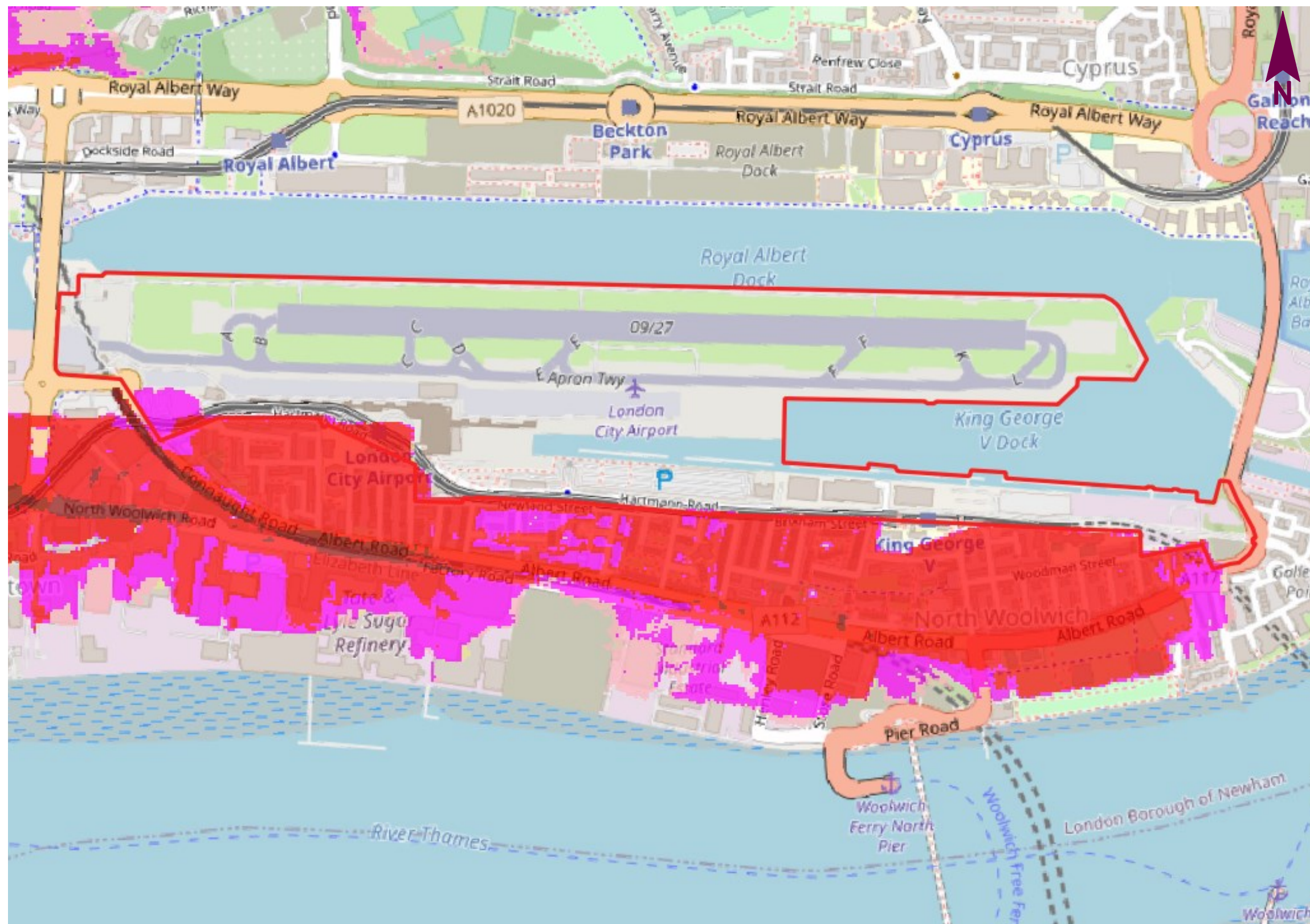
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Date: 05.10.22

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Client: LONDON CITY AIRPORT

Title: Maximum flood velocity

Thames upriver breach scenario  
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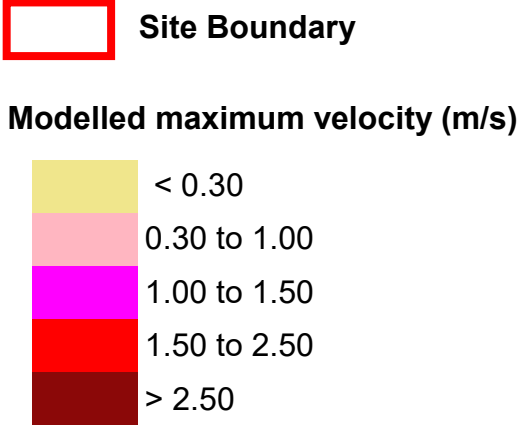
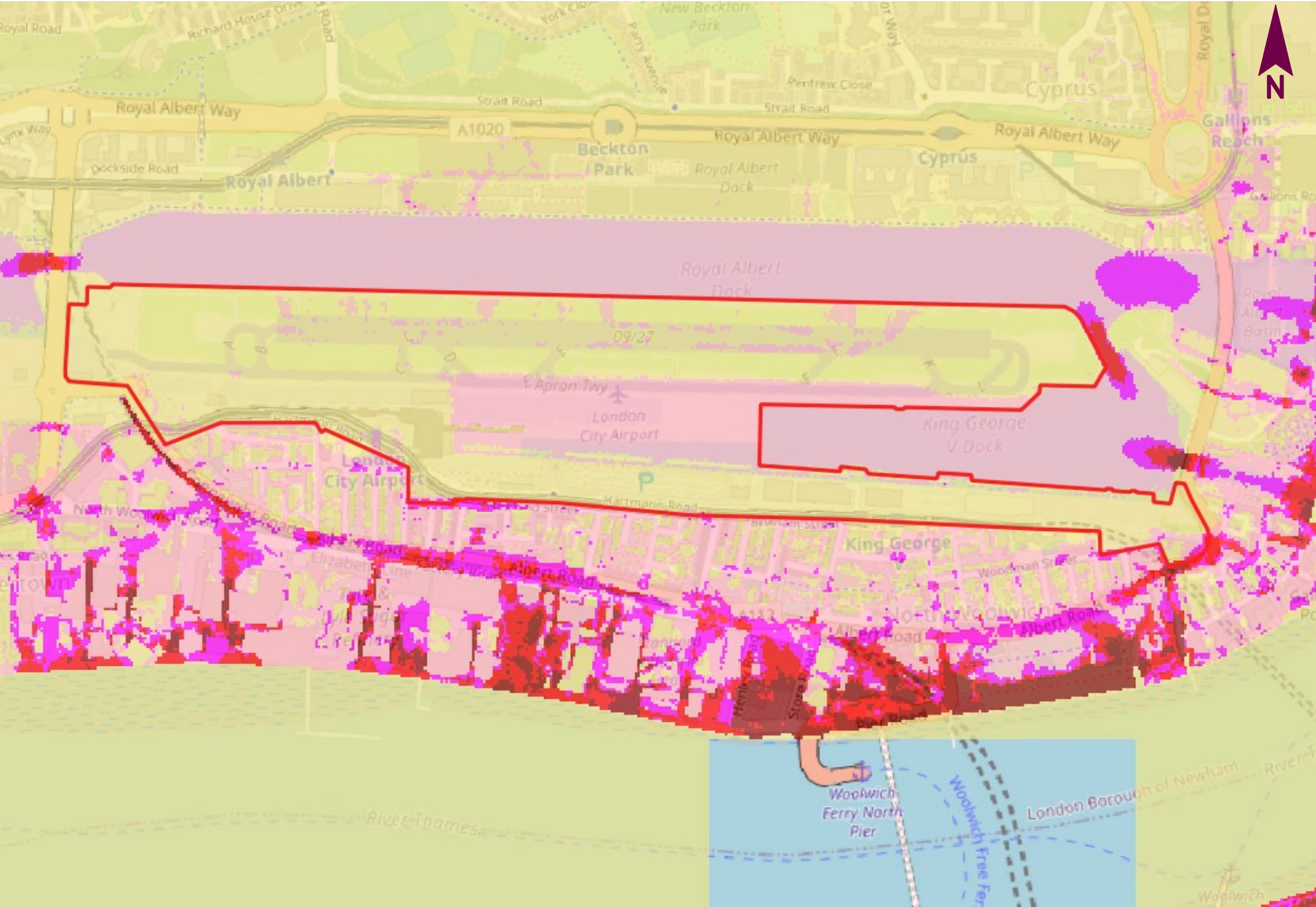
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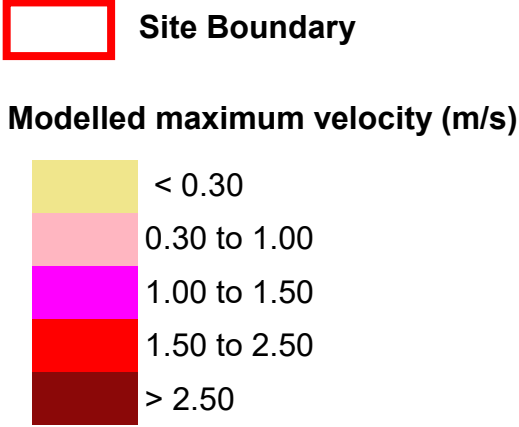
Thames downriver breach scenario  
200 year— 2115 epoch

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