

Product 4 (Detailed Flood Risk) for: Charlton Riverside, Anchor and Hope Lane, Charlton

Requested by: Guy Laister, Water Environment Ltd

Reference: KSL 6999 TM

Date: 29 March 2016

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The information provided is based on the best data available as of the date of this letter.

You may feel it is appropriate to contact our office at regular intervals, to check whether any amendments/ improvements to the data for this location have been made. Should you re-contact us after a period of time, please quote the above reference in order to help us deal with your query.

This information is provided subject to the enclosed notice which you should read.

Flood Map for Planning (Rivers and Sea)

The Flood Map:

Our Flood Map shows the natural floodplain for areas at risk from river and tidal flooding. The floodplain is specifically mapped ignoring the presence and effect of defences. Although flood defences reduce the risk of flooding they cannot completely remove that risk as they may be over topped or breached during a flood event.

The Flood Map indicates areas with a 1% (0.5% in tidal areas), Annual Exceedance Probability (AEP) - the probability of a flood of a particular magnitude, or greater, occurring in any given year, and a 0.1% AEP of flooding from rivers and/or the sea in any given year. In addition, the map also shows the location of some flood defences and the areas that benefit from them.

The Flood Map is intended to act as a guide to indicate the potential risk of flooding. When producing it we use the best data available to us at the time and also take into account historic flooding and local knowledge. The Flood Map is updated on a quarterly basis to account for any amendments required. These amendments are then displayed on the internet at

<https://www.gov.uk/government/organisations/environment-agency>.

At this Site:

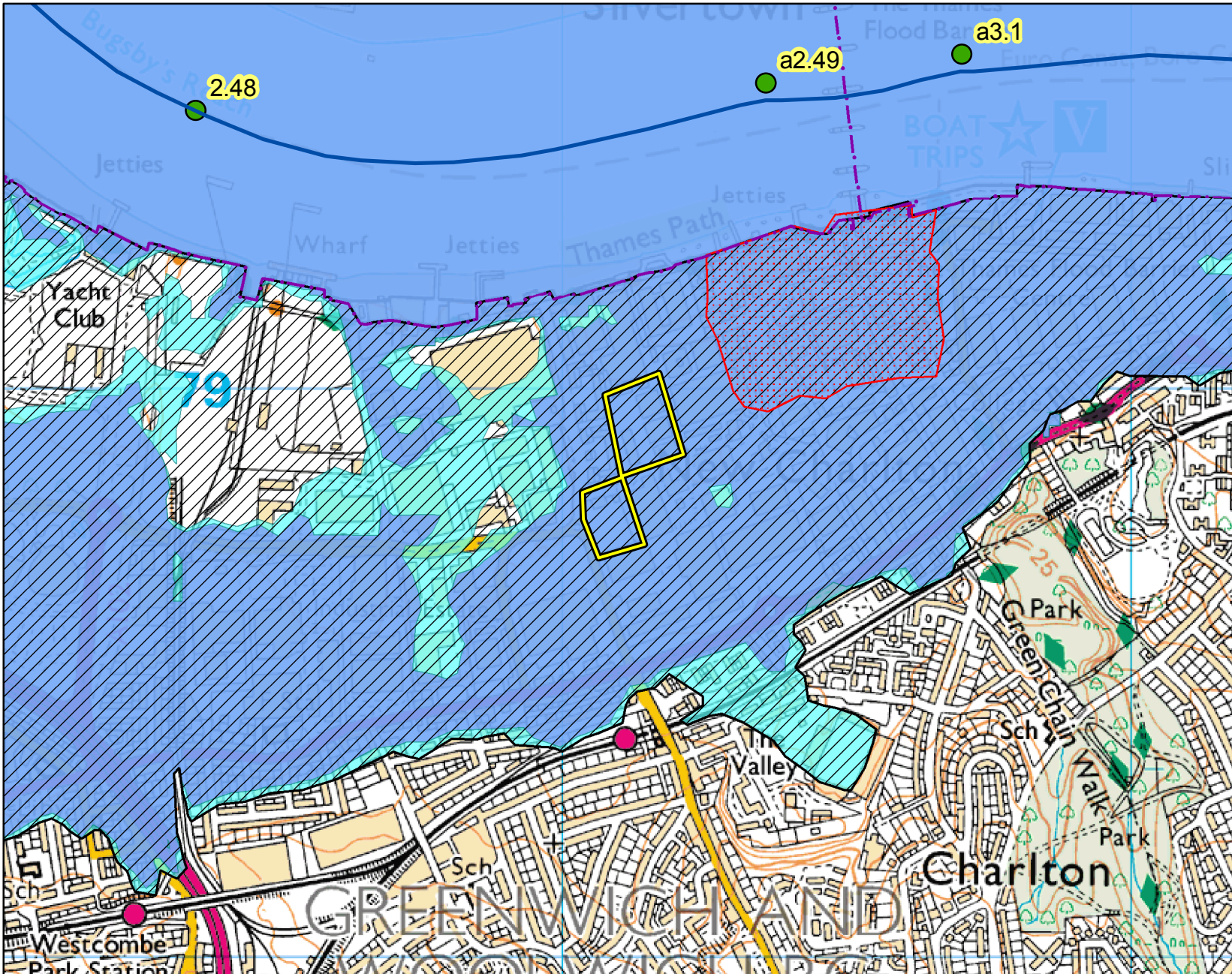
The Flood Map shows that this site lies within the outline of Flood Zone 3. This zone comprises land assessed as having a 0.5% (1 in 200) or greater annual probability of tidal flooding.

Enclosed is an extract of our Flood Map which shows this information for your area.

Method of production

The Flood Map at this location has been derived using detailed modelling of the Thames Tidal Defences Study completed in 2006 by Halcrow Ltd.

Detailed FRA Map centred on SE7 7TE created 29 March 2016 [Ref: KSL 6999 TM]



Scale 1: 10,000



Legend

- Main Rivers
- Site
- TE2100 Model Nodes
- Flood Map - Defences
- Jan 1928 Flood Outline
- Areas Benefitting from Flood Defences
- Flood Storage Areas
- Flood Map - Flood Zone 3
- Flood Map - Flood Zone 2

Flood Map for Planning (assuming no defences)

Flood Zone 3 shows the area that could be affected by flooding:
 - from the sea with a 0.5% or greater chance of occurring each year
 - or from a river with a 1% or greater chance of occurring each year

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 0.1% chance of occurring each year.

Thames Estuary 2100 (TE2100)

You have requested in-channel flood levels for the tidal river Thames. These have been taken from the Thames Estuary 2100 study completed by HR Wallingford in 2008. The modelled node closest to your site is 2.48; the locations of nearby nodes are also shown on the enclosed map.

Details about the TE2100 plan

The TE2100 plan is now live and within it are a set of levels on which the flood risk management strategy is based. The plan is the overarching flood management strategy for the Thames Estuary and therefore any development planning should be based on the same underlying data.

Details about the TE2100 in-channel levels

The TE2100 in-channel levels take into account operation of the Thames Barrier when considering future levels. The Thames Barrier requires regular maintenance and with additional closures the opportunity for maintenance will be reduced. When this happens, river levels – for which the Barrier would normally shut for the 2008 epoch – will have to be allowed through to ensure that the barrier is not shut too often. For this reason, levels upriver of the barrier will increase and the tidal walls will need to be heightened to match.

For further information about the Thames Barrier please visit our website at:

<https://www.gov.uk/the-thames-barrier>

TE2100 2008 levels:

Levels downriver of the Thames Barrier are 0.1% AEP (1 in 1000) and levels upriver are the highest levels permitted by the Thames Barrier, described as the Maximum Likely Water Levels (MLWLs). The defence levels (left defence, right defence) are the minimum levels to which the defences should be built.

| Location | Node | Easting | Northing | Extreme water level (m) | Left defence (m) | Right defence (m) | Allow for future defence raising to a level of... | |
|-----------|-------|---------|----------|-------------------------|------------------|-------------------|---|----------------|
| | | | | | | | Left Bank (m) | Right Bank (m) |
| Greenwich | 2.47 | 539826 | 179982 | 4.65 | 5.18 | 5.18 | 6.20 | 6.20 |
| | 2.48 | 540347 | 179492 | 4.64 | 5.18 | 5.18 | 6.20 | 6.20 |
| Barrier | a2.49 | 541357 | 179535 | 4.63 | 5.18 | 5.18 | 6.20 | 6.20 |

| Location | Node | Easting | Northing | Extreme water level (m) | Left defence (m) | Right defence (m) | Allow for future defence raising to a level of... | |
|----------|------|---------|----------|-------------------------|------------------|-------------------|---|----------------|
| | | | | | | | Left Bank (m) | Right Bank (m) |
| Barrier | 3.1 | 541634 | 179578 | 6.04 | 7.20 | 7.20 | 8.80 | 8.80 |
| | 3.2 | 542533 | 179565 | 6.03 | 7.20 | 7.20 | 8.80 | 8.80 |

TE2100 climate change levels:

The water levels in west London are lower than the current day extreme levels because they do not take into account extreme fluvial events; they are tidal only levels.

| Location | Node | Easting | Northing | 2065 to 2100 | | 2100 | |
|-----------|------|---------|----------|--------------------|----------------------------|--------------------|----------------------------|
| | | | | Design water level | Defence level (both banks) | Design water level | Defence level (both banks) |
| Greenwich | 2.47 | 539826 | 179982 | 5.14 | 5.70 | 5.62 | 6.20 |
| | 2.48 | 540347 | 179492 | 5.13 | 5.70 | 5.61 | 6.20 |
| Barrier | 2.49 | 541357 | 179535 | 5.12 | 5.70 | 5.60 | 6.20 |

| Location | Node | Easting | Northing | 1000-year design water levels | | | | | |
|----------|------|---------|----------|-------------------------------|------|------|------|------|------|
| | | | | 2000 | 2040 | 2070 | 2100 | 2120 | 2170 |
| Barrier | 3.1 | 541634 | 179578 | 6.04 | 6.25 | 6.44 | 6.76 | 6.97 | 7.49 |
| | 3.2 | 542533 | 179565 | 6.03 | 6.24 | 6.44 | 6.75 | 6.96 | 7.49 |

Thames Tidal Breach Modelling

The table below displays site-specific modelled flood levels at your site. These have been taken from the Thames Tidal Breach Modelling Study 2015 completed by CH2M HILL in March 2015. The exact location of the given site-specific levels and the extent of the breach are shown on the enclosed map.

This modelling simulates tidal breaches along the Thames from Teddington to the Mar Dyke and River Darent. A series of 113 tidal models were developed for the Environment Agency at pre-determined breach locations. These were chosen using a risk-based approach by examining critical locations based on low floodplain topography. For hard and composite defences breaches are set at 20 m wide; for soft defences, breaches are 50 m wide. In both cases, the defence breach scour distance was assumed to extend into the floodplain by the same distance as the breach width.

Based on the 2008 TE2100 in-channel levels, the 0.5% (1 in 200 year) and 0.1% (1 in 1000 year) annual probability of exceedance tidal events were modelled for all breach locations downriver of the Thames Barrier. These were modelled for the 2014 year epoch, as well as a 2065 and 2100 epoch which include allowances for climate change.

For breaches upriver of the Thames Barrier, there is no return period for modelled levels as the levels are controlled by barrier closures. The levels used are referred to as Maximum Likely Water Levels (MLWLs). Therefore 2014, 2065 and 2100 epochs were modelled on that basis.

The modelled levels shown assume that the Thames defences have been breached at location 'Grn04' (NGR TQ4166979267).

| Node | National Grid Reference | | Grn04 | | | Grn04 | | |
|------|-------------------------|----------|-------------------------------------|------|------|-------------------------------------|------|------|
| | | | Modelled levels in mAODN (0.5% AEP) | | | Modelled levels in mAODN (0.1% AEP) | | |
| | Easting | Northing | 2014 | 2065 | 2100 | 2014 | 2065 | 2100 |
| 1 | 541055 | 178694 | 4.93 | 5.67 | 5.86 | 5.34 | 5.89 | 6.09 |
| 2 | 541028 | 178754 | 4.93 | 5.67 | 5.87 | 5.34 | 5.89 | 6.09 |
| 3 | 541028 | 178820 | 4.94 | 5.68 | 5.87 | 5.35 | 5.90 | 6.08 |
| 4 | 541093 | 178771 | 4.93 | 5.67 | 5.86 | 5.34 | 5.89 | 6.09 |
| 5 | 541065 | 178937 | 4.95 | 5.69 | 5.88 | 5.35 | 5.91 | 6.09 |
| 6 | 541110 | 178966 | 4.97 | 5.69 | 5.88 | 5.36 | 5.91 | 6.10 |
| 7 | 541165 | 179037 | 5.00 | 5.74 | 5.95 | 5.43 | 5.98 | 6.18 |
| 8 | 541230 | 178894 | 5.04 | 5.76 | 5.96 | 5.41 | 5.99 | 6.20 |
| 9 | 541202 | 178856 | 5.03 | 5.77 | 5.97 | 5.43 | 6.00 | 6.20 |
| 10 | 541178 | 178716 | 4.99 | 5.70 | 5.91 | 5.37 | 5.94 | 6.13 |

Thames Tidal Upstream Inundation Modelling

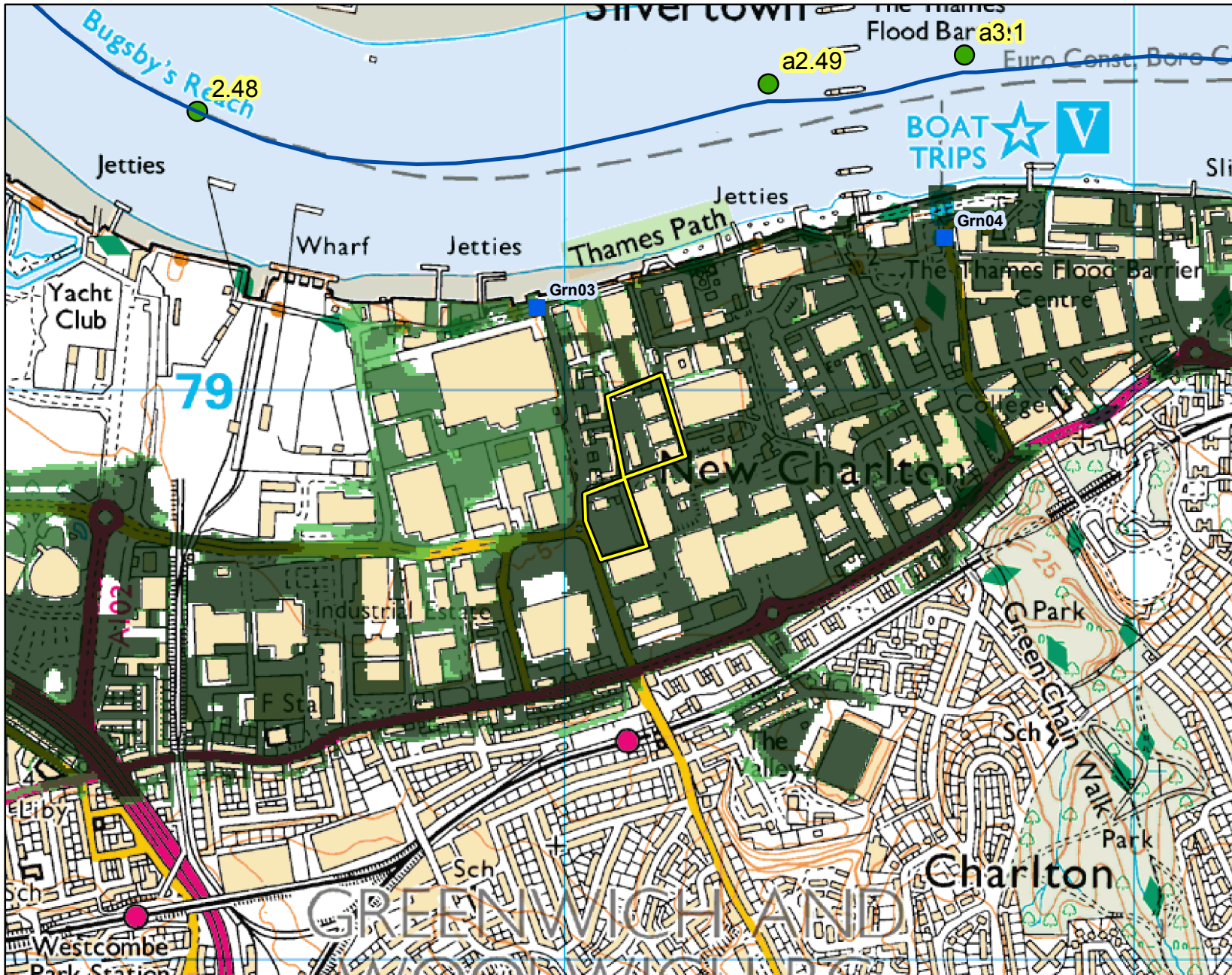
The enclosed map shows results for the Thames Tidal Upstream Inundation Modelling Study 2015 completed by CH2M HILL in March 2015.

Upriver of the Thames Barrier, there is no return period for modelled levels as the levels are controlled by barrier closures. Therefore 2014, 2065 and 2100 epochs were modelled on that basis.

Using the domains updated as part of the Thames Tidal Breach Modelling Study 2015 completed by CH2M HILL in March 2015, the project generated outputs for water depths, velocity, levels and hazard. However the scenario modelled is that the Thames Barrier is operational but all linear defences have been removed. It uses the TE2100 in-channel levels calculated in 2008 and only provides data for embayments upriver of the Thames Barrier.

| Point | National Grid Reference | | Modelled levels in mAODN | | |
|-------|-------------------------|----------|--------------------------|------|------|
| | Easting | Northing | 2014 | 2065 | 2100 |
| 1 | 541055 | 178694 | 3.74 | 4.87 | 5.44 |
| 2 | 541028 | 178754 | 3.74 | 4.87 | 5.44 |
| 3 | 541028 | 178820 | 3.74 | 4.87 | 5.44 |
| 4 | 541093 | 178771 | 3.74 | 4.87 | 5.44 |
| 5 | 541065 | 178937 | Nil return | 4.87 | 5.43 |
| 6 | 541110 | 178966 | 3.70 | 4.87 | 5.43 |
| 7 | 541165 | 179037 | Nil return | 4.93 | 5.42 |
| 8 | 541230 | 178894 | Nil return | 4.87 | 5.43 |
| 9 | 541202 | 178856 | 3.71 | 4.87 | 5.43 |
| 10 | 541178 | 178716 | Nil return | 4.87 | 5.44 |

Breach Modelling Map centred on SE7 7TE created 29 March 2016 [Ref: KSL 6999 TM]



Scale 1: 10,000



Legend

- Main Rivers
- Site
- TE2100 Model Nodes
- Breach Locations

Downriver 0.5% AEP Outlines

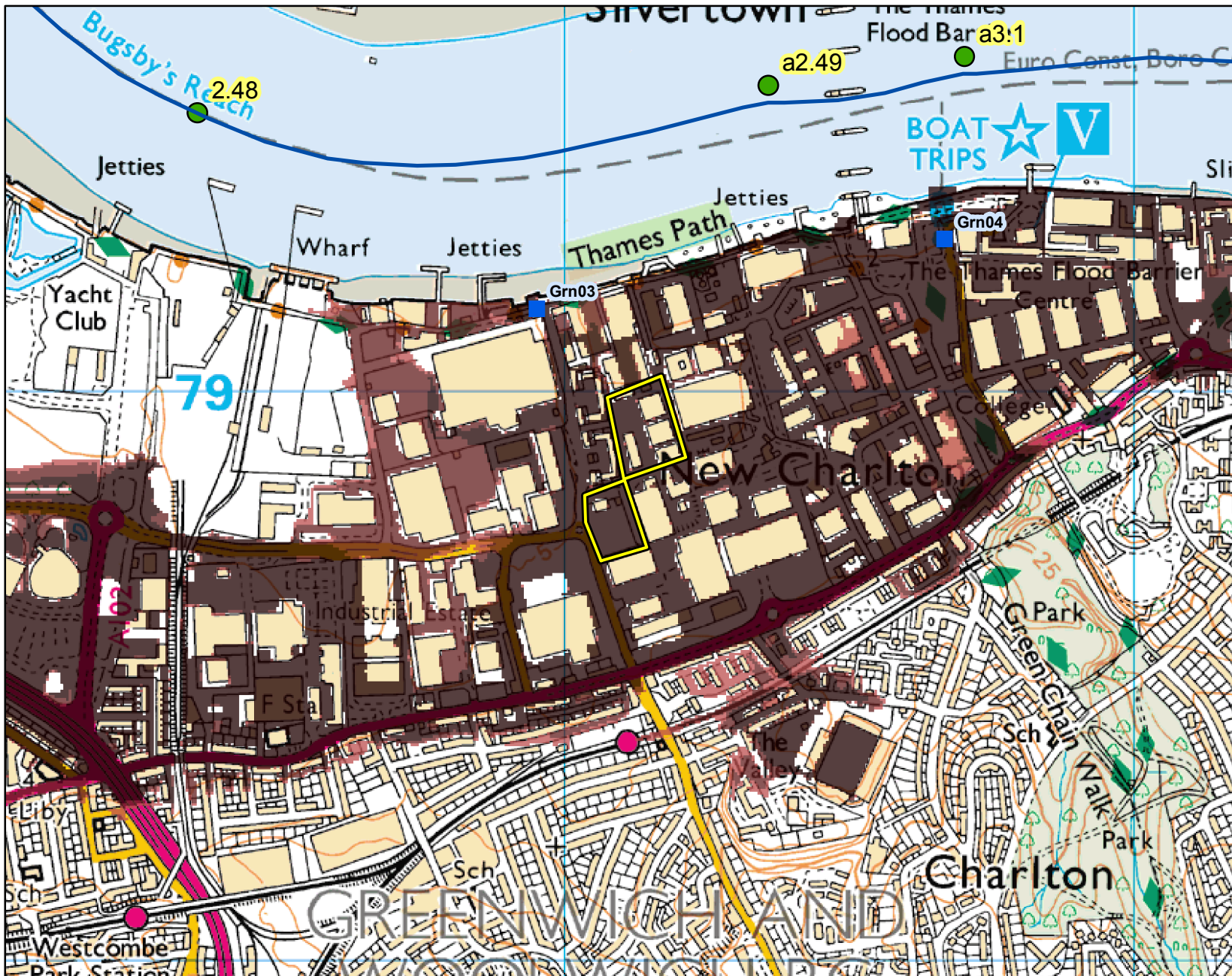
Epoch

- 2014
- 2065
- 2100

Thames Tidal Breach Modelling 2015

A modelled representation of tidal breaches along the Thames from Teddington to the Mar Dyke and River Darent, based on low floodplain topography. For hard and composite defences breaches are set at 20 m wide; for soft defences, breaches are 50 m wide. In both cases, the defence breach scour distance was assumed to extend into the floodplain by the same distance as the breach width. The modelling is based on the 2008 TE2100 in-channel levels, with an allowance for climate change for epochs 2065 and 2100.

Breach Modelling Map centred on SE7 7TE created 29 March 2016 [Ref: KSL 6999 TM]



Scale 1: 10,000



Legend

- Main Rivers
- Site
- TE2100 Model Nodes
- Breach Locations

Downriver 0.1% AEP Outlines

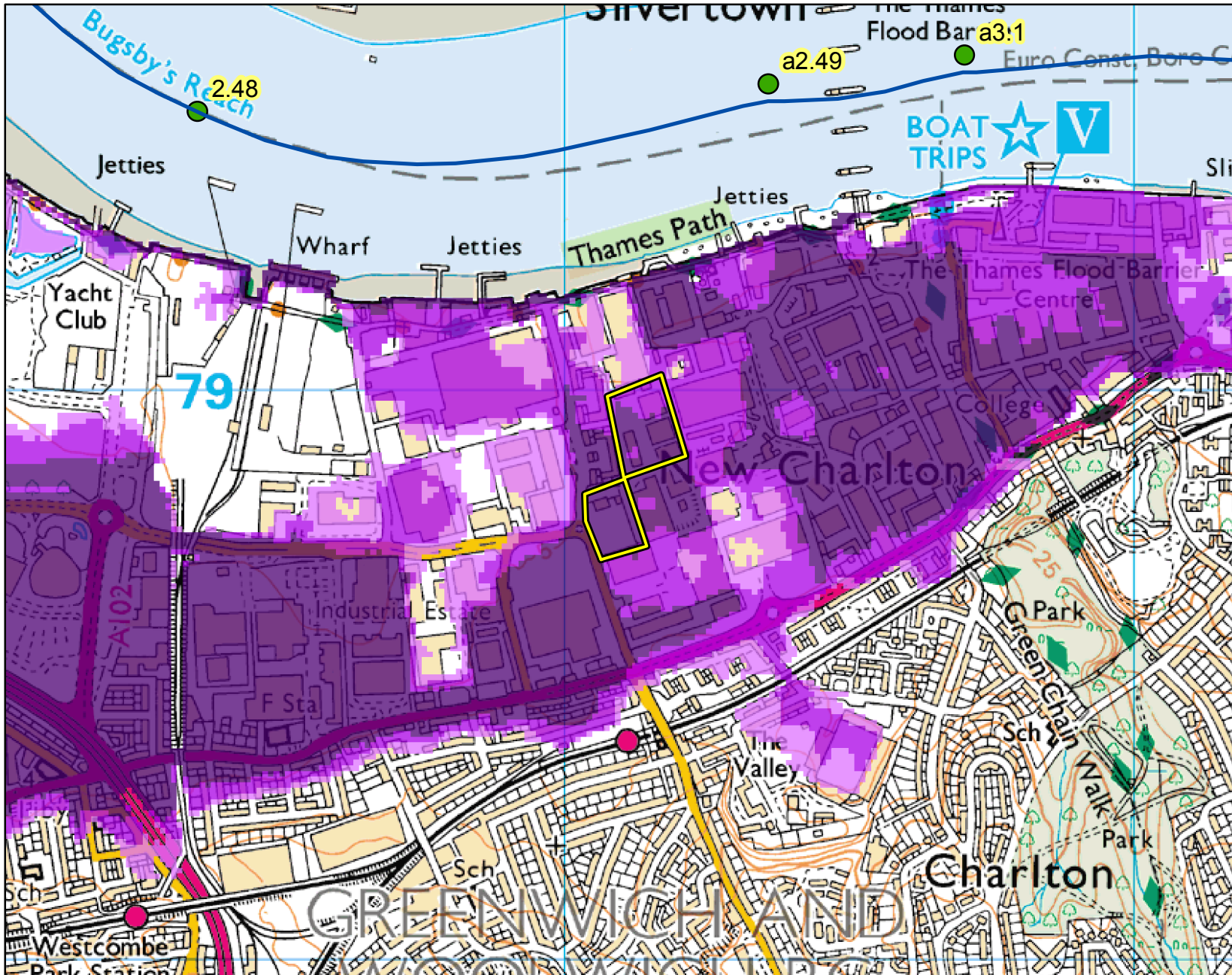
Epoch

- 2014
- 2065
- 2100

Thames Tidal Breach Modelling 2015

A modelled representation of tidal breaches along the Thames from Teddington to the Mar Dyke and River Darent, based on low floodplain topography. For hard and composite defences breaches are set at 20 m wide; for soft defences, breaches are 50 m wide. In both cases, the defence breach scourplain distance was assumed to extend into the floodplain by the same distance as the breach width. The modelling is based on the 2008 TE2100 in-channel levels, with an allowance for climate change for epochs 2065 and 2100.

Upstream Inundation Modelling Map centred on SE7 7TE created 29 March 2016 [Ref: KSL 6999 TM]



Scale 1: 10,000



Legend

Main Rivers

Site

TE2100 Model Nodes

Upriver MLWL Outlines

Epoch

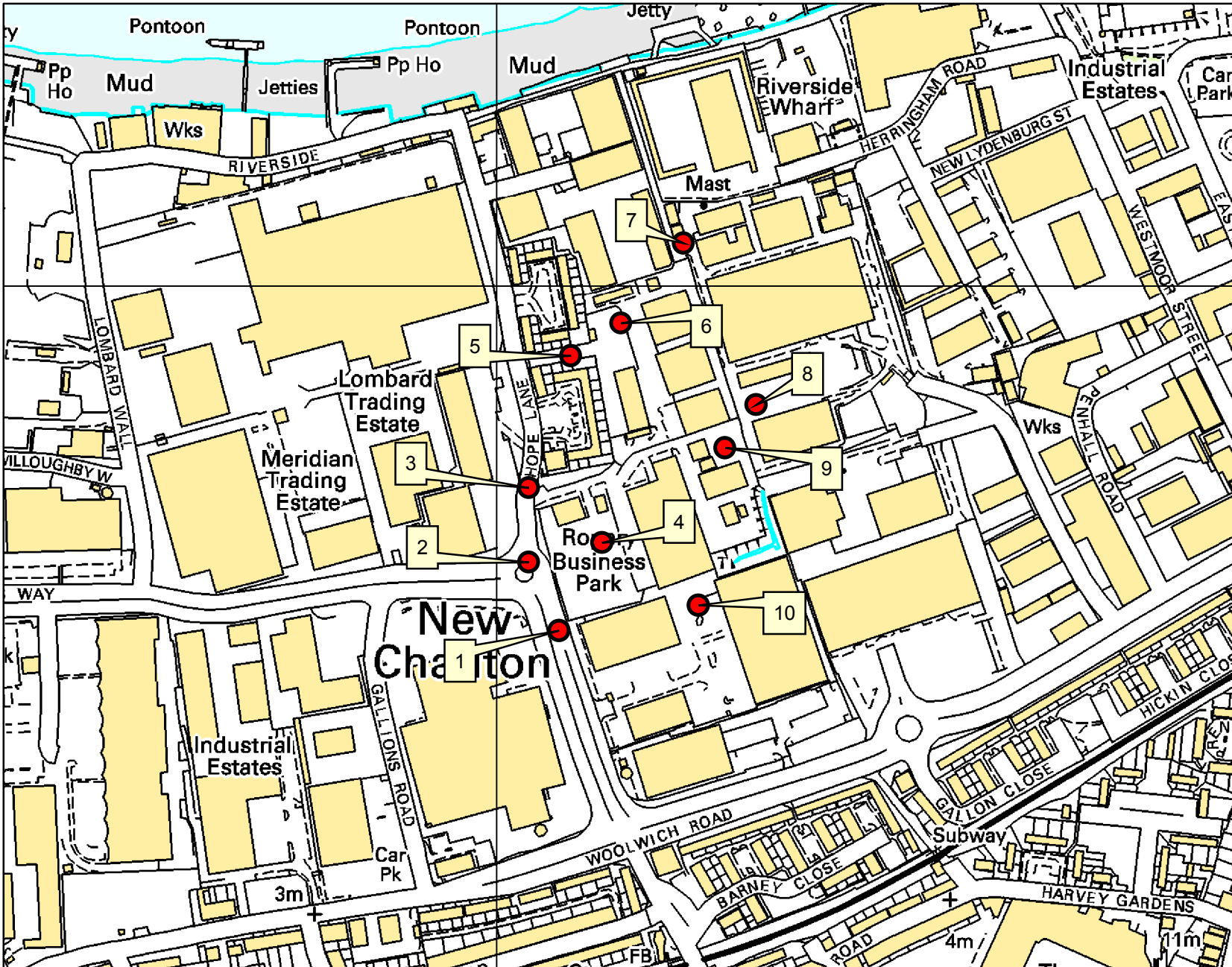
- 2014
- 2065
- 2100

Upstream Inundation Modelling 2015

The modelled scenario is that the Thames Barrier is operational but all linear defences have been removed. The modelling is based on the 2008 TE2100 in-channel levels including an allowance for climate change.

Upstream of the Thames Barrier, there is no return period for modelled levels as the levels are controlled by barrier closers. Therefore 2014, 2065 and 2100 epochs were modelled using Maximum Likley Water Levels (MLWLs).



2D Node Location Map centred on SE7 7TE created 29 March 2016 [Ref: KSL 6999 TM]



Scale 1: 5,000



Legend

-  Main Rivers
-  Nodes

Defence Details

The design standard of protection of the flood defences in this area of the Thames is 0.1% AEP; they 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. It is the riparian owners' responsibility to ensure that they are maintained to a crest level of 5.18m AODN (the Statutory Flood Defence Level in this reach of the Thames). We inspect them twice a year to ensure that they remain fit for purpose. The current condition grade for defences in the area is 2 (good), on a scale of 1 (very good) to 5 (very poor). For more information on your rights and responsibilities as a riparian owner, please see our document 'Living on the edge' found on our website at:

<https://www.gov.uk/government/publications/riverside-ownership-rights-and-responsibilities>

There are no planned improvements in this area. Please see the 'Thames Estuary 2100' document on our website for the short, medium and long term Flood Risk Management strategy for London:

<https://www.gov.uk/government/publications/flooding-thames-estuary-2100-te2100-plan>

Areas Benefiting from Flood Defences

This site is within an area benefiting from flood defences, as shown on the enclosed extract of our Flood Map. Areas benefiting from flood defences are defined as those areas which benefit from formal flood defences specifically in the event of flooding from rivers with a 1% (1 in 100) chance in any given year, or flooding from the sea with a 0.5% (1 in 200) chance in any given year.

If the defences were not there, these areas would be flooded. An area of land may benefit from the presence of a flood defence even if the defence has overtopped, if the presence of the defence means that the flood water does not extend as far as it would if the defence were not there.

Recorded Flood Events Data

We hold records of historic flood events from rivers and the sea. Information on the floods that may have affected the area local to your site is provided below and in the enclosed map (if relevant).

Flood Event Data

1928 – The site was within approximately 110 m of the tidal flooding on the night of the 6th and morning of the 7th January. There was overtopping in the area during a storm surge (which coincided with high fresh water flows). An approximate level in the Thames at the time was 5.02 m AODN.

Due to the fact that our records are not comprehensive, we would advise that you make further enquiries locally with specific reference to flooding at this location. You should consider contacting the relevant Local Planning Authority and/or water/sewerage undertaker for the area.

We map flooding to land, not individual properties. Our historic flood event record outlines are an indication of the geographical extent of an observed flood event. Our historic flood event outlines do not give any indication of flood levels for individual properties. They also do not imply that any property within the outline has flooded internally.

Please be aware that flooding can come from different sources. Examples of these are:

- from rivers or the sea;
- surface water (i.e. rainwater flowing over or accumulating on the ground before it is able to enter rivers or the drainage system);
- overflowing or backing up of sewer or drainage systems which have been overwhelmed,
- groundwater rising up from underground aquifers

Currently the Environment Agency can only supply flood risk data relating to the chance of flooding from rivers or the sea. However you should be aware that in recent years, there has been an increase in flood damage caused by surface water flooding and drainage systems that have been overwhelmed.

Additional Information

Use of Environment Agency Information for Flood Risk/Flood Consequence Assessments

Important

If you have requested this information to help inform a development proposal, then we recommend that you undertake a formal pre-application enquiry using the form available from our website:-

<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

Depending on the enquiry, we may also provide advice on other issues related to our responsibilities including flooding, waste, land contamination, water quality, biodiversity, navigation, pollution, water resources, foul drainage or Environmental Impact Assessment.

In **England**, you should refer to the Environment Agency's Flood Risk Standing Advice, the technical guidance to the National Planning Policy Framework and the existing PPS25 Practice Guide for information about what flood risk assessment is needed for new development in the different Flood Zones. These documents can be accessed via:

<https://www.gov.uk/flood-risk-standing-advice-frsa-for-local-planning-authorities>

<https://www.gov.uk/government/publications/national-planning-policy-framework-technical-guidance>

<https://www.gov.uk/government/publications/development-and-flood-risk-practice-guide-planning-policy-statement-25>

You should also consult the Strategic Flood Risk Assessment produced by your local planning authority.

You should note that:

1. Information supplied by the Environment Agency may be used to assist in producing a Flood Risk/Consequence Assessment (FRA/FCA) where one is required, but does not constitute such an assessment on its own.
2. This information covers flood risk from main rivers and the sea, and you will need to consider other potential sources of flooding, such as groundwater or overland runoff. The information produced by the local planning authority referred to above may assist here.
3. Where a planning application requires a FRA/FCA and this is not submitted or deficient, the Environment Agency may well raise an objection.
4. For more significant proposals in higher flood risk areas, we would be pleased to discuss details with you ahead of making any planning application, and you should also discuss the matter with your local planning authority.

Surface Water

We have provided two national Surface Water maps, under our Strategic Overview for flooding, to your Lead Local Flood Authority – London Borough of Greenwich – who are responsible for local flood risk (i.e. surface runoff, ground water and ordinary watercourse), which alongside their existing local information will help them in determining what best represents surface water flood risk in your area.

The London Borough of Greenwich have reviewed these and determined what it believes best represents surface water flood risk. You should therefore contact this authority so they can provide you with the most up to date information about surface water flood risk in your area.

You may also wish to consider contacting the appropriate relevant Local Planning Authority and/or water/sewerage undertaker for the area. They may be able to provide some knowledge on the risk of flooding from other sources. We are working with these organisations to improve knowledge and understanding of surface water flooding.

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Email: kslenquiries@environment-agency.gov.uk

Website: <https://www.gov.uk/government/organisations/environment-agency>