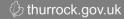
# Strategic Flood Risk Assessment

Sarah Littlewood

AECOM

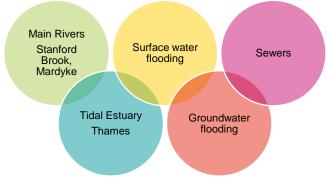


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#### **National Planning Policy Framework Section 14**

Plans and strategic policies should be informed by a **Strategic Flood Risk Assessment**:

- all sources of flooding
- · cumulative impacts in areas susceptible to flooding
- · impacts of climate change
- land that needs to be safeguarded for future flood risk management (FRM)
- opportunities to reduce the causes and impacts of flooding (green infrastructure, natural flood management (NFM)
- locations where climate change could increase flood risk so that development may not be sustainable in the long term

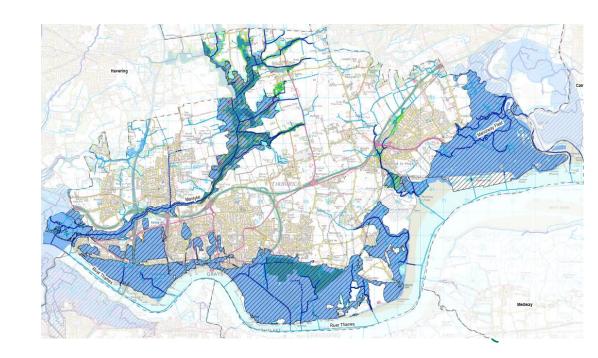


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#### Flooding from sea/estuary: Thames Estuary

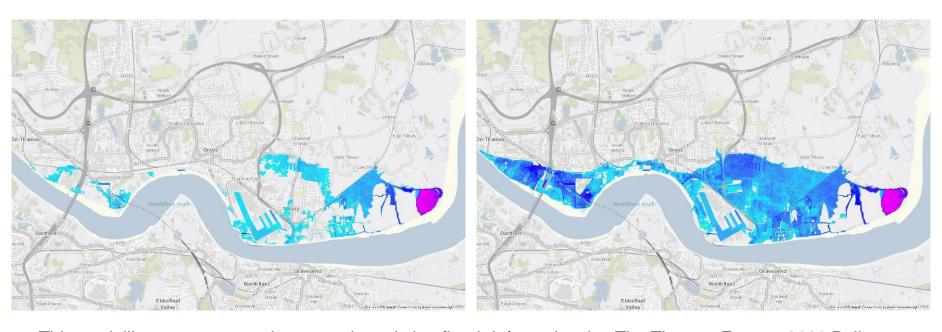
- Large areas of Flood Zone 3

   'high probability' of flooding.
   \*doesn't account for defences
- Shown to benefit from **defences**.
- So, what is the risk?
  - Risk of overtopping of the defences in the future due to climate change
  - 'Residual' risk of breach in defence



### Flooding from sea/estuary: Risk from overtopping

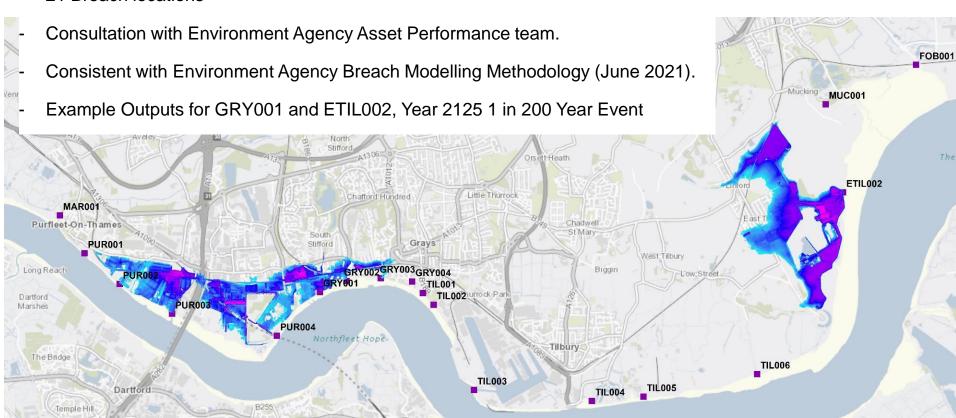
- Example Outputs, Year 2125, 1 in 200 Year Event
- Example Outputs, Year 2125, 1 in 1000 Year Event



- This modelling assumes no change to the existing flood defence levels. The Thames Estuary 2100 Policy most of the Thurrock frontage is to improve defences in line with climate change. Therefore, this provides a conservative understanding of the risk, should defences remain as they are.

## Flooding from sea/estuary: Residual risk of a breach in Thames defences

- 21 Breach locations

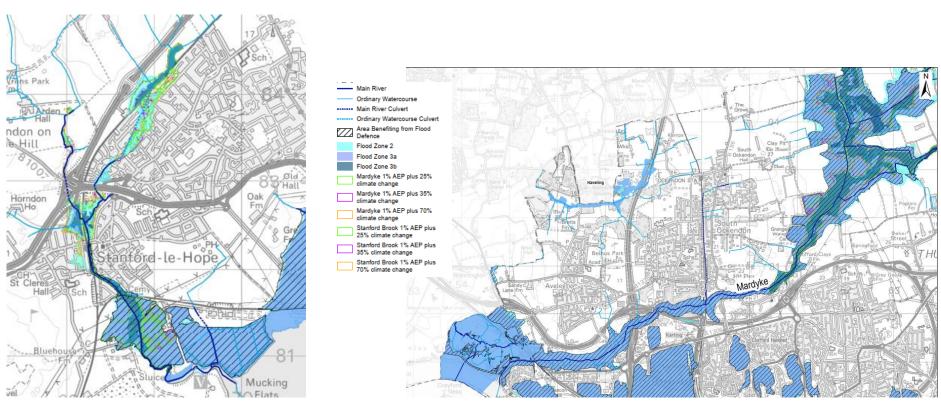


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#### Flooding from rivers: Mardyke, Stanford Brook

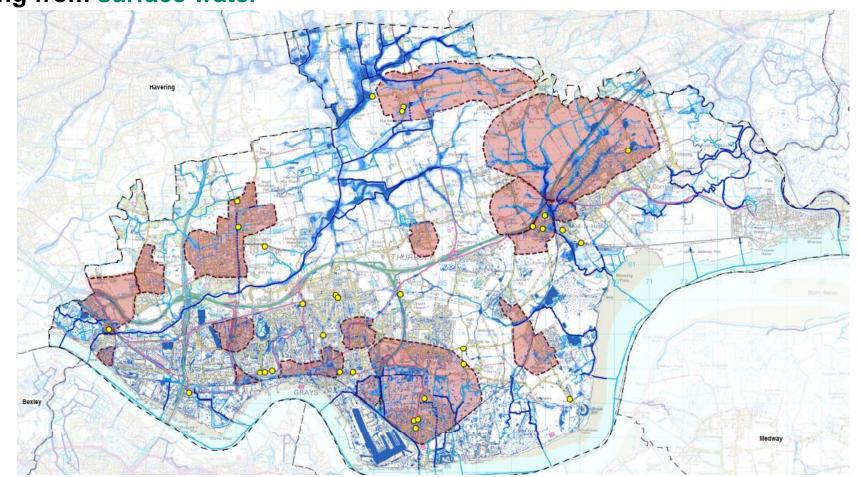
Hydraulic models, latest climate change allowances.

Additional sensitivity analysis study for Mardyke model, to determine potential for cumulative impact of development on flood risk.



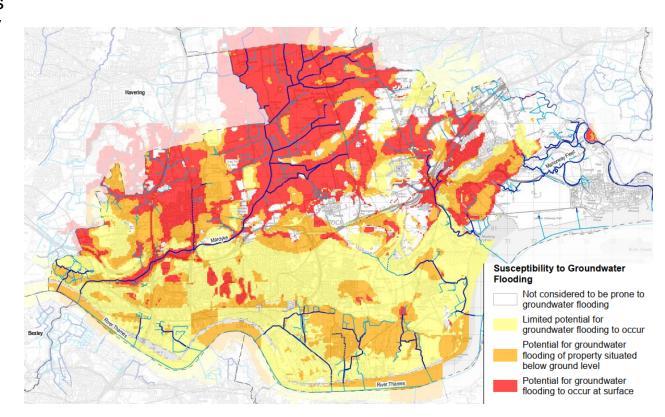
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Flooding from surface water



### Flooding from groundwater

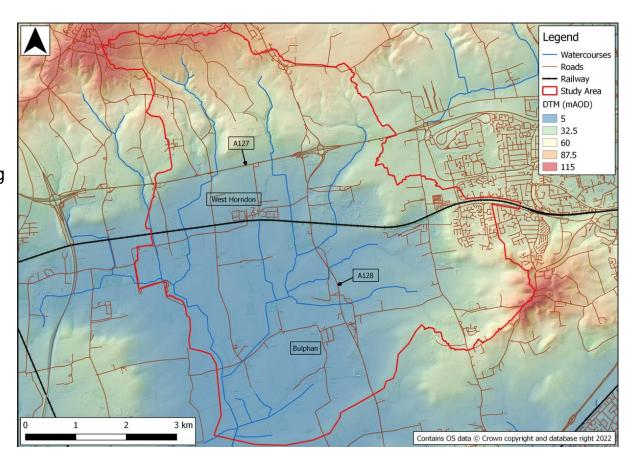
- BGS dataset which provides an overview of susceptibility to groundwater flooding.
- Can be used in connection with historical records to understand risk.



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#### **Local Study: West Horndon**

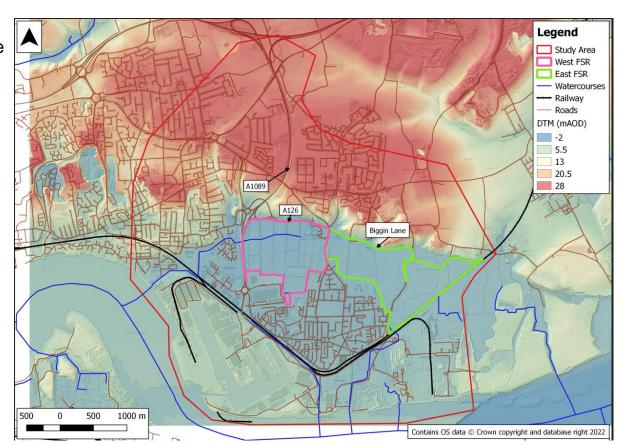
- Interconnected sources of flooding (surface water, sewers, river)
- Integrated Catchment Model
- High level assessment of potential cumulative impact of multiple development sites
- Sensitivity of catchment and existing flooding to future development



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#### **Local Study: Tilbury**

- Interconnected sources of flooding (surface water, sewers, flood storage areas)
- Integrated Catchment Model
- High level assessment of potential cumulative impact of multiple development sites
- Sensitivity of catchment and existing flooding to future development



### **Development management considerations**

Appropriate development types

Sequential approach to site layout

Flood resilient design

**Emergency plans** 

Safe access/escape

Safe refuge



# **Policy recommendations**

Types and location of development

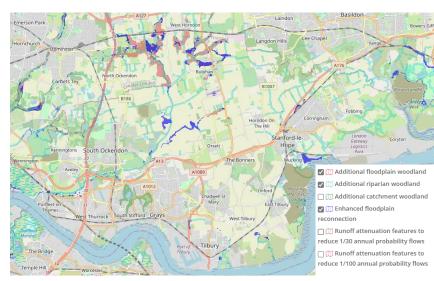
Land that needs to be safeguarded for FRM; set back distances

Management of surface water runoff

Development management

**Emergency planning** 

Opportunities to reduce the causes and impacts of flooding through green infrastructure – working with natural processes.



Screen shot from: https://naturalprocesses.jbahosting.com/Map



#### **Tool for Thurrock Council: Site Assessment Database**

Data to enable Thurrock Council to undertake Sequential Test process.

Α	В	c	D	E	F	G	Н	1	J	K	L	М	N	0	P	Q	R	S	Т	U	١
										Proportio	,		Proportio	Proportio	Proportio	Proportio	Proportio	Proportio	Proportion	Number	.
											Proportio	Proportio			n of Site				of Site	of	
						Initial DRAFT	Proportio	Proportio	Proportio	1		n of Site	1	within	within	within	within	within	overlapping	flooding	
						ranking **NB Refer to Notes in Cell 48 of the 'Datasets'	n of Site within	n of Site within	n of Site within	3.3% AEP for	within 3.3% AEP	within Flood	Mardyke 25%	35%	Mardyke 70% Climate	Stanford 25% Climate	35%	Stanford 70% Climate	"Area	incidents within	s
																					Floo
																					Warn
OMID ▼	Site Name	s v	Thurrock Site Number	Site Classification	Area (H ▼	Tab** ▼	Zone 1 🔻	Zone 2 ▼	Zone 3a ▼	Brook 💌	Mardyl 🔻	Area 💌	Change ▼	Change ▼	Change 💌	Change •	Change *	Change 🔻	Defence" 💌	the Site	▼ Area
M_001				Greenfield	1.511184		100	0	0	C	0	C	0	0	0	(	0	0	(	)	1 The
OM_002				Previously Developed	0.186169		2 0	0	100	C	0	C	0	0	0	(	0 0	0	100	2	23 The
M_003				Previously Developed	0.433794		46.39	3.52	50.09	C	0	C	0	0	0	(	0	0	50.09	9	5 The
M_004				Greenfield	58.44082	4	99.92	0.08	0	C	0	C	0	0	0	(	0 (	0	0.08	3	3 Tid
OM_005				Greenfield	0.426659	9	100	0	0	C	0	C	0	0	0	(	0	0	(	)	0 The
M_006				Greenfield	2.490093		99.67	0.32	0.01		0	C	0	0	0	(	0 (	0	0.01	1	7 The
M_007				Greenfield	9.509598		100	0	0		0	C	0	0	0	(	0	0	(	)	4 Th
800_MC				Greenfield	0.4975		100	0	0		0	C	0	0	0	(	0 (	0	(	)	3 Th
M_009				Greenfield	14.44837	3	87.74	5.89	6.37		0		0	0	0	(	0	0	12.24	1	4 Tic
M_010				Greenfield	2.881314		100	0	0	C	0	C	0	0	0	(	0 (	0	(	)	2 Th
M_011				Previously Developed	0.631854		100	0	0	C	0	C	0	0	0	(	0 0	0	(	) :	2 Th
M_012				Greenfield	3.479307		100	0	0	C	0	C	0	0	0	(	0 0	0	(	1	3 Th
M_013				Greenfield	80.35903		100	0	0	C	0	C	0	0	0	(	0 0	0	(		1 Th
M_014				Greenfield	1.818492	(	100	0	0	C	0	C	0	0	0	(	0 0	0	(	)	9 Th
M_015				Greenfield	26.73649	:	73.42	23.16	3.42	C	15.55	C	0	0	0	22.6	5 23.2	24.18	(	)	8 Th
M_016				Greenfield	14.7656		100	0	0	C	0	C	0	0	0	(	0 0	0	(	)	3 Tid
M_017				Greenfield	1.005467	9	100	0	0	C	0	C	0	0	0	(	0 0	0	(	)	0 Th
M_018				Greenfield	6.305099	:	7 100	0	0	C	0	C	0	0	0	(	0 0	0	(	) .	4 Th
M_019				Greenfield	7.106586	i i	82.54	17.38	0.08		0	C	1.34	1.34	11.41	. (	0 0	0	(	)	6 Th
M_020				Greenfield	2.605614	(	100	0	0		0	C	0	0	0	(	0 0	0	(		3 Th
M_021				Greenfield	23.10571		97.71	0.55	1.74		0	C	0.09	0.09	0.34	. (	0 0	0	1.74		8 Th
M_022				Greenfield	5.08737		100	0	0	C	0	C	0	0	0	(	0 0	0	(	) :	2 Th
OM_023				Greenfield	0.728978	1	7 100	0	0	C	0	C	0	0	0	(	0 0	0	(	)	0 Th
OM_024				Greenfield	0.659885		100	0	0	C	0	C	0	0	0	(	0 0	0	(	) :	2 Th
M_025				Previously Developed	0.59183	9	100	0	0	0	0	0	0	0	0	(	0 0	0	(	)	2 Th
OM_026				Previously Developed	0.347305		100	0	0	C	0	C	0	0	0	(	0 0	0	(		6 Th
OM_027				Greenfield	30.60635	4	99.96	0.04	0		0		0	0	0		0	0	0.04		5 Tic
OM_028				Greenfield	73.02608		0	97.01	2.99	C	0	96.72	0	0	0		0 (	0	100	2	28 Th
OM_029				Greenfield	30.22907		100	0	0	C	0	C	0	0	0		0 0	0	(		9 Th
OM_030				Greenfield	0.386041	(	100	0	0	C	0	C	0	0	0		0 (	0	(	)	4 The
OM 021				Groonfield	0.064065		100	0	1 0		J 0		1 0		0		n	J 0		1	nTh

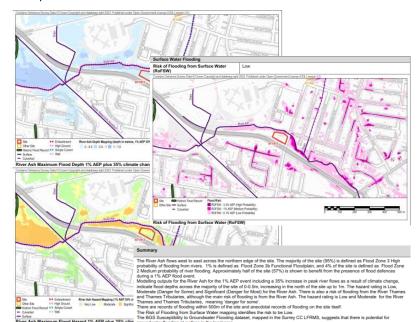
#### **Level 2 SFRA Site Assessments**

Some sites in Thurrock will require application of the Exception Test, e.g., any residential development proposed in Flood Zone 3.

NPPF para. 164: To pass the exception test it should be demonstrated that:

- a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; and
- b) 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.

#### Example extracts of a Level 2 SFRA Site Assessment Sheet:



e specific Recommendations

New development is not permitted in areas of Flood Zone 3b Functional Floodplain. This part of the site should be retained as floodplain and steps taken to restore the land to provide a more natural floodplain for the River Ash.

Residential development is defined as More Vulnerable and is only permitted in Flood Zone 3 where it can be demonstrated that the Exception Test is satisfied i.e. (1) that the proposed development will provide visit outside job for such as a facility of the user, without increasing flood risk, and (2) that it will be safe for its filterine taking account of the vulnerability of its users, without increasing flood risk, and (2) that it will be safe for its filterine taking account of the vulnerability of its users, without increasing flood risk and control and a 10% higher certain.) The following recommendations are made for this site:

 There is built development on the existing site. In order to ensure that future development does not increase the risk of looding, the built footprint of new development of the site should not exceed that of the existing building and where possible should be reduced. Finished floor levels for residential accommodation must be set above the design flood level (1% AEP including climate

 Safe access/egress (i.e. that is dry or Low hazard during the 1% AEP event including climate change) to an area at low risk of flooding is likely to be achievable south along Woodthorpe Road.

The site is located within the Flood Warning Areas for the River Ash (River Ash at Ashford and Staines) and the River Thames at Staines and Egham). Emergency Plans would need to be developed for occupants of the site to set out the response in the event of a flooding warning.

 Development proposals for the site should seek to restrict surface water runoff rates to greenfield rates; demonstrate sustainable approaches to the management of surface water making use of SuDS including green roofs, rainwater harvesting and other innovative technologies; and incorporate soft landscaping, planting and permeable surfacing.

 A preliminary Hydrogeological Risk Assessment (HRA) should be undertaken to determine ground conditions and groundwater levels in proximity to the site, and to identify whether the proposed development will impact on groundwater, either from subsurface construction or from changes to surface water drainage. Should the preliminary HRA identify potential for impact, a full HRA should be prepared to identify proposed mitigation measures. Refer to Section 5.7 in the Level 1 SFRA Record.

#### Summary: Considering flood risk in plan making and site selection

Update Flood Risk Evidence
Base

Apply **Sequential Test** to Sites

Are sites at medium or high risk of flooding required to meet targets?

Undertake Level 2 Site Assessment work, to inform **Exception Test** 

 Strategic Flood Risk Assessment (AECOM)

- Site Assessment Database (AECOM)
- Document Sequential Test Process & Decisions (Thurrock Council)
- Outcome from Site Selection Decisions (Thurrock Council)
- Level 2 SFRA Site
   Assessments to inform part
   (2) of the Exception Test
   (AECOM)



# **LURB NPPF Proposed Amendments**

- ☐ Minor modification to the presumption in favour
- ☐ Removal of the justified test of soundness.
- Additional text relating to Green Belt
- Emphasis on design has been strengthened further, with a focus on 'beautiful design' throughout and the requirement for LPAs to bring forward design codes for their area
- ☐ Greater weight to energy efficiency improvements in existing buildings and there is also increased support for applications for the repowering and life-extension of existing renewable sites.

'Green Belt boundaries are not required to be reviewed and altered if this would be the only means of meeting the objectively assessed need for housing over the plan period.'