

Flood Map for Planning and Modelling Data Review

Introduction

At each of the sites assessed in the Oxford Level 2 Strategic Flood Risk Assessment (SFRA) a comparison has been made between i). the EA's nationally available Flood Map for Planning (FMfP) extents and ii). hydraulic modelling data held for the watercourses within Oxford. In many locations the hydraulic modelling data informs the FMfP and the flood extents are identical. However, following the release of the updated National Flood Risk Assessment (NaFRA) in early 2025, there are cases where the new national model replaces or is combined with existing modelling data leading to differences.

Following this exercise, a decision has been reached at each site upon the best data to assess flood risk. This technical note details the methods applied and the key findings.

Modelling Data available

The bullet points below summarise the hydraulic modelling data available for watercourses which affect the sites assessed in the level 2 SFRA.

- Hydraulic modelling data for the River Thames and tributaries (2018¹, 2021²)
- Hydraulic modelling data from the Northfield and Littlemore Brook (2011³)
- Hydraulic modelling data for the Boundary Brook (2010⁴)

This data was compared with the latest flood extents in the FMfP. This showed that for the majority of events the outputs from the Thames model aligned with the FMfP; indicating that it informs the FMfP. Where differences were observed, they are only for certain events or in specific locations. They tended to be very minor and are thought to be due to post-processing of the FMfP extents.

In terms of the Northfield and Littlemore Brook model and the Boundary Brook model the FMfP extents differ significantly. It is thought that the new national model now informs the FMfP along these watercourses. The decision to use the new national model is likely based on the age of the existing model data and potential limitations. For example, the boundary brook model is 1D only so flow routing across the wider floodplain is not represented.

Approach for Flood Extents

For sites affected by the Northfield, Littlemore and Boundary Brooks, the FMfP extents are used exclusively. This includes the extents for flood zone 2 and 3, the 3.3% defended extents and climate change extents. The FMfP extents pick up flooding within and close to the channel in more detail and include extents for the upper reaches which are not included in the older detailed models. Furthermore, the Boundary Brook model was never run for a 3.3% AEP event so has no data with which to inform Flood Zone 3b.

In terms of the River Thames as mentioned the extents are identical in most cases with only slight differences for certain events and locations. As the FMfP flood zones are obligatory for planning they are used at all sites. However, the 3.3% extents and the climate change extents for have been reviewed on a site-by-site basis.

In general, a precautionary approach has been adopted, with the dataset showing the greatest flood extent at each site selected. Where the 3.3% AEP extents are close to identical, the detailed modelling dataset has been used. This is because it provides undefended flood extents, which are not available in the FMfP. Where available, the undefended scenario is considered to be a better

¹ CH2M (2018) *Oxford Baseline Hydraulic Modelling*

² Jacobs (2022) *Oxford Flood Alleviation Scheme Modelling*

³ EA (2011) *Northfield & Littlemore Brook Hydraulic Model*

⁴ EA (2010) *Boundary Brook Hydraulic Model*

representation of Flood Zone 3b. It should be noted that the impact of defences on flood extents in Oxford is very small due to limited flood defence infrastructure.

Approach for Flood Depths

To assess fluvial flood risk in more detail at some sites depth data for the design 1.0% AEP plus central climate change event was required. For sites in Flood Zone 3b, an assessment of the 1.0% AEP plus higher central climate change event was also required. Note, the FMfP only provides extent data for the 1.0% AEP plus central climate change event. For sites impacted by the River Thames, depth data from the Thames model could be used. The model aligns with the FMfP and also contains flood data for both climate change events.

For sites impacted by the Littlemore Brook, Northfield Brook or Boundary Brook, a different approach was necessary as the existing modelling data is not used by the FMfP. In general the approach adopted has been to use the Risk of Flooding from Rivers and Seas (RoFRS) dataset. Whilst depth data is not available for the FMfP climate change extents, it is available for the RoFRS climate change extents. The two datasets are very similar, however when assessing climate change the FMfP considers the 2080s epoch (2070-2125), whereas the RoFRS is based on the 2050's epoch (2041-2069). The RoFRS extents were reviewed and where they were very similar to the FMfP extents, the RoFRS depth data was considered suitable for the purposes of the SFRA.

In cases where differences were significant LIDAR topographical data was used to estimate the flood level associated with the FMfP climate change extents. This flood level was then extrapolated across the relevant site to determine probable flood depths.

Site by Site Review

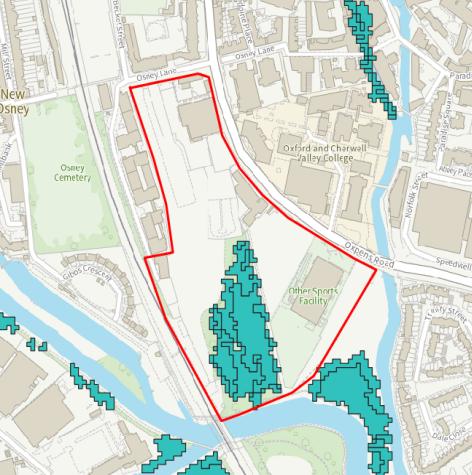
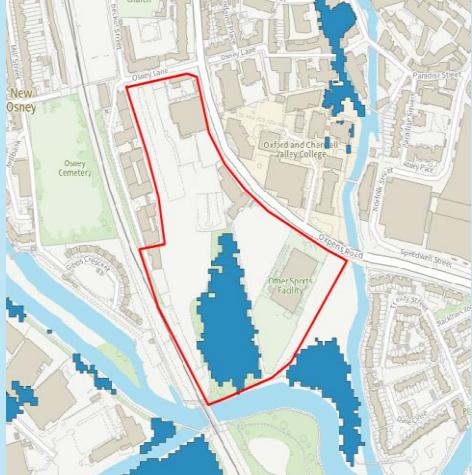
The tables overpage provide a summary of the review process at each site. Table 1 considers the 3.3% AEP extent whilst Table 2 considers the 1.0% AEP + Climate Change extent.

Table 1- Review of 3.3% AEP Extents at each Level 2 Site

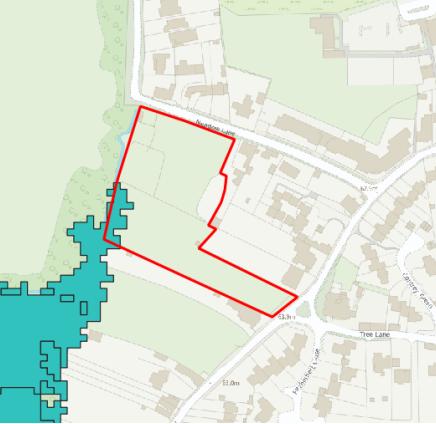
Site Ref	Site Name	Hydraulic Modelling Data	Flood Map for Planning	Decision
008a	Bertie Place Recreation Ground			<p>Close to identical flood extents at the site. Opt for FMfP as flooding to the west of site not fully captured in modelling data.</p>
11	Canalside Land, Jericho			<p>Extents close to identical and similar proportion of site flooded. Opt for hydraulic modelling data as undefended.</p>

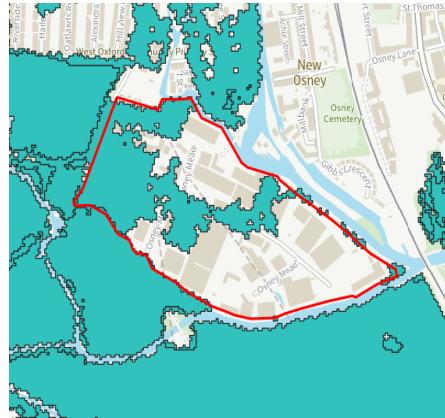
16	Cowley Marsh Depot	Not available.		FMfP extents are selected, 3.3% AEP extents are not available from the Boundary Brook hydraulic model.
028a	Kassam Stadium			FMfP extents are selected, these pick up flooding within and close to the channel in more detail and include extents for the upper reaches which are not included in the older detailed models.
028b	Overflow carpark at Kassam Stadium site			FMfP extents are selected, these pick up flooding within and close to the channel in more detail and include extents for the upper reaches which are not included in the older detailed models.

028c	Ozone Leisure Complex & Minchery Farmhouse	 	<p>FMfP extents are selected, these pick up flooding within and close to the channel in more detail and include extents for the upper reaches which are not included in the older detailed models.</p>
31	Manor Place	 	<p>FMfP extents are selected. Whilst these are defended, they show a slightly greater extent in areas around the site. This guarantees a precautionary approach to flood risk.</p>

70	Island Site			<p>FMfP extents are selected. Whilst these are defended, they show a slightly greater extent at the site and in areas around the site. This guarantees a precautionary approach to flood risk.</p>
76	Oxpens			<p>Extents close to identical and similar proportion of site flooded. Opt for hydraulic modelling data as undefended.</p>

81	Worcester Street Car Park and Public House			<p>Extents close to identical and similar proportion of site flooded. Opt for hydraulic modelling data as undefended.</p>
117	Land surrounding St Clement's Church			<p>Extents close to identical and similar proportion of site flooded. Opt for hydraulic modelling data as undefended.</p>

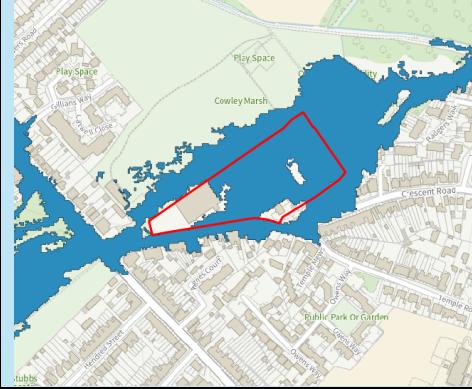
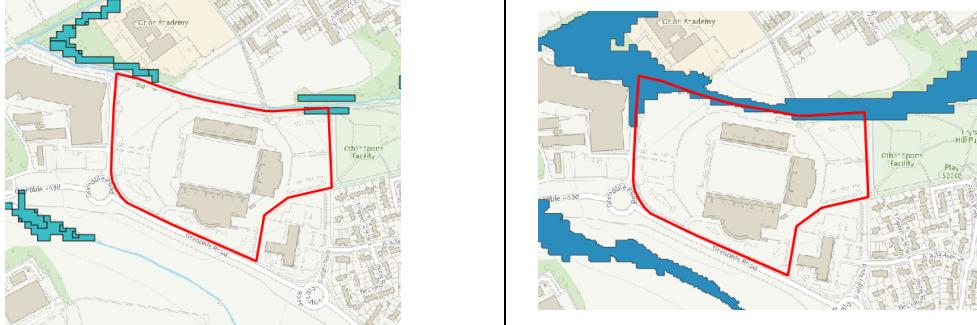
389	Land at Meadow Lane			<p>Extents close to identical and similar proportion of site flooded. Opt for hydraulic modelling data as undefended.</p>
516	474 Cowley Road	Not available.		<p>FMfP extents are selected, 3.3% AEP extents are not available from the Boundary Brook hydraulic model.</p>

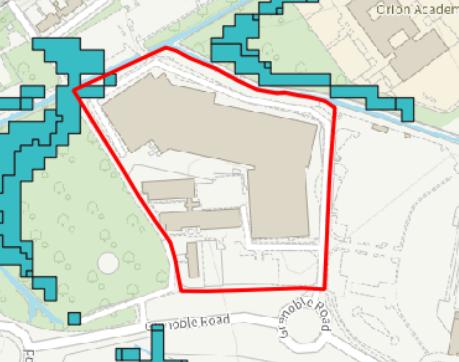
586	Osney Mead			<p>FMfP extents are selected. Whilst these are defended, they show a slightly greater extent at the site and in areas around the site. This guarantees a precautionary approach to flood risk.</p>
588	Oxford Science Park			<p>FMfP extents are selected, these pick up flooding within and close to the channel in more detail and include extents for the upper reaches which are not included in the older detailed models.</p>

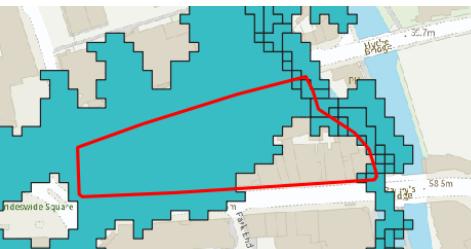
613, 614, 615	Botley Road sites around Cripley Road including River Hotel and Westgate Hotel			<p>FMfP extents are selected. Whilst these are defended, they show a slightly greater extent in areas around the site. This guarantees a precautionary approach to flood risk.</p>
616	St Thomas and Osney Warehouse			<p>Extents close to identical and similar proportion of site flooded. Opt for hydraulic modelling data as undefended.</p>
624	Land south of Frideswide Square			<p>Use national mapping. Defended but shows slightly worst-case extent so guarantees precautionary approach, even if site is outside of flood extents.</p>

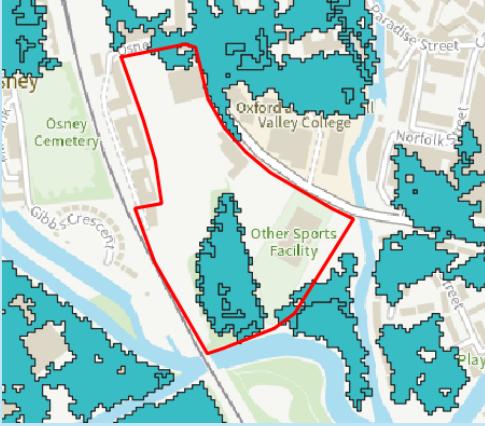
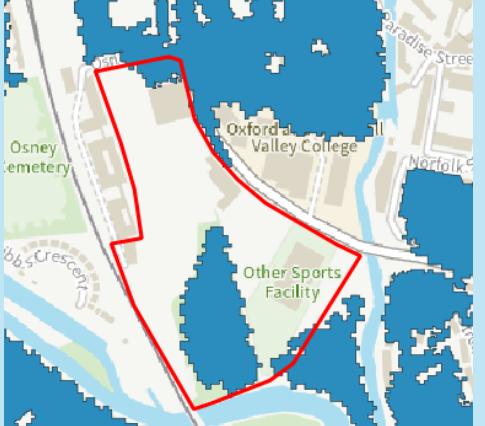
Table 2- Review of 1.0% AEP plus Climate Change Extents at each Level 2 Site

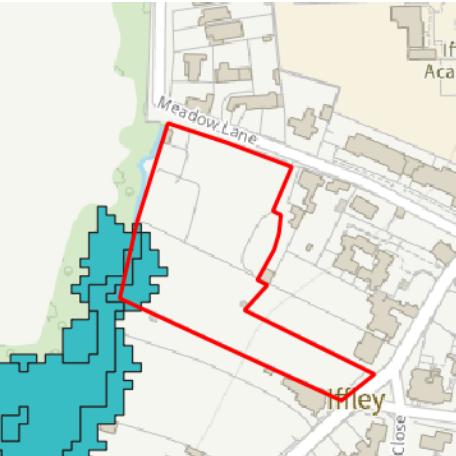
Site Ref	Site Name	Hydraulic Modelling Data	Flood Map for Planning	Decision
008a	Bertie Place Recreation Ground			<p>Extents are close to identical at the site. FMfP used to inform extent mapping as it captures flooding to the west of the site. However, given similarity confident to use SFRA depth data and higher central extent to inform more detailed analysis of flood risk.</p>
11	Canalside Land, Jericho			<p>Extents are close to identical, confident to use SFRA depth data and higher central extent to inform more detailed analysis of flood risk.</p>

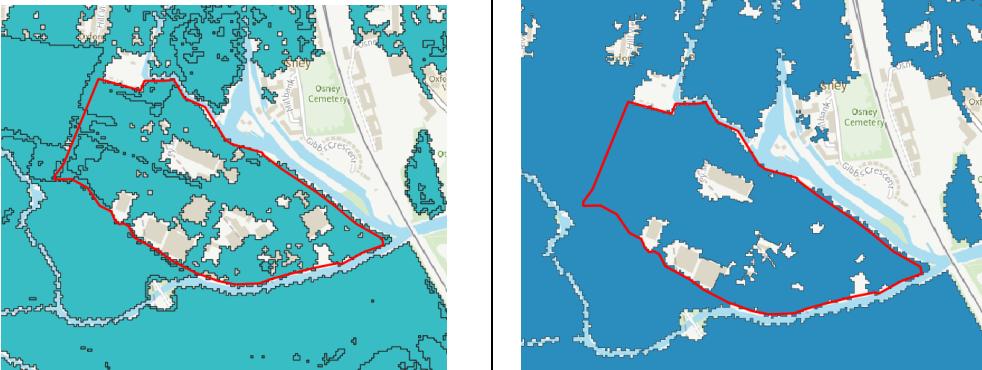
16	Cowley Marsh Depot	Not available.		<p>Climate Change extents for latest allowances not available in Boundary Brook model. FMfP extents used with extrapolation using LIDAR data applied to estimate flood depths.</p>
028a	Kassam Stadium			<p>FMfP extents show greater extent, capturing flooding within and close to the channel in more detail. To assess flood depth RoFRS data has been used.</p>

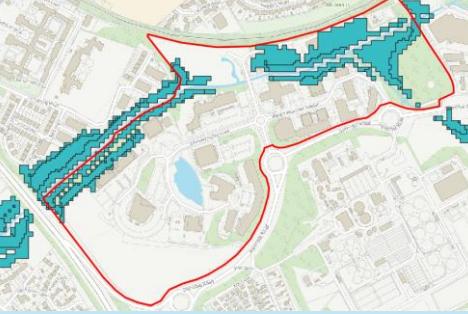
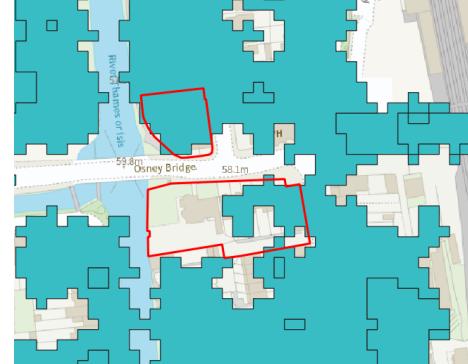
028b	Overflow carpark at Kassam Stadium site			<p>FMfP extents show greater extent, capturing flooding within and close to the channel in more detail. To assess flood depth RoFRS data has been used.</p>
028c	Ozone Leisure Complex & Minchery Farmhouse			<p>FMfP extents show greater extent, capturing flooding within and close to the channel in more detail. To assess flood depth RoFRS data has been used.</p>

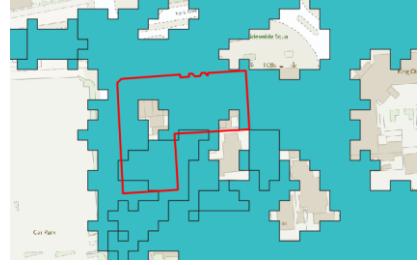
31	Manor Place			<p>FMfP extent is slightly greater so used to inform extent mapping. Hydraulic modelling extent remains similar enough to use in detailed assessment of flood depths.</p>
70	Island Site			<p>FMfP extent is slightly greater so used to inform extent mapping. Hydraulic modelling extent remains similar enough to use in detailed assessment of flood depths.</p>

76	Oxpens			<p>Extents are close to identical, confident to use SFRA depth data and higher central extent to inform more detailed analysis of flood risk.</p>
81	Worcester Street Car Park and Public House			<p>Extents are close to identical, confident to use SFRA depth data and higher central extent to inform more detailed analysis of flood risk.</p>

117	Land surrounding St Clement's Church			<p>Hydraulic model extent is slightly greater so used to inform extent mapping. Both extents remain similar enough to use in detailed assessment of flood depths.</p>
389	Land at Meadow Lane			<p>FMfP extents are greater due to representation of upper reaches of river channel. These are used for extent mapping. For detailed assessment of flood depths, whilst the extents differ, the Thames model is still considered representative of the primary flood risk to the site. It also contains data for both climate change scenarios (i.e. central and higher central)</p>

516	474 Cowley Road	Not available.		Climate Change extents for latest allowances not available in Boundary Brook model. FMfP extents used with extrapolation using LIDAR data applied to estimate flood depths.
586	Osney Mead			Extents are close to identical, confident to use SFRA depth data and higher central extent to inform more detailed analysis of flood risk.

588	Oxford Science Park			<p>Extents differ likely due to representation of river channel. Recommend that section 4 assess 1D flood levels in the SFRA model and the national extents against available LIDAR. This should give idea of likely depth at the site.</p>
613, 614, 615	Botley Road sites around Cripley Road including River Hotel and Westgate Hotel Sites			<p>Extents are close to identical, confident to use SFRA depth data and higher central extent to inform more detailed analysis of flood risk.</p>

616	St Thomas and Osney Warehouse			<p>FMfP extent is slightly greater so used to inform extent mapping. Hydraulic modelling extent remains similar enough to use in detailed assessment of flood depths.</p>
624	Land south of Frideswide Square			<p>FMfP extent is slightly greater so used to inform extent mapping. Hydraulic modelling extent remains similar enough to use in detailed assessment of flood depths.</p>