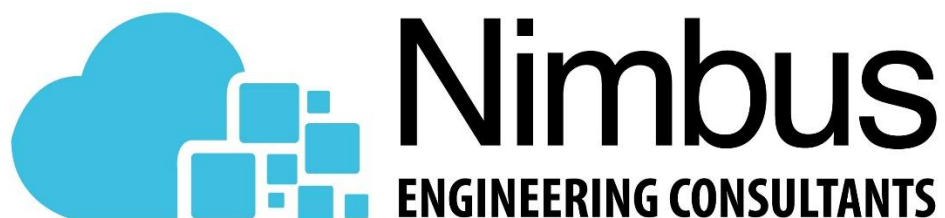


VOID BLOCKAGE SCENARIO ANALYSIS REPORT
FOR WARREN CREEK, THE WARREN,
CAVERSHAM, RG4 7TQ

DOCUMENT NUMBER.: C3710-R2-REV-B

PREPARED BY



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1. BRIEF

The scope of the project is to provide information to discharge the following planning condition, and this report focusses on point d) as the Void blockage scenario results:

4. No development shall commence on site, barring any demolition works down to existing ground levels only, until a scheme to mitigate flood risk impact has been submitted to and been approved in writing by the Local Planning Authority. The scheme shall include:
 - a) Detailed proposals of the compensatory flood storage being provided.
 - b) Details of the void design, including the height of the openings from ground level to above design flood level.
 - c) Details to ensure there will be no ground level raising on site.
 - d) Void blockage scenario analysis for multiple flood events up to and including the design flood, including a reasonable worst case scenario.

The scheme shall be fully implemented prior to the first occupation of the dwelling hereby approved and subsequently maintained throughout the lifetime of the development.

Reason: To reduce the risk of flooding to the proposed development and future occupants and to reduce the risk of increasing flood risk elsewhere, in accordance with section 14 of the National Planning Policy Framework (December 2024, as amended) and Policy EN18 of the Reading Borough Local Plan 2019.

2. STUDY AREA

2.1. Catchment location

The Site is located in Caversham Heights Reading adjoining Thames River. This study develops on existing fluvial risk flood study ‘Caversham Flood Alleviation Scheme project (Jacobs,2021)’.

The initial model extent of the river section is shown in Figure 1.

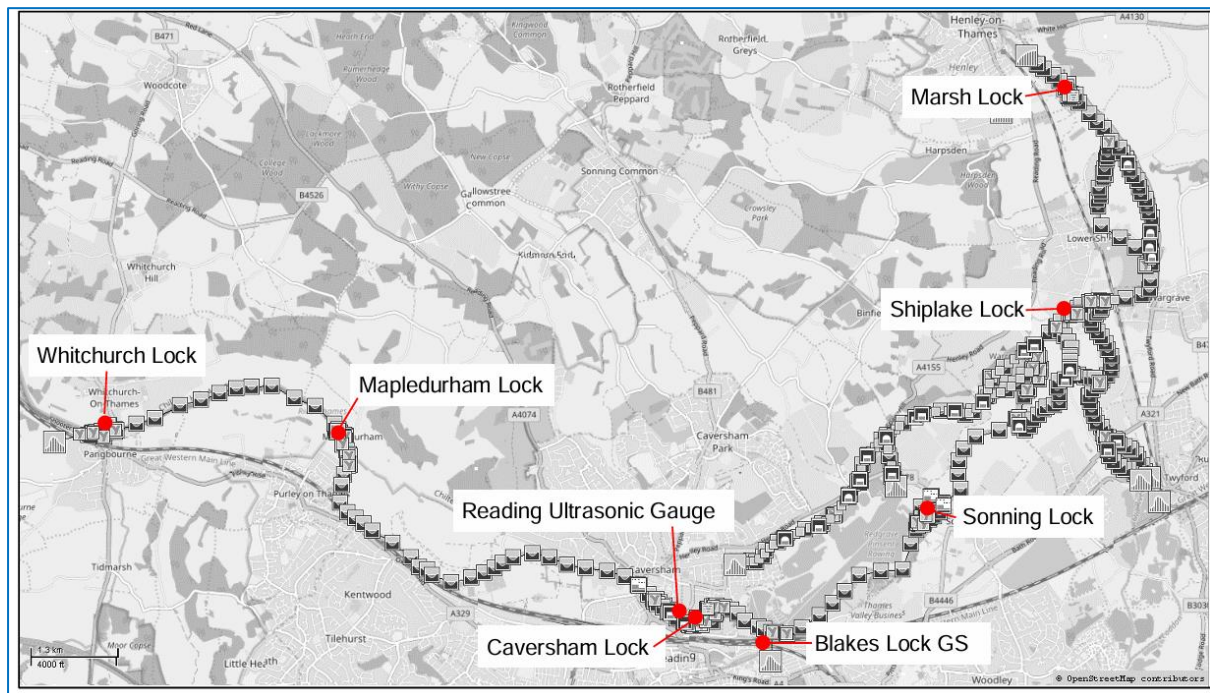


Figure 1

2.1.1. Watercourses

The principal modelled fluvial flood source is the River Thames. Warren Creek is present adjacent to/within the site setting and has been considered as part of the local site context, but the hydraulic modelling assessment is based on the River Thames flood model inputs described in this report.

2.2. Site survey

The existing topographic levels were obtained at the proposed development that would be used to assess the flood levels at the site

3. Methodology

3.1. Choice of approach

The Environment Agency's Caversham Flood Alleviation Scheme model (Jacobs, 2021) was adopted for this assessment. The model was truncated to the local study area and refined to a finer resolution suitable for site-specific analysis.

Inflow boundaries (river and floodplain flows) were taken directly from the original model as upstream conditions, while water levels from the same model were applied as downstream boundaries.

The modified model was then validated against the original by comparing flood depths and extents in the vicinity of the site, confirming its suitability for use in the site-specific flood risk assessment.

The purpose of this study was to assess the impact of void under the proposed building on the flood levels. The 50% blockage representation has been adopted as a conservative reasonable worst-case blockage scenario for the purposes of Condition 4 of the proposals. The flood levels around the site to this scenario are assessed.

4. HYDRAULIC MODELLING

4.1. Model Extent and Schematic

The truncated model extent is shown in Figure 2 as described above along the location of site.

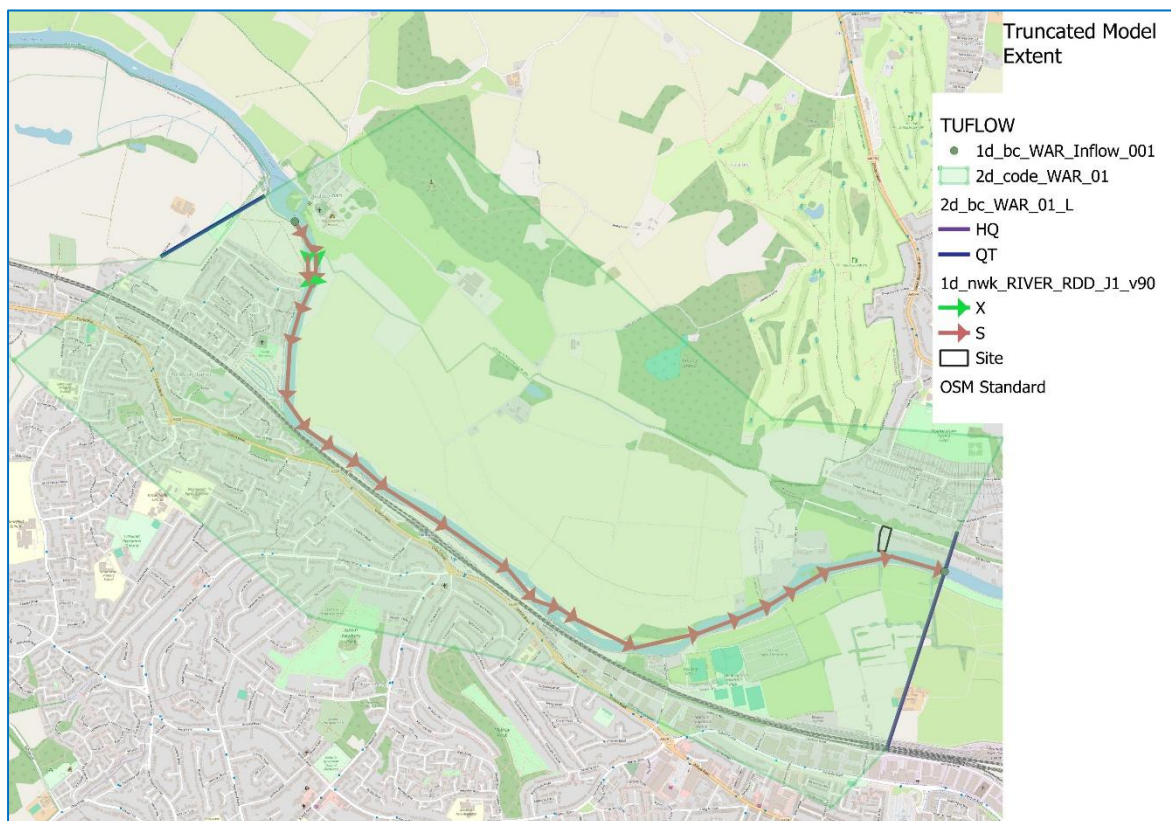


Figure 2: Truncated Model Extent Schematic

The model is truncated at Node 36.149 from the original model that is near Mapledurahm house. This is where river flow is obtained along with overland flows at the location. All other hydraulic inputs are based on the original model including terrain, topography modifications, and land use data.

The model was validated with the original model for Q100 years with extents and flood levels at the site as in Figure 3 & 4.

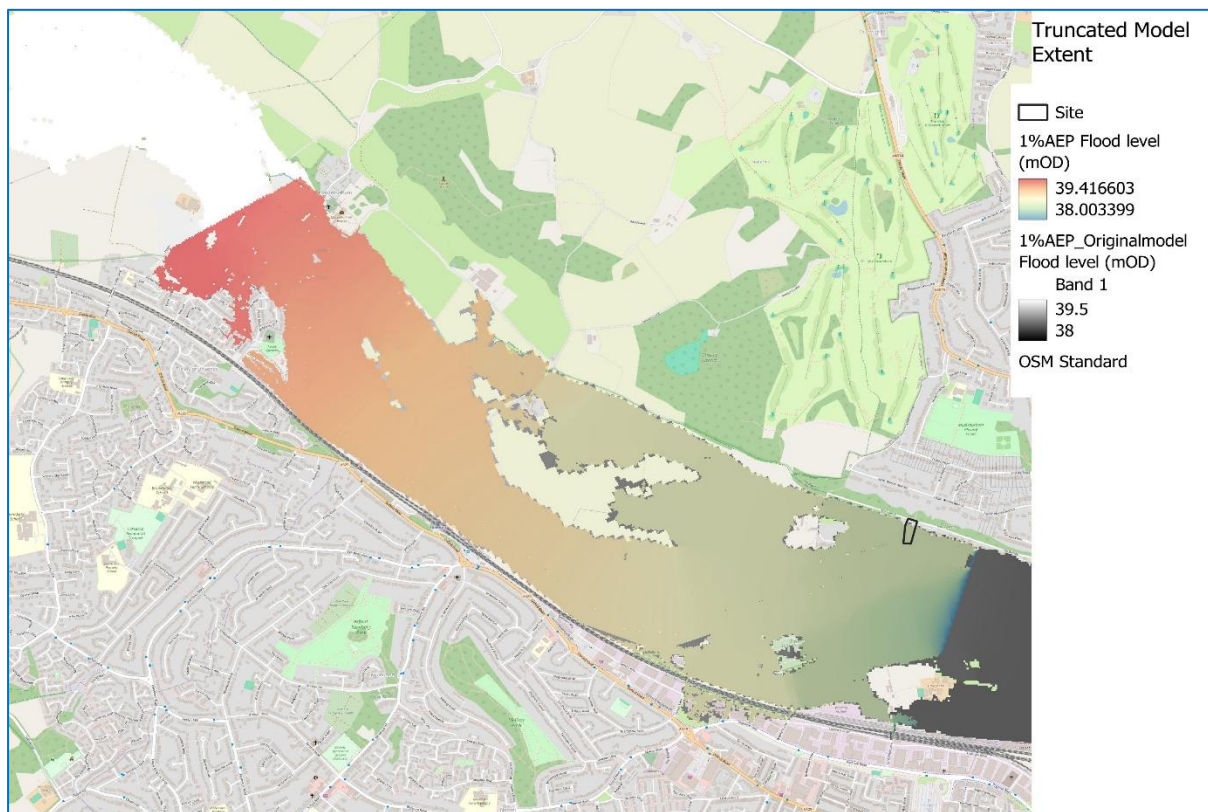


Figure 3 : Validation of Truncated model extents to original model extent



Figure 4 : Validation of Truncated model flood levels to original model at the site

4.2. 2d Domain

The basis of the 2D Domain was developed using the original model DTM. A 4m cell size was used in the study that was appropriate to represent fluvial flooding around the Thames River and the flooding at the site.

4.3. Development and void representation

The post-development scenario, the building footprint was represented in TUFLOW using a depth-varying flow constriction (2d_lfcsh). The ground level up to the entrance finished-floor level was modelled assuming 50% blockage, with full blockage applied above this level. This approach provides a conservative representation of flow behaviour under the proposed development conditions.

4.4. Surface roughness

All the roughness factors from the original model truncated to the model extent are used in this study.

4.5. Boundary conditions

River Inflow at node 36.149 from the original model is applied along with floodplain flows as QT boundary along the right bank of the river. The downstream boundary is modelled as a time varying water level based on original model.

5. MODEL RESULTS

The model was run for 3.33% AEP, 1% AEP, 0.1% AEP and 1%AEP plus 43% Climate Change event for both the existing scenario and development scenario (Void scenario). The model has run successfully without any issues along with normal parameters. The results map for the above events is given in the following sections.

5.1. Existing scenario – 1% AEP Flood Depth

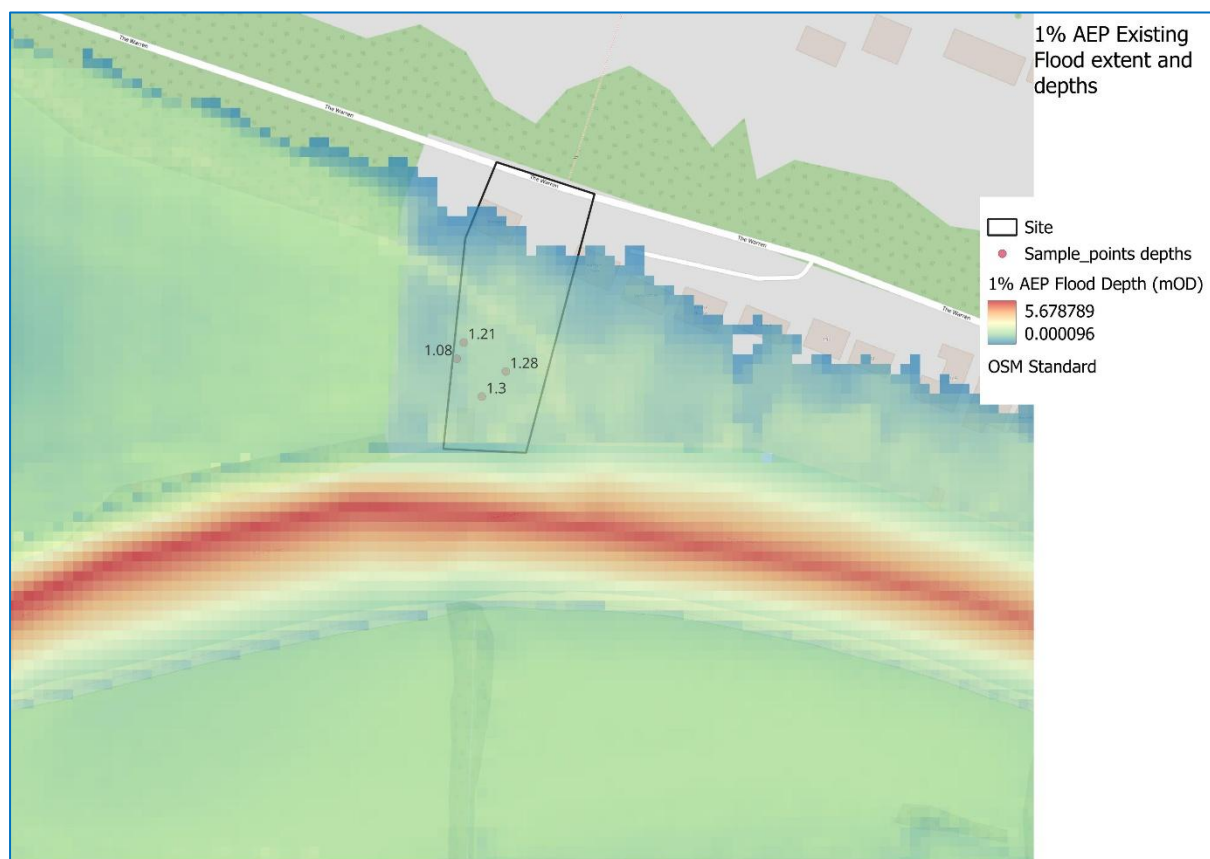


Figure 5 : 1% AEP Flood depth – Existing scenario

5.2. Development scenario – 1% AEP Flood Depth

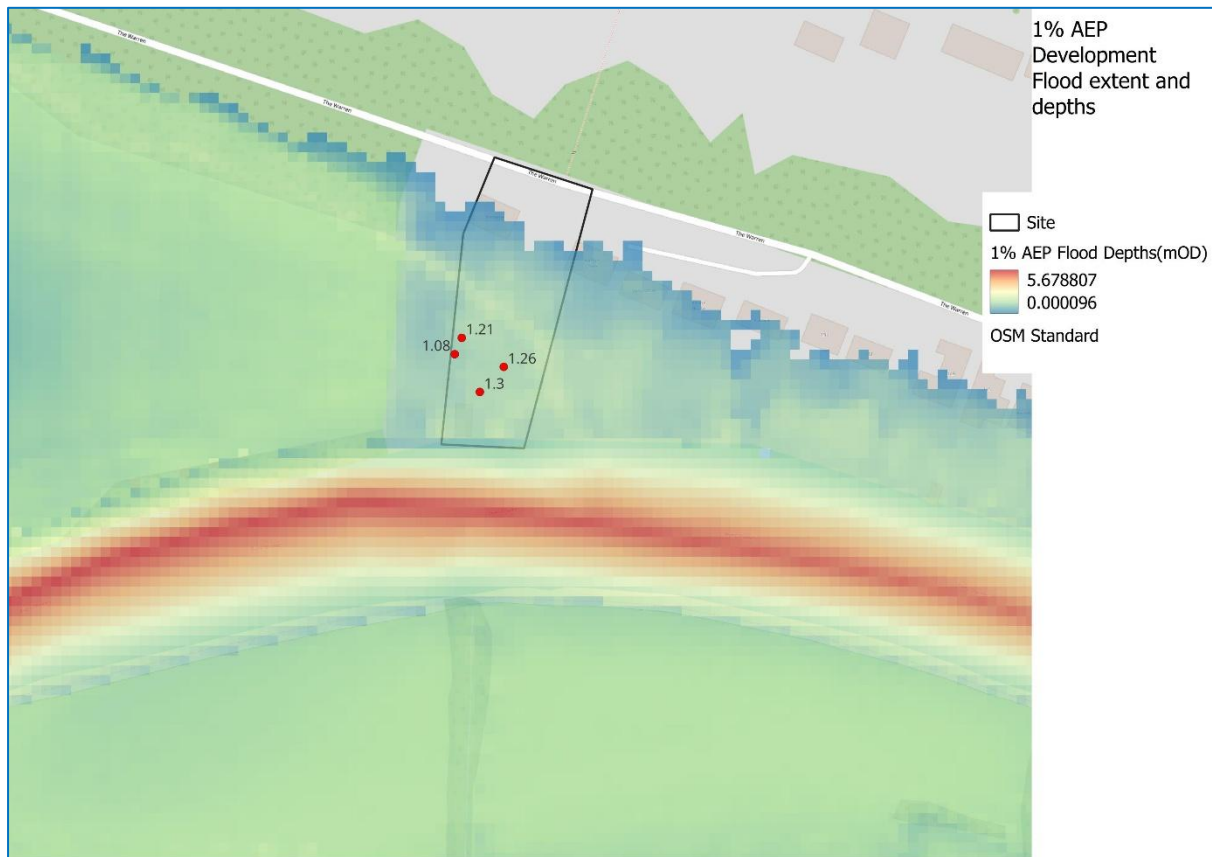


Figure 6 : 1% AEP Flood depth – Post Development scenario

5.3. Afflux Map – 1% AEP



Figure 7 : 1% AEP Afflux Map

5.4. Tabulated flood depths for all events around the site

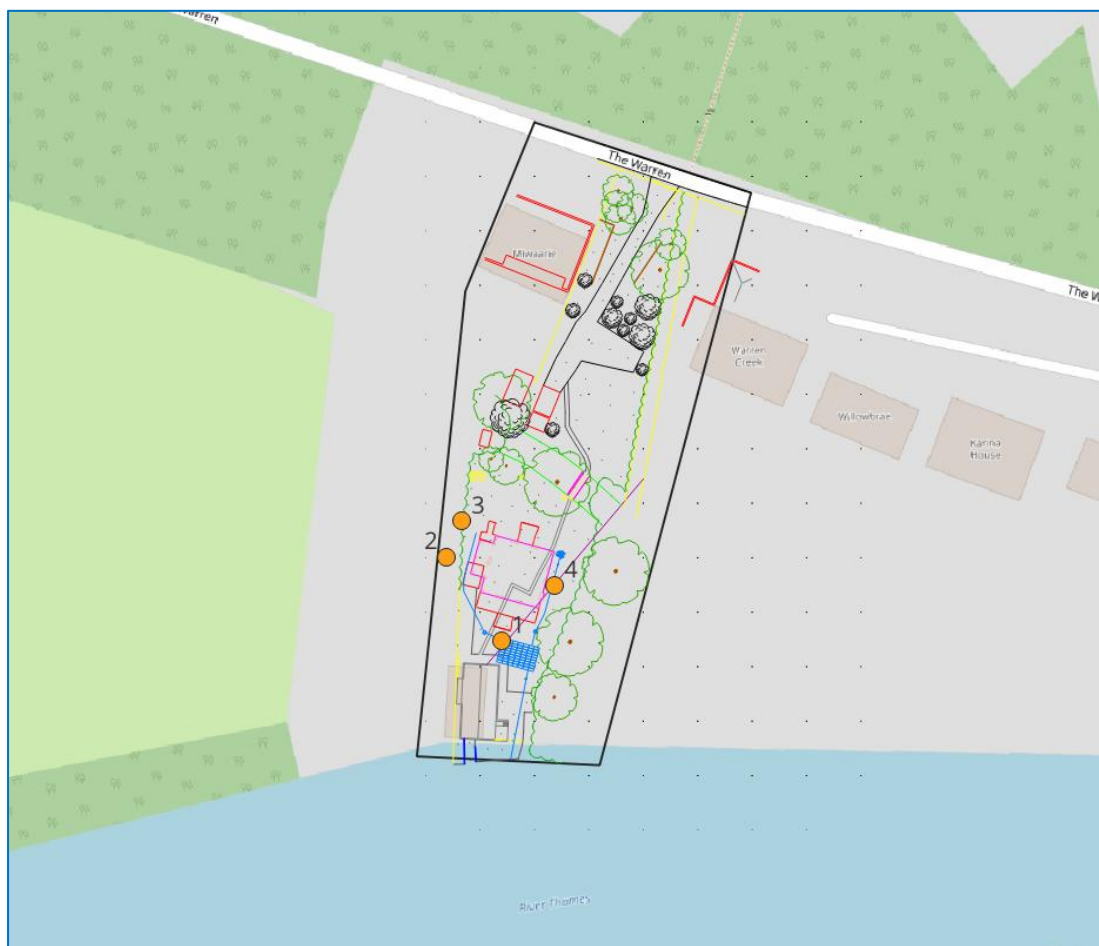


Figure 8: Flood depths sample points location

Sample point	3.33pct_EXG	3.33pct_DEV	1pct_EXG	1pct_DEV	0.1pct_EXG	0.1pct_DEV	1pctCC_EXG	1pctCC_DEV	0.1pctCC	0.1pctCC_DEV
1	0.942	0.938	1.303	1.299	1.936	1.932	1.702	1.698	2.304	2.300
2	0.717	0.718	1.078	1.079	1.710	1.710	1.476	1.476	2.077	2.077
3	0.852	0.853	1.214	1.215	1.846	1.847	1.612	1.613	2.214	2.214
4	0.915	0.894	1.276	1.255	1.910	1.889	1.676	1.655	2.278	2.258

6. SUMMARY OF RESULTS AND CONCLUSION

The hydraulic model was derived from an existing, large-scale flood alleviation scheme model, which was truncated and refined to suit the requirements of a site-specific assessment. Validation was undertaken by comparing water levels, depths, and extents from the truncated model against the original full-system model to confirm its suitability for further analysis.

The assessment included a post-development void impact analysis for all relevant design flood events, including a 43% climate change allowance, with results compared against the existing baseline scenario. Flood levels and afflux were reviewed to determine any change in fluvial flood risk associated with the proposed development.

The modelling results show that the proposed development causes a negligible change in flood levels, with increases of less than 10 mm.

This demonstrates that, in the context of the wider floodplain storage and local fluvial processes, the void blockage scenario at this development does not have a measurable impact on fluvial flood risk at the site.