

Appendix C

2017 Surface water flood modelling
comparison

This appendix summarises the modelling undertaken by WSP as part of the 2017 commission in addition to the surface water modelling undertaken in the past, as listed in Table C.1.

Table C-1 indicates that the model that used the most advanced techniques as the WCC updated model as it allows for the conveyance and storage in roads as a result of applying direct rainfall on roads. Kerbs are then used as a first line of defence. The 2012 SFRA model did not have direct rainfall on roads.

A comparison of results is difficult as the latest Beckton model does not have a 2d element however it has been possible to compare all models (except those that are 2d models only – the Drain London and the gully blockages models) in terms of locations and number of manholes that overflow from the sewers. This comparison has enabled to assess which modelling would result in the larger, medium or least flood extents and depths respectively.

Figures C1, C2 and C3 show the locations where manholes overflow for the 2012 SFRA model, the updated WCC model and the latest 1d Beckton model respectively for the 1 in 100 year flood event.

Flood depth > 0 with the red coloured manholes means that there is floodwater overflowing from the manhole. The green coloured manholes are therefore not overflowing.

The results from Figures C1 to C3 indicate that based on the number of locations of manholes:

All models follow a similar mechanism of flooding and the main flood risk areas are similar.

The most conservative estimates are from the 2012 SFRA model (the largest number of manholes overflowing)

The least flooding from overflowing manholes is from the updated WCC model

The results from the latest 1d Beckton model are in between the two above.

As a precautionary approach the surface water modelling outputs from the 2012 SFRA model have been used to inform this SFRA and the flood depths and extents of this modelling are provided in Figures 33014-COL-402 to 33014-COL-405. In terms of gully blockages it is important to provide an indication of the locations where flooding could occur as a result of a high intensity localised storm as overland flows will be accumulating at low points. Although this modelling is conservative (all gullies are assumed to be blocked at the same time), this mapping could be useful to prioritise asset gully maintenance. It can also be used to promote flood resilience measures at these locations. Figure C.4 provides the peak water depths for the gully blockage scenario, for the 1 in 100 year flood event.

Table C.1 – Surface water modelling in the City of London

Name	Type	Thames 1d model version	Key Features	Purpose
Drain London model (localised storm)	2d	n/a	No detailed 2d with direct rainfall everywhere. No kerbs, no gullies, no buildings, limited allowance for permeability coefficients and only allows for sewer flows by removing part of the rainfall.	To inform SWMPs.
2012 SFRA model (catchment-wide storm)	1d-2d	2012 (detailed not calibrated)	Detailed 1d and 2d. Modelled buildings and kerbs. Sewers modelled only in the vicinity of the City. Does not have direct rainfall on roads.	Used for the 2012 SFRA.
WCC updated model (catchment-wide storm)	1d-2d	2015 (detailed calibrated)	Detailed 1d and 2d. Sewers modelled in the entire catchment Direct rainfall on roads to allow for the conveyance and attenuation of flows in roads).	Used for the development of business cases for the City of Westminster since 2015, however it includes relevant results for the City of London.
Latest 1d Beckton model (catchment-wide storm)	1d	2017 (detailed calibrated and further improved from 2015 version)	Most up to date detailed 1d.	To inform the locations where manholes overflow in the City of London, for the 2017 SFRA review.
2017 Gully Blockages model (localised storm)	2d	n/a	Detailed 2d. Includes kerbs, detailed mesh and allowance for permeability coefficients.	Sensitivity test to inform gully maintenance regimes as part of this 2017 SFRA review.

Figure C1 – Locations of Manholes Overflowing (2012 SFRA Model)



Figure C2 – Locations of Manholes Overflowing (Updated WCC model)

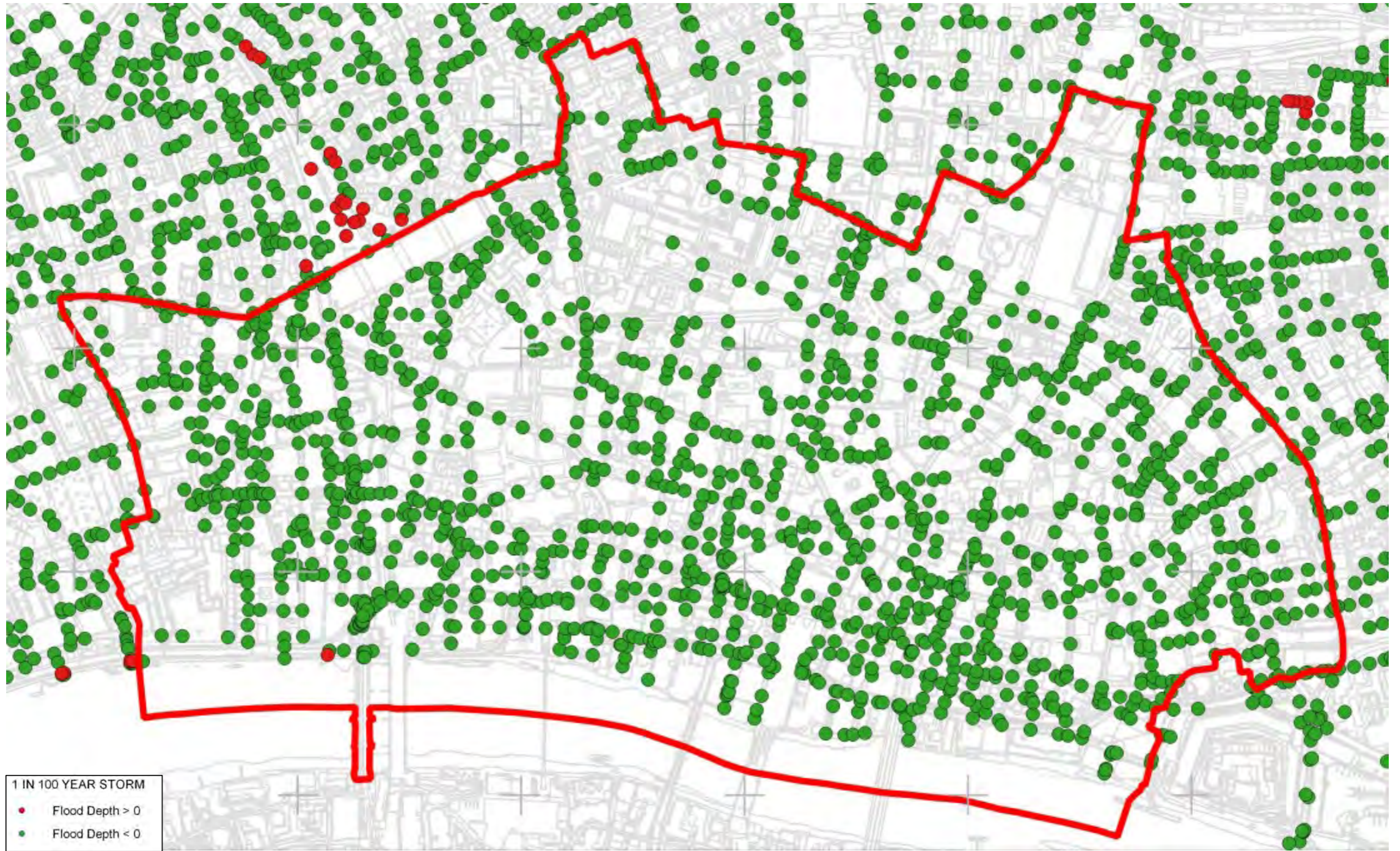


Figure C3 – Locations of Manholes Overflowing (Latest 1d Beckton Model)

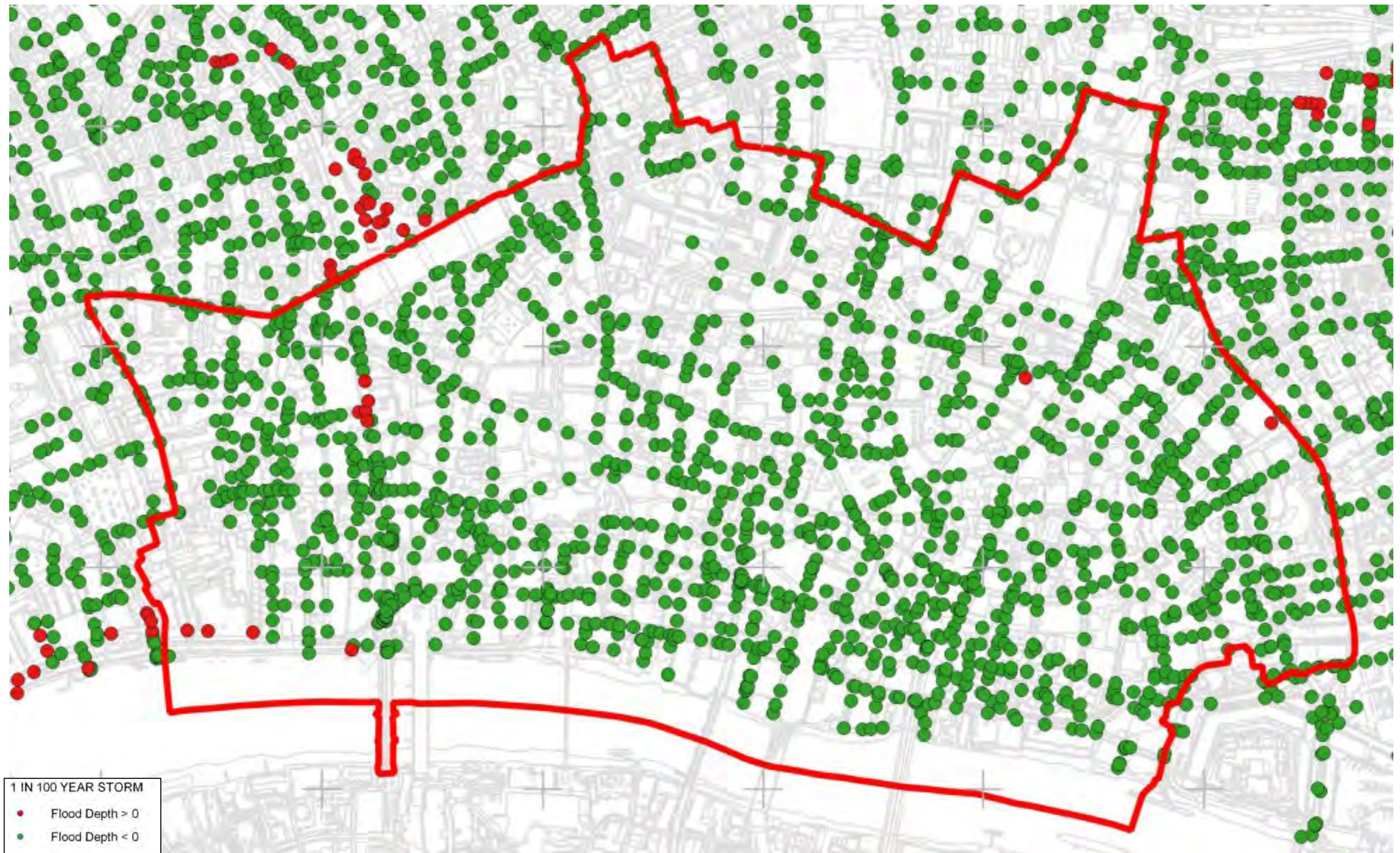


Figure C.4 – Peak flood depths for the Gully Blocked Scenario

