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**YOUR REF: CAS-140006-N1S4****WREXHAM COUNTY BOROUGH COUNCIL REF: P/2020/0110 and P/2021/0111****NORTH AND SOUTH OF LANE FARM ROSSETT ROAD TREVALYN
FLOOD RISK**

This is a response to further comments made by NRW in their letter dated 19th October relating to flood risk posed to and by the proposed development on land north and south of Lane Farm, Rossett Road, Trevalyn.

NRW advised that further work is still needed to address the increase in flood risk shown to the property on the site's western boundary. NRW suggested a sensitivity test of the model cell size to support our argument that the neighbouring property might not be impacted.

To this end, we have undertaken such a sensitivity test. We reduced the model cell size from 3m (the original cell size in the NRW model) to 2m. This reduction in cell size required a reduction in 2-D time step from 1.5s to 1.0s and a reduction in 1-D time step from 0.75s to 0.5s, as per standard Flood Modeller-TUFLOW modelling practice. No other changes were made to the model.

Model Results

The refining of the model cell size from 3m to 2m resulted in changes to flood plain volume and flood flow routing. The low flood depths predicted by the meant that some flood flow routes model in the existing scenario were especially sensitive to these changes.

The existing scenario results of the 3m cell size model for the 1 in 1000 year 25% blockage event are shown on Drawing no. HYD554/501/A and for the existing scenario with the 2m cell model on Drawing no. HYD554/503/A.

The largest difference between the results of the 3m cell model and the 2m cell model is the absence of the flood flow eastwards in the 2m cell model. Close up plans of the point from where this flow route commences are shown on Drawing nos. HYD554/502/A and HYD554/504/A and in Figure 1.

In the 3m cell model, flood water spills from Gun Lane and flows eastward towards the development site. In the 2m cell model, this does not occur. Inspection of the digital terrain model (DTM) at this point reveal no change in ground level.

Inspection of flood level, however, revealed a reduction in water level at this point in the 2m cell model of approximately 0.229m. This reduction in level was sufficient to prevent the spill from Gun Lane.



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The 2m cell model is more refined than the 3m cell model. This is because smaller cell models are able to include topographical features that may be missed in coarser models. Because of the more accurate representation of the flood plain topography, the 2m cell size model results should be viewed as superior to those of the 3m cell model.



Figure 1: 3m cell size model showing spill from Gun Lane



Figure 2: 2m cell size model showing no spill from Gun Lane

Conclusions

The sensitivity analysis of cell size has shown that flood flow routing is particularly sensitive to cell size. When the cell size was reduced from 3m to 2m, a change in flood flow routing was observed which had the effect that flood water no longer spills from Gun Lane and did not reach the development site. This also means that the property neighbouring the development site is not affected.

We will submit the refined hydraulic model for your review.

I trust you will find the above of assistance, however, if you have any queries or require further information, please do not hesitate to contact me.

Yours sincerely,



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Enc. Drawing no. HYD554/501/A
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