

Station Road, Wombwell – November 2019 Flood Note

For:	Hartwood Estates
Date:	28 th November 2019
Author:	Ian Hopkinson BSc (Hons), MSc, MCIWEM – Senior Hydrologist
Approver:	Matt Travis, BSc (Hons), MSc, MCIWEM, C.WEM, CEnv, CSci - Director

INTRODUCTION

On Thursday 7th and Friday 8th November 2019, South Yorkshire experienced heavy rainfall which led to widespread flooding in the region. Low Valley, Wombwell was one of the areas which flooded. Enzygo Ltd undertook a site walkover of the Station Road, Wombwell site on Friday 8th November. The purpose of the site walkover was to assess the extents and mechanisms of flooding and compare what happened in reality to how the updated River Dove and Bulling Dyke flood modelling Enzygo Ltd completed in June 2018 performed.

STATION ROAD

Properties along both sides of Station Road were flooded on November 7th and 8th. See Figure 1.



Figure 1: Flooding on Station Road

Figure 2 shows the 1 in 100-year, 1 in 100-year plus 30%, plus 50%, and 1 in 1000-year event flood extents at Low Valley from the Enzygo Ltd River Dove and Bulling Dyke model which was used to update the Environment Agency Flood Map for Planning in June 2018.

The model shows that flooding of Station Road and the properties along this road would occur in the 1 in 100-year plus 30% climate change event and upwards.

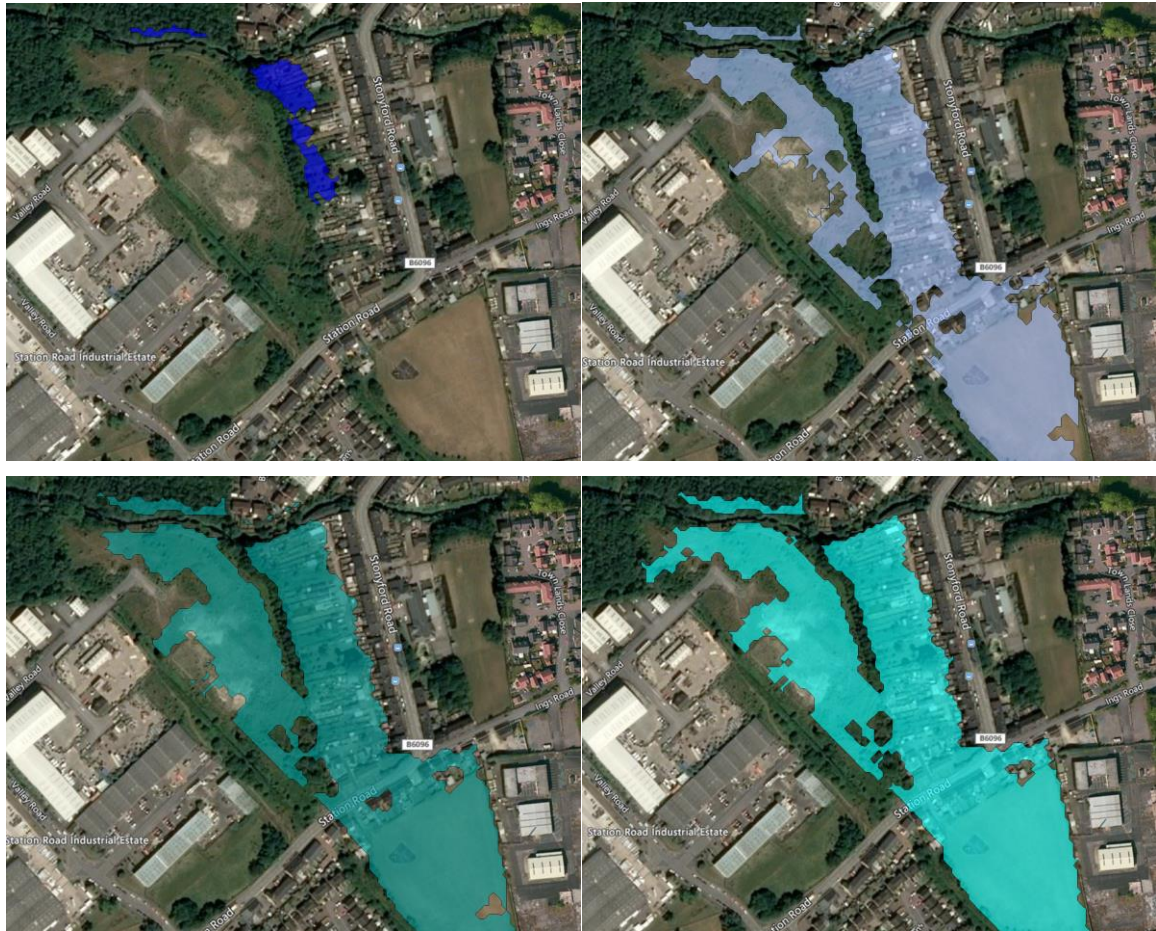


Figure 2: Modelled Flood Extents

Top Left: 1 in 100-year event; Top Right: 1 in 100-year plus 30% climate change event; Bottom Left: 1 in 100-year plus 50% climate change event; Bottom Right: 1 in 1000-year event

STONYFORD ROAD

Flooding of the areas to the rear of properties on Stonyford Road also occurred (see Figure 3). It appears that the River Dove overtopped its right bank just upstream of the Stonyford Road bridge with flood water then flowing south into the allotments and rear gardens on Stonyford Road. This floodwater is then thought to have continued south to affect properties on either side of Station Road (Figure 1).



Figure 3: Flooding to properties on Stonyford Road

Figure 4 shows the right bank of the River Dove upstream of the Stonyford Road bridge on the morning of Friday 8th November. Levels in the river are very close to bankfull and floodwater can be seen on the right bank. It appears that this is one of the spots at which the river burst its bank. This flooding mechanism and the area of flooding is replicated in the model in all events from the 1 in 100-year upwards.



Figure 4: Right bank flooding on the River Dove upstream of Stonyford Road

THE SITE

Areas within the northern part of the Site close to the right bank of the River Dove, and the north-western and central parts of the Site also flooded. Areas of standing water were clearly visible within the low areas in these parts of the Site on the morning of Friday 8th November (Figures 5 and 6).



Figure 5: Flooding within the northern part of the Site

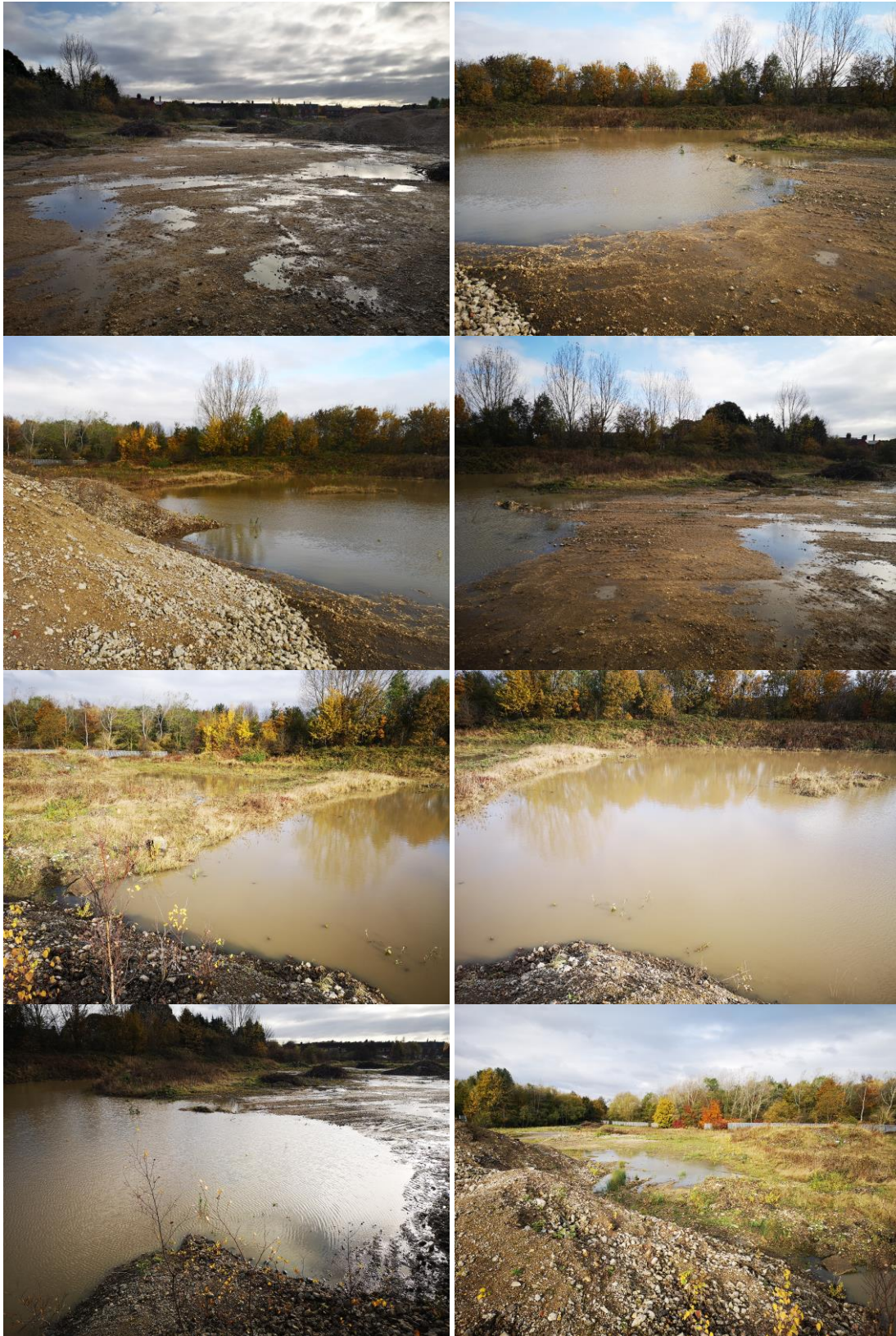


Figure 6: Flooding within the north-western and central parts of the Site

Inspection of the right bank of the river along the northern boundary of the Site showed clear evidence of overtopping. The vegetation had been flattened (Figure 7) and a line of debris on the footpath immediately downstream of the footbridge denoting the edge of the flood extent (i.e. a wrack mark) was visible (Figure 8).



Figure 7: Evidence of right bank flooding on the River Dove downstream of the footbridge



Figure 8: Wrack mark immediately downstream of River Dove footbridge

The evidence indicates that the River Dove burst its right bank in this location (immediately downstream of the footbridge), floodwater then flowed south into the Site and resulted in flooding of the low spots seen in Figures 5 and 6. This flooding mechanism and area of flooding is replicated in the model from a 1 in 100-year plus 30% climate change event and upwards.

BULLING DYKE

At the time of the walkover (the morning of Friday 8th November 2019), the levels in Bulling Dyke, which runs along the south-eastern boundary of the Site, were relatively low in comparison to those in the River Dove. It was clear from the amount of muddy silt deposited on the vegetation lining either bank of the Dyke and on the downstream face of the Valley Road access bridge that water levels had been much higher overnight/on the previous day. However, the top of these wrack marks was below bank top suggesting that Bulling Dyke had not overtopped and burst its banks in this location (Figures 9 and 10).



Figure 9: Bulling Dyke wrack mark downstream face of Valley Road access bridge



Figure 10: Bulling Dyke wrack mark upstream of Valley Road access bridge



Figure 11: Evidence of flow pathway between River Dove and Bulling Dyke to west of the Site

Upstream of the access bridge, there was evidence in the form of flattened vegetation that suggested an overland flow pathway from the north into Bulling Dyke (Figure 11). It is possible that out-of-bank flooding from the right bank of the River Dove upstream of the Site and footbridge travelled south along the path that runs west of the Site before joining Bulling Dyke upstream of the Valley Road access bridge. This flood mechanism is not replicated in the model

but is known to have been a historical occurrence prior to the removal of the dilapidated Pitt bridge and its replacement with the New Bridge at Netherwood Academy.

Downstream of the access bridge, there was evidence that flooding on the right bank of Bulling Dyke had occurred. Figure 11 shows an area of flattened vegetation around 20m downstream of the access bridge where the Dyke may have burst its right bank.



Figure 11: Evidence of right bank flooding on Bulling Dyke downstream of access bridge

Figure 12 shows an area on the right bank of Bulling Dyke close to Station Road where, again the vegetation had been flattened, and there was a clear line of debris on the metal fence which indicated the level to which flood water had risen in this location. It is unclear whether the Dyke itself had burst its bank and caused this area of flooding or if floodwater had flowed in from Station Road to the south. Both areas are not predicted to flood in the model. It is also possible that other sources of flooding (the capacity of the surface water network, failure of sewers) may have contributed.



Figure 12: Evidence of right bank flooding on Bulling Dyke close to Station Road

CONCLUSIONS

- The updated River Dove and Bulling Dyke flood model predicts flooding in the Low Valley area well based on the evidence observed on 8th November 2019 following the South Yorkshire floods.
- Properties along both sides of Station Road and the rear of properties on Stonyford Road flooded after the River Dove overtopped its right bank upstream of the Stonyford Road Bridge.
- Areas within the north-western and central parts of the Site were also flooded after the River Dove overtopped its right bank just downstream of the footbridge.
- Both flooding mechanisms observed for the River Dove are represented well in the model.
- An overland flow pathway between the right bank of the River Dove and Bulling Dyke was evident but not represented in the model.
- Evidence of flooding on the right bank of Bulling Dyke just upstream of Station Road was observed and not represented in the model.
- It is unclear if the two mechanisms of flooding around Bulling Dyke are fluvial or whether other factors (capacity of the surface water drainage network, sewer failure, may have played a part).
- Overall the model predicts fluvial flooding in the area well and the assessment of risk in the Flood Risk Assessment for the Site is reinforced by the evidence observed on 8th November 2019. The mitigation measures recommended in the Flood Risk Assessment should therefore be adhered to.