Initial report and observations concerning flooding to property in Fore Street, Ide on Thursday 2 November 2023 around 3am

Event: At around 3am an exceptionally heavy period of rain, probably in the order of 75 – 100 mm (3 – 4 inches) fell and caused a cascade of surface water running off the fields behind Fore Street which overwhelmed the so-called 'minor watercourse' which drains the area. The bottom part of the agricultural field behind 1 & 3 Fore Street became a small lake because the volume of water could not drain through the 37 mm culvert which is the normal means of draining the water. The rising water overtopped the earth banks behind Nos 1 & 3 causing serious flooding to the two residences.

Background / History: My involvement and interest in the flood potential of this minor water course (it doesn't even have a name!) began in February 1994 when our house (No 15) was lightly flooded and garden paving was lifted by water flow from the same source as above. We made enquiries at the time including talking to Wallace Burnett, now deceased, who for some years ran a butchery business from the property. As far as he was aware there had been no previous incidents of flooding up until that time.

Some notable changes had taken place in the period before 1994. Drake's Farm ceased to be a dairy farm which included the land between the watercourse and the railway line. Whilst part of the dairy farm, the field had been in permanent pasture, probably for a very long time. Subsequently the land was re-let by the Church Commissioners and turned over to arable use. As part of the change to arable, one of the tenant farmers lowered the stream bed of the watercourse for 2-300 m or so to the south of the culvert. Presumably the intention was to improve the drainage to the field to reduce the water table which has always tended to be high in winter. The unintended consequence was to speed up the flow of water before the culvert and increase the rate of erosion.

Teignbridge DC and the Environment Agency were both involved in the post 1994 flood review and as a result the current offset debris screen structure was built. This has been successful up to a point in that it is intended to stop the entrance to the small culvert A blocking with debris. Before this construction there was a simple steel lean-to debris screen against the culvert entrance but this tended to quickly create a debris dam so was actually fairly useless.

I took engineering advice following our flood and as a result build a flood wall in the low point of my garden where the floodwater had entered. This has prevented any further inundation of our house. On the night of 2 November, percolating water did create a puddle in the low corner of our garden.

It is important to note that the earth banks, which have protected the Fore Street properties under most conditions, must be considered as vulnerable to collapse when storm water collects behind them to the point of overtopping. If the walls did collapse the potential flooding consequences could be very serious and my view is that the protection of numbers 1 & 3 should not be dependent upon these earth banks holding up.

As far as I can recall numbers 1 & 3 have flooded on one other occasion since 1994. Roughly speaking, this means that serious inundation has taken place once every 10 years. I believe that we have to accept that we are now seeing the effects of climate change and that a much greater frequency of severe weather events must be expected which includes periods of exceptional rainfall. This **must** be major factor when considering flood attenuation options to mitigate the likelihood of repeat flooding.

Topography and Land Ownership in the catchment area: I attach a plan based on an ordnance survey map (north at the top) which shows, edged red, the approximate extent of the rainfall catchment with which we are concerned. The length of the stream shown on the plan is approximately 0.65 miles and the length of the valley from the bottom up to near Markham Cross is just under 1 mile. The height of the land above sea level ranges from c. 25 m at culvert A to c.105 m near Markham Cross. There is therefore an 80 m (262 ft) drop from the highest point of the valley to the drainage exit point at culvert A on the plan attached. Most of the catchment therefore comprises steep hillsides which means that surface water will run off very quickly and also that it will be quite challenging for agricultural management.

My understanding is that the two fields at the bottom are owned by the Church Commissioners and that the rest is owned by Devon County Council. All the land is let to two different tenant farmers.

Cause of Flooding: The primary cause was obviously the volume of torrential rainfall falling on already saturated ground. The major secondary cause was the agricultural practices employed in the catchment, exacerbated by the time

of year, which meant that most of the catchment was recently sown winter cereal which probably had little benefit in reducing surface water run-off.

My further observation is that shortly before the maize crop, which was growing on most of the arable land in the catchment this year, was harvested, there was a fairly severe rain event in which around 65 mm fell in a short period of time. This did not cause any problem and culvert A coped well. It may be that the ground saturation was not quite as high as before this earlier storm but it was generally wet. This strongly suggests that the standing maize crop sufficiently held back surface water run-off to prevent a flood problem.

From my observations, over the last 50 years, I suspect that the 2 November storm was the worst to date. The level of soil erosion caused by the storm is proven by the volume of gravel which has accumulated along the watercourse. The parish council ordered a clearance of gravel behind the debris screen at culvert A, since the storm, and the excavated pile is still available for inspection. The gravel is only part of story but indicates that the loss of topsoil and nutrients from the steep fields in the catchment area must have been very considerable hence the red-orange colour of the flood water.

The total run-off from the catchment can only drain away by passing through the 37 mm diameter culvert A or overtopping the rear Fore St banks as happened on this occasion.

How can we reduce the chances of a repeat flooding: It is clear from the plan that the much greater proportion of the catchment is to the south of the former railway line. All surface water from this southern area has to pass through culvert B which was built under the railway when it was constructed in around 1905. This culvert is approximately semi-circular with a base width of 1.5 m. (I took these measurements a few years ago – culvert entrance is neither visible nor accessible at present due to bramble growth). It is therefore roughly 4 times greater in capacity than the lower culvert A. The result is that the total run-off from the catchment south of the railway embankment passes through culvert B unimpeded and flows on to culvert A. The force of water cascading through culvert B on 2 November was sufficient to create a hole in the field on the other side. Most of the flow appears to have ignored the normal stream route and spread out over the relatively level field on the north side. I have held the view for some time that a steel plate, effectively reducing the size of the culvert and positioned on the south side, would hold back floodwater for sufficient time to allow the smaller culvert A to drain the total

flow satisfactorily over a longer period. My reconsidered view is that whilst this potential solution should provide immediate protection to the Fore Street properties from a similar extreme storm it should only be considered as a short term fix. This alteration to the culvert would require consent from the landowners, the Church Commissioners, and their agreement to allow the short-term ponding of excess run-off in the valley bottom adjacent to the culvert.

I strongly suggest that what is required in addition is a well-designed natural flood management scheme to minimise surface water run-off, particularly during the winter months, and to reduce the level of soil erosion and the significant gravel deposits that resulted from the recent storm. As an example, reverting the catchment land to permanent pasture would go most of the way to eliminating soil erosion although this would probably not greatly reduce the level of surface water run-off – it would just be much cleaner. If the landowners and farmers could not be persuaded to change completely to permanent pasture, the introduction of buffer strips of grass planting, hedges and tree planting could make a big difference. Farming practices such as contour ploughing could also help but much of the land in the catchment is so steep that it might make contour ploughing dangerous (risk of tractor rolling over). Improving soil structure also helps with surface water absorption.

There are already a couple of ponds in the valley bottom of the southern area which could be maintained by regular dredging and this could help slow up water flow. There is also the potential to introduce further ponds or storm lagoons. Furthermore, the entire length of the stream bed could be better managed. At present, it appears that no one owns responsibility to do this (I have always tried to keep my short section clear but only once a year even though I don't think that I own the stream)

I mention these potential actions as examples of what could be done but I am not an agricultural expert and it is not for me to make specific proposals. A natural flood management scheme could only be achieved with the guidance of experts followed by negotiations between the landowners and possibly their tenants. Such schemes are always a delicate balance between the cost of achieving a suitable level of flood attenuation and the effect on agricultural profitability. It seems reasonable that the landowners owe a moral duty of care to people who may be affected by flooding generated from their land; whether a legal duty of care exists would require legal advice.

A further option is that a secondary means of drainage could be constructed between the northern most field and Fore Street. This would require the agreement of one of the property owners but the likely cost of building a second culvert is likely to make such a project unviable.

The flow of the existing culvert to Fore Street could be improved by removing the underground junction with another drain, in Fore Street, and making both drains run independently into Fordland Brook. This would probably be a cost to Devon CC.

Heritage Homes are planning a residential development of their site at Pynes Farm. The scheme currently includes an on-site surface water attenuation tank which will be expensive and it may be worth talking to them about using that money as a contribution towards achieving a natural flood management scheme for the whole catchment.

Other consultations that should be considered with the Environment Agency, Teignbridge District Council and possibly a consulting engineer with appropriate experience in watercourse management.

I hope that the above observations and comments will assist the Parish Council in formulating a policy and action plan to minimise the further flood risk to Fore Street properties.

Ian Campbell
13 November 2023