

# Derwenthorpe flooding information

## Introduction

Local residents have been asking about how Derwenthorpe, the new community between Osbaldwick, Tang Hall and Heworth, will affect – or be affected by – flooding in the area.

We have worked with our partners, consultants and contractor to provide thorough answers to these questions, and have produced this ‘question and answer’ information sheet on flooding.

We hope it provides a degree of clarity and reassurance concerning both the construction and proposals, and highlights some measures being taken to ensure that the actual flooding risk caused through developing Derwenthorpe is no greater than that posed by the land’s current undeveloped situation – in other words, no adverse impact.

Within the current climate change debate, there are strongly held – and differing – views presented by the media, government, insurance, business and scientists about whether flooding events will happen more in the future than they have in the past. Even with no development at Derwenthorpe, it is possible that flooding could occur in future. However, the steps we are taking are designed to ensure that the risk of flooding is not increased as a result of this development, even when the potential effects of climate change are taken into account.

## Insurance/compensation

- 1 Question:** (a) We've never had flooding in our area (in the Temple Avenue area) – (b) if there is any flooding in the area after Derwenthorpe is built, who should I call and (c) who would pay for any damage caused by flooding to my property?

**Answer:** (a) Information provided by the Environment Agency (historical flood outlines) suggests that properties on Temple Avenue were affected by flooding in 1947 (gardens and three or four properties), 1978 (gardens only), 1982 (gardens and one or two properties) and 2000 (gardens and possibly one property). It would therefore appear that there have been four flood events in the last 60 years or so which have impacted upon the Temple Avenue properties. Osbaldwick Beck will always be prone to flooding, due to its catchment area and limited channel capacity, and current guidelines suggest that flooding on the whole is likely to become worse due to the potential effects of climate change.

However, the surface water attenuation<sup>1</sup> facilities for the Derwenthorpe development have been primarily designed to ensure that flood risk in the area is not exacerbated as a result of the development.

The rates of run-off<sup>2</sup> into the Beck during extreme rainfall events will in fact be reduced to values below those of the existing site, with a result that flows downstream of the development, during significant flood events, will be less (albeit very marginally) than those at present.

The projected effect of the development will therefore be to slightly reduce flood risk in the Temple Avenue area (as demonstrated in previous publicly reported hydraulic modelling<sup>3</sup> studies). Any future flooding should, therefore, be attributable solely to natural events, rather than as a result of the Derwenthorpe development.

(b) You could call the relevant organisations (as well as your insurance company), which would be determined by a number of issues including the nature of the flooding and what threat it may (or may not) be posing – for example:

- i) the Foss Internal Drainage Board and Environment Agency, which manages and monitors the waterways (rivers, becks, etc);
- ii) Yorkshire Water and Local Authority – surface water drains, sewers and highways, etc;
- iii) Local land/property owners – if the flooding is crossing over their boundaries and into yours.

(c) Unless JRHT is proven to be legally liable for the flooding and the flooding is established to have been directly and unequivocally caused by some unlawful or negligent act or omission of JRHT (or its consultants/contractors) the situation will be no different to any other flooding incident and one line of recourse could be to the relevant organisation as previously described in (b) above.

---

1. Surface water attenuation – slowing down the rate of flow generated by rainfall on impermeable (see footnote 8) surfaces, such as clay, to help prevent flooding.

2. Run-off rate – measurement of water flow over the ground surface to drainage systems and watercourses, such as Osbaldwick Beck.

3. Hydraulic modelling – using computer modelling to predict flood levels both in watercourses – such as Osbaldwick Beck – and other systems that transport floodwater.

**2 Question:** (a) It has been suggested (by local people in Osbaldwick) that insurance for some existing households may already be difficult to obtain, due to the existing flood risk. (b) Do you intend to help householders at Derwenthorpe to get insurance, (c), and if so, would you extend this to other households off the site?

**Answer:** (a) Insurers generally base their assessment of risk on the Environment Agency's Flood Map, although some insurers have developed flood risk maps of their own. Insurance can be difficult to obtain if the 'standard of protection' is less than 75 years (i.e. a property may be expected to flood more than once in a 75-year period). The Agency's Flood Zone 3 (as shown on its Flood Map) represents the '100-year' flood risk and this zone does extend over some properties along Osbaldwick Village and a few on Temple Avenue. As stated in part of the answer to Question 1, the flood risk along Osbaldwick Beck should not be exacerbated by the development, and the insurance situation as a consequence of the Derwenthorpe development should, therefore, not be affected.

The Environment Agency supplies relevant maps to ABI<sup>4</sup> insurance companies, and insurers will also typically supplement this with more detailed information on flood risk.

In all cases, premiums are set by the insurer and will reflect differing degrees of risk. There may be reasons not related to flood risk which mean that an insurer may choose not to offer cover.

b) The properties on the development itself are all clear of the floodplain (this was a requirement of the Environment Agency) and householders should therefore have little difficulty in obtaining insurance for their home, subject to them satisfying all the other requirements the insurance companies may have.

JRHT will assist householders by providing generic information (such as this report) from its consultants and contractors – accessible to relevant insurers through its website – which, as previously stated, will demonstrate that the likely effect of the development will be to reduce rather than to increase the risk of flooding. JRHT cannot possibly guarantee that insurers will insure though, as individual companies have individual attitudes to particular risks and may well refuse insurance for a number of reasons.

c) The generic insurance information (including this document) produced by our consultants and contractors will be placed on our website prior to the formal marketing of the homes. Respective Derwenthorpe householders' insurers can access this, as can existing households in the area and their insurers, who will, in turn, determine its relevance for each property insurance evaluation.

---

4. ABI – Association of British Insurers.

## Flood risk and prevention

**3 Question:** Is it likely there will be any flooding as a result of the new development?

**Answer:** No. As outlined above, the primary objective in designing the pond within the development has been to ensure that run-off rates from the site will not increase as a result of the development. The pond is designed to cope with very extreme rainfall events, even if they coincide with major flood events in the Beck. This is why the pond is so large. Run-off from the development will be directed into the pond where it will be stored and released to the Beck through outlet pipes, which have been sized to restrict the rate at which the water can flow out.

**4 Question:** What steps are being taken to reduce the risk of flooding?

**Answer:** The attenuation pond will control the flow of water off the site. It is designed to reduce these run-off rates to values below those associated with the existing undeveloped site. In this way, flood flows in Osbaldwick Beck will be reduced (albeit very marginally, as the development site only represents a very small proportion of the total catchment area) so the local flood risk will also be reduced.

**5 Question:** Will work be carried out on the existing beck to make it wider to prevent flooding?

**Answer:** Currently no works are proposed (by us) to the Beck, other than certain necessary works associated to form the outfall<sup>5</sup> from the attenuation pond. Works to watercourses can have an impact on flood risk upstream and downstream, and are normally the subject of detailed engineering and economic analysis by the Environment Agency. Widening of Osbaldwick Beck in the vicinity of the development may lower flood levels there, but the increased capacity and reduced floodplain storage would exacerbate flood risk to properties downstream. The philosophy adopted for Derwenthorpe has therefore been to avoid the floodplain (which has been determined by separate hydraulic modelling studies) and provide attenuation on site to control discharges into the Beck.

**6 Question:** The beck is full of litter sometimes – will this make things worse when Derwenthorpe is finished?

**Answer:** The outlets from the ponds have grilles fitted that will prevent debris discharging into Osbaldwick Beck. The Foss Internal Drainage Board monitors Osbaldwick Beck and is responsible for removing anything that could significantly obstruct the flow. We will have maintenance staff who will also monitor the section of Osbaldwick Beck that flows past the development and will liaise with the FIDB to remove obstructions.

---

5. The outfall – the structure through which the pond will discharge to the Beck, comprising pipework, a valve chamber and a headwall (support structure for the bank and outlet pipes) on the northern Beck bank.

**7 Question:** (a) If the beck bursts its banks and your ponds are full, where will the excess surface water go? (b) It looks like you are going to concrete over the land, which currently acts like a sponge.

**Answer:** (a) The pond is designed to cope with very extreme events, such as the ‘100-year’ storm on the site combined with a ‘100-year’ flood in Osbaldwick Beck. The potential effects of climate change have also been taken into account. The combined probability<sup>6</sup> of these two events coinciding precisely (as has been assumed in the design) would be between 100 years and 10,000 years. It is therefore exceedingly unlikely that the pond would fill to overflowing at the peak of a flood in the Beck. However, no works of this nature can be designed to cope with the whole statistical range of natural events. To cause the pond to overflow may take an intense (eg. ‘100-year’) rainfall event on the site, lasting for over 24 hours, combined with a prolonged ‘100-year’ flood in the Beck. If this did happen, the spillway<sup>7</sup> would come into operation, releasing excess flows to the Beck in a controlled manner.

(b) It is important to point out that, in such an event as described in (a), the existing site would be totally saturated, and all rainfall would be shed straight to the Beck, hence the amount of water entering the Beck would be no worse if the site were developed.

In regard to the capacity of the existing ground to absorb rainfall, the site is known to be relatively impermeable<sup>8</sup> and this has been confirmed by ground investigations, which have shown that the ground is generally clay or other ‘slowly permeable’ soils. The existing site has been observed to hold standing water for a significant period following heavy rainfall, again demonstrating the soils’ inability to absorb water. Investigations were undertaken to determine the proportion of rainfall which would soak into the ground and that which would run off into the Beck, and this assessment of the existing run-off rate has formed the basis of the pond design. As mentioned in the answers to Questions 1, 3 and 4, the pond is designed to limit run-off rates from the development to below these existing rates.

## Pond/lake

**8 Question:** How big is the pond or lake that you’re building and is it a pond or a lake?

**Answer:** The pond is made up of two parts – a larger pond in Phase 1 of the development and a smaller (linked) pond in Phase 2. Under normal (dry weather) conditions, the water surface in the main (larger) pond will measure approximately 75 metres (north to south) by 30 metres (east to west). At top water level (i.e. under the most onerous design storm conditions) this water surface would measure approximately 95 metres by 55 metres. In terms of drainage definitions, a pond is normally a man-made water body, which serves

---

6. Combined probability – likelihood of at least two events occurring at the same time.

7. Spillway – A lower section in an embankment, provided to allow a controlled emergency discharge at a known location, rather than allowing the pond to overflow along its banks.

8. Impermeable – In this context, impermeable means the soils’ relative inability to absorb water.

a function and is managed and maintained. A lake is generally designated as a natural water body. Hence with the attenuation facility provided on the development, it is more correct to term the water body as a pond.



*The area highlighted on this Derwenthorpe site plan shows phase 1 of the development, where the attenuation pond will be situated.*

**9 Question:** This pond/lake has an overflow, could this cause more flooding?

**Answer:** No. The overflow is provided as a contingency, to allow water to overflow from the pond in a controlled manner should the pond fill above its designed top water level. All engineered retained water bodies of this nature (e.g. reservoirs) are fitted with an emergency spillway, for these purposes. However, as explained in answers 3 and 7 above, this spillway would only come into operation under an exceedingly improbable combination of extreme rainfall and flooding events, and will not exacerbate flood risk.

**10 Question:** How does it work, and what happens if it goes wrong?

**Answer:** Essentially, the attenuation pond gathers run-off from the development site and allows it to be stored and released to the Beck at a controlled rate. The engineering facilities are relatively simple, comprising an excavated storage pond with two outlet pipes, which combine in a chamber and discharge to the Beck via a single pipe. The pond will be lined at a low level to ensure that it does not dry out during dry weather. A body of water will therefore always be contained within the pond, and the volume of the pond above that water is the 'live storage' component. There is little that can go wrong with such an arrangement other than pipe blockages. If the blockages are in the sewer pipes serving the development, local overflows from manholes may be experienced. However, this part of the system will be adopted by Yorkshire Water, which would respond to any such incidents. The pond itself, including the outfall arrangements, will be owned and maintained by us. We may enter an arrangement with the Foss Internal Drainage Board to assist with management of the pond. Regular checks will be made on the pipework and associated valves, and the grass banks of the pond will be maintained by JRHT ground

staff. Any blockages of the outfall pipes are more likely to occur on the grilles which protect them, and any such blockage would be easily spotted and removed. Occasionally, it will be necessary to remove accumulated sediment from the pond, and this operation would probably be carried out by the FIDB, as it has the operatives and plant to undertake such an operation.

## Other concerns related to the site

**11 Question:** What time scale contingency (i.e. 100-year event) are you planning to take into account?

**Answer:** The attenuation facilities on the site have been designed to cope with a 12-hour duration, 100-year rainfall event on the site (including a 20 per cent increase in rainfall depth to account for the potential effects of climate change) coinciding in the most onerous way with a 100-year flood in Osbaldwick Beck. Under these (and other) conditions, the effect of the pond will be to reduce the run-off to the Beck to below existing rates. Extensive hydraulic modelling studies have shown that the flood risk in the Beck should be reduced for a whole range of combinations of flood and rainfall events. It should be noted that the Derwenthorpe development will not offer any 'protection' against flood events. Flooding in Osbaldwick Beck is generated by rainfall in its catchment. However, the development will result in a marginal reduction in flood risk. The new properties on the development will be set at least 600mm above the 100-year flood level in Osbaldwick Beck, as required by the Environment Agency.

**12 Question:** Where will you place on site the spoil removed from digging the lagoons?

**Answer:** The spoil arising from the excavation works will fall into two categories: topsoil and subsoil.

Topsoil will be stored on site in suitable temporary spoil heaps, and will be distributed to permanent landscaping as work proceeds throughout the development.

Subsoil will be re-used where possible to regulate levels on site as required. The balance of subsoil produced by the pond excavation will be removed from site to a licensed disposal facility.

**13 Question:** Will this have any effect on my house foundations?

**Answer:** No. There is no aspect of the proposed drainage systems that should have any effect on the foundations of existing properties (see question 15 regarding the water table). The proposed construction does not require plant etc. that causes excessive vibration and hence there should be no detrimental effect on existing foundations or properties which (at the relevant time) are in a satisfactory condition.

## Questions related to existing flood risk

**14 Question:** There is currently standing water at the end of my garden after a heavy rain – will this get worse when the development is finished?

**Answer:** No – not as a consequence of the development. It sounds as though this problem could be associated with poor drainage characteristics of the soil beneath the garden, which will be unaffected by the development.

**15 Question:** What is the present water table level before work commences and will the development proposals negatively affect surrounding properties?

**Answer:** The water table level has been monitored over the last two years and measured in previous ground investigations. The level varies quite considerably throughout the year and a range of around 2.34m has been recorded. Detailed hydrological studies have been undertaken, based on monitored groundwater levels and information on soils obtained from boreholes. These studies have shown that, under some conditions, the effect of the pond could raise groundwater levels (e.g. when the pond fills and the ground is generally dry) and at other times may depress the level (e.g. when the water table is high and the pond is at a low level). However, because of the relative impermeability of the clayey subsoils, these effects are small, and it has been concluded that any variation attributable to the pond would be less than 200mm at the site boundary (compared to a natural variation of 2.34m, the impact of which – if any – is not known to JRHT). It has therefore been concluded that the provision of the pond should not have any adverse effect on saturation of subsoils, foundation strengths, etc.

**16 Question:** At the moment, when the meadows are full and the water table has risen, water pours down Metcalfe Lane –how will you prevent this from happening?

**Answer:** It has not been an objective of the drainage design to address existing drainage problems outside the site. Indeed the intention (as agreed with the Environment Agency) has very much been to maintain the ‘status quo’ around the site boundary. However, in regard to Metcalfe Lane, some reduction in flooding may be achieved as a result of the management of the newt habitat area (to the north of the National Grid site). It is intended to construct a low bank around this area, in order to maintain its wetness, with a controlled overflow weir that will ultimately discharge into a swale (grass-lined ditch) leading to the attenuation pond. It is therefore anticipated that flooding along Metcalfe Lane should be reduced to a degree.

### NOTE:

To avoid doubt, it should be noted that through the production and dissemination of the statements and responses contained within this ‘Question and Answer’ document, JRHT is not assuming any more responsibility for flooding than is put upon it by the general law.