23 October 2017

OFA comments on revised FRA for the Seacourt P&R extension 16/02745/CT3

Dear Mr Murdoch,

I am writing to set out additional grounds for objection to the above mentioned planning application having now reviewed the updated Flood Risk Assessment. The new document is little changed from the previous version. It contains information about the Oxford Flood Alleviation Scheme which is out of date and seriously inaccurate. It includes statements which are at variance with the Addendum to the Planning Statement submitted in August 2017, and like the earlier version it fails to properly represent the flood risk associated with the site, or to present credible proposals for how this might be mitigated. The inconsistencies in the Applicant's documents, and the limited updating of the FRA, are indicative of the lack of serious attention being given to flood risk in this application.

Conflict with the PS addendum on NPPF categorisation

Section 1 of the revised FRA is unchanged. Table 1 (page 6) states unequivocally that the Flood Vulnerability Class of the site is 'Less Vulnerable' - so is in conflict with the Addendum to the PS which claims it is 'Essential Infrastructure'.This section also retains all of the original argument about the site not fitting within an NPPF category. The Applicant appears to be unable to present a set of documents putting forward a coherent and consistent position on the NPPF Flood Risk Category.

Modelling for climate change is inadequate

In the revised FRA para 3.2.9 has been updated – using Nov 2016 modelling data – and the table in para 3.2.10 showing flood levels has been updated - including columns for 1:100 (1% AEP) plus various levels of climate change. While this now includes estimates for the possible impact of climate change on a 1:100 yr event, there is no analysis of effects of climate change on lower order events, for example a 1:5 (20% AEP). Under a climate change scenario what is currently a 20% AEP event will also be more severe, and as this is the level at which the car park is expected to flood it is surely of critical importance to understand how much more serious flooding would be in events of this frequency. No attempt has been made by the Applicant to analyse what climate change would mean for events of less than a 1:100yr occurrence. Instead the revised FRA simply retains the original assumptions about flood depths for lower order flood events. Para 4.4.3 uses 57.14 AOD as the flood level for a 1:5yr event. This doesn't include the effects of worsening climate change – and the assumptions which follow from this fail to take account of the need to be able to respond to a more hazardous situation. The FRA is complacent about flood risk and understates the likely frequency and scale of flooding by failing to properly consider climate change.

Historical flood data incomplete and inconsistent with the PS addendum

The 'historic events' table in para 3.2.10 has been updated but only includes 9 events - the PS addendum has 13. The revised FRA does not include several recent events and gives a misleading impression of the frequency of flooding at the site. The inconsistency with the

PS addendum is indicative of the lack of attention to the facts on the part of the consultants who prepared this. It also raises questions about who is checking these documents before they are submitted. The initial application was full of inconsistencies and we raised questions about quality control at the time. We see no evidence of any improvements in the checking of documents.

Para 3.2.11 includes this comment on the SFRA (retained from the earlier version): 'The report acknowledges that these areas are extensive and require more refinement in order to gain greater confidence of the severity of flood risks within specific zones in the critical drainage areas shown.' There is no evidence in the updated report of any attempt over the last 9 months by the consultants to seek a greater understanding of the flood risk (see comments below on groundwater).

Risk of groundwater flooding is not adequately assessed

In the revised FRA, para 3.4.3 now states that a 'groundwater flooding incidents map' has been added as Appendix C, to support the claim that there is no record of groundwater flooding. But Appendix C does not include a groundwater flooding incidence map. Has this information been omitted through oversight? Or is the reference to its inclusion a 'typo'?

Groundwater flooding at this site is actually a serious issue. In para 3.9.2 the Table claims that risk of groundwater flooding is low – this is unchanged from the previous version. We contest this. In Map 7 of the County PFRA, which is available online, the site of the proposed P&R extension is officially designated by the Lead Local Flood Authority as a site where >75%per km is at risk of groundwater emergence. This is the whole area of the P&R and extension (Map 7 is attached for convenience). We know from testimony of local residents that the site floods even when fluvial flooding is not happening. We provided clear photographic evidence of this to the Applicant, at a meeting with officers of the City Council on 24 January 2017, but this has been completely ignored. (The objection letter from 224 Botley Rd on groundwater, posted 5 Oct 2017 on the planning website, includes a photograph of groundwater flooding.)

The Applicant's Ground Investigation report (unchanged from original submission) says groundwater was encountered at between 0.5mbgl (metres below ground level) and 1.6mbgl. Section 6.3.1 of that report comments: 'It should be noted that the soakage rate may be affected by shallow groundwater and this rate should be confirmed at a wetter time of year as site work was carried out after a number of days of dry weather.' No follow up study has been conducted. The Applicant has failed to understand the behaviour of groundwater at the site and seriously understates the risk of groundwater emergence in the application documents.

The FRA contains seriously inaccurate statements about OFAS

Para 4.4.10 describes the Oxford Flood Alleviation Scheme (OFAS) as 'still at an early stage'. This is the same wording as in FRA from June 2016 – in fact OFAS now has a very detailed design, and is itself moving into the planning permission stage. Para 4.4.11 (*which has been updated from previous version*) says:

> 'The Park and Ride extension site falls within 'Area 1' of the scheme proposals and is likely to be affected by its implementation. *Currently it would appear that a bund will be built around the Park and Ride extension site*, which will protect adjacent properties fronting Botley Road. Channel widening of Bulstake and

> Seacourt stream will increase flood storage volumes to compensate for this. *Flood waters will therefore be contained within the Park and Ride site during more extreme flood events as a result of the bunding.* It is unknown at this stage what effect this will have on flood levels within the site, however it is anticipated that channel widening works would ensure that water levels remain the same or reduce within the proposed extension site. The draft proposals are included in Appendix G.' (Emphasis added.)

This is totally incorrect. The P&R site will in fact be north of the bund, in other words on the side where flood water will accumulate. Because access from the carpark to Botley Rd is required, a temporary barrier will be erected across the southern end of the P&R during times of flooding, thereby completing the defensive wall protecting neighbouring properties. The P&R will not benefit from protection from this defence. This is the design approach agreed by the Sponsorship Group, of which the City Council is a member. The consultants working for the applicant have clearly made no effort at all to update themselves on OFAS, and no one has bothered to check the revised FRA. Appendix G has not been updated and contains channel options maps that are significantly out of date. There were the options put out for public consultation in Jan 2016. They include a channel south of the ring road to Sandford for example which has not been a part of the scheme for many months, perhaps even a year. More recent information on the scheme design is freely available online, but the consultants have clearly not even bothered to look. The Applicant completely fails to understand that the proposed P&R extension would be in the functioning floodplain, fully exposed to the flow of water passing across that area and seeking an outlet via the Seacourt stream (current) or OFAS channel (future).

Failure to understand potential to increase flood risk

In para 4.4.4 the claim that flood depths don't pose a hazard is based on the assumption that the water will not be moving, or not at any appreciable speed (the Flood Hazards map in Appendix F assumes 0.25m/s). This would manifestly not be the case given the proximity to either Seacourt Stream or the OFAS channel. Even in fairly minor floods water will be moving at some speed across this area. Para 4.4.6 seriously understates the risk when it says: 'The new car park area poses a potential hazard to people in accordance with Table 13.1 and could reach the 'danger to all' classification *at the most extreme events*.' (Emphasis added). If one assumes that the water will be flowing, and with increasing speed for larger scale events, it is evident from the table that the site becomes extremely dangerous at depths of 0.3m. The consultants assume a depth of 57.14 AOD for a 1:5 yr event. The surface level of the P&R extension is given as between 55.357 and 56.157 for the vast majority of the area. That would mean flood depths of around 10-18cms, and this is without taking account of climate change.

According to the AA 30cm (12 inches) of water moving at only 6mph is enough to float the average family saloon. Flood water is extremely dangerous. If you fall over in 15cm (6 inches) of water moving at only 6mph you are unlikely to be able to stand up again. The AA recommends that moving water more than 10cms (4 inches) deep should not be entered. Vehicles could be stranded well before water reaches a point where they begin to float. Once they do float they will be carried towards the bridge where the Seacourt Stream passes under Botley Rd, the route OFAS will also use. If OFAS is built the rate of flow will be significantly greater than is currently observed at the site. Cars in the stream channel will impede flood flow and the proper operation of the city's flood defences,

increasing the risk of flooding to properties in this city, particularly those located along Botley Rd.

The original FRA, in para 4.4.9, acknowledges that there was a risk that vehicles could be 'swept away' where flood depths were sufficient, and said 'consideration should be given to putting measures in place to prevent vehicles being swept beyond the site boundary.' The revised FRA has exactly the same wording. Neither the revised FRA, nor the PS addendum, give any further information on what such 'measures' might be. A 1.8m post and rail fence is proposed as part of the design, and is perhaps intended to prevent vehicles being swept away. But such a fence is wholly incompatible with the location. The EA has said in the OFAS scheme that there can be no fences crossing the project area as these would trap debris and act as dams, impeding flood flow. A fence around the P&R extension would have exactly the same effect, obstructing the free flow of water into the Seacourt channel. There is no way the Applicant can prevent vehicles been swept out of the site and not at the same time impede flood flow.

Attenuation calculations take no account of the location of the site

Para 3.8.1 includes the statement (unchanged from the original FRA): 'An increase in impermeable area within the site will result in an increase in surface water runoff which can cause flooding both within the site and to downstream watercourses if not managed and controlled.' (The point is emphasised again in para 3.9.3: 'It is also recognised that the increase in development runoff presents a high risk and as such it will be essential to ensure that that the mitigation measures identified in Section 4 are adopted.') This is a key statement as issues about whether the SuDS can be built to the specification given, how it would operate when flooded, and how it will be maintained raise questions about whether increased surface water runoff can be controlled.

Paras 4.4.12 and following, dealing with attenuation calculations and SuDS, present a number of problems. Para 4.4.2 has been updated and the assessment of required attenuation for runoff is now based on 40% allowance for climate change rather than the 20% used in the original FRA - and Appendix I has accordingly also been updated. Para 4.5.2 presents a table which assesses suitability of SuDS for the location – but the assessments are all based on the assumption that the gravels underneath the paving, which help to attenuate flow, will be free-flowing. This would only be the case in normal, non-flood conditions, where rainwater runoff would be attenuated. As soon as groundwater levels rise and infiltrate the SuDS, the drainage will be zero and water will start to pond on the surface of the car park, and eventually flow into the surrounding floodplain.

Section 4.6 claims that the SuDS will filter out pollutants, e.g. from oil left on the parking surface. But again this will only be true in non-flood conditions. During a flood even of a modest magnitude, contaminants will be washed freely into the river system. And after a flood has subsided, contaminated water will be pumped directly into the river if the Council's plan for draining the car park is followed.

Para 4.7.1 says that 15,000m^2 of porous paving can be accommodated at the site. It says: 'This calculation is based on a sub-base foundation to the permeable paving having a void ratio of 30% and being 350mm in depth.' It is unclear from this sentence what is '350mm in depth' but we assume it is the whole structure. That would be consistent with the dimensions given e.g. here http://www.pavingexpert.com/permeable04.htm. The Ground Investigation report (unchanged from the original submission) says groundwater was

encountered at between 0.5mbgl (metres below ground level) and 1.6mbgl. Section 6.3.1 of that report comments: 'It should be noted that the soakage rate may be affected by shallow groundwater and this rate should be confirmed at a wetter time of year as site work was carried out after a number of days of dry weather.' If the paving/SuDS structure is 350mm deep that leaves only 150mm between the bottom of the SuDS and the groundwater. And in wetter periods it will be less. No attempt seems to have been made to establish actual levels of groundwater flooding in the area (as noted above) and what impact this would have on the operation of a SuDS. In our view the SuDS would cease to be free draining even before fluvial flooding started to occur.

The FRA then starts to get rather surreal. Reporting on the attenuation modelling, para 4.7.1 says: 'The results show that there is sufficient attenuation within the voids in the permeable paving foundation to accommodate a 1:100yr storm allowing for climate change. Given that the car park is not flat *there will be areas of ponding at the low points during more extreme events*. However *any ponding will be contained within the new car park*, as well as the floodplain compensation area proposed to the north of the new car park given that ground levels rise towards the site boundaries on all sides (refer to Section 4.9).' (Emphasis added.) This suggests the consultants think the SuDS can cope with a 1 in 100yr plus climate change. Whoever did the modelling, and wrote this paragraph, is clearly unaware that the site will be more than 2m underwater in the scenario they describe.

Para 4.7.3 says: 'In the event of short duration intense storms in excess of the 1 in 100 year event plus climate change that exceed the capacity of the system, or due to a blockage of the main drainage system, *surface water will drain via an overland route to the adjacent watercourse* or floodplain.' Again the consultants fail to recognise the fact that the site will be more than 2m under water at this point.

The modeller appears to have run a computer simulation to assess the hypothetical *difference* in runoff from a field and the car park (Appendix I) and have then designed a SuDS to cope with that *difference*. They have ignored the fact that the site will be under water in making their assessments. If the car park were outside the floodplain and remained free-draining, even in a major storm, the statements in the FRA would make sense. But given the actual location they are ludicrous.

Para 4.11.1 is a masterpiece of confusion: 'As the majority of the Park and Ride extension will be flooded within a 1:5yr return period flood, the residual risk of a storm event that exceeds the capacity of the drainage system (in excess of 100yr return period) is likely to be of little consequence due to the high probability of the drainage system being inundated from fluvial flooding in such an event.' This seems to acknowledge that the whole system will be flooded and not operating even at a 1:5yr return event, so problems created by anything worse are irrelevant as the drainage system won't be working anyway. This contradicts the statements in paras 4.7.1 and 4.7.3.

As stated previously, the SuDS would work in normal weather conditions, during non-flood periods, attenuating runoff from the car park and filtering out pollutants (provided that the car park has not already flooded from rising groundwater). But for floods of almost any scale, and certainly for floods happening every 5 years, it is overwhelmed and ceases to have any relevance.

Conclusions

The limited updating to the FRA are illustrative of the lack of serious attention being given to flood risk in this application.

The revised FRA contains statements about the NPPF Flood Risk Category of the site which are in conflict with the addendum to the Planning Statement submitted in August 2017.

Climate change impacts are only considered for 1:100 yr events. No attempt has been made to understand the implications of climate change for more frequent events.

The historical flood record in the revised FRA is inaccurate, and understates the frequency of flooding at the site.

The Applicant has failed to adequately investigate the risk of groundwater emergence at the site and its implications. Groundwater flooding is much more serious than the FRA estimates.

The revised FRA totally misrepresents the design of OFAS and its implications for the site. The P&R extension, if built, will be in the functional floodplain and fully exposed to the flow of water entering the flood channel. There is significant risk of stranded cars being swept into the new channel (or existing watercourse) thereby obstructing the passage of flood water and increasing the risk of flooding for local residents. The proposed perimeter fence is not a solution to this as any fencing would trap debris and impede flood flow. Fencing of any kind is incompatible with the site.

The attenuation modelling appears to have been completed by someone who was unaware that the site is in the functional flood plain. This results in absurd claims about the SuDS which are manifestly untrue.

The functional floodplain is totally the wrong location for a car park and this application should be refused.