

DESIGN AND MANAGEMENT.co.uk

7 WEST FEN, FRITHVILLE, BOSTON. LINC'S. PE22 7EX TEL 01205 750775

FLOOD RISK ASSESSMENT

Reference Proposed Dwelling and Wildlife Sanctuary, Land Adjacent Holly Cottage, Station Road,
Old Leake Commonside, Boston. Linc's PE22 9QJ

Background

See/read the below in conjunction with the attached EA Docs Letter Plans and Maps of predicted levels Risk etc.

For the 2006 scenario, the levels are based on the Northern Area Tidal Modelling carried out by Mott MacDonald in 2006.

For the 2115 scenario, the levels are based on predictions in *FCDPAG3 Economic Appraisal Supplementary Note to Operating Authorities - Climate Change Impacts* (October 2006) and Planning Policy Statement 25 (PPS25). The calculated total sea level rise between 2006 and 2115 is 1.14m.

It should be noted at the outset that this FRA is based on the EA docs and predictions but following recent enquiries/investigations on the "Basis Of" and "Exclusions and Omissions From" the EAs Flood Hazard Maps modelling, the extrapolated data presented as Hazard Maps cannot be in any way relied on as an accurate or even remotely possible consequence of any of the modelled breaches.

To expand on the above, the EAs modelling only accounts for inundation and outflow through a breach and not outflow or dispersal of floodwater via the drainage network either by gravity or pumping. In fact the model compounds inundation on inundation for a period of seventy-two hours then illustrates the worst moment during the seventy-two hour period.

The breaches are modelled with the base level of the breach set at more or less 3.0M ODN, which causes drainage to cease, more or less, after that point of the receding tide is reached, with the consequence that residual floodwater on land at that point is then modelled to subside to the breach height, partly I am informed by outflow through the breach, the remainder including all floodwater below the height of the base of the breach is then modelled to spread further inland. The reality is that floodwaters could and would continue to recede, at least through the gravity outfalls of the drainage network, continuing from the level of the bottom of the breach through to the level of the Low Tide (generally between -0.5M ODN to -2.0M ODN) and back

I have attached a graphic to show/illustrate the above in respect of the EAs Modelled Breach W12, which I do not think effects this site but it does show the perversity of the EAs modelling in the context of particular and in that all are based on the same parameters, all breach events.. In reality if the capacity and function of the drainage network were even partly accounted for, it would likely considerably mitigate the effect on this site in the short, medium and longer term of the modelled events.

Specifically in regard the Hazard Maps referred to above, wherein when included within the Forty Foot drain is shown to flood to in excess of 2.0m depth which is a physical impossibility. In reality

it and other land drains have the potential, both hypothetical and real to disperse and discharge much/most of the floodwater modelled to remain/build up/result as shown by the EA Hazard Maps. The reality is that there is as far as I can find no bar to flood water at a depth of 1.0M adjacent the site flowing unimpeded to the Forty Foot Drain or Maude Foster Drain to disperse/discharge. To explain, the maps treat the surface of the water in the drain as solid ground and the water is consequently modelled to pool or flow along the surface of the water rather than the reality of it being absorbed into the water body that exists in the drain and that body of water and the flood-water combining to increase in depth only proportionate to the rate of dispersal/flow along the entire length of the drain with the consequence of the water height/depth of the entire drain increasing slowly as a result. There is of course the pumping station and gravity outfall at the foot of the forty-foot and Maude Foster that will also enable discharge of flood water back to the Witham Haven as and when tidal conditions allow, which will, as is illustrated by the attached graphic, exceed in duration the opportunity for inundation as a consequence of the breach.

It should be additionally noted that defence dimensions derived/provided/relied on in the EAs modelling have been shown not to be entirely accurate (read/see BBC vs Staples Appeal Decision) it appears the EA understates the dimensions of some defences and as a consequence overstates in certain circumstances the consequence of a breach.

Obviously the above as a minimum indicates that the EAs modelling is seriously flawed and as such cannot be accepted as an accurate, likely or realistic model or prediction of current defences or future risk. It provides in my opinion not even a best guess scenario, providing a cumulative worse than worst case based on a multiplicity of extrapolated hypothesis and omissions/compromises that in at least the above cases are incorrect and on the evidence of that the remainder of which may or may not be correct. The data is in the form of potential flood depth in various bands from 0.25M to in excess of 2.0M. Unfortunately that means where for instance the data indicate depths could be between 1.0M and 1.5M it could well be that worse than worst-case scenario could be only marginally above 1.0 M.

Clearly there is some risk, but that must be looked at in light of the exaggerated modelling by the Hazard Maps and in consideration of if or not a breach in the modelled locations, or any other location for that matter, are a likely/realistic prospect or not. What the risk is remains to be seen. What is currently certain is that based on the weather and storm/tidal surge hypothesis that the EA has modelled (presumably their "worst case scenario"), the consequence is far less than the EAs Hazard Maps indicate/show/ predict.

Risk in Context

Having assessed whatever hypothetical risk there may be, it is of course necessary to consider the likelihood or not of that risk materialising into reality. Also it is additionally necessary to assess how if the risk is real, what can be done to warn of an impending materialisation of that risk and what can be done to minimise any effect from it if it does occur.

Essentially since the demise of the "precautionary principle" risk is not the be all and end all. The NPPF practice Guidance says "The broad approach of assessing, avoiding, managing and mitigating flood risk should be followed." what this means is that development can take place where there is hypothetical or risk of flooding provided that, what the NPPF says at paragraphs 102 and 103 (now paragraph 167 etc) are followed,

1."within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location; and"

2."development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including by emergency planning; and it gives priority to the use of sustainable drainage systems." and

3."a site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall."

Flood risk of course is but one risk in the lives of future occupants and must be considered in that context.

NPPF Para 167

167. When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment ⁵⁵. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

(a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;

(b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;

(c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;

(d) any residual risk can be safely managed; and

(e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

Risk has to be accepted because even the most mundane daily activity incorporates risk but that risk must be seen in light of "probability" , "consequence" and "manageability", so that whatever the risk is, its probability of materialising can be objectively assessed and the consequences if it did can be put it in context with other risk so that it can be managed to minimise both it's likelihood of occurring and the potential consequence/s if it did.

Without accepting risk that we could do nothing at all because every action and operation carries risk, so it follows that if we adopt the "precautionary principle" and avoid all risk, nothing is possible.

Risk of death or injury from fire within buildings, is directly comparable to risk of death or injury from flooding or any other life threatening risk within the same.

Do we not build or inhabit buildings because there is a risk of death or injury from fire within them, no we do not, we manage the risk by providing separation, compartmentation and means of warning and escape. In fact, there is a great deal of legislation and guidance to ensure that the risk is managed and mitigated, the application of that works to reduce and minimise occurrences and consequences. In fact much of that legislation and guidance provides an appropriate model to adopt, without even necessarily the need for any new legislation, to enforce any reasonable requirement to

prevent any person being put at risk of death from flooding.

In order to put flood risk into context I have pasted in below the DCLG statistical overview on Fire Risk/Consequences for 2011-12. As will be seen, these represent real everyday risk and consequences of that risk, including death. You will see there were 44,000 fires in dwellings, 37,600 of which were accidental. 285 people died in dwelling/house fires and that just over half of those deaths were partly or wholly from the products of combustion (smoke and fumes) rather than heat or burning.

In the context of the legislation and guidance and what is a real and ongoing "accepted risk" in relation to fire, I can see no reason why flood risk should be managed or dealt with in any other way than that applied to fire. Whilst it is of course eminently sensible, and the obligation and duty of all responsible persons, both personally and for their families and others whom may rely on them, to provide a means of warning, escape and safe haven from flooding. The reality is that flooding is in fact a considerably less real risk to occupants of buildings than fire.

I cannot find any statistic in relation to death or injury caused by flooding for any or a comparable period, but I know, acknowledging of course that even one death or injury is one to many, that fire risk far exceeds flood risk, both in terms of numbers and that it is a relentless everyday risk, not just some hypothesis that may or may not occur once in a 100, 200 or a 1000 years, or never.

Fire Statistics Overview

- In 2011-12 fire and rescue authorities attended 585,000 fires or false alarms in Britain, 7% fewer than in 2010-11 (para 1.1).
- A total of 272,000 fires were attended, 6% fewer than in 2010-11. Around 71% were outdoor fires (193,000), e.g. road vehicles, refuse, grassland. A total of 44,000 (16%) were fires in dwellings (para 1.1, 1.2 & 5.1).
- The total number of accidental dwelling fires fell by 3% to 37,600 in 2011-12 (para 1.7).

Fatalities from fires

- In 2011-12, there were 380 fire-related fatalities in Britain, 24 fewer than in 2010-11 and lower than in any year in the last fifty years. The highest number of fatalities recorded was 967 in 1985-86. Through the 1990s and 2000s there was a general downward trend. (para 1.10).
- Three quarters (76%) of fire-related fatalities occurred in dwelling fires (para 1.11). Fire fatality rates are notably higher for people aged 80+ and for males, and in Scotland (para 1.14 & 1.25).
- Being overcome by gas, smoke or toxic fumes was partly or wholly the cause of death in over half (53%) of all fire fatalities.

Site Location and Description

The site is located a short way from the centre of the village of Old Leake Commonsides a satellite or subsidiary settlement of Old Leake. It is within a fairly densely developed section of Station Road and other dwellings immediately adjacent to and surrounded by existing dwellings. The site was most recently in use as a paddock and previously contained various buildings alongside the road in more or less the same location as the now proposed, the site but is currently dormant, only the grass and other growth on occasion being cut back, it being unsuitable for modern agricultural use because of its configuration..

The site is surrounded by residential and other uses with existing buildings in both residential and other uses. The adjoining dwelling is in other ownership but that is of some considerable age it appearing since the late Victorian OS maps, and in fact also other buildings, but not this, shown in the location of this proposed.

The EA Lidar shows road levels adjacent the site at 2.3 ODN, the site being more or less level with the road but decreasing in level toward the rear, site level typically is around 2.0M ODN

Sources of Potential Flooding

Potential flooding of a part of the site could be according to the EA Data, tidal from There is no flood risk from Main River Sources, see **EA Ref CCN/2020/190256 Dated: 09/11/2020 CCN 4.1 Fluvial Defence Information**. There is no known or recorded flooding in respect of the Hobhole Drain some 0.75 miles NNW of the site, to and by which the site and surrounding are actively drained by the Local DB including considerable capacity self powered pumped outfalls into the Wash.

The Ea suggest there may be a risk of tidal flooding from the Wash, some 4.25 miles distant to the SE. See **EA Ref CCN/2020/190256 Dated: 09/11/2020 CCN 5.1 Tidal Defence Information**

The EA Data states "The existing tidal defences protecting this site consist of earth embankments which are supplemented by saltmarsh. They are in good condition and reduce the risk of flooding (at the defence) to a 0.67% (1 in 150) chance of occurring in any year. We inspect these defences routinely to ensure potential defects are identified."

The same data extrapolates that the worst case scenario, the 1in 200 2115 inc climate change Breach event could result in the site flooding to a depth of between 0 and 0.25M, and for the same date extrapolated event of Overtopping, strangely by up to 1.0M.

However noting that the site adjacent, (See EA Lidar Holly Cottage, EA Lidar Land Adjacent Holly Cottage and EA Lidar Gen Site Levels ODN), is more or less at the same ODN as the site.

Therefore based on the EAs own levels, as the overtopping scenario extrapolates is not feasible and the Breach event has to be the worst case scenario. That is up to 0.25M of flooding depth on the site.

Additionally the site being some 4.25 Miles from the The Wash and the land between and surrounding being flat and interspersed with intervening drains to inhibit flow and direct water away from the site. Which, when considered in conjunction with other EA modelling expediciencies amongst other such as ignoring Pumping Station pumping capacity and modelling drains as grassy channels where water flows directly across rather than as in reality it would be absorbed within and spread initially only along the encountered body of water, it is most likely no flooding would occur even were the worst case scenario to materialise.

There is no history of the site or buildings ever flooding.

Summary

The site is surrounding by buildings, mainly dwellings and the proposed buildings currently would be at no risk of flooding from overtopping, It is intended to raise the level of the northernmost part of the site so as to match the level of the adjoining both sides, which will remove the dwelling garage and parking etc entirely out of the extrapolated EA risk. According to the EAs data, the 2115 1 in 200 Breach Scenario of up to 0.25M of flooding, that will require no more than a 250mm raise in ground level to 2.50M ODN in relation to which floor level of the dwelling and garage will be an additional 150mm higher than the surrounding ground level at 2.65M ODN. The risk shown by the EA is the "extreme event" if it were to occur it would not effect the site surrounding the building or

the buildings the subject of this FRA, even were it to attain the modelled worst possible case prediction.

Mitigation

No additional mitigation is necessary as the dwelling is three storey, ground floor level will be a min 150 above surrounding at 2.65M ODN (150mm at least above worst case scenario) but to consider for were the impossible to occur, even then the occupants would not be in danger as there would be considerable advance warning, most likely days rather than hours, and by the adjoining the Northern boundary of the site safe evacuation could occur until the very last as there will be dry egress for evacuation by Station Road and Hobhole Bank to higher ground of the Wolds at Stickney or the Toyntons near Spilsby until the risk of flood subsides

If any doubt at all exists it will be possible for occupants to sign up for the EA Early Warning System, to incorporate demountable defences to entrances into the building to whatever height is considered appropriate and for the building to be constructed of flood resilient construction minimise damage by keeping water out of the building and minimising any possible damage if it got in.

Additionally if it thought prudent, floor and or ground level could be increased a further 150mm to 2.65M ODN and 2.8M ODN respectively but once levels exceed adjoining local flooding issues may arise.

Surface water from the building will be dealt with by way of drains and soak away, the surface water first being directed to the proposed pond and wet wildlife area, before any soak-away is engaged. No additional hard landscaping is proposed and parking and turning areas will all be permeable.

All plans and drawings etc. are supplied subject to Keith Baker Design & Management's Standard Conditions of Contract, which are available on request. Copyright is reserved.
Sole proprietor Keith Baker.