

FLOOD RISK ASSESSMENT
FOR PROPOSED
MARINA
AT
WHITE MILLS LOCK
GRENDON
NORTHAMPTONSHIRE

Environmental Statement Volume 2 Chapter 9

8th July 2013
First Issue

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Revisions

Rev.	Date	Description
-	8/7/13	First Issue

1.0 Introduction

1.1 This Flood Risk Assessment has been produced in support of a planning application for a proposed marina at Station Road, Grendon in Northamptonshire.

2.0 Planning Policy & Methodology

2.1 Planning policy for flood risk is set out in the Nation Planning Policy Framework (NPPF) technical guidance published in March 2012. The policy document sets out key planning objectives in relation to land usage and flood risk management. The development proposals are designed to be compliant with the requirements of the National Planning Policy Framework.

2.2 Pre-planning application consultation has been undertaken with the Environment Agency to establish the issues which need to be considered relating to flood risk.

2.3 A Flood Risk Assessment has been carried out to assess the effects of flooding on the development and how the development might affect flood risk elsewhere.

3.0 Development Location & Description

3.1 The site is located immediately north of the White Mills Lock built on the River Nene which runs along the southern boundary of the site. Station Road runs along the eastern site boundary and an industrial estate is located to the north. West of the site are open fields used for agriculture. A location plan of the site is shown below.



Location Plan

3.2 The application site has relatively flat topography and is within the flood plain of the River Nene. A small watercourse passes through the northern half of the site running eastwards and discharges into a watercourse running parallel with Station Road within the Highway boundary. There is also a culverted land drain crossing the site running west to east. A topographical survey drawing showing the existing layout is located in **Volume 3 Chapter 9 Appendix 1**.

3.3 The proposed development will consist of a 141 berth marina linked to the River Nene. There will be a facilities building with undercroft parking for staff and a car park for visitors. The car park will be linked to an access off Station Road.

6.2 Fluvial flooding from minor watercourses

6.2.1 The watercourses running through and adjacent to the site feed by gravity into the River Nene just downstream of White Mills Lock. Consequently the water level in the watercourses are primarily dictated by the downstream water level of the River Nene. With the flood risk from the River Nene being high, the influence of flooding from the minor watercourses is considered insignificant.

6.3 Groundwater

6.3.1 With the site being located close to the River and exposed to relatively frequent fluvial flooding, ground water levels are likely to be high. This is confirmed by the boggy ground conditions found. Again, with the flood risk from the River Nene being high, the influence of flooding from groundwater is considered insignificant.

6.4 Surface water run-off from the development

6.4.1 The proposed roof of the facilities building will increase surface water run-off from the site. This will need to be managed in order to prevent an increased risk of flooding downstream of the site. The proposed car park area will be constructed in gravel and will therefore not increase run-off.

6.5 Surface water run-off from areas adjacent to the site

6.5.1 The surrounding topography is relatively flat and will therefore exhibit low rates of surface water run-off. Land to the west of the site is believed to be irrigated into the land drain crossing the site which connects to the minor watercourse system. Flood risk from this will therefore be dictated by the River Nene water levels.

6.5.2 Station Road is the only significant impermeable area adjacent to the site and this also drains into the minor watercourse system with flood levels dictated by the River Nene.

7.0 Probability

7.1 The development site is located within a Zone 3b flood area. This is deemed to be at high risk of flooding, typically greater than 1 in 20 annual probability.

8.0 Climate Change

8.1 Table 5 in the NPPF technical guidance provides recommended allowances for increase peak rainfall intensity of 20% which should be used for any surface water drainage design.

8.2 The Environment Agency have provide flood levels with climate change allowances which can be used for the design of proposed site levels.

9.0 Flood Risk Management Measures

9.1 It has been established that the River Nene is the overriding influence of flooding on site. During a 100 year flood event, the site would typically flood to a depth of about 1.6m.

9.2 The proposed car park will be constructed at existing ground level and therefore prior to flood events, vehicles will need to be evacuated. The evacuation procedure will be set out in the Flood Management Plan and based on Flood Warning Trigger Levels issued by the Environment Agency.

9.3 In order to protect the facilities building, the finished floor level shall be set at the 100 year plus climate change level of 48.21m AOD. Electrical fuse boxes, sockets and switches, and telecom points should be mounted at least 1m above floor level. Foul drainage chambers and tanks should have lockable sealed lids and vent points should be set at least 1m above the 100 year flood level.

9.4 Staff should be fully conversant with the Flood Management Plan and on hand to ensure that procedures set out in the plan are followed. Whilst the site is 'unmanned', the site manager should be on call to attend in the event of a Flood Warning Trigger being issued.

9.5 The marina nominal water level has been set at 47.36m AOD which is the same level as the River Nene. This is regulated by the slots in White Mills Lock. As shown on the proposed layout drawing in **Volume 3 Chapter 9 Appendix 1**, the embankment located on the outer perimeter of the sheet piling will terminate at this level. For flood events exceeding this level, some seepage from the sheet piling can be expected. Above the top of the sheet piling, the River Nene will also overtop and the entire area will be flooded.

9.6 During periods when the marina is flooded, the boats will remain secured to the piles adjacent to the jetty. The jetty will be designed to float and therefore will provide an adequate means of escape for pedestrians leaving their boats. This will be linked to an elevated walkway which will be set at a level equivalent to the 100 year plus climate change flood level. The walkway will then ramp down to Station Road.

9.7 Provided the Flood Management Plan procedures are followed, evacuation from Station Road should be achieved prior to significant flooding to the site occurring. However, in the event that this is not achieved, evacuation by emergency services should be carried out at the base of the ramp on the elevated walkway in Station Road.

9.8 As can be seen on the Environment Agency's flood map, the area to the east of the site (downstream) is in Flood Zone 2 due to ground levels being higher than the site. This raised area will ensure flood conveyance velocities are low in the vicinity of the marina, allowing evacuation to be achieved safely in the event of late departure due to the Flood Management Plan not being adhered to.

9.9 It is intended that the facilities building will be drained to soakaway which will ensure that there is no increased run-off from the site. The geology report located in **Volume 3 Chapter 9 Appendix 4** suggests that the ground will be 'loamy and clayey flood plain soils with naturally high groundwater'. However, preliminary trial holing shows that the ground comprises of gravel deposits which will be much more permeable. Given the high water table, it is suggested that any soakaway will need to be a shallow trench type in order to work.

9.10 The existing minor watercourse crossing the site will be diverted as shown on the proposed site layout drawing. Initial discussions with the Land Drainage Authority's agent, The Bedford Group of Drainage Boards, suggests that a suitable land drainage consent can be obtained for undertaking this diversion (refer to emails in **Volume 3 Chapter 9 Appendix 2**).

9.11 The existing land drain crossing the site will be diverted into the minor watercourse as shown of the proposed development layout plan.

10.0 Off Site Impacts and Proposed Mitigation Measures

10.1 The proposed earth embankment adjacent to the sheet piling will displace part of the flood plain and could exacerbate flooding off site. In order to mitigate against this, flood compensation is proposed on a level for level basis.

10.2 The flood compensation proposals are presented on the drawing located in **Volume 3 Chapter 9 Appendix 1** and supporting calculations are located in **Volume 3 Chapter 9 Appendix 3**. Compensation areas are predominantly located around the northern end of the site where levels

will be reduced by approximately 200mm. A small area of compensation is also proposed at the south western end of the site on the embankment adjacent to the River Nene. This will be reduced by a similar amount and if deemed necessary by the Environment Agency, geotechnical calculations will be provided to prove that this will not destabilise the embankment.

10.3 The flood compensation proposals were presented to the Environment Agency who have subsequently approved the scheme as stated in their email of 24th January 2013 presented in **Volume 3 Chapter 9 Appendix 2.**

10.3 Although the lowering a ground at the northern end of the site is close to Station Road and the adjacent development to the north, there is no proposal to lower the boundaries of the site. Therefore the proposals will not introduce new flood flow paths to into adjacent development and will consequently not increase flood risk to adjacent property.

11.0 Management of Residual Risks

11.1 Watercourses and site drainage should be inspected annually for blockages and remedial works carried out accordingly.

11.2 All visitors to the site should be provided with a copy of the Flood Management Plan.

11.3 Annual inspections and maintenance of the jetty should be carried out.

11.4 The site operator must subscribe to the Environment Agency's flood warning service.

11.5 Access will be provided to the western length of the River Nene adjacent to the site by a track linking to the car park and Station Road. Access to the eastern section of the River and the lock will be retained as existing.

11.6 A 9m easement will be provided in accordance with the land drainage bylaw along the river bank, from the landward toe of the bank. This will be to permit access to the Environment Agency for maintenance of the River. A Land Drainage consent will be applied for to construct works within the 9m easement.

12.0 Conclusions

12.1 The proposed development complies with the requirements of the Sequential Test set out in the NPPF technical guidance.

12.2 The site will be constructed so that the proposed building will be protected from flooding and there is a safe evacuation route off site from the marina.

12.3 Flood compensation will be provided to ensure there will be no net loss of flood plain storage.

12.4 A Flood Management Plan will be put in place to ensure the site can be operated safely during flooding.



..... 8th July 2013

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