



now part of



# TRANSPORT OF WORKS ACT ORDER 1992 THE PROPOSED NETWORK RAIL (EAST WEST RAIL BICESTER TO BEDFORD IMPROVEMENTS) ORDER

**Proof of Evidence in relation to Flood Risk**

**Amy Hensler 156/3/1**

**BEng (Hons), MSc, C.WEM, MCIWEM, CEnv**

On behalf of **O&H Q6 Limited**

**O&H Q7 Limited**

Project Ref: 27467/P016 | Rev: AA | Date: January 2019

---

Registered Office: Buckingham Court Kingsmead Business Park, London Road, High Wycombe, Buckinghamshire, HP11 1JU  
Office Address: Caversham Bridge House, Waterman Place, Reading, Berkshire RG1 8DN  
T: +44 (0)118 950 0761 E: reading@peterbrett.com

Statement by Amy Hensler BSc (Hons), MSc, C.WEM, MCIWEM, CEnv

---

This page is intentionally blank

Statement by Amy Hensler BSc (Hons), MSc, C.WEM, MCIWEM, CEnv

---

## Contents

<b>1</b>	<b>Introduction .....</b>	<b>1</b>
<b>2</b>	<b>Overview of the evidence .....</b>	<b>2</b>
<b>3</b>	<b>Planning Policy Context .....</b>	<b>3</b>
	3.1 National Policy Guidance .....	3
	3.2 Local Policy .....	5
<b>4</b>	<b>Sequential Approach in Design .....</b>	<b>8</b>
<b>5</b>	<b>Compensatory Flood Storage Calculations.....</b>	<b>10</b>
<b>6</b>	<b>Flood Risk Mitigation .....</b>	<b>18</b>
	6.2 Conveyance .....	18
	6.3 Location of CFSA.....	19
	6.4 Maintenance and Access .....	20
	6.5 Surface Water Drainage.....	21
<b>7</b>	<b>Conclusions &amp; Summary.....</b>	<b>22</b>

## Figures

Figure 5-1 Level for Level Compensation Storage .....	11
Figure 5-1 Schematic of method to estimate floodplain width and area .....	13
Figure 5-3 Map of Woodley Crossing, Woburn Sands (2D0023).....	15
Figure 6-1 Map of Marston Road, Marston Valley (2D0048) .....	20

Statement by Amy Hensler BSc (Hons), MSc, C.WEM, MCIWEM, CEnv

---

This page is intentionally blank

Statement by Amy Hensler BSc (Hons), MSc, C.WEM, MCIWEM, CEnv

## 1 Introduction

1.1.1 I am a Chartered Water and Environmental Manager and Chartered Environmentalist with over 18 years' experience in the assessment of water management, flood risk, hydrology and hydraulics. I am Director of Flood Risk at Peter Brett Associates LLP (PBA), now part of Stantec.

1.1.2 I have worked on a range of projects including flood risk mapping, flood forecasting and flood management strategies for the Environment Agency (EA). I have also worked for a range of private sector clients, providing advice and undertaking Flood Risk Assessments (FRAs) and Environmental Statements, and I am experienced in applying national policy and guidance with regard to flood risk.

1.1.3 The evidence that I have prepared in this proof of evidence is true and has been prepared and is given in accordance with the guidance of my professional institution and I confirm that the opinions expressed are my true and professional opinions.

1.1.4 This proof considers the flood risk elements of the East West Rail Bicester to Bedford Improvements proposals, specifically for O&H's interests, as follows:

- The Former Bletchley Brickworks
- Woburn Estate
- Marston Valley
- Kempston Hardwick

These plots of land are as set out in the O&H Q6 Limited and O&H Q7 Limited Statement of Case.

## 2 Overview of the evidence

2.1.1 This proof addresses the points within O&H Q6 Limited and O&H Q7 Limited (hereafter referred to as O&H) Statement of Case relating to flood risk.

2.1.2 O&H object to the inclusion of all of the land in the Draft Order allocated for compensatory flood storage areas.

- a. There is no evidence that a sequential approach, as per NPPF and reinforced in local planning policy, has been undertaken in the design of the permanent works which would minimise the flood risk impacts.
- b. The compensatory flood storage calculations are not sufficiently detailed to be used as a basis of the compulsory purchase or to satisfy planning requirements.
- c. Network Rail has failed to demonstrate, through the recommended flood risk mitigation, that flood risk will not be increased as a result of the proposals, which is contrary to National and Local planning policy.

2.1.3 My evidence is based on Network Rail's (NR) Environmental Statement Chapter 13 and its appendices, telephone discussions with Atkins on 20<sup>th</sup> December 2018 and 8<sup>th</sup> January 2019 and an annotated digital version of Table 2D0023 in Appendix 13.1E provided by Atkins on 4<sup>th</sup> January 2019 for the Woodley Crossing at Woburn Sands.

## 3 Planning Policy Context

### 3.1 National Policy Guidance

3.1.1 The National Planning Policy Framework (NPPF), released in July 2018, paragraphs 155 – 165 relate to development and flood risk. The Planning Practice Guidance (PPG) sits alongside it and provides further guidance on the application of the NPPF.

3.1.2 Paragraphs 157 - 163 set out the sequential approach to flood risk, the Sequential Test and the Exception Test:

*“157. All plans should apply a sequential, risk-based approach to the location of development – taking into account the current and future impacts of climate change so as to avoid, where possible, flood risk to people and property. They should do this, and manage any residual risk, by:*

*a) applying the sequential test and then, if necessary, the exception test as set out below;*

*b) safeguarding land from development that is required, or likely to be required, for current or future flood management;*

*c) using opportunities provided by new development to reduce the causes and impacts of flooding (where appropriate through the use of natural flood management techniques); and*

*d) where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to relocate development, including housing, to more sustainable locations.*

Statement by Amy Hensler BSc (Hons), MSc, C.WEM, MCIWEM, CEnv

---

*158. The aim of the sequential test is to steer new development to areas with the lowest risk of flooding. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. The strategic flood risk assessment will provide the basis for applying this test. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding.*

*159. If it is not possible for development to be located in zones with a lower risk of flooding (taking into account wider sustainable development objectives), the exception test may have to be applied. The need for the exception test will depend on the potential vulnerability of the site and of the development proposed, in line with the Flood Risk Vulnerability Classification set out in national planning guidance.*

*160. The application of the exception test should be informed by a strategic or site specific flood risk assessment, depending on whether it is being applied during plan production or at the application stage. For the exception test to be passed it should be demonstrated that:*

- a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; and*
- b) 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.*

*161. Both elements of the exception test should be satisfied for development to be allocated or permitted.*

Statement by Amy Hensler BSc (Hons), MSc, C.WEM, MCIWEM, CEnv

---

*162. Where planning applications come forward on sites allocated in the development plan through the sequential test, applicants need not apply the sequential test again. However, the exception test may need to be reapplied if relevant aspects of the proposal had not been considered when the test was applied at the plan making stage, or if more recent information about existing or potential flood risk should be taken into account.*

*163. 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. 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;*
- 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.”*

## **3.2 Local Policy**

### **Bedford**

3.2.1 The Bedford Borough Draft Local Plan 2030, released September 2018, includes Policy 96 Flood Risk. The relevant sections of the policy states:

Statement by Amy Hensler BSc (Hons), MSc, C.WEM, MCIWEM, CEnv

---

*“In considering new development water management, quality and flood risk must be addressed by:*

- *Directing development to areas at lowest risk of flooding by applying the sequential test and, where necessary, the exception test, in line with national policy...*
- *Ensuring new development considers its impact on flood risk both to existing development and the development proposed and where flood risks on or off site is identified, includes measures to reduce overall flood risk.*
- *Demonstrating how the cumulative impact of development on flooding to the immediate and surrounding area has been addressed and reduced through the proposed development.”*

### **Central Bedfordshire**

3.2.2 Central Bedfordshire Local Plan 2015 – 2035, released January 2018, includes Policy CC3: Flood Risk Management. The relevant section of this policy states:

*“Development will be supported where:*

- *It is located in areas at lowest risk of flooding (from all sources) and the Sequential and Exceptional Tests (where required) demonstrates that the site is appropriate for development and its intended use.*
- *A sequential approach to site layout is applied, directing the most vulnerable uses to areas at lowest risk from all sources of flooding.*

Statement by Amy Hensler BSc (Hons), MSc, C.WEM, MCIWEM, CEnv

---

- *It will be safe for the lifetime of the development, will not increase flood risk elsewhere or result in the loss of floodplain storage capacity or impede flowpaths, and reduces the overall flood risk within and beyond the site boundary where possible. Land that is required for current and future flood management will be safeguarded from development....*
- *Development must consider the impacts of the layout and land use on offsite flood risk. Measures should be identified and implemented, including passive measures to improve flood risk.”*

### **Milton Keynes**

3.2.3 The Milton Keynes Council Plan:MK Draft Plan for development until 2031, released February 2017, includes Policy FR1 Managing Flood Risk. The relevant section of this policy to flood risk states:

*“Plan:MK will seek to steer all new development towards areas with the lowest probability of flooding. The sequential approach to development, as set out in national guidance, will therefore be applied across the Borough, taking into account all sources of flooding as contained within the Council’s Strategic Flood Risk Assessment (SFRA).*

*Development within areas of flood risk from any source of flooding, will only be acceptable if it is clearly demonstrated that it is appropriate at that location, and that there are no suitable alternative sites at a lower flood risk.*

## 4 Sequential Approach in Design

- 4.1.1 The NPPF section on flood risk starts with the following principle, paragraph 155 *“Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.”*
- 4.1.2 There is no evidence within the Flood Risk Assessment (FRA, Appendix 13.1 of the Environmental Statement) or the Planning Statement submitted that the Sequential Approach advocated within NPPF and reinforced in local planning policy has been considered or accorded with in the planning or design of the proposed permanent works. To be clear, we do not object to the route of the railway line itself, but it has not been demonstrated that the sequential approach has been applied in the design of ancillary permanent works.
- 4.1.3 In FRA Section 2.3.56, specifically for the temporary site compounds, it is stated that *“Existing floodplain areas both fluvial and surface water will be avoided where possible. If a construction compound must be located in the existing floodplain, a risk based approach to setting out site operations will be adopted, with high risk activities located outside of flood risk areas, options to limit infrastructure in the floodplain will be considered and Flood Management Plans developed.”*
- 4.1.4 Although not referred to explicitly in FRA paragraph 2.3.56, a sequential approach as advocated within NPPF is being followed, both in the siting of the temporary compound and in the planning of activities and land uses within the compound, to reduce flood risk.
- 4.1.5 However, there is no evidence that the same sequential approach has been followed for any of the permanent works. The scale of mitigation, and thus the size of the CFSA and required compulsory purchase areas, could and should

Statement by Amy Hensler BSc (Hons), MSc, C.WEM, MCIWEM, CEnv

---

have been minimised through the sequential approach, for example, a road alignment design could be adjusted such that the extent to which an overbridge and the embankments associated with it impacts on the floodplain it crosses is minimised.

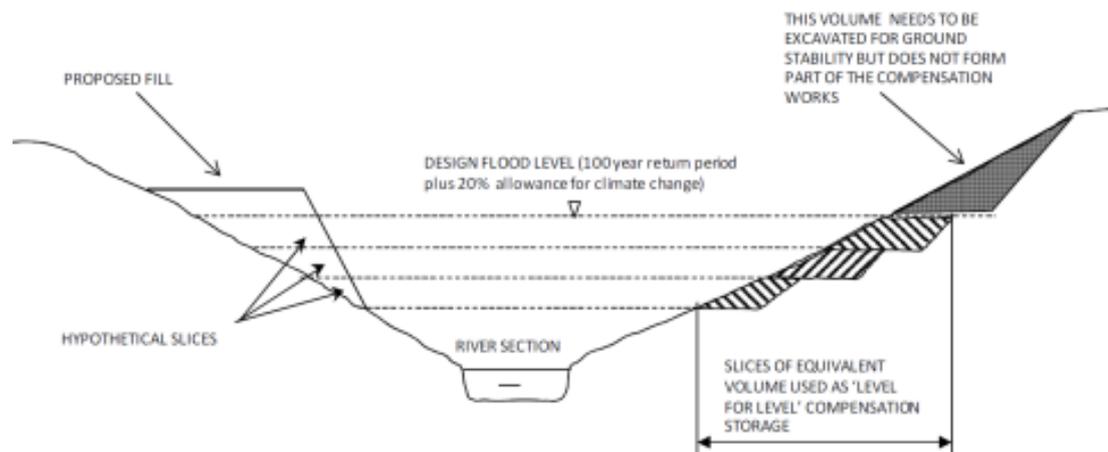
4.1.6 Evidence should be provided to demonstrate that that NPPF paragraph 155 and local policies 96, CC3 and FR1, as set out in Section 3.2 above with regard to the sequential approach in design.

4.1.7 The Planning Statement states that the proposals are “*fully compliant*” with national and local planning policies with regard to flood risk, but the application documents do not demonstrate how the proposals comply with the sequential approach and therefore it has not been proved that the application is indeed fully compliant.

## 5 Compensatory Flood Storage Calculations

- 5.1.1 NPPF Paragraph 163 states that “When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere.” Additionally, Part B of the Exception Test detailed in Paragraph 160 requires 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.” Although not stated anywhere within the TWAO documents, it is assumed that the proposals would, at least in part, be considered as Essential Infrastructure and therefore the Exception Test should be applied where there is encroachment into the floodplain.
- 5.1.2 Where the proposals encroach into areas of flood risk, for example the construction of railway embankments, overbridge embankments or the siting of temporary compounds, then mitigation is required to ensure that flood risk is not increased elsewhere.
- 5.1.3 Network Rail proposals include Compensatory Flood Storage Areas (CFSA) to provide mitigation for such features. It has been agreed, during liaison with the Environment Agency and other stakeholders, that this compensatory flood storage must be provided on a level for level basis for both surface water and fluvial flood risk. The principles of level for level flood compensation, the methodology adopted and the resulting calculations are presented in Appendix 13.1E of the ES.
- 5.1.4 Figure 5.1 below, taken from Appendix 13.1E, summarises the principle of level for level flood compensatory storage. The flood compensation provided must operate in the same way as the current area of floodplain, flooding at the same time to the same volume, and this is done on a ‘level for level’ basis, ensuring that there is an equivalent volume of storage created in each band.

Statement by Amy Hensler BSc (Hons), MSc, C.WEM, MCIWEM, CEnv



**Figure 5-1 Level for Level Compensation Storage**

- 5.1.5 As part of the Network Rail methodology in Appendix 13.1E, the volume of floodplain that would be lost through the proposals is estimated. The approach used is a 3D approach and calculates losses within each level band. This estimate approach is reasonable and uses industry-standard approaches.
- 5.1.6 The approach taken to identify and demonstrate that mitigation can be provided for the floodplain losses is not based on an industry-standard approach. Further, it is not a 3D approach and does not consider volumes on a level for level basis. It is relatively coarse and high level and focusses on the land areas that will be available for compensatory flood storage rather than volumes that would be provided.
- 5.1.7 The adopted approach can be summarised as follows: an area that might be used for mitigation is identified on a map, in accordance with parameters set out in the FRA (Appendix 13.1 of the ES).
- 5.1.8 This area, which has been defined based on limited assessment, is then subject to two sets of calculations, as follows:
- 5.1.9 The first set of calculations estimates the volume that would be provided if the whole area was lowered by 0.1m, and additionally if it were lowered to the 'maximum available depth' which is assumed to be the top of bank of the

Statement by Amy Hensler BSc (Hons), MSc, C.WEM, MCIWEM, CEnv

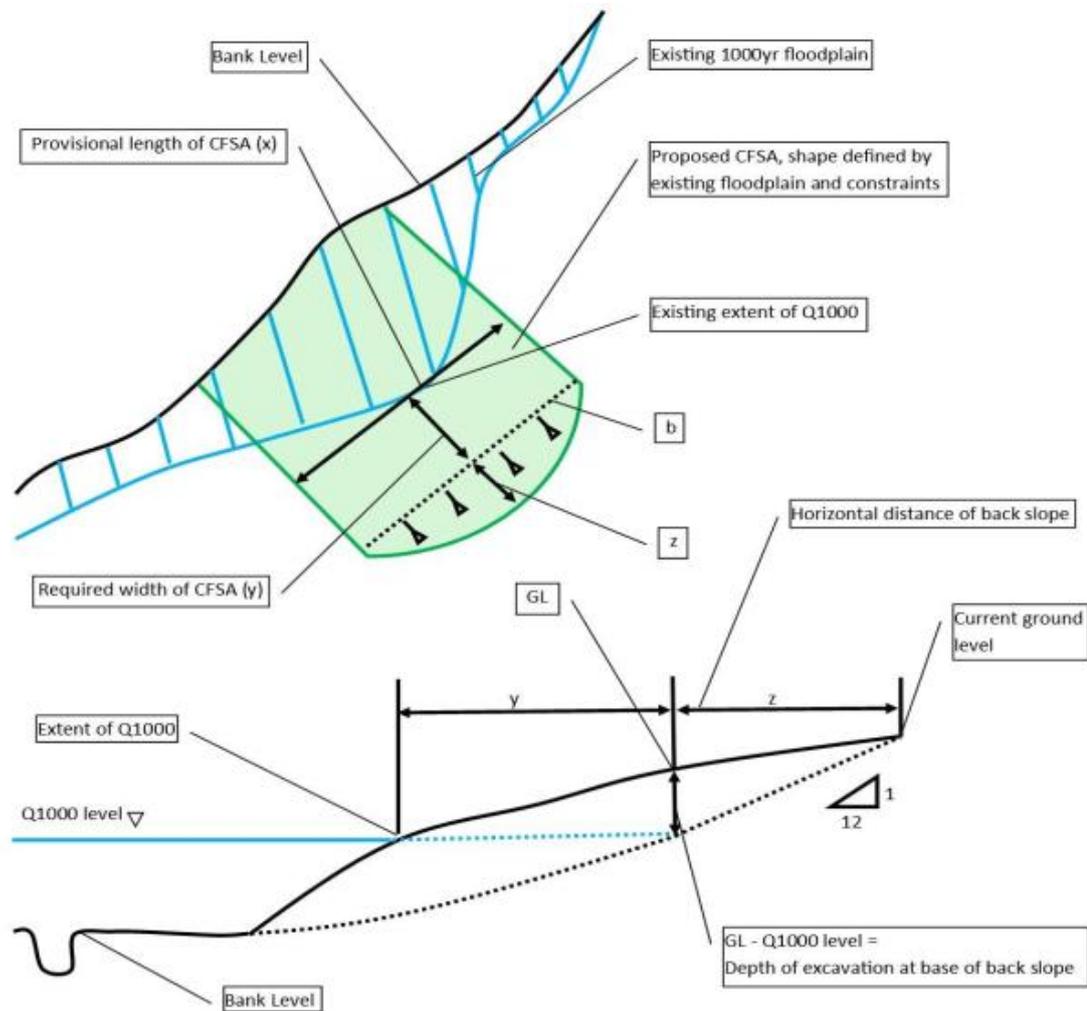
---

watercourse or ditch adjacent to the potential storage area. These volumes are presented as CFSA volumes, but this is not equivalent to floodplain storage volume. For example, if the whole area was lowered by 0.1m, this does not guarantee that a flood depth of 0.1m would be achieved throughout the area in the design standard event.

5.1.10 These calculations seek to demonstrate that a large potential volume could be created, and the two estimates are upper and lower bands to indicate a range, but there is no evidence presented that confirms that the volumes required across each level band can be created. These level bands are 100mm horizontal slices. Equally, the areas indicated are, in the majority of cases, much larger than the areas of encroachment into the floodplain, and the CFSA area indicated may, in some instances, be significantly greater than required.

5.1.11 The second set of estimates effectively calculates the approximate 'width' of floodplain storage that might be required based on the provisional length drawn in the CFSA by estimating an area that might be expected to be required based on the estimate of volume lost (described in Paragraph 5.1.5) and a regular-shaped 'wedge' (see Figure 5.2 below). This calculation then concludes with a 'yes/no' statement as to whether that required area fits "inside the drawn area". Where the conclusion is Yes, the area fits "inside the drawn area", there is no evidence that demonstrates that the volumes required across each level band can be provided.

Statement by Amy Hensler BSc (Hons), MSc, C.WEM, MCIWEM, CEnv



**Figure 5-2 Schematic of method to estimate floodplain width and area**

5.1.12 At CFSA 2B1563, at the Former Bletchley Brickworks site, the answer is 'No', the area provided is estimated to be insufficient for the required compensatory storage. The area allocated for compensatory flood storage, and thus a CPO and defined within the red line for planning, is shown to be inadequate based on NR's own calculations.

5.1.13 The assertion by NR, based on the two sets of estimates summarised above, is that CFSA areas as presented on the plans in the TWAO application are, as far as can be determined from their two sets of calculations, large enough that the required compensatory storage can be provided and that this will be demonstrated at detailed design, when more detailed topographic data is

Statement by Amy Hensler BSc (Hons), MSc, C.WEM, MCIWEM, CEnv

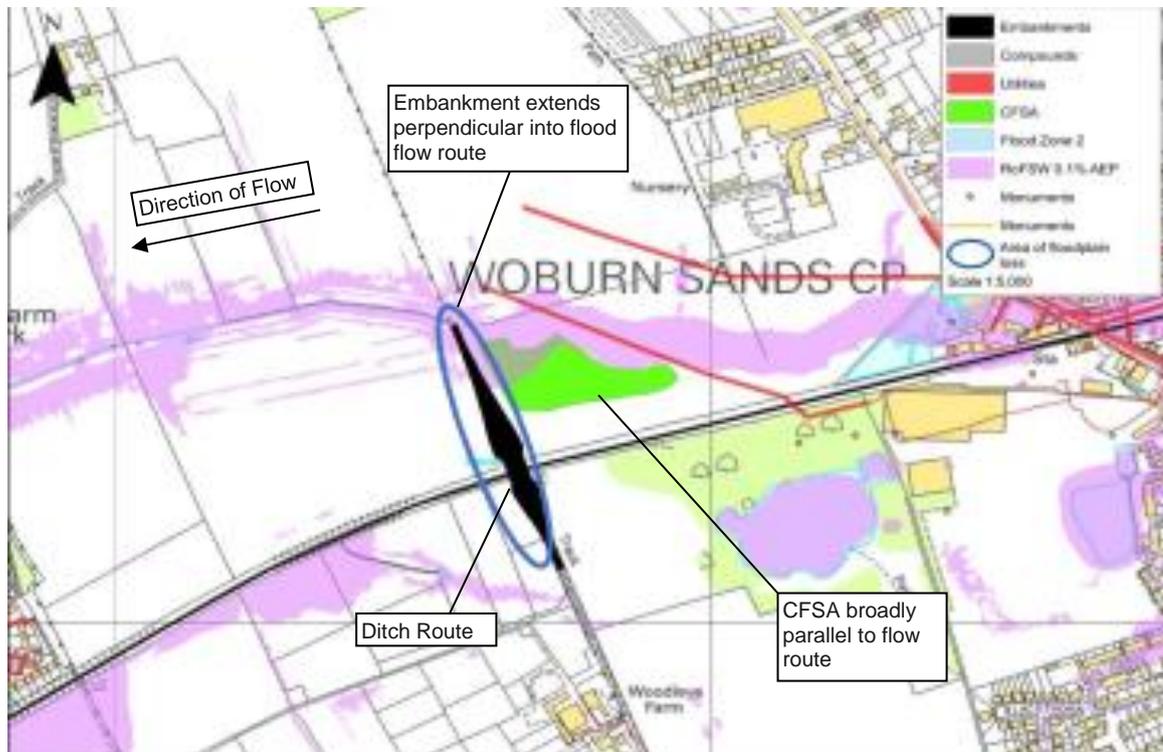
---

available. It might be that the required compensatory storage area required is less than the area presented and thus there is overprovision of storage; however, as no calculations have been undertaken on a level for level basis, it has not been proven that they are appropriate to provide the required volume through each level band; there is an underlying concern that it has not been established that the CFSA's are neither too large nor too small to fulfil their purpose.

5.1.14 For the compensatory storage area to provide the required volumes through each level band, it is reasonable to assume that the storage area would be located and aligned similarly to where the volume is lost. Where a proposed embankment is perpendicular to the direction of flow, the embankment will cross the floodplain and associated ditch or low points and cause losses through a wide range of level bands. A proposed CFSA running broadly parallel to the direction of flow is likely to have a narrower range of existing levels, so it may not be easy to provide compensation for losses at all required level bands.

5.1.15 For example, at Woburn Sands, the area of floodplain lost is broadly oriented NNW-SSE and appears to reach into the centre of the existing flow route, as annotated in the figure below, recreated from 2D0023 in Appendix 13.1E. Further, the proposed embankment runs along the route of an existing ditch. The CFSA proposed is irregular, but predominantly oriented E-W and parallel to the direction of flow. Insufficient information has been provided to demonstrate that volume can be provided on a level for level basis for all losses.

Statement by Amy Hensler BSc (Hons), MSc, C.WEM, MCIWEM, CEnv



**Figure 5-3 Map of Woodley Crossing, Woburn Sands (2D0023)**

5.1.16 Overall the approach taken is back-to-front. Rather than undertaking calculations to demonstrate how the mitigation can be provided and thus define the CFSA, instead an area for the CFSA has been defined through an inexact method and then calculations have been undertaken to attempt to demonstrate that this area is adequate. These calculations are not robust and there is uncertainty over whether the solution can be delivered.

5.1.17 Further, due to the uncertainties associated with the approach, the CFSA sizes are intended by the NR team to be conservative, so that there is sufficient area available should the detailed design highlight some bands cannot easily be met. As such, the conservative approach may lead to large areas not being used.

5.1.18 In summary, the level of detail presented in the calculations is not sufficient to demonstrate that the objectives agreed with the stakeholders such the Environment Agency, Internal Drainage Boards and Lead Local Flood Authorities, as set out in paragraphs 2.3.50-60 of the FRA in Appendix 13.1 of the ES have been met. It has not been shown that the areas designated for

Statement by Amy Hensler BSc (Hons), MSc, C.WEM, MCIWEM, CEnv

---

compensatory flood storage areas are not too large or indeed too small. As such, it has not been demonstrated that the proposals will either not increase flood risk or not be greater than is necessary to meet flooding requirements.

5.1.19 It is my view that the analysis undertaken within the submission to define the compensatory flood storage does not robustly demonstrate that the proposals comply with national and local planning policy with regard to whether flood risk is not increased.

5.1.20 LiDAR data is available for all sites, and while this is less accurate than topographic survey, it could have been used to undertake initial calculations based on a 3D model of the topography, instead of the 2D approximations that have been utilised. This could have shown that the required volumes can be provided within each level band.

5.1.21 It is understood that 3D calculations are now being undertaken by Network Rail's consultants, Atkins, although it is not clear what status these refined calculations have with regard to this Inquiry and the compulsory purchases of land for CFSAs.

5.1.22 We note that in the Environment Agency's formal response on 7th September 2018, it is stated that the EA has no in-principle objection to the scheme, although they support Natural England's objection regarding the need for additional survey work. However, in their detailed response they also state:

- We have some concerns with the calculations used for the Compensatory Flood Storage Areas (CFSAs). Some changes may need to be made to the CFSAs and we are unsure whether this could impact on the proposed red-line boundary for the TWAO. These calculations will need to be confirmed following the update of the Flood Risk Assessment after the design is finalised.

5.1.23 They later go on to state that if, during detailed design, it is determined that the area designated for CFSA is inadequate and land beyond the TWAO red line boundary is required to ensure that there is no increase in flood risk as a result of the works, then a separate planning application would be required.

Statement by Amy Hensler BSc (Hons), MSc, C.WEM, MCIWEM, CEnv

---

5.1.24 While the EA, as the relevant statutory consultee, may be satisfied that this approach is acceptable and the mitigation can be achieved through the planning system, this approach is not acceptable to O&H, as landowner. There is uncertainty as to whether all the designated CPO land is required, and equally whether further CPOs may be required.

## 6 Flood Risk Mitigation

6.1.1 Regardless of whether level for level compensation storage is provided, this is not the only flood risk consideration in ensuring there is no increase in flood risk and there is insufficient evidence presented regarding other concerns.

### 6.2 Conveyance

6.2.1 Development proposals may increase flood risk through either a reduction in the available floodplain storage, increasing risk downstream, or through obstructing the route through which flood flows are conveyed, which would cause water to back up behind an obstruction and increase flood risk upstream.

6.2.2 This conveyance element needs as much consideration as floodplain storage, but no evidence has been provided to demonstrate that this can be effectively managed through proposals as presented for any of the O&H sites.

6.2.3 For example, at the Woburn Sands Woodley Crossing (see paragraph 4.1.14), the proposed embankment crosses the floodplain, perpendicular to the direction of flow, and as indicated on the map (Figure 5.3 above) there may be a significant restriction to conveyance. This may, regardless of any CFSA proposed, increase flood risk to the O&H land upstream of the embankment. No assessment has been made regarding this.

6.2.4 The FRA makes no mention of the need for a flood relief culvert, or similar measures, in this location which might maintain conveyance, in the proposals or recommendations.

6.2.5 It has therefore not been demonstrated that there will be no increase in flood risk to any O&H land outside of the CPO area, which is contrary to NPPF and local policy.

6.2.6 In the EA formal response dated 7<sup>th</sup> September 2018, it is highlighted that impacts on flow paths should be considered.

Statement by Amy Hensler BSc (Hons), MSc, C.WEM, MCIWEM, CEnv

---

### **6.3 Location of CFSA**

- 6.3.1 Any compensatory storage area needs to be hydraulically similar to the area of floodplain lost. Regardless of whether level for level storage is provided, flood risk will be increased if water cannot get to the compensatory flood storage area at the same rate as the floodplain currently operates.
- 6.3.2 Only very limited information has been provided for all four O&H sites where CFSA's are proposed. The local hydraulics, under existing conditions and post construction, are not explained within the FRA. It is not clear how these areas currently operate or how they will fill and drain post-construction.
- 6.3.3 For example, at Marston Road in the Marston Valley site, the floodplain storage that is lost is located to the north and south of the railway, as shown in the figure recreated in Figure 6.1 below, taken from 2D0048 in Appendix 13.1E. The surface water floodplain particularly to the south does not appear to correspond with a ditch or flow route but instead appears to be associated with water pooling on the road and immediately to the south of the railway line. The proposed CFSA is located to the north of the railway line adjacent to a ditch running broadly perpendicular to the railway line.

Statement by Amy Hensler BSc (Hons), MSc, C.WEM, MCIWEM, CEnv



**Figure 6-1 Map of Marston Road, Marston Valley (2D0048)**

6.3.4 It is not clear whether this CFSA location is hydraulically similar to the areas where volume is lost. Further, it is not clear how rainwater running off the areas will get to the proposed CFSA, which is approx. 500m from the area where the volume is lost, and on the opposite side of the railway line to some of the lost storage.

6.3.5 It has therefore not been demonstrated that flood risk will not be increased to O&H land outside of the CPO areas.

#### **6.4 Maintenance and Access**

6.4.1 The proposed CFSA's are areas of land to be regraded and do not provide formal attenuation, like a reservoir, or flow control. Therefore, it is not clear why there is a requirement for this land to be acquired on a permanent basis.

6.4.2 Should this land be acquired permanently, no corresponding right of access is sought and therefore it is not clear how the CFSA will be maintained.

Statement by Amy Hensler BSc (Hons), MSc, C.WEM, MCIWEM, CEnv

---

## **6.5 Surface Water Drainage**

- 6.5.1 At each of the four O&H sites, the submission documents touch on surface water very briefly, and very limited information is provided.
- 6.5.2 Swales and ditches are stated to be provided at the toe of any proposed earthworks. Limited information is provided as to where these drainage features might drain or whether any formal attenuation or flow control is proposed for these features.
- 6.5.3 In some locations, it is not clear how or where the swales or ditches outfall.
- 6.5.4 Without satisfactory arrangements, these swales / ditches may overflow and could then increase flood risk for O&H's land.
- 6.5.5 It has therefore not been demonstrated that flood risk will not be increased to O&H land adjacent to these surface water drainage features.
- 6.5.6 It is requested that a condition is included which will address this, to demonstrate that there will be no increase in flood risk to adjacent land as a result of surface water drainage features.

## 7 Conclusions & Summary

- 7.1.1 This proof sets out why O&H object to the inclusion of all of the land in the Draft Order allocated for compensatory flood storage areas.
- 7.1.2 There is no evidence that a sequential approach, as per NPPF and reinforced in local planning policy, has been undertaken in the design of the permanent works which would minimise the flood risk impacts.
- 7.1.3 The compensatory flood storage calculations are not sufficiently detailed for a basis of the compulsory purchase or to satisfy planning requirements.
- 7.1.4 The CFSA's have not been defined by calculations; rather a series of calculations have been undertaken from which NR conclude that the CFSA's are sufficiently large that the required level for level storage volumes can be provided. However, due to the uncertainties associated with the approach, the CFSA's sizes are intended by the NR team to be conservative, should the detailed design highlight some bands cannot easily be met.
- 7.1.5 It has not been proven that level for level compensatory storage can be provided within the area designated, and as such the EA notes that if it is determined that the area designated for CFSA is inadequate and land beyond the TWAO red line boundary is required then a separate planning application would be required, presumably requiring land beyond the CPO extent.
- 7.1.6 It has not been shown that the areas designated for compensatory flood storage areas are not too large or indeed too small. As such, it has not been demonstrated that the proposals will not increase flood risk, as per NPPF and local planning policies.
- 7.1.7 When considering flow conveyance, Network Rail has failed to demonstrate, through the recommended flood risk mitigation, that flood risk will not be

Statement by Amy Hensler BSc (Hons), MSc, C.WEM, MCIWEM, CEnv

---

increased as a result of the proposals, which is contrary to National and Local planning policy.

7.1.8 It has not been proven that the CFSA's are hydraulically similar and will operate in the same way as the floodplain lost. It is therefore not clear that that flood risk will not be increased which is contrary to National and Local planning policy.

7.1.9 It is not clear why there is a requirement for this land to be acquired on a permanent basis, as the proposed CFSA's are areas of land to be regraded and do not provide formal attenuation, like a reservoir, or flow control. Further, it is not clear how the CFSA will be maintained if it is permanently acquired as no corresponding right of access is sought.

7.1.10 Should this land be acquired permanently, no corresponding right of access is sought and therefore it is not clear how the CFSA will be maintained.

7.1.11 It is requested that a condition is included to demonstrate that there will be no increase in flood risk to adjacent land as a result of surface water drainage features, confirming how and where swales and ditches will discharge, and therefore that National and Local planning policy are accorded with.