



University of Oxford, Department of Engineering Science

Flood Risk Assessment

New Cycle Rack and Bin Store, Near
Holywell House, Osney Mead, Oxford OX2
0FA

Project Number:	11970
Date:	26 th May 2023
Revision:	P1
Suitability:	S2 (For Information)



Site location (Jessop and Cook Architects)

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Whilst all reasonable care has been taken in this assessment, we cannot guarantee that during the lifetime of this development the flood risk may not exceed that stated in this report. This report has addressed the risk of flooding to the site from surface water runoff, and the conclusions stated in it are based on our best estimate using available data with a precautionary approach taken where possible. We must make it clear that the assessment of weather generated flooding is inexact and that analysis is limited by the accuracy and availability of recorded data. Higher flood risk may occur in the future due to the actions or omissions of third parties, or to poor maintenance, blockage, storm events in excess of the design standard quoted, inaccuracy or unavailability of data. Flooding beyond that estimated in this report may also occur due to climate change.

Document issue details: 11970-MNW-XX-XX-RP-C-0501-S2-P1 Cycle Racks and Bin Store, Near Holywell House Flood Risk Assessment

Revision	Issue Date	Issue Status	Distribution
P1	26 th May 2023	S2	Client / PM

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1.0 Introduction

- 1.1.1 The University of Oxford Department of Engineering Science wants to enhance its facilities to encourage cycles usage and improve the appearance of the area near their facility at Holywell House, Osney Mead. The proposal provides improved safety and protection for cycles, with electrical charging point, and an enclosure for bin storage.
- 1.1.2 According to the Environment Agency (EA) Flood Risk Map for Planning, the site is shown to be located mainly in Flood Zone 2, at Medium Risk of Flooding, but also partly in Flood Zone 3, at high risk of flooding. The planning application for the works is therefore required to be accompanied by a Flood Risk Assessment (FRA), to show that the site will not increase food risk elsewhere and will be safe for its lifetime.
- 1.1.3 This Flood Risk Assessment considers the propsoals and flood risk, and shows that the proposals will be safe for their lifetime without increasing flood risk elsewhere.

2.0 Site Location & Setting

- 2.1.1 The site is located in the existing concrete service yard of Holywell House, Osney Mead, Oxford OX2 0FA.

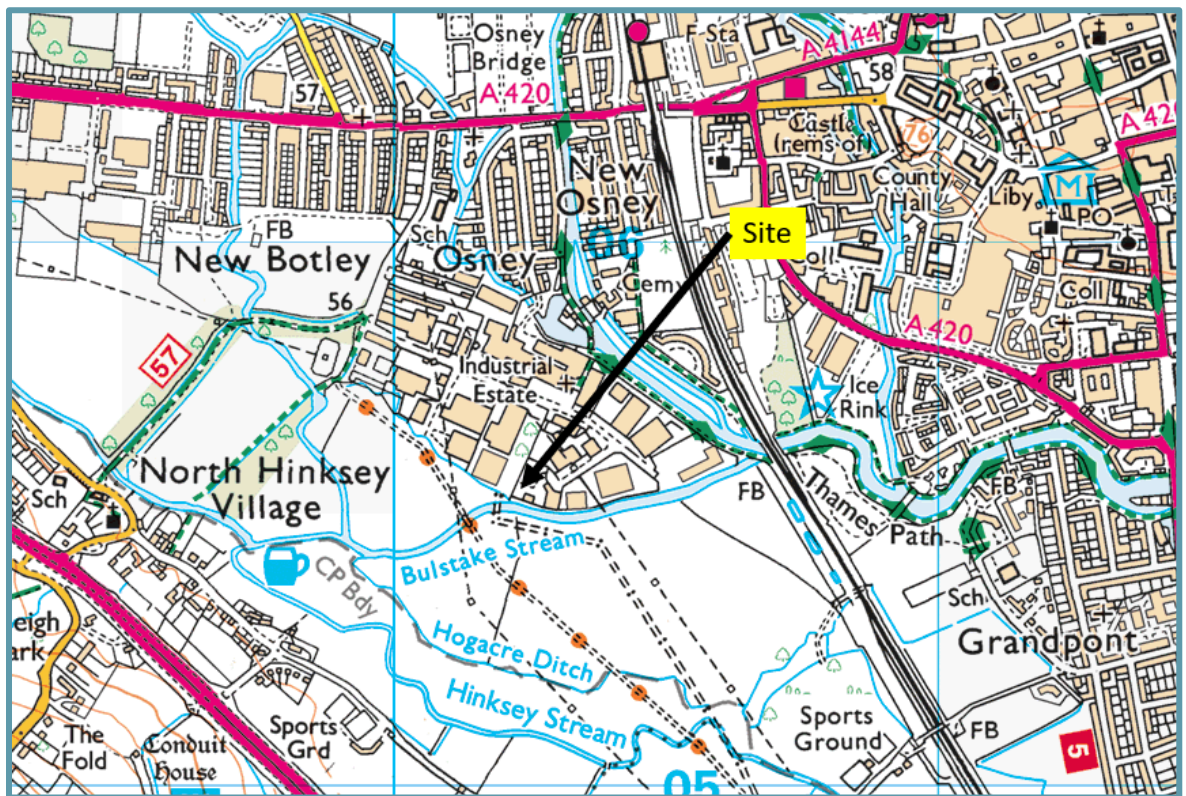


Figure 1 Site Location (Streetmap).



Figure 2 Site location (Google Earth).

2.1.2 The site is in the following setting:

- a) To the northeast is the main part of the concrete service yard
- b) To the southeast is Holywell House
- c) To the southwest is grass landscaping leading to the top of bank of the Bulstake Stream, which is 7.5m from the proposed cycle racks
- d) To the northeast is the existing edge of the concrete yard, a line of shrubs/small trees and then the neighbouring industrial unit facilities.

2.1.3 The site is therefore located adjacent Holywell House, which the facilities serve.

3.0 Existing Site

3.1.1 The existing site forms part of the concrete yard to Holywell House.

3.1.2 It can be seen from the cover photograph that it is already used for informal cycle and bin storage.

3.1.3 A detailed topographic survey has been undertaken by Midland Survey Ltd dated October 2016 which shows the levels of the concrete slab between 56.60m AOD and 56.46m AOD, with raised conventional kerb edge.

3.1.4 The northern part of the service yard rises to 56.86m AOD.



Figure 3 Site outline superimposed on Google Earth image showing site entirely on existing concrete slab.

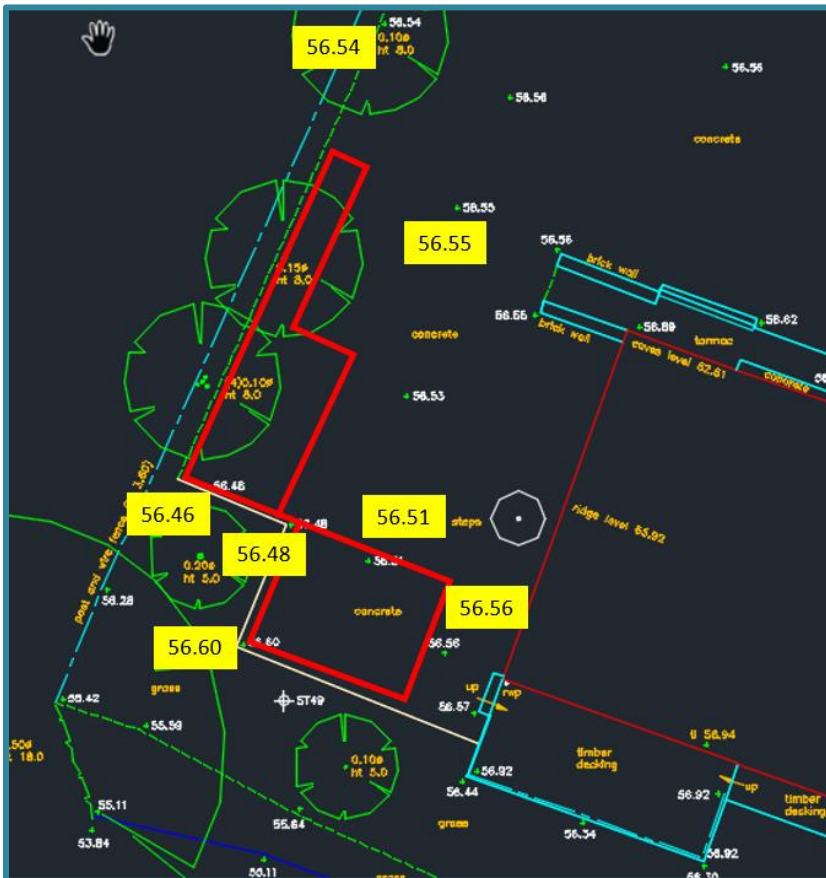


Figure 4 Extract of detailed topographic survey of Osney Mead with annotated levels related to m AOD

4.0 Proposed Development

4.1.1 The proposals involve the following works;

- Clean existing concrete slab and set out the works
- Bolt cycle hoops down to existing concrete slab
- Bolt posts for canopy to concrete slab
- Install cable and bolt feeder pillar to concrete slab
- Deliver bin enclosure and bolt to slab.

4.1.2 The layout is shown below, with illustrations of the cycle hoops, canopy and bin store below.

4.1.3 The cycle feeder pillar will be raised above ground for easy connection of cycle leads.

4.1.4 All units will be securely fixed to the concrete slab. The bins will also be contained within the enclosure and not at risk of becoming mobile in a flood, which would occur with the current informal arrangement.

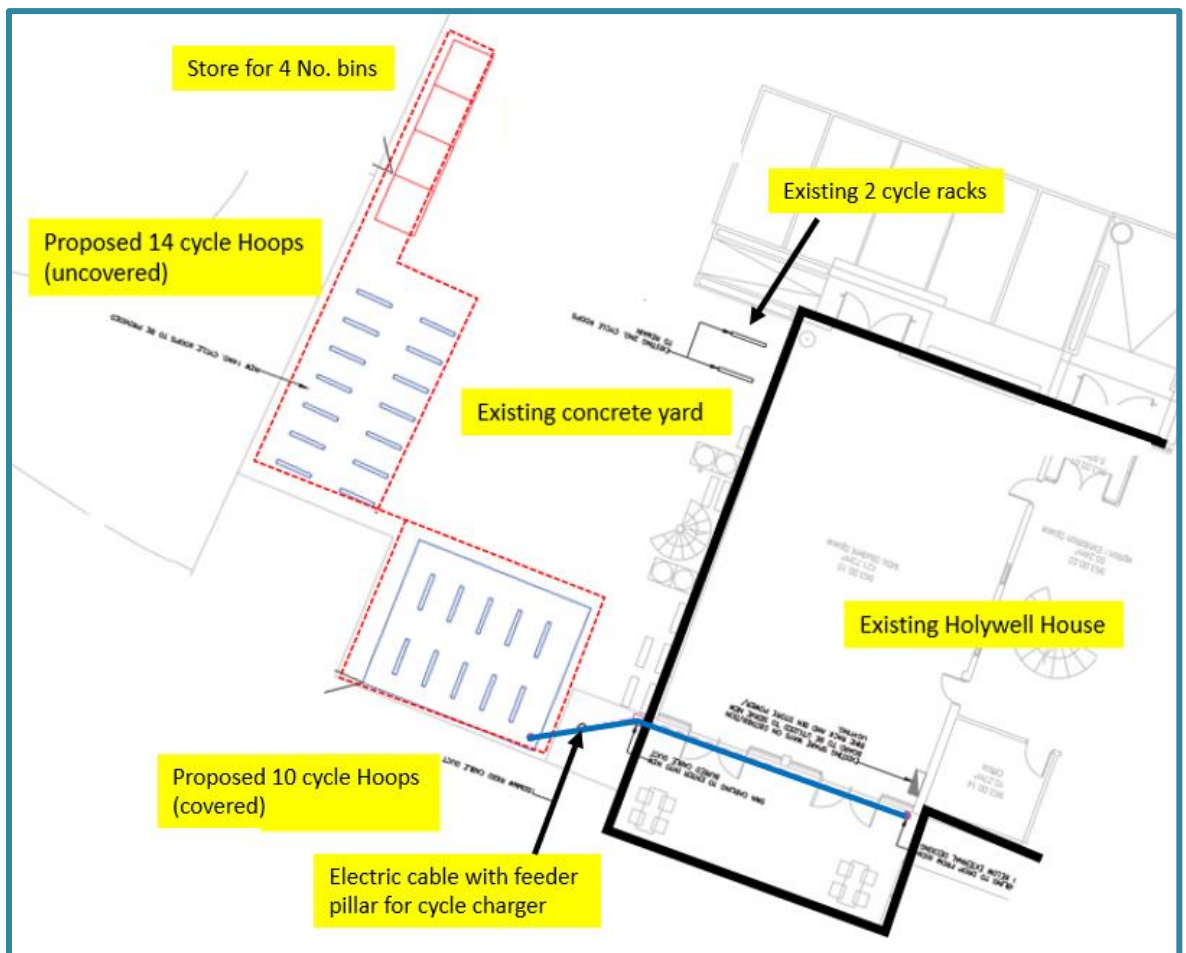


Figure 5 Proposed site layout identifying features. Note that red line is approximate to simply enclose the new works for illustrations.



Figure 6 Typical canopy proposed



Figure 7 Typical bin store – note it is raised above the slab on legs.

5.0 Flood Risk

5.1.1 The EA Flood Map for Planning shows the site to be mainly in Flood Zone 3 (at high risk of flooding) but with the southwest part in Flood Zone 2 (at medium risk of flooding).

5.1.2 It is clearly on the margins of Flood Zone 2.



Figure 8 EA Flood Risk Map for Planning, showing site located in Flood Zones 2 and 3.



Figure 9 Expanded EA Flood Map for Planning; the blurred outline is from the EA Flood Map. The black alignment is the division between Flood Zones 2 and 3, as traced.

5.1.3 The EA has provided Product 4 data for the area, which has been used to determine the predicted flood level.

5.1.4 Although the use of the proposal is considered to be Less Vulnerable, a precautionary 100 year lifetime has been allowed. Central Allowance will be applied, as advised in the current Climate Change Allowance dated 27th May 2022.

5.1.5 The EA has advised specifically that the Peak River Flow Allowances should be based on the Cotswold catchment.

5.1.6 The EA has confirmed that the 2016 flood model is applicable, and the Product 4 information from 2019 has been used to inform the predicted flood levels, including allowances for climate change.

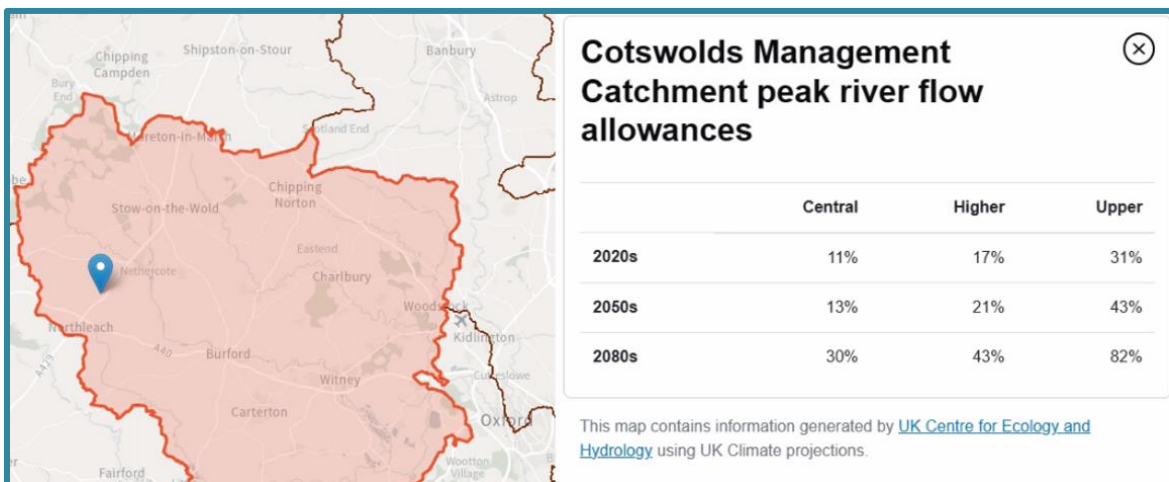


Figure 10 Peak River Flow Allowances, as advised by the EA for Osney Mead. For the Design Flood Level (DFL) 30% is applicable, with 82% climate change as a sensitivity test for the Upper End allowance.

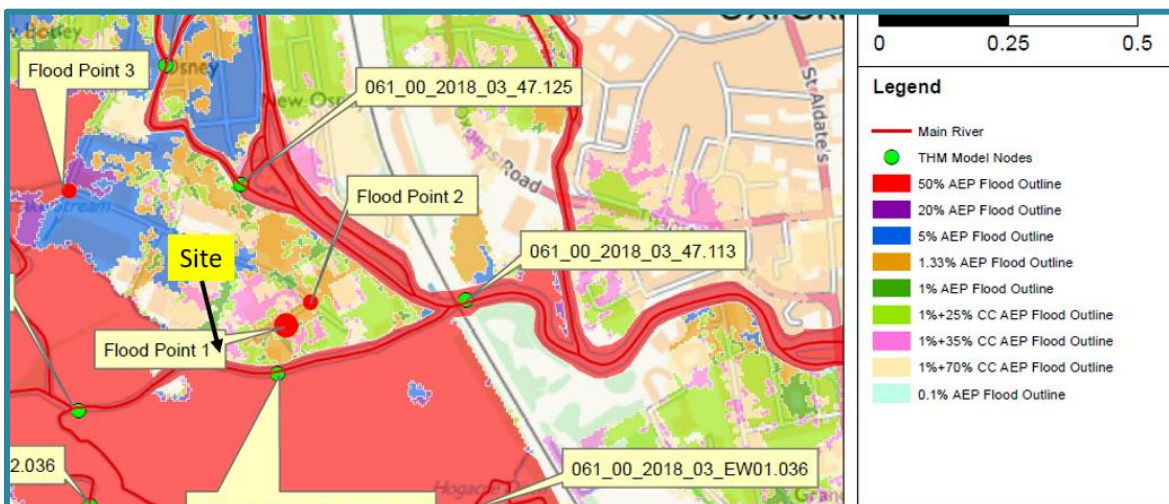


Figure 11 EA Product 4 response. Flood Point 1 is the appropriate location (noted that there is very little variation in the peak events in this area).

Modelled floodplain flood levels

The modelled flood levels for the closest most appropriate model grid cells for your site are provided below:

2D grid cell reference	Model	Easting	Northing	flood levels (mAOD)								
				50% AEP	20% AEP	5% AEP	1% AEP	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP	
Flood Point 1	Thames (Eynsham to Sandford) 2018	450,369	205,581	No Data	No Data	No Data	No Data	No Data	56.77	56.77	56.97	56.79
Flood Point 2	Thames (Eynsham to Sandford) 2018	450,414	205,625	No Data	No Data	No Data	56.64	56.70	56.78	56.97	56.79	
Flood Point 3	Thames (Eynsham to Sandford) 2018	449,947	205,840	No Data	No Data	56.77	56.88	56.98	57.04	57.19	57.05	

Figure 12 Flood Point 1 gives a predicted flood level of 56.77m AOD with 35% climate change allowance and 56.97m AOD with 70% climate change allowance.

5.1.7 Using the above information, the predicted 1 in 100 year with 35% climate change allowance would be 56.77m AOD (Central in 2123). This is the Design Flood Level (DFL).

5.1.8 With 82% climate change allowance, and using a linear scale from 70% climate change, gives a predicted flood level of gives a level of 57.07m AOD (Upper End in 2123)

5.1.9 With a ground level of 56.46m AOD, in the Design Flood Event the depth of water at the lowest point would be 310mm. In the Upper End event it would be 610mm

5.1.10 A summary of the key levels is given below.

Table 1 – Level summary

Location	Level (mAOD)
Existing Site Levels	
Concrete slab	56.46 – 56.56m AOD
Predicted flood levels	
1 in 100 year current day	Does not reach site
1 in 100 year + 30% (DFL)	56.77m AOD
1 in 100 year + 82%	57.07m AOD
1 in 1000	56.79m AOD
Flood resilience level where reasonable	57.07m AOD

5.2 Surface Water Flooding

5.2.1 The EA surface water flood risk map shows the site to be in an area of very low risk of flooding.

5.2.2 The site is therefore safe from surface water flooding.

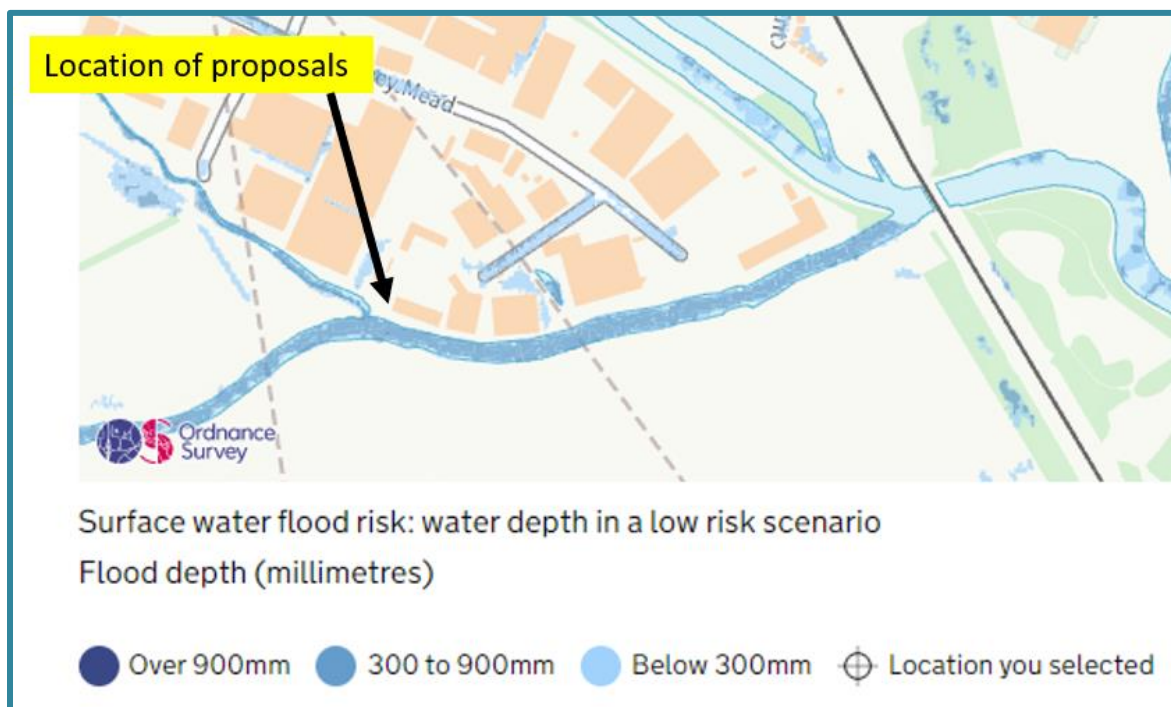


Figure 13 The site is shown to be in an area at very low risk of flooding, even in the Low Risk Scenario

5.3 Reservoir Flooding

5.3.1 The site is shown to be outside the area at risk of flooding from reservoirs in normal conditions, However, it is shown to be within an area at risk of reservoir flooding when the rivers are also flooding.

5.3.2 According to the EA map, the reservoirs responsible for flooding are upstream in the Thames Valley.



Figure 14 EA Extent of flooding from reservoirs map.

5.3.3 UK Reservoirs have to be maintained in accordance with the Reservoirs Act and there have been no serious failures in the UK in recent years; the safety record is excellent and as the proposal occupies an existing site and is Less Vulnerable with no increase in people in the area, there is no increased risk.

5.4 Other Sources of Flooding

5.4.1 There are no other likely risks of flooding – groundwater would be at the adjacent normal water level within the channel, and if sewer flooding occurs, it would drain into the adjacent Bulstake Stream.

6.0 Flood Mitigation

6.1.1 The proposed development is all water resilient.

6.1.2 The proposed structures are column supports with negligible displacement of flood water; no flood compensation is required.

6.1.3 Sensitive electrical connections in the Feeder Pillar charging point will be more than 600mm above ground level, and above the Upper End Allowance in 2123.

6.1.4 The proposals pass the Sequential Test as there are no reasonably available and suitable alternative sites at lower risk of flooding close to Hollywell House which would enhance cycle facilities.

6.1.5 It is recognised that the Oxford Flood Alleviation Scheme (OFAS) is proposed which would benefit this area.

6.1.6 However, although OFAS will reduce flood risk at Osney Mead and on this site, due to the established partnership working between the EA and Oxford University, no allowance has been made for the benefits of OFAS.

6.1.7 The proposals will not obstruct access to the Bulstake Stream, which will be maintained along the river bank or between or by unbolting the cycle hoops.

6.1.8 The development proposal is therefore safe and resilient, and no mitigation is required.

7.0 Means of Escape

- 7.1.1 The depth of flooding in the cycle storage area will be less than 300mm deep and slow moving,. In accordance with FD2320 this is considered safe for most people. There will be safe access to buildings in the area, and the topographic survey shows the northern part of the service yard to rise to 56.86m AOD, which is above the predicted DFL.
- 7.1.2 The cyclists who use the proposed hoops will be attending Holywell House.
- 7.1.3 It is recognised through experience that flooding in this area carries several days warning, and rises very slowly.
- 7.1.4 Flooding will occur in upstream communities, and the flood characteristics will inform the risk to Oxford. The depth of flooding and timing of flooding will therefore be well estimated.
- 7.1.5 The management in Holywell House (and within the wider University) will monitor flooding predictions, news feeds, weather forecasts, social media and their upstream property to inform decisions at Holywell House.
- 7.1.6 If people are in the area when flooding begins in Oxford, they are advised to leave the area because flooding is worse in the surrounding area.
- 7.1.7 It is emphasised that this proposal in itself will not increase the population in the area, and so there is no increased risk to people.

8.0 Summary & Conclusions

- 8.1.1 University of Oxford Department of Engineering Science is submitting a planning application for improved cycling and bin facilities to serve Holywell House at Osney Mead. There are no associated or planned changes to operations or staffing at Hollywell House.
- 8.1.2 The EA Flood Map for Planning shows the site to be on a generally level existing concrete service yard, but mostly in Flood Zone 2 and partly in Flood Zone 3.
- 8.1.3 The proposal does not increase the risk to users due to flooding, because there is no change in attendance at Hollywell House.
- 8.1.4 The cycle hoops, canopies and bin stores are flood resilient, bolted to the floor and not mobile, Furthermore the bins will be contained and not free to float in a flood, thus avoiding becoming a hazard.
- 8.1.5 Sensitive equipment in the cycle charger will be above the predicted flood level in the Upper End event.
- 8.1.6 Holywell House will be closed prior to flooding arrive in the area, so there will be no cyclists in the area to be vulnerable to the hazards of flooding.
- 8.1.7 The proposal is therefore resilient, will not increase flood risk elsewhere, and will be safe for its lifetime, and therefore complies with the National Planning Policy Framework.