

Tappers Farm, Oxford Road, Bodicote



Drainage Strategy and Flood Risk Assessment

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1. INTRODUCTION

1.1 Background

1.1.1 PHG Consulting has been commissioned by GreenSquare Homes to review available information and prepare this Drainage Strategy and FRA to support a reserved matters planning application for land at Tappers Farm, Oxford Road, Bodicote, Banbury, OX15 4BN.

1.1.2 The report sets out a drainage strategy, including surface and foul water management, and Flood Risk Assessment.

1.2 Existing site

1.2.1 The Development Site covers an area of approximately 2.19 ha located at National Grid Reference SP461383. The Development Site is mainly greenfield with the existing farm and out-buildings to the south of the site. The approximate site location is shown in Figure 1.



Figure 1. Site location. National Grid reference: SP461383. Nearest Postcode: OX15 4BN.



1.3 Surface Water Features

1.3.1 The site is mainly open greenfield and farm buildings. There is no evidence of surface water features within the site.

1.3.2 The nearest main river or water body to the development are the Sor Brook, which is located approximately 1 km to the south of the site and Oxford Canal positioned 1 km to the north.



Figure 2: Nearest Surface Water Features



1.4 Geology and Hydrogeology

1.4.1 Figure 3 below is an extract from WRAP map showing that the site is located in WRAP Class 1 that is potentially permeable.

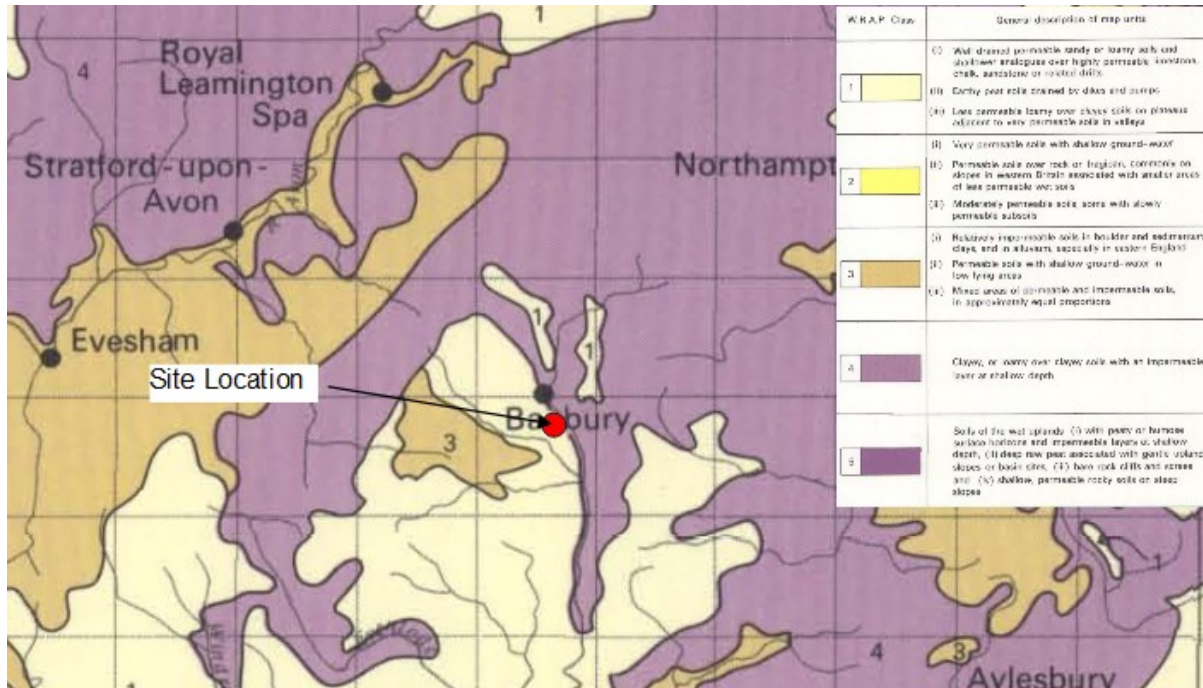


Figure 3. The Wallingford Procedure WRAP Map soil classification extract

1.4.2 The site investigation report indicates that the use of infiltration is suitable.

1.4.3 Groundwater was encountered during the intrusive works undertaken in December 2020 following a period of wet weather. Groundwater was located in excess of 2.5 to 3m b.g.l.

1.5 Development Proposals

1.5.1 The proposal comprises the provision of 46 residential units with associated infrastructure. The scheme already benefits from Outline Planning Permission 18/00792/OUT. The Latest Site Engineering Layout is included in Appendix A.



2. DRAINAGE STRATEGY

2.1 Existing Drainage

2.1.1 As shown in Appendix C there is an existing 150mm foul sewer within Oxford Road to the east of the site, along with other smaller drainage within the adjacent residential area.

2.1.2 There is no evidence of any usable surface water drains or watercourses across the site. Existing surface water drainage from the farm is likely to drain to ground or to the local adopted foul system.

2.2 Surface Water Management Approach

2.2.1 Following site investigation, the use of infiltration on site is suitable. Extracts of the site investigation is included with Appendix B. Also included in Appendix B is further site wide infiltration testing carried out in accordance with BRE365.

2.2.2 Infiltration rates have been confirmed suitable to discharge via infiltration. The worst-case rate of 0.05 m/hr has been used in calculations, taken from the original site investigation. Site wide detailed testing yielded results ranging between 0.036 to 0.443 m/hr and these localised results shall be used at detailed design stage.

2.2.3 The site runoff will discharge to ground via infiltration. The main highway serving the site will be drained via porous paving and offered for adoption to Oxfordshire County Council via a Section 38 Agreement. Design and calculations have been provided via Tobermore and included within Appendix D. Detailed design shall utilise the varying infiltration rates across the site.

2.2.4 All private surface water drainage will be managed on plot, either via private porous paving to or private cells. Appendix E shows a typical private cell system calculated using the FEH-13 data and based on a 200m² drained area. Again at detailed design calculations will be undertaken utilising the varying site wide infiltration rates. Typical Maintenance Plan in line with CIRIA C753 is included in Appendix H - MAINTENANCE SCHEDULES.

2.2.5 The preliminary hydraulic surface water design is to 1 in 100-year return period with an additional 40% increase in rainfall intensity due to climate change.

2.2.6 Following approval of the site scheme and layout detailed design will include a full engineering design package including appropriate individual designs to rate obtained in September 2021, see Appendix B. Rates obtained following testing to BRE365 are in excess to preliminary testing.



2.2.7 Desired Water Quality standards will be achieved by the use of suitable treatment measures in line with CIRIA C753 SuDS Manual. Runoff off driveways will receive treatment within permeable paving. House roofs (which are of negligible to very low Pollution Indices) will receive appropriate treatment within minimum 300 mm depth of soils with good contamination attenuation potential. Compliance has been demonstrated by Simple Index Approach Tool – please refer to APPENDIX I – WATER QUALITY.



2.3 Proposed Foul Drainage

2.3.1 The proposed system is gravity-based.

2.3.2 The proposed foul water network will connect to the existing adopted system within Oxford Road. The connection will be made under Section 106 Notice with Thames Water. Main foul system within the development shall be offered for adoption to Thames Water via a Section 104 Agreement.3

2.3.3 The proposed foul water network is presented in Figure 4.

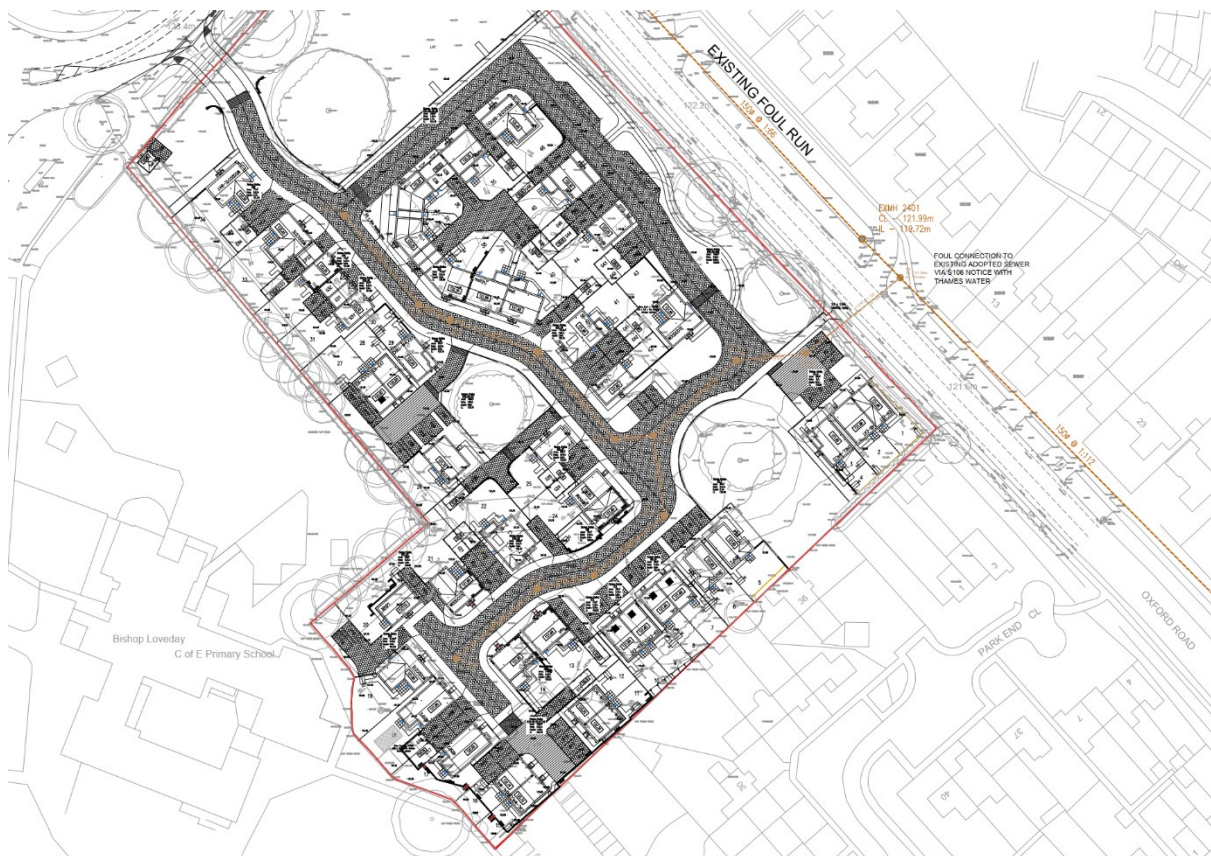


Figure 4: Proposed Foul Water Network



3. FLOOD RISK ASSESSMENT

3.1 Legislation

3.1.1 This assessment has been conducted in accordance with Oxfordshire County Council Planning Policy Guidance and guidelines for Sustainable Drainage in Oxford.

3.2 Definition of Flood Risk

3.2.1 Flood risk is the product of the likelihood or chance of a flood occurring (flood frequency) and the consequence or impact of the flooding (flood consequence).

3.3 Flood Frequency

3.3.1 Flood frequency is identified in terms of the return period and annual probability. For example, a 1 in 100-year flood event has a 1% annual probability of occurring. Table 1 below provides a conversion between return periods and annual flood probabilities.

Table 1: Flood Probability Conversion Table

Return Period (years)	2	5	10	20	50	100	200	1000
Annual Flood Probability (%)	50	20	10	5	2	1	0.5	0.1



3.4 Flood Zone

3.4.1 The proposed development is located entirely within Zone 1 of Environment Agency Flood Map for Planning so is at low risk of fluvial or tidal flooding, i.e. less than 1 in 1000-year event.

3.5 Flood Risk Vulnerability Classification

3.5.1 The proposed development is residential so classed as highly vulnerable.

3.6 Flood Risk Vulnerability Classification and Flood Zone Compatibility

3.6.1 As indicated by Environment Agency Flood Map for Planning, the development is located entirely within Zone 1, therefore the proposed land use is appropriate.

3.7 Other Sources of Flooding

3.7.1 The site is well protected from overland flow by existing topography.

3.7.2 The Environment Agency Risk of Flooding from Surface Water surface water flood map shows an area of approx. 540 m² in the centre of the site at low risk (1 in 1000 year probability) of Surface Water Flooding (Figure 5 below).



Figure 5. Local Low Risk of Flooding from Surface Water



3.7.3 The development will not result in increased surface water flood risk within the site or downstream.

3.8 Summary of Existing Flood Risk

3.8.1 The proposed development site is at very low risk of flooding from rivers, groundwater and overland flows. EA Flood Maps are presented in Appendix F.



4. CONCLUSIONS

- 4.1.1 The surface water runoff from the development will be managed solely by infiltration as the infiltration potential has been confirmed by appropriate testing and no exception criteria have been encountered (i.e. shallow groundwater, ground contamination, ground instability, etc.).
- 4.1.2 Proposed foul water system will be offered for adoption under Section 104 Agreement.
- 4.1.3 There will be no surface water flooding/runoff from impermeable area leaving the site for 1 in 100-year with a 40% allowance for increase in rainfall intensity due to climate change.
- 4.1.4 The development is located in an area at very low risk of flooding. Minor localised Low Risk of Surface Water flooding has been identified in the centre of the site due to the existing site topography, which will be mitigated post-development. The development will not result in increase of the risk of flooding on the site or downstream.