Water Resource Associates

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Review of the Flood Risk Assessment and Desk Study for the proposed development at Town Lane, Whittle-le-Woods, Lancashire

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Version 3: Final Report Incorporating Client Comments

Executive Summary

In summary the following key points have been identified for the FRA and Desk Study Report for the proposed development at the land off Town Lane, Whittle-le-Woods.

1. Both reports are dated February 2019, and have not been submitted until a period almost 2 years after their completion.
2. Both reports are limited and lacking in detail which may be due to the current status of the proposals. It is expected that more detail will be provided in the FRA for the management of surface water at a later stage once ground investigations have been undertaken at the site (as recommended in the desk study) and the development layout has been finalised.
3. The FRA is lacking detail on the hydrology of the River Lostock and information on historical flooding.
4. The FRA proposed a stringent design in terms of restricting the surface runoff from the site to the 1-year greenfield flow. The associated storage volume with this flow restriction is given as 5,500 m^3, adequate provision for this storage must be demonstrated and tested using drainage design software.
5. The FRA in its current format does not provide a robust SUDS design.
6. The FRA does not consider the issue of contamination and soil erosion during construction. This may be requested by the EA and included within another report if any environmentally sensitive areas are deemed to be at risk. The neighbouring fishing lodge should be highlighted as a sensitive area which is at risk of contamination.
7. The Desk Study Report is lacking attention to detail and has listed wrong values for the topography and incorrectly named the River Lostock the River Istock.
8. Photos of the site show wet areas and surface water indicating the risk of surface water flooding may be higher than stated on the EA maps.
9. Information on the geology is missing from the Desk Study Report and the FRA needs to be revisited to consider the risk of groundwater flooding once site investigations have been completed.

Background

Water Resource Associates LLP (WRA) has been engaged by Whittle-le-Woods Parish Council (WLWPC) in January 2021 to undertake a review of the documents submitted as part of the planning application for land at Town Lane, Whittle-le-Woods, Lancashire in relation to the risk of flooding. This work is in addition to earlier studies undertaken by WRA in 2019 and 2020 which considered the risk of flooding associated with a number of development sites around Whittle-le-Woods including the Town Lane site. The Town Lane site was the subject of a study by WRA submitted in March 2020 entitled *Hydrological Survey Phase 4: Review of Flood Risk for additional development sites at Whittle-le-Woods, Lancashire*. The study considered the risk of flooding from all sources and concluded that under the current conditions the risk of flooding was low, but with the development of the site and the conversion of greenfield land to a housing estate with significant areas of impermeable surfaces the peak flow of surface runoff from the site would increase approximately by a factor of three. Therefore, measures would need to be included in the development to attenuate the additional water.

This current report provides a review of documents (and their appendices) submitted as part of the application which are relevant to flood risk. These are a Flood Risk Assessment and Drainage Strategy, by Waterco, dated February 2019 and a Desk Study Report for Land to the North of Town Lane, Whittle-le-Woods undertaken by Betts Geo and also dated February 2019. It is notable that both reports have only been recently submitted, almost two years after being completed.

Document Contents

The contents of the two reports are as follows

Flood Risk Assessment (85 pages in total):
Pages 1-4 title and contents;
Pages 5 – 19 main text (without figures);
Pages 20 -22 Appendix A map of the development location;
Pages 23 – 24 Appendix B topographic survey;
Pages 25 – 32 Appendix C sewer plan;
Pages 33 – 52 Appendix D Environment Agency flood maps;
Pages 53 – 54 Appendix E ReFH2 model output;
Pages 55 – 69 Appendix F MicroDrainage model output;
Pages 70 – 71 Appendix G Drainage optioneering sketch;
Pages 72 – 82 Appendix H Maintenance schedules;
Pages 83 – 85 Appendix I Concept designers risk assessment.

Desk Study Report (41 pages plus 199 pages of Appendices)
Pages 1-7 title, contents and summary;
Pages 8-41 main text;
Appendix A: 11 pages showing site location plan, site photos and aerial photo;
Appendix B: historical maps divided into three files of 15, 21 and 21 pages;

Appendix C: coal report divided into two files 57 and 85 pages;
Appendix D 2 pages repeating source pathway receptor conceptual model;
Appendix E 2 pages notes on limitations.
Other associated documents:

Topographic Survey: provided as three separate maps and one overview map
Illustrative masterplan: single drawing
Location plan: single map
Utilities Report: 7 pages

FRA Review

A Flood Risk Assessment (FRA) is a detailed report which is submitted as part of a planning application. This is required where development sites are shown to be within areas of medium to high risk of flooding as shown on the Environment Agency's (EA) flood zone maps or required for any areas in excess of 1 ha in area. For the Town Lane site this is subject to both requirements. The aim of the FRA is to consider the flood risk to the development site from all sources and to ensure the flood risk to neighbouring properties is not increased by the development. The level of detail associated with a FRA should be proportional to the scale of the development, therefore a greater level of detail would be expected for a significant housing development such as in the current study as opposed to a proposed single dwelling development. The 85-page report submitted by Waterco would appear to be of considerable detail given its length. However, only 14 pages are actual written text within the FRA, the majority of the document is made up of the appendices including drawings, reports from other organisations, and printouts from modelling software.

The main body of text of the FRA is generally well written and but key information such as the location, geology maps, flood risk maps and plans showing the extent of the development are not included as figures within the main text but are given in the appendices or referred to in other documents. There are no photos of the site which is a normal requirement to demonstrate the consultants have actually visited the site. Overall, the FRA is very brief for the size of the development, however it does state that proposed development plans are not available at this stage and that the report is intended to aid with the master planning process. This implies that further reports will be submitted giving more details at a later stage.

The FRA is generally lacking in background information on the hydrology of the site. Apart from identifying the site being close to the River Lostock there is no information given about the frequency and characteristics of flooding on this river. Likewise, the description of historical flooding at the site is limited to mapped information given by the EA. For such a significant development more information on the hydrology would be expected to be included in the FRA. Such information is readily available through internet sources. By contrast, one of the earlier studies by WRA on behalf of WLWPC was a Hydrological Survey of Whittle-le-Woods undertaken in November and December 2019, which included a detailed description of the River Lostock catchment, an analysis of flow records and a listing of flooding events which affected the

parish. The FRA does identify that the site is bordering areas at high risk of surface water flooding along town lane but it does not identify the at risk area as including both residential and commercial properties and it only summarises the surface water flood risk at the site itself.

The FRA does provide information on the impact of the increased areas of impermeable surfaces on surface water flooding and correctly used the ReFH2 to calculate the greenfield flow at the site. The values for the predicted greenfield flows are given in Appendix E, but no other details in terms of the ReFH2 model parameters are included. A comparison of the Waterco results with the ReFH2 simulations undertaken by WRA in the March 2020 study shows similar 100-year flows of 0.19 and 0.24 cumecs (cubic metres per second) respectively. Unlike the WRA study, the FRA does not however use the ReFH2 to simulate the flow from the developed site scenario, which would have been most appropriate given a lack of detail about the layout and would have provided concise and clear results. The developed site peak flow value is not actually given in the FRA, instead the discharge rate from the developed site is proposed to be limited to 0.0458 cumecs (45.8 l/s) and the volume of storage is estimated at 5,500m^3. This flow value is the 1-year greenfield peak flow, and the storage volume is much more stringent than the volume proposed in the WRA study (1702 m^3 of storage) which is based on limiting flow to the 100-year greenfield value.

The initial drainage design from the FRA based on these values would represent a reduction in the risk of flooding to the River Lostock. However, the FRA does not provide any more details on the actual measures or a plan showing where they would be implemented. The selected measures would be based on the results of ground investigations at the site, which have not yet been undertaken. It is assumed a detailed SUDS design would need to be submitted at a later stage, which would include the finalised layout and simulations using the specialist drainage design software, MicroDrainage to prove the performance of the system under a range of flooding scenarios. In its current format the FRA does not include a full and robust SUDS design.

The FRA does not include any information about the risk of contamination and soil erosion from the site and how this could lead to siltation issues in the River Lostock. It also does not consider the impacts of construction on the reservoir (as identified in the report) which is a fishing lodge on the north-western edge of the site. The impact of soil erosion and contamination during construction is not normally an issue for developments unless there are particularly sensitive areas nearby such as designated nature reserves which may be at risk of receiving contaminants. The fishing lodge however does represent a sensitive receiving area and the Environment Agency and local authority should be made aware of this. In this instance the developer would need to include a construction management plan supported by the application of water quality modelling to estimate the potential sediment erosion from the site, which would require EA and local authority approval.

Desk Study Report Review

The desk study report is mostly a summary of the data provided by the Groundsure searches in Appendices B and C. Groundsure are a company which undertake site based environmental searches for domestic or commercial property. The searches make use of freely available information in the public domain such as maps and data from the British Geological Survey (BGS), Ordnance Survey and Environment Agency. Information provided from these searches is

used to inform other aspects of the development proposal such as the FRA. In addition to the Groundsure searches the report does refer to a brief walkover inspection of the site with some photos. These show former mill races at the site, areas of wet ground with marsh grass, surface water and even a spring which raise concerns about the surface water flood risk at the site being higher than shown on the EA maps.

As with the FRA, a greater level of detail is normally expected for such a significant development including ground investigations and monitoring which should continue over a period of at least 6 months. It appears that ground investigations will be undertaken at a later stage in the project. These are recommended in the Desk Study Report section 8.2 but they will provide critical information for the detailed SUDS design including the infiltration rates of the soils at the site and boreholes which can give the seasonally high groundwater levels. If the soils are only slowly permeable or groundwater comes to within 1m of the surface, then any infiltration-based schemes for managing the surface water (i.e. soakaways) will not function. This would mean some form of surface water storage, like detention ponds and swales would be the ideal solution.

The Desk Study Report is lacking accuracy. The River Lostock is incorrectly named the River Istock, and the altitude range given in the description of the topography of the site (161 – 175m AOD) is different from the FRA which gives the range between 73 and 92m AOD. The maps of the topographic survey prove the FRA values are correct, although these are very difficult to read due to the small font used for spot heights. A summary map such as that given in Appendix B of the FRA with contours, shading for different altitude ranges and selected spot heights is more informative and should be made available for general use on the project. The lack of attention to detail for some of the most basic information does not inspire confidence in the authors of this report that further information such as the review of monitoring results will be correctly presented.

There are some other aspects of the report which are not fully dealt with. The discussion of the geology for example states that although records for 18 boreholes were found there are no freely accessible borehole records within 250m of the site. However, the BGS Borehole Scans (BGS, 2021) listed only 4 of these boreholes as confidential. Also, other BGS data identifies the potential for groundwater flooding within 50m of the boundary of the site, with a high degree of confidence, as emergence from superficial deposits. The FRA does not consider the risk of groundwater flooding to be high and it appears that it has not referenced the Desk Study Report. A revised assessment of the risk of groundwater flooding should be given based on the BGS information and the results of monitoring at the site.

References

BGS, 2021. Geology of Britain viewer | British Geological Survey (BGS)

WRA LLP 2019. Whittle-le-Woods, Lancashire Hydrological Survey Phase 1 and 2.

WRA LLP 2020. Hydrological Survey Phase 4: Review of Flood Risk for additional development sites at Whittle-le-woods, Lancashire.