Comments on Arkall Farm housing development FRA

Application Reference 14/00516/OUTMEI

1. The notes on Drawing no. 28648-007-001 state that the calculated attenuation volume is estimated using WinDes drainage design software and it is based on FEH rainfall data. However, the calculation sheets in Appendix D refer to the use of FSR rainfall data in the design.
2. Sheet 2 of the calculations (Appendix D) refers to a development area of 81 ha and a developable area of 43.1 ha. There is no explanation as to why these areas contradict the development area of 76.6 ha and the developable area of 50.9 ha which form the basis of the runoff and storage calculations.
3. Sheet 3 of the calculations (Appendix D) refers to a design discharge rate of 102 l/s for a proposed impermeable area of the eastern catchment of 10.3 ha. The proposed area to be drained is given as 39.2 ha. There is no explanation given in the calculation sheet or in Table 5.1 for this discrepancy. Presumably this relates to the proposal to direct runoff from the south western catchment to the eastern catchment, as per paragraph 5.4.5, but this needs clarification.
4. Sheet 4 of the calculations (Appendix D) refers to design discharge rates and design parameters for the eastern catchment but the title of the sheet indicates that these calculations are for the western catchment.
5. The required storage volumes are based on the results from WinDes Quick Storage estimates. As the disclaimer in the software states, these values are estimates only and should not be used for design purposes. In order to calculate the required storage volumes it is necessary to run the full Source Control package, specifying outflow and overflow control structures and levels. The required storage volumes are based on the critical storm durations for the swales or basins.
6. The volumes of the attenuation basins in the East Catchment are based on a 1.5m maximum water depth below 0.3m of freeboard. The existing ground level for the northern attenuation basin on the survey is approximately 67 mAOD. This indicates an active storage range in the basin of approximately 65.2 – 66.7 mAOD. The survey indicates an invert of 65 mAOD for the East “ditch” (more properly termed a watercourse) at the proposed discharge point which is only 0.2m below the minimum storage level of the basin. Allowing for a water level in the receiving watercourse during a 1 in 100 year plus climate change event there is unlikely to be sufficient gradient for the water to drain fully from the basin due to backing up from the watercourse. Thus, the western and northern attenuation basins are unlikely to function as envisaged because they would not be able to freely drain to the watercourse.
7. The storage provision for the West Catchment is calculated as 6,260 m^3. However, the WinDes calculation indicates that a storage volume of up to 9,068 m^3 is required for a 1 in 100 year storm plus a 30% allowance for climate change. The note after the calculations states that the shortfall in the required storage will be provided in the swale along the western boundary and within plot level source control features. There are no calculations to indicate whether this additional storage will be sufficient to provide the shortfall stated above.
8. Section 3.4 reviews data provided by the EA on surface water flooding. The 1 in 30 year and 1 in 200 year storm event maps indicate flooding close to Syerscote Lane to the north of the proposed development. In fact the lane floods quite frequently after storm events with a probability much

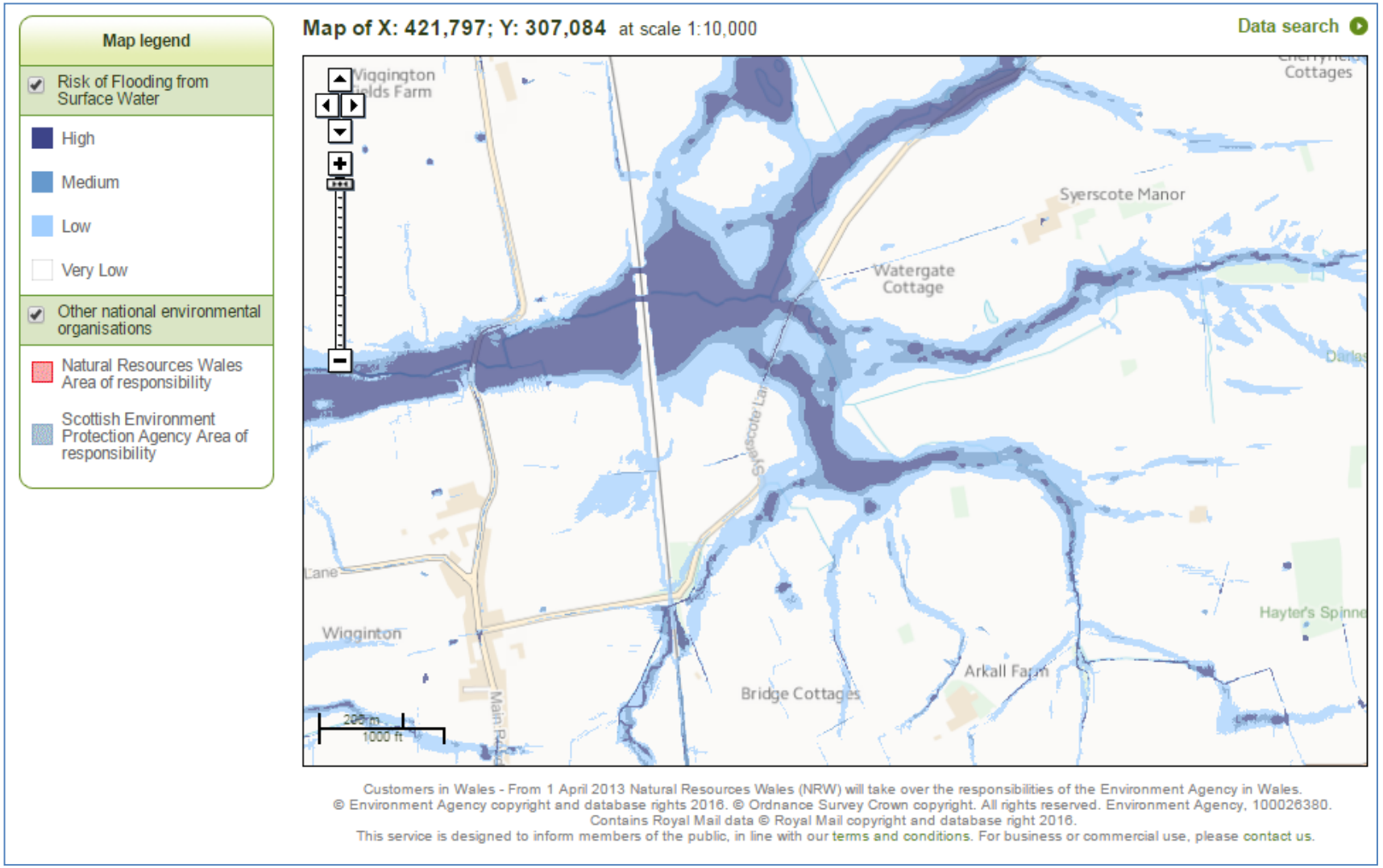
higher than 1 in 30 years. The photographs below, taken on 28th March 2016, show flooding of the lane due to overtopping of the banks of the west "ditch". This followed wet weather during the previous 2 – 3 days. In view of the shortcomings of the proposed drainage scheme, outlined above, the risk of Syerscote Lane flooding could increase.

9. Section 3.2 describes the hydrological context of the development site. Although referring to the main rivers in the area and the ordinary watercourses close to or at the development site, it makes very little reference to the ordinary watercourses downstream of the development site. The topographic survey shows the west "ditch" running alongside Syerscote Lane but it appears to end when it joins another watercourse running from the general area of the proposed eastern attenuation swale. Clearly the watercourse must continue flowing northwards through a culvert or pipe because there is no surface expression. As a bare minimum, an FRA should determine the route that runoff takes after it is discharged from a proposed development, including the condition and capacity of that route, whether there are existing flooding events and their severity and frequency.
10. The property Watergate Cottage lies downstream of both the West and East ditches which take runoff from the proposed development. This area already has a chance of flooding of greater than 1 in 30 (3.3%). Given the uncertainties outlined above in the FRA, there is a risk that the proposed development will exacerbate flood risk of this area and pose an increased risk to the property. The photograph below, taken on 28th March 2016 after 2 – 3 days of wet weather, shows that the watercourse adjacent to the property was already at a high level.
11. A FRA was submitted for the permitted development for 165 houses at Brown's Lane, to the west of the railway line. This estimated a storm runoff volume of over 2,000 m^3 for a 1 in 100 year storm with a critical duration of 4 hours. The runoff will be discharged, via a retention pond, to the head of the Syerscote Lane Stream which flows to the west "ditch". There is no reference to this discharge in the Arkall Farm FRA and no attempt at a cumulative impact assessment.

Conclusion

The FRA has not demonstrated a full understanding of the drainage and current flooding issues downstream of the site or of the cumulative impact with the Brown's Lane housing development. The SUDS proposal has a high degree of uncertainty and there is a risk that it will be unable to maintain the discharge of surface water at greenfield runoff rates.

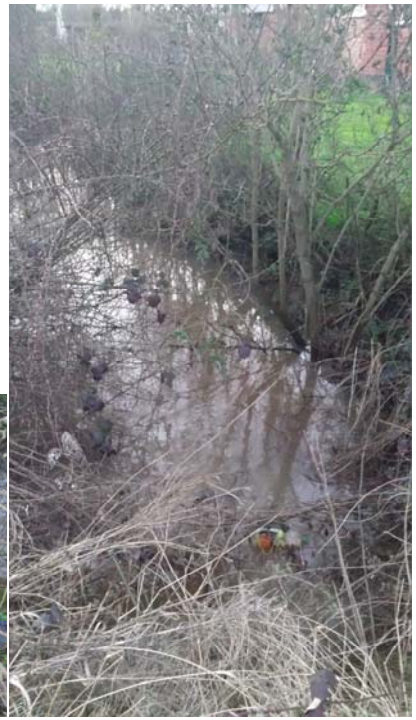
CMP 03/04/16



Risk of Flooding from Surface Water

Flooding in Syerscote Lane (SK 21553 06843)

Flooding watercourse by Syerscote Lane



Watercourse by Watergate Cottage

Flooding in land adjacent to Syerscote Lane (SK 21618 06905)

<u>All photos taken on 28/03/16</u>