WATERMILL BRIDGE - NON-TECHNICAL SUMMARY

Flooding and Hydraulic Modelling

Bewley Homes is in the process of preparing an outline planning application to Basingstoke and Deane Council for a proposed development at Wash Water. The proposed development will be supported by a comprehensive evidence base, including hydraulic modelling and flood risk mapping. In advance of the submission, this note has been prepared to provide a summary of the work undertaken so far, and the next steps in support of the submission.

The proposed development is located south of the River Enborne which flows west-east alongside the northern boundary of the site. An unnamed feeder tributary flows in a northerly direction through the centre of the site discharging into the Enborne.

The Environment Agency (EA) flood map for planning shows that most of the site is free from standing water and is at very low risk of flooding (Flood Zone 1). This is the lowest category of flooding recognised by the EA for the purposes of planning. However, along the northern boundary there is an area associated with the floodplains of both the River Enborne and unnamed tributary, which are shown to be at a medium to high flood risk (Flood Zone 2 and/or 3).

A detailed review of the publicly available hydraulic models[1] identified that the model outputs were not sufficiently accurate for use in a site-specific assessment of flood risk. As such, more needed to be done to inform a Planning Application for proposed development.

The model previously used in this location (by the EA) was broad in scale, developed relatively quickly and inexpensively to provide a baseline understanding of flood risk from different sources (e.g. rivers, the sea, intense rainfall, groundwater and reservoir impoundment failure) across wide areas. Such models are built from datasets with complete coverage across the area of interest using a generalised methodology and simplifying assumptions where necessary – for example, where a certain aspect of the physical system cannot be modelled efficiently or explicitly at that scale. As such the coarse nature of the model means that the outputs are not appropriate for site specific assessments.

In order to produce more accurate information on the potential flood risk to the site from streams/rivers, a detailed site-specific hydraulic modelling exercise has been undertaken. The model methodology employed is in accordance with best practice guidance published by EA. This provides confidence to Bewley Homes that the modelling results are of sufficient quality and accuracy to support a Planning Application. A summary of the key best-practice principles which have been adhered to in the Watermill Bridge model are:

- **Incorporating information on the local topography**. This is to ensure level used within the model are as accurate as reasonably possible.
- Using the **latest version of industry-standard modelling software** which has been developed over a number of years and implemented in hydrological studies globally.
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[1] It was identified that the existing publicly available hydrological data was based on a catchment wide modelling prepared some years ago, around 2001, as part of the JFLOW UK wide study.

- **Utilising flow estimates.** These estimates are generated via well-established, industry-standard, best-practice guidance technique, which uses available local catchment data, as well as information sources from catchments with similar characteristics.
- **Linking to local landscape survey data.** The river channel model is then coupled/linked to wider landscape survey data, which represents the local floodplain as well as the landscape beyond. The linking allows for an accurate representation of floodplain flows.
- **Incorporating drainage features.** A representation of in-channel structures (e.g. culverts, weirs, bridges) based on topographical survey data in order that their influence on flood risk and water conveyance is captured in the modelling.
- **Taking Stock.** Once the model is run a sensitivity check is undertaken in order to ensure an assessment of reasonable uncertainties are accounted for. This is important as it looks to estimates applied within the model are reasonable and subject to significant fluctuation.
- **Assuming the Worst.** The model is run multiple times for a range of event probabilities, from smaller storm events (1 in 2 year) up to very large, rare events (1 in 100 year probability). For the more extreme event an additional allowance for the potential effects of climate change is included.

The climate change allowance included within the model is underpinned by a national statistical analysis on a range of emission (CO2) scenarios, low, medium and high. The outputs of these scenarios result in several climate change allowances. Based on the type and assumed development life, an appropriate climate change allowance or allowances are selected for assessment. For this particular project the Climate Change scenario which has been considered in the modelling account for an increase in flood flows of up to 70% this represents the highest risk for this particular area. This is in accordance with the Government (Environment Agency) guidance available at the time the modelling was undertaken. Subsequent to the completion of the model the EA updated climate change guidance in July 2021; the most recent requirement is to consider a lower magnitude of climate change allowance (21%). Thus the modelling has greatly exceeded what is expected by the EA in accounting for risk associated with climate change.

Model results indicate that as the magnitude of events increases, the channel capacity becomes exceeded leading to water spilling out into the floodplain, where it fills topographically lower areas adjacent to the channel.

Based on the outputs of the hydraulic model, the site layout has ensured that developable areas are steered away from areas that are prone to, or could be prone to flooding in the future. This approach is in accordance with national and local planning policy.

Site Drainage

The proposed development includes a sustainable drainage system which provide sufficient storage to attenuate a 1 in 100 year storm event plus an additional 40% allowance for potential increases in rainfall intensity associated with climate change within four above-ground ponds.

The drainage network has been designed to gravity drain water from extreme storm events, which will be discharged into the wider local water network at ‘greenfield’ rates. This will effectively manage the risk of flooding within the site.

The above ground attenuation features will also aid in promoting ecological enhancement by providing wet environments within which local target species can be allowed to flourish. Furthermore, the drainage network will be designed, where possible, to promote other sustainable initiatives, such as grey water recycling and sustainable energy generation.

All drainage works have been designed in accordance with local and national policy requirements.

To ensure the foul system has sufficient capacity the Applicant will be in constant communication with the Utility Provider. During this process the Applicant will inform the utility of proposed development phasing providing sufficient time in order that the utility can undertake, where required, the necessary network upgrades.