

## Approval of Reserved Matters: Flood Risk and Drainage Checklist

This document provides a list of the information that, in general, must be submitted to support an Approval of Reserved Matters application in relation to flood risk and drainage following Outline planning approval.

### Application details

<b>SITE:</b>	Land at Orchard House, Credenhill, Hereford HR4 7DA
<b>DESCRIPTION:</b>	Reserved matters application (layout, scale, appearance and landscaping) following grant of outline planning permission (190089/O - Outline application for up to 69 residential units with all matters reserved except for access) for 67 residential units and details reserved by conditions 11 and 12 of the outline permission.
<b>APPLICATION NO:</b>	211291
<b>GRID REFERENCE:</b>	OS 345877, 243466
<b>APPLICANT:</b>	Mr Ian Green
<b>DATE OF THIS RESPONSE:</b>	08/02/2022

Information provided for this application has been obtained from the following sources:

- Amended Suds Construction Details – 26.11.21;
- Amended Flood Exceedance Layout – 26.11.21;
- Surface Water Catchment Plan – 26.11.21;
- Amended Longitudinal Sections Sheet 3 - 1.10.21;
- Amended Longitudinal Sections Sheet 2 - 1.10.21;
- Amended Longitudinal Sections Sheet 1 - 1.10.21;
- Amended Off-Site Surface Water Layout - 1.10.21;
- Amended Engineering Layout Sheet 3 – 26.11.2021;
- Amended Engineering Layout Sheet 2 – 26.11.21;
- Amended Engineering Layout Sheet 1 – 26.11.21;
- Amended 30yr Calculations – 26.11.2021;
- Amended 30yr+100yr Calculations – 26.11.2021;
- Amended Site Layout – 26.11.2021;
- Amended Hydrobrake Detail – 26.11.2021.

This review focusses on the principles of the drainage strategy and flood management measures to demonstrate compliance with planning policy and does not provide a detailed review of input or output data. It is assumed that the design of the drainage strategy and flood management measures has been undertaken by a competent engineer and therefore the liability for the proposed design lies with the applicant and not Herefordshire Council.

Responses in **grey** are previous comments which have not changed as part of this consultation response.

### Surface Water Management

✓ Information provided is considered sufficient

✗ Information provided is not considered sufficient and further information will be required

Information required	Reviewer comments	✓ ✗
<b>Strategy</b>		
Detailed drawings of the proposed surface water drainage system including location of SuDS features, manholes, external pipework, attenuation	The applicant proposes a controlled discharge of surface water to the Yazor Brook. The applicant proposes the creation of an adoptable gravity surface water sewer system that will drain the roof areas and access roads within the site.	✓

Information required	Reviewer comments	✓ x
features, pumping stations (if required) and discharge locations	Attenuation storage up to the 30 year event will be held in below ground, offline crates. Storage for the 100 year + 40% climate change event, will be provided in an additional crate system positioned beneath open space further north within the development. The system then discharges to pipework laid across third party land which will discharge to the Yazor Brook at the calculated greenfield Qbar rate for the site of 11.1 l/s.	
Detailed drawings of proposed features such as infiltration structures, attenuation features, pumping stations and outfall structures	The applicant has provided detailed drawings of the individual storage features and outfall to the Yazor Brook. The proposals include positioning the SW outfall at a distance from the watercourse on riparian land, with a swale to convey flows from the headwall to the Yazor Brook. <b>The presence of a swale is likely to stall the surface water drainage adoptions process with Welsh Water.</b> This has already happened at another site in Herefordshire. We note that the email from Mark Callister at Welsh Water dated 16 <sup>th</sup> Dec 2020 confirms that the requisition can proceed if the site discharged to a watercourse. However, the discharge would be to a swale, not a watercourse. <b>We recommend that the applicant reconsiders the inclusion of the swale and instead promotes a direct discharge into the Yazor Brook.</b>	x
Infiltration rates at the location(s) and proposed depth(s) of any proposed infiltration or attenuation structure(s), undertaken in accordance with BRE Digest 365 methodology	The applicant has provided the results of infiltration testing undertaken in accordance with BRE365 and located in the position of the originally proposed infiltration basin. No pits drained sufficiently enough to complete any infiltration tests for the 4 days they remained open. Infiltration rates for the incomplete tests gave results of $2.6 \times 10^{-7}$ , which demonstrate that infiltration is not a viable methods for dealing with SW at this site.	✓
Trial pit/borehole logs demonstrating that the depth to groundwater below the base of any proposed infiltration or attenuation structure(s) is greater than 1m at the location(s) and proposed depth(s) of the proposed structure(s)	The applicant has provided the results of a number of tests pits excavated to approximately 1.5m bgl that encountered no groundwater. The nearest borehole indicates that groundwater level is approximately 6m bgl, and as the development site is elevated above the position of the borehole it is considered unlikely that there will be groundwater at shallow depths within the site.	ü
If pumped systems are proposed, justification for the use of these systems, summary of key design principles and assessment of residual risk, with supporting calculations	The SW system is to be gravity fed and so no pumps are proposed.	✓
Calculations to demonstrate that the proposed surface water drainage system has been designed to prevent the surcharging of any below ground drainage network elements in all events up to an including the 1 in 2 annual probability storm event	The applicant has provided MicroDrainage calculations that show there to be no surcharging of any drainage features during the 1 in 2 year event. These have been updated to reflect recent changes to the proposed drainage design.	✓
Calculations to demonstrate that the proposed surface water management system will prevent any flooding of the site in all events up to an including the 1 in 30 annual probability storm event	The Surface water network has been redesigned in order that there is no flooding from manholes in the 100year + 40%. Flood exceedance plan produced to show that any minor flooding would travel down the estate roads and discharge over the open space.	✓

Information required	Reviewer comments	✓ x
Completed application for Ordinary Watercourse Consent for any proposed structures within an ordinary watercourse	As the proposed design does not include any construction within the Yazor Brook itself, Ordinary Watercourse Consent would not be required. However, should the design change to include the construction of a headwall within the channel then OWC would need to be sought.	✓
<b>Infiltration systems</b>	<b>No infiltration systems proposed</b>	
<b>Off-site discharge</b>		
For discharge to a watercourse, sewer or local authority asset, detailed calculations of greenfield and, if relevant, current runoff rates calculated using the methods outlined in The SuDS Manual 2015 for the 1 in 1 year, Qbar, 1 in 30 and 1 in 100 year events	The applicant has stated that outflow from the site will be limited to the greenfield Qbar rate of 11.1 l/s. The applicant has not included any additional calculations of greenfield rates in different events, however, use of the Qbar rate is acceptable.	✓
For discharge to a watercourse, sewer or local authority asset, detailed calculations of proposed discharge rates and volumes calculated using the methods outlined in The SuDS Manual 2015 for the 1 in 1 year, Qbar, 1 in 30 and 1 in 100 year events	The applicant has proposed a controlled discharge to the Qbar rate of 11.1 l/s for all storms.	✓
For discharge to a watercourse, sewer or local authority asset, detailed calculations of proposed attenuation volume to manage the rate and volume of runoff to greenfield or current rates and volumes, allowing for climate change effects	The proposals state that the 30 year crate system has an attenuation volume of 340m <sup>3</sup> . The maximum modelled water level within the system is 75.439m AOD. That provides over 300mm of freeboard within the 30 year crate system. The 100 year crate system has an attenuation volume of 420m <sup>3</sup> . The maximum modelled water level within the system is 76.396m AOD. That provides 50mm of freeboard above the 100 year +40% climate change level.	✓
Clarification if attenuation structures are to be provided partly or wholly above adjacent ground level (i.e. above ground storage), and assessment of potential failure of above-ground attenuation features, including assessment of residual risks to downstream receptors, and proposed mitigation and management measures	All attenuation structures are provided below ground level.	✓
Demonstration that a viable connection can be made and that the suitability and capacity of the downstream system has been explored in consultation with the relevant authority	The applicant proposes to discharge to the Yazor Brook. The watercourse is open and free flowing so there are no capacity concerns. A fall of approx. 5m can be achieved between the site and the receiving watercourse, offering strong evidence that a hydraulic head will be achieved.	✓
For discharge to a watercourse, consideration of the risk of water backing up the drainage system from any proposed outfall and how this risk will be managed without increasing flood risk to the site or to people, property and infrastructure elsewhere, noting that this also includes failure of flap valves	There is a fall of approx. 5m between the site and the level of the Yazor Brook. The site is elevated above the 100 year flood outline and the outfall is elevated above the usual water level within the brook. Therefore, the risk of flooding caused by backing up of the outfall is limited.	✓

Information required	Reviewer comments	✓ x
<b>General</b>		
If the development is to be delivered in phases, demonstration of proposed delivery and ability to maintain key design criteria	Phased construction is not proposed.	✓
<b>Exceedance</b>		
Assessment of natural surface water flow paths through the site, noting that natural flow paths should be retained as far as practicable within a development layout, and demonstration that consideration has been given to the potential for overland flow to overwhelm the capacity of the proposed drainage system	The land is gently sloping towards the south west. There are no surface flow routes identifiable on the Surface Water Flood Map and the site is bounded by permeable agricultural land. The risk of flooding as a result of overland flow is low.	✓
Description and drawings demonstrating the management of surface water runoff during events that may exceed the capacity of the drainage system (including temporary exceedance of gullies) up to the 1 in 100 annual probability event with climate change (including assessment of where water is likely to emerge) and noting that surface water should be retained within the site boundary and not pose risk to the development	The applicant has stated that exceedance flows will be held within the site roadways and conveyed away from properties. The surface water system has been redesigned to retain all water in the 100year + 40% event. A flood exceedance plan has been included.	✓
<b>Access, adoption and maintenance</b>		
Confirmation that an agreement has been made with the necessary landowners/consenting authorities to cross third party land and/or make a connection to the proposed watercourse/sewer	The applicant proposes to cross third party land to reach the Yazor Brook to outfall surface water. The applicant has stated that a DCWW requisition would be possible to lay the pipe across 3 <sup>rd</sup> party land to the brook. <b>An agreement with the landowner would be required for construction of the headwall as the headwall is an above ground structure and not a sewer.</b> Welsh Water have a duty under the Water Industry Act to adopt the sewers subject to technical compliance. MF Freeman will apply for adoption of all potentially adoptable sewers. <b>Please refer to our comments above about the Swale.</b>	x
Confirmation that the adoption and maintenance of the surface water drainage system has been agreed with the relevant authority	Welsh Water have a duty under the Water Industry Act to adopt the sewers subject to technical compliance. MF Freeman will apply for adoption of all potentially adoptable sewers.	✓
Demonstration that appropriate access is available to maintain SuDS features (including pumping stations)	Maintenance to the on-site features such as the storage crate have been provided for within the design. Welsh Water will adopt the headwall under the Section 104 Water Industry Act.	✓
Operational and maintenance manual for all proposed drainage features that	The surface water drainage is proposed to be adopted by DCWW and so an operation and maintenance strategy will be put into	✓

Information required	Reviewer comments	✓ ✗
are to be adopted and maintained by a third party management company <sup>1</sup>	place by the adopting authority. We note that the 100 year crates will be privately owned. The applicant has provided an operation and maintenance manual for the features to be maintained by a private management company.	

### ***Foul Water Management***

✓ Information provided is considered sufficient

✗ Information provided is not considered sufficient and further information will be required

Information required	Reviewers comments	✓ ✗
<b>Strategy</b>		
Detailed drawings of the proposed foul water drainage system including location manholes, external pipework, package treatment plants, drainage fields, pumping stations and discharge locations	The applicant proposes the construction of a new gravity fed foul sewer which will drain into a Type 3 adoptable Pumping Station. The pumping station will then pump foul flows via a rising main to the DCWW public foul sewer in the adjacent highway. The foul sewer system will be put forward for adoption by DCWW. Detail of the foul load have been included. The pump will be designed to Welsh Water requirements.	✓
Detailed drawings of proposed features such as drainage fields, pumping stations and outfall structures	Detail of the pumping station layout has now been provided.	✓
If pumped systems are proposed, justification for the use of these systems, summary of key design principles and assessment of residual risk, with supporting calculations	Site levels dictate the use of a pump to elevate foul flows to the level of the public foul sewer. The storage volume is based on 160L per dwelling. In accordance with Welsh Waters requirements, an additional 50% has been added to the storage volume. No detail of potential overland flow routes in the event of failure have been provided, however the fall of the land based on site contours would see flows falling away from properties and towards the adjacent farmland to the south east of the development.	✓
If on-site treatment is proposed, summary of proposed methods / manufacturers details	N/A	✓
Completed application for Ordinary Watercourse Consent for any proposed structures within an ordinary watercourse	N/A	✓
<b>Discharge to a sewer</b>		
If discharge to the public sewerage system is proposed, confirmation that this has been agreed with the relevant authority	We note that DCWW have no objection to the discharge to the existing foul system.	✓
<b>Infiltration systems</b>	<b>No infiltration systems are proposed</b>	
<b>Discharge to a watercourse</b>	<b>Discharge to a watercourse is not proposed</b>	
<b>Access, adoption and maintenance</b>		

<sup>1</sup> Note that further information will be needed if the Council are to adopt and maintain part or all of the proposed drainage system, and further consultation with the Council will be required

Confirmation that an agreement has been made with the necessary landowners/consenting authorities to cross third party land and/or make a connection to the proposed watercourse/sewer	There is no requirement for foul drainage to cross third party land.	✓
Confirmation that the adoption and maintenance of the foul water drainage system has been agreed with the relevant authority	The applicant proposes that DCWW will adopt the foul water system and pumping station. Welsh Water have a duty to adopt the foul system under the Water Industry Act.	✓
Demonstration that appropriate access is available to maintain drainage features (including package treatment plants and pumping stations)	The applicant has provided vehicular access to the proposed adoptable pumping station as part of the site layout.	✓
Operational and maintenance manual for all proposed drainage features that are to be adopted and maintained by a third party management company <sup>2</sup>	The foul drainage is proposed to be adopted by DCWW and so an operation and maintenance strategy will be put into place by the adopting authority.	✓

### **Overall Comment**

Before the Reserved Matters can be approved, the Applicant will need to reconsider the proposed swale to convey surface water runoff to Yazor Brook. Welsh Water are likely to stall the adoption of the surface water system unless this is removed.

The installation of the headwall cannot be completed under a Water Industry Requisition.

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<sup>2</sup> Note that further information will be needed if the Council are to adopt and maintain part or all of the proposed drainage system, and further consultation with the Council will be required