

Outline Planning Applications: Flood Risk and Drainage Checklist

This document provides a list of the information that, in general, must be submitted to support outline planning applications in relation to flood risk and drainage.

Application details

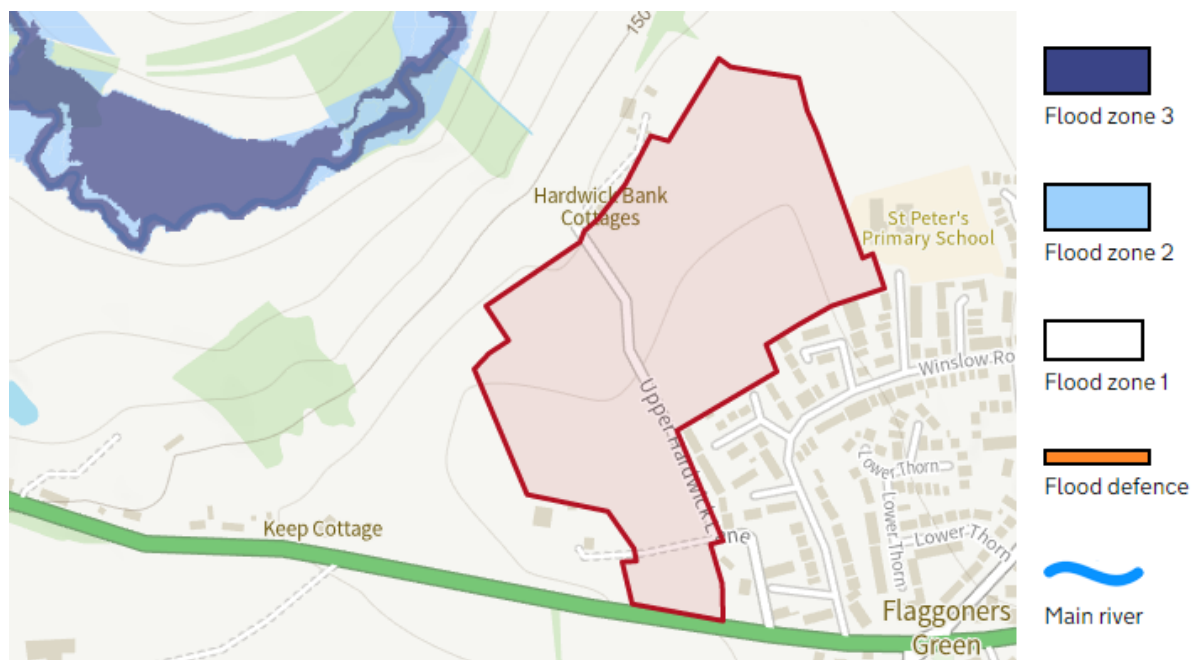
SITE:	Land at Hardwick Bank, Bromyard, Herefordshire.
DESCRIPTION:	Outline planning application for a sustainable urban extension comprising: up to 250 dwellings; open space, allotments and landscaping; school expansion land; areas of children's play; sustainable urban drainage infrastructure; internal roads; and associated infrastructure. Detailed approval is sought for principal means of access and layout with all other matters reserved.
APPLICATION NO:	163932
GRID REFERENCE:	OS 364676, 254881
APPLICANT:	Bovis Homes Limited & Mosaic Estates C/o Agent
AGENT:	Walsingham Planning
DATE OF THIS RESPONSE:	19/12/2023

This response is in regard to flood risk and land drainage aspects, with information obtained from the additional sources following our initial consultation in April 2019:

- Location Plan drawing (Ref: 0687-101)
- Flood Risk Assessment (January 2023);
- Proposed Drainage Plan Sheet 1 of 1, 2, 3 (Rev P05).Nov 2023
- Covering Letter from McLoughlin Planning 8th Sept 2023
- Long Section through South Pond 6th Sept 2023
- Stantec Technical Note 30th Oct 2023 , response to LLFA comments 28th Nov 2023
- Overland Flow Assessment drawing , Overland Exceedance Route drawing
- Utility Mapping and CCTV drawing
- Micro drainage calculations (north pond, south pond)

Site location and extract of flood map(s)

Figure 1: Environment Agency Flood Map for Planning (Rivers and Sea), May 2023



Development description

The Applicant proposes the construction of up to 250 dwellings, open space, allotments and landscaping, school expansion land and children's play areas. The site occupies an area of c. 11ha and is currently used for agricultural purposes. The topography of the site slopes down from approximately 169m AOD in the west to approximately 130m AOD in the east. The River Frome is located approximately 250m to the north and west of the site.

Identifying the need for a Flood Risk Assessment

Information required	Reviewers comments
Confirmation of the site area in hectares or square metres	Site area confirmed as c.11.2 hectares.
Identification of all designated main rivers within 20m of the site boundary	The site is not located within 20m of any main rivers.
Identification of all designated ordinary watercourses and land drains within 20m of the site boundary	There are no ordinary watercourses within 20m of the site boundary.
Confirmation of the site's location in Flood Zone 1, Flood Zone 2 or Flood Zone 3, and taking climate change effects into account	The submitted FRA confirms the location of the site in the low risk Flood Zone 1, and is likely to remain in Flood Zone 1 with the effects of climate change.
Confirmation and supporting justification of whether the site is at significant risk of flooding from other sources, including surface water flood risk or flood risk from minor watercourses with unmapped flood extents	The submitted FRA indicates that the site is not at risk of surface water flooding or other sources.

Completing a Flood Risk Assessment


A Flood Risk Assessment (prepared in accordance with NPPF and EA Standing Advice) must support the planning application for any development:

- Located in Flood Zone 2 or Flood Zone 3¹.
- With a site area greater than 1 hectare.
- Located in an area identified to be at significant risk of flooding from other sources, including surface water flood risk or flood risk from minor watercourses with unmapped flood extents.

Complying with the above guidance, the Applicant has submitted a FRA to support this outline planning application.

¹ Note that the Council may also request an assessment of flood risk where the development is indicated to be at risk of flooding when the potential effects of climate change are taken into account.

Information required	Reviewer comments	✓ ✘
Sources of risk		
Assessment of Flood Zone 2 and 3 taking the effects of climate change into account, including predicted flood depths for the 1 in 100 and 1 in 1000 annual probability events	The proposed scheme is located entirely within Flood Zone 1. The site is not considered to be at risk of fluvial flooding when the effects of climate change are considered.	✓
Assessment of areas protected by flood defences and risk of flooding in the event of breach, taking the effects of climate change into account	The site not at risk of flooding in the event of defence breach.	n/a
Assessment of fluvial flood risk from other watercourses in close proximity (c.20m) to the site including those with no mapped flood extent, and taking the effects of climate change into account	There are no known other sources of fluvial flooding associated with minor or unmapped flood extents.	✓
Assessment of mapped surface water flood risk	Review of the EA's Risk of Flooding from Surface Water map indicates that the site is not located within an area at significant risk of surface water flooding. The Flood Risk Assessment (FRA) indicates that there is a small area at high risk of surface water flooding noting that it is a low spot in the topography of the site. Our own review indicates a very slight valley located within the centre of the site with the potential for slight concentration of overland flow between Bromyard's existing urban extent and Drythistle Farm, although this is not considered to pose risk to the site or elsewhere.	✓
Assessment of flood risk associated with potential overland flow from adjacent steeply sloping land	Review of topography indicates that the site is located at a local high point and is therefore not at risk from overland flow.	✓
Assessment of groundwater flood risk	The submitted FRA states that the site is not at risk from groundwater flooding. We concur with this statement although highlight the presence of groundwater springs within the steeper sloping land to the north-west (towards the River Frome) and south-west of the site (towards Hackley Brook that is a tributary of the River Frome), indicated to emerge between the 145-155m contour lines.	✓

Information required	Reviewer comments	✓ ✗
<p>Assessment of flooding from surface water, foul water and highway sewers</p>	<p>The submitted FRA states that the site is not at risk of flooding from sewers. We concur with this statement</p> <p>18.7.23 The applicant should provide a Surface Water Exceedance Plan to demonstrate how surface water will flow in the event of the highway gullies being overwhelmed. From our own review we note that provision may be needed to accommodate surface water runoff at the following locations, but the designer should complete a site wide review. Some properties may need to be raised 300mm.</p> <p>Upper Hardwick Lane runs very close to the location below. A direct discharge point may be created onto the public highway as the lane is lower down than the proposed site road, this may create an ice hazard.</p>  <p>28.11.2023 The applicant has presented an Overland Flow Assessment drawing. We note that the service road alongside Upper Hardwick Lane has been deleted. The applicant has advised that surface water will be directed along Upper Hardwick Lane, advising that there are no receptors that would be affected. We note that Upper Hardwick Lane forms part of the impermeable area throughout the site. The flow assessment has demonstrated the significance of this flow route. We consider that at Reserved Matters stage, a highway grip/ditch should be added, along with a swale to divert exceedance flow from the lane into the proposed balancing pond. This would need to be located at the eastern end of the pond.</p> <p>19.12.2023 A culvert has been added to the Overland Flow drawing. A ditch/swale is referenced in the applicant's response</p>	<p>✓ ✗</p> <p>✓</p>

Information required	Reviewer comments	✓ ✗
Assessment of flood risk from any other manmade sources, including reservoirs, ponds, detention basins etc.	The submitted FRA states that the site is not at risk of flooding from artificial sources such as canals, lake and ponds. We concur with this statement	✓
Summary of historic flooding records and anecdotal evidence	The submitted FRA states that no records of historic flooding were identified in their assessment. We agree that the Council hold no records historic flooding events that have occurred within or immediately adjacent to the site, although highlight a number of known historic flooding events that have affected property and infrastructure downstream of the site, most notably fluvial flooding from the River Frome. This may influence discharge of runoff as discussed elsewhere.	✓ (with note)
Other works that could pose risk		
Are there any other proposed works that could lead to increase of flood risk to the site or elsewhere, for example culverting or diversion of watercourses?	There are no other known works that would pose increased flood risk to the site or elsewhere.	✓
Sequential approach		
Assessment of the acceptability of the development within the identified Flood Zone, in accordance with the Sequential Test outlined in the National Planning Policy Framework	The site is located entirely within Flood Zone 1 and therefore passes the Sequential Test.	✓

Information required	Reviewer comments	✓ ✘
<p>Demonstration of how a sequential approach has been taken to locate development in the lowest risk areas of the site, including the risk of flooding from other sources</p>	<p>The site is located entirely within Flood Zone 1 and a sequential approach is not considered necessary.</p>	<p>✓</p>

Information required	Reviewer comments	✓ ✗
Mitigation		
<p>Summary of how the development has addressed the identified flood risks and incorporated appropriate mitigation into the layout and operation of the development</p>	<p>No mitigation beyond the appropriate management of surface water runoff is considered necessary.</p> <p>18.7.23 We note that Upper Hardwick Lane crosses through the site, which is lower than the existing farmland. It is impractical to convey the exceedance flows (arising from the scenario when the surface water drainage system is overwhelmed) from the north-east of the site to the proposed balancing pond.</p> <p>We note that Upper Hardwick Lane crosses the edge of the proposed Public Open Space and is shown running parallel to a new site road. A direct discharge of surface water onto the public highway needs to be avoided. The extent of the existing highway drainage on Upper Hardwick Lane needs to be reviewed as if a direct discharge were to occur then water may not be effectively conveyed via the highway drains</p> <p>28.11.2023 The applicant has advised that the service road alongside Upper Hardwick Lane has been deleted.</p> <p>The applicant refers to the use of gullies to prevent the discharge of water onto the highway. However, the exceedance route considers the scenario when these block or cannot cope with flows of water from large storms.</p> <p>The applicant refers to water being conveyed to the River Frome. However, there is a need to attenuate water arising from exceedance events.</p> <p>We consider that at Reserved Matters stage, a highway grip/ditch could be added as explained above</p> <p>19.12.2023 A culvert has been added to the Overland Flow drawing. A ditch/swale is referenced in the applicant's response.</p>	<p>✓</p>
<p>Assessment of how a safe access route(s) to Flood Zone 1 (not including dry islands) would be achieved from the development, taking flood hazard and climate change into account</p>	<p>Vehicular accesses to the site is located in Flood Zone 1 and the site is not a dry island.</p>	<p>✓</p>

Information required	Reviewer comments	✓ ✗
<p>Assessment of how the development will ensure no increased risk to people, property or infrastructure elsewhere, for example through the displacement of floodplain compensation or failure of flood defence structures, and demonstration of how mitigation will be incorporated into the design, with supporting calculations</p>	<p>The site is located entirely within Flood Zone 1 and is not assessed as being at risk from other sources of flooding. Therefore no increased risk to people, property or infrastructure is identified beyond the appropriate management of surface water runoff.</p>	<p>✓</p>
<p>Exception Test</p>		
<p>Justification for the successful application of the Exception Test, if applicable</p>	<p>The site is located entirely within Flood Zone 1 and therefore the Exception Test is not required.</p>	<p>n/a</p>

Information required	Reviewer comments	✓ ✗
Strategy		
<p>Summary of likely ground conditions including permeability and contamination risks</p>	<p>Review of information provided by applicant in the submitted FRA states that infiltration testing has been completed and concludes variable but likely unfavourable conditions for infiltration. The Applicant states the targeted soakage testing at proposed SuDS locations will be undertaken at the detailed design stage, suggesting that infiltration will be maximised if possible. We agree with this approach.</p> <p>We note that the applicant has completed only 4 soakaway tests within the red line area but TP19 and TP24 are close together. Only three areas were tested</p> <p>Ground Conditions vary across the site. Sandstone and Mudstone are recorded to alternate across the site. The beds are typically recorded to dip gently to the east, however they have been folded into a synclinal structure with its axis trending north-south through the east of the site. Strata dips may therefore be expected to be shallow and towards the west in the east of the site. At shallow depth the sandstones can be expected to weather to predominantly sand and the mudstones to clay/silt</p> <p>Around 20 of the trial pits within the red line area demonstrated the presence of sand and sandstone. However only one soakaway test (TP19) was completed in the sand - sandstone strata.</p> <p>We are unclear whether the sand layer at TP10 was underwater during the soakaway test. We assume that the soakaway test was completed within the trial pit, but we cannot be sure. It is possible that if the soakaway test pit had been filled to the surface that some soakage may have occurred. At the adjacent TP9 there is sand to a depth of 0.75m, also there is a layer of gravel. The sand bed is localised and may provide a route for dispersing water, the gravel is also likely to be permeable.</p> <p>28.11.2023 The applicant has advised that the proposed surface water strategy considers the worst-case scenario of infiltration not being viable. We consider that if some infiltration is possible then it would be in isolated areas of the site. There will be some space within the estate to accommodate soakaways. We accept that the additional infiltration testing and re-design could be completed at Reserved Matter stage.</p>	<p>✗ (with note)</p>

Information required	Reviewer comments	✓ x
<p>Summary of proposed surface water management strategy with supporting illustration, including location of proposed outfalls, attenuation structures and/or infiltration features</p>	<p>The submitted FRA states that surface water runoff will be conveyed via a mix of traditional piped systems and on-ground conveyance features to attenuation basins located throughout the site. From the attenuation basins, surface water runoff from the vast majority of the site will be discharged to the River Frome at a controlled rate.</p> <p>18.7.23 <u>Detention Basin 1</u></p> <p>The applicant has suggested that a variable flow control would be installed that would ensure that the flow rate discharged at the pond would change with different storms. There is no technical evidence that supports this proposal.</p> <p>Table 6.1 shows the discharge rate for four storms. The submission does not demonstrate how the flow control would be designed for intermediate storms (for example those between 2 years and 30 years). If a 5 year storm were to occur, would the flow rate be the flow rate associated with a 2 year storm or the flow rate associated with a 30 year storm? Conversely if a 29 year storm were to occur then if the flow control delivered the flow rate for a 30 year storm there would be a net increase in runoff for the site.</p> <p>We remind the applicant that the post development flows <u>and volumes</u> should not increase for all design storms. It is for this reason that most developers choose to design the attenuation on a discharge rate of Q Bar (2year storm) for all design storm as then the volumetric requirements are met in every design storm. As this is a large development, we would expect the applicant to consider more frequent storms such as the 15 year storm in their assessment.</p> <p>The submitted microdrainage calculations have been reviewed. The simulation did not feature the use of a variable flow control.</p> <p>The drawing shows that the pond would have a base level of 158.100m, but the simulation shows node 1.017 has a level of 157.45m. We respect that the same storage may be provided higher up, but the extra hydraulic head would lead to an increased flow through the hydrobrake. The model outputs suggest that the base was modelled at 157.70m (we note that the 30 year water level at node 1.018 is 158.564m and the predicted depth is 0.864m)</p> <p>Based on the hydrobrake flow curve, the pass forward flows are higher than the flows defined in Table 6.1 :</p> <p>30 year – 0.864m and so 28.1 litres/sec 100 year – 2.301m and so 45.7 litres/ sec</p> <p>If the hydrobrake was installed at 157.40m as suggested then these figures would be even higher :</p> <p>30 year – 1.114m and so 32 litres/sec 100 year – 2.551m and so 48 litres/ sec</p>	<p>✓ x</p>

Information required	Reviewer comments	✓ x
	<p>The submission should have demonstrated that the volumetric criteria are met. There are insufficient details to confirm that the proposed design would work adequately</p> <p>The pond does not feature an overflow, which would normally be provided in case the flow control blocks. The level of the earth bunding needs to be a minimum of 300mm higher than the top water level in accordance with the Herefordshire SuDS Handbook. This level remains to be confirmed.</p> <p>13.10.23 The Long Section through the Southern Pond shows a 2.5m tall retaining wall. There is a Childs Play Area nearby.</p> <p>The covering letter advises as follows “.....without significant retaining walls or over engineered appearance”.</p> <p>The presence of a retaining wall presents risks of falling to the general public. The designer has a duty to mitigate such risks through design, ideally removing the risk of falling by re-design. The designer needs to consider how the risk of people (particularly children) falling of the wall can be mitigated.</p> <p>28.11.2023 The applicant has advised in their technical note that the variable flow control has been removed and that the flow discharging from the site has now been designed to meet greenfield rate for all storms.</p> <p>The applicant has also presented revised micro drainage calculations simulating the 30 year and 100 year + 40% Climate Change Storms.</p> <p>Water levels in the pond is shown as 1.432m deep in a 30 year storm and 1.432m deep in a 100 year storm (node 1.018, manhole S78). This water level is consistent with the modelled cover level of manhole S78. <u>In both storms the pond is modelled as overflowing.</u></p>	

Information required	Reviewer comments	✓ x
	<p>There is no simulation for the 1 or 2 year storm (QBar). The flow control control head/discharge table shows that 30.8 litres/sec would be discharged if the water in the pond was 300mm deep.</p> <p>Section 6.6.3 of the Flood Risk Assessment identifies the discharge rates associated with Q Bar as 12.2 litres/second. Without provision of the calculations it is evident that the pass forward flows would be higher than the greenfield rates. <u>Most significantly there would be a net increase in the volume of rainwater discharged in lower storm events</u> (noting that these are the most common types of rainstorm).</p> <p>Section 4.4.4 of the Flood Risk Assessment defines the climate change figures to be used (40% for the 30 year event and 45% for the 100 year event). However, we note that the simulation uses the lower figure of 40%, which is not consistent with current guidelines.</p> <p>The proposed design does not meet the National Standards for Peak Flow and Volume Control</p> <p>The designer has advised that the risk of falls has been mitigated by reducing gradients to 1:4 and providing a flat plateau at the bottom of the wall. There are also proposals for a post and rail fence.</p> <p>There is no drawing giving precise dimensions of the length of the proposed wall. However by scaling off contoured plans the length of the wall appears to be around 90m</p> <p>Section 1.4.3 of the Flood Risk Assessment refers to responsibilities under the Construction Design and Management Regulations 2015. There are opportunities at Outline stage to alter the design so that the wall may be lower or even to remove the wall entirely.</p> <p>The SuDS Manual offers guidance on slope design, typically a 1: 3 graded slope is considered appropriate.</p> <p>We note that there is land within the masterplan to the north west of the proposed balancing pond. The pond could be re-positioned to utilise a gently graded earth slope instead.</p> <p>19.12.2023 The applicant has also presented additional micro drainage calculations simulating the 30 year and 100 year + 45% Climate Change Storms</p> <p>The revised calculations include different hydrobrake levels to the original design. The pond is not shown overflowing. The correct climate change figure has been used (45%)</p>	<p>✓ x</p>

Information required

Reviewer comments



Return Period	Post-development Discharge Runoff Rate for Detention Basin 1 (l/s)
1 in 1 year	10.2
QBAR (1 in 2.3 year)	12.2
1 in 30 year	24.4
1 in 100 year	31.3
1 in 100 year plus 45% climate change allowance	31.3

Table 6-1 - Peak Allowable Discharge Rates for Detention Basin 1

The above table is extracted from the applicant's own FRA

The results show the 2 year flow to be 29.8 l/s, which is 17.6 l/s more than greenfield rate. The 30 year flow is 30.8 l/s, which is 6.4 l/s more.

The proposed design shown on the drawing and as simulated would increase flood risk downstream. Most significantly the volume of floodwater released will be higher than under the existing scenario.

The proposed design does not meet the National Standards for Peak Flow and Volume Control.

However, there are conflicting comment in the applicants Response Log. The notes suggest the intent to provide geocellular crates below the proposed basin. There are also some proposals to install separate flow controls to allow different flow rates in different storms.

Although the submitted Microdrainge simulation does not demonstrate that this proposal could work, we accept that it should be possible to provide some extra storage below ground. It would also be possible to utilise multiple flow controls to refine the design in order to meet the respective design criteria.

The Response Log advises that the basin has been re-graded to 1 in 3 and the wall has been removed. We note that the 30 year storm was modelled with CC, although our understanding is that Sewers for Adoption does not reference CC

Detention Basin 2

It has been proposed that a small area of proposed access road and roundabout in the south-west of the site will be discharged to existing highways drainage in the A40 at a controlled rate. However the proposed discharge rate (QBar) is only 0.4 litres/second. Herefordshire Highways have a policy of utilising flow controls with a minimum 100mm orifice, accordingly the pass forward flow would be around 5 litres/second. If this flow control were proposed, then due to the small catchment only a small amount of water would be attenuated within the pond. Please refer to our remarks under regarding TP09 and TP10. We consider that it may be possible to utilise a soakaway basin at this location. Further testing is requested to refine the design.

28.11.2023 The applicant has advised that further investigations may demonstrate that infiltration is viable. A utilities survey plan has been presented showing that highway drainage discharges to the west.

We accept that a detailed design could be progressed at Reserved matters stage

Information required	Reviewer comments	✓ x
<p>Demonstration that the SuDS hierarchy has been considered in accordance with NPPF and justification for the proposed method of surface water discharge</p>	<p>The submitted FRA demonstrates that consideration has been given to the SuDS hierarchy. Infiltration testing indicates that ground conditions may be unfavourable hence discharge to a watercourse is promoted. However the FRA recommends that further infiltration testing is undertaken to inform the detailed design at the proposed location of drainage features and we agree with this approach. The results of this testing will need to be submitted as part of the reserved matters application.</p>	<p>✓ (with note)</p>
<p>Demonstration that best practice SuDS have been promoted, appropriate to the size and nature of development</p>	<p>The outline drainage strategy and FRA indicates that good practice SuDS are proposed. In addition to further investigation of infiltration as discussed above, the FRA also states that consideration should be given to other SuDS features such as <u>permeable paving</u> and swales. Given the strategic importance of this site we expect to see further consideration of this as part of the reserved matters application.</p>	<p>✓ (with note)</p>
<p>If pumped systems are proposed, justification for the use of these systems, summary of key design principles and assessment of residual risk</p>	<p>No pumped systems are proposed.</p>	<p>n/a</p>

Information required	Reviewer comments	✓ x
Off-site discharge		
<p>For discharge to a watercourse, sewer or local authority asset, confirmation of the relevant authority from which consent will be required</p>	<p>We are unclear exactly where the proposed headwall HW 04 would be located. Any works within 8m of the River Frome will require a Flood Risk Activities Permit.</p> <p>Email correspondence in the 2016 FRA discusses correspondence with Welsh Water regarding sewer requisition opportunities to facilitate the proposed discharge to the River Frome. The applicant will need to confirm how the proposed surface water drain will be installed on third party land.</p> <p>18.7.23 If the intent is to have the roads adopted by HC, then the surface water drainage will need to be maintained by a Statutory Authority such as Welsh Water or Albion Water or Ancala Water. Welsh Water do not adopt Balancing Ponds but the incoming surface water drainage network could be adopted by Welsh Water. Subject to discussion the pond could be adopted by HC or the Lugg Internal Drainage Board.</p> <p>13.10.23 The South Pond Elevation drawing shows a 2.5m high retaining wall. We note that the wall retains ground that is higher than the top water level of the pond, can the applicant please confirm which party will be responsible for maintenance of the wall and for the provision of any safety barriers that may run along the top of the wall. We note that there are no such barriers shown on the drawings.</p> <p>Subject to discussion, it may be possible for the surface water drain downstream of the balancing pond (and the flow control) to be adopted by HC. However, easements would be required for access. HC cannot deliver a sewer requisition to allow the drain to be built. Accordingly, the applicant may need to consider approaching Albion Water or Ancala Water.</p> <p>The proposed discharge the highways drainage network will require consent from the Council's highways authority. As explained above the existing highway drain may already drain into the field. A soakaway pond may be easier to install.</p> <p>28.11.2023 The Skanska Technical Note does not provide any commentary on proposed adoption issues.</p> <p>Progression of the housing development relies on the surface water pipeline being installed though third party land. Conversely Outline Planning considers all aspects related to compliance with policy and practice.</p> <p>19.12.2023 The applicant's response log advises that crates would be installed below the basin. This would allow Welsh Water to adopt the entire surface water drainage system although the basin would remain private</p>	<p>x</p>

Information required	Reviewer comments	✓ x
<p>For discharge to a watercourse, sewer or local authority asset, summary 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 and 1 in 100 year events</p>	<p>The FRA states that existing greenfield runoff rates are as follows: 1 in 1 year event: 2.5 l/s/ha 1 in 30 year event: 6.0 l/s/ha 1 in 100 year event: 7.7 l/s/ha</p> <p>18.7.23 Section 5.7 refers to Long Term Storage and references a 2 l/s/ha flow rate, however we note that Table 5.1 shows the rates above. The SuDS Manual includes the 2 l/s/ha figure for scenarios where the greenfield runoff rate is lower than this figure. We recognise that the figures in Table 5.1 are being used at this site for the volumetric storage calculations</p>	<p>✓</p>
<p>For discharge to a watercourse, sewer or local authority asset, summary of proposed discharge rates and volumes calculated using the methods outlined in The SuDS Manual 2015 for the 1 in 1 year, Qbar and 1 in 100 year events</p>	<p>The FRA states that the Greenfield runoff rates stated above will be achieved for the corresponding 1 year, 30 year and 100 year events (allowing for climate change effects for the 100 year event). The FRA also states that additional storage will be provided to achieve required volumetric discharge restrictions. Whilst the proposals are acceptable in principle, we highlight that these are considered to be the minimum expected requirements. It is expected that a development of this size would go beyond minimum requirements and strive to achieve betterment, particularly as there are a number of historic flood records downstream of the site associated with the River Frome. We note the FRA's recommendation to maximise infiltration, permeable paving and swales which will assist in providing betterment. However as part of the reserved matters application it is expected that further restriction on proposed discharge rates in achieved, ideally restricting discharge rates and volumes to a value closer to Qbar for all events.</p> <p>19.12.2023 As explained above, the discharge rates increase for most of the storms. Accordingly, the volume of rainwater stored during most storms is inadequate to meet the volumetric discharge criteria.</p> <p>The applicants Response Log includes proposals regarding the discharge rates that the basin/crate system would be designed for. These proposals do not comply with the National Standards. Different figures would need to be agreed with the LLFA before detailed design work commenced to avoid re-work of the design submission.</p>	<p>x</p>
<p>For discharge to a watercourse, sewer or local authority asset, summary of proposed attenuation volume to manage the rate and volume of runoff to greenfield or current rates and volumes, allowing for climate change effects and demonstrating sufficient space within the site</p>	<p>The submitted FRA states that attenuation will be provided to cater for the 1 in 100 year event plus a 40% increase in rainfall intensity to accommodate climate change effects – giving consideration to both peak discharge and volumetric discharge requirements. As discussed above this is considered acceptable in principle, although a greater volume of attenuation is expected as part of the reserved matters application.</p> <p>19.12.2023 The requirement is now 45%</p>	<p>✓ (with note)</p>
<p>Assessment of potential failure of any above-ground attenuation features, including assessment of residual risks to downstream receptors, and proposed mitigation and management measures</p>	<p>The Applicant proposes an attenuation basin.</p>	<p>✓</p>

Information required	Reviewer comments	✓ x
<p>Drawing to illustrate that attenuation structures are not located within an area at risk of fluvial flooding up to the 1 in 100 annual probability event and taking the effects of climate change into account, unless it can be demonstrated that the capacity of the drainage system will not be reduced and that any loss of fluvial flood storage can be compensated for elsewhere without increasing risk to people, property or infrastructure</p>	<p>The site is located entirely within Flood Zone 1, therefore no loss of fluvial flood storage will occur.</p>	<p>✓</p>
<p>For discharge to a watercourse, sewer or local authority asset, 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</p>	<p>Given the elevation of the site above the River Frome it is unlikely that a connection cannot be achieved. However we highlight that the applicant will need to give consideration to the impact of surcharged outfalls on the ability to discharge during flooding events when river levels may be high.</p> <p>18.7.23 If a connection to the highway drainage system is needed then the suitability and capacity of the system will need to be discussed with the Council's highways authority.</p> <p>13.10.23 The applicant will need to demonstrate the route of the existing highway drainage system.</p> <p>19.12.2023 A CCTV and Utility drawing has been issued .</p>	<p>✓</p>
<p>General</p>		
<p>If the development is to be delivered in phases, demonstration of proposed delivery and ability to maintain key design criteria</p>	<p>It is understood that these proposals relate to Phase 1 and a separate strategy may be used if the site is extended</p>	<p>✓</p>
<p>Exceedance</p>		
<p>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</p>	<p>The Flow Exceedance plan shows the alignment of the flow routes</p>	<p>✓</p>

Information required	Reviewer comments	✓ x
<p>Demonstration of how surface water that exceeds the capacity of drainage features will be managed within the site up to and including the 1 in 100 annual probability event to ensure no unacceptable flood risk to the development and no increased flood risk to people, property and infrastructure elsewhere</p>	<p>The submitted FRA discusses residual risks in terms of blockage or events that exceed the capacity of the design storm. Whilst these are valid and must be considered, we also highlight that consideration must also be given to events that exceed the inlet capacity of gullies or exceed the design capacity of below ground and above ground conveyance features.</p> <p>As part of the reserved matters application the applicant must demonstrate how temporary exceedance of inlet systems such as gullies is managed to allow water to enter the drainage system up to the 30 year event as minimum; and how exceedance of conveyance systems will be managed during events greater than the 30 year event to route overland flows towards the proposed attenuation basins – demonstrating that this water will not flow off site up to the 100 year + CC event.</p> <p>19.12.2023 This issue has been considered, although additional gullies will need to be provided on the drawings at a later stage</p>	<p>x</p>
<p>Access, adoption and maintenance</p>		
<p>Confirmation if access or works to third party land will be required and, if so, confirmation of the party with which agreement will be required</p>	<p>Access to third party land will be required to achieve connection to the River Frome. This is not discussed in detail in the submitted FRA. It is suggested that Welsh Water can assist with these connections. Confirmation of the approach and any agreements in principle with relevant land owners will be required as part of the reserved matters application.</p> <p>18.7.23 If the intent is to have the roads adopted by HC, then the surface water drainage will need to be maintained by a Statutory Authority such as Welsh Water or Albion Water or Ancala Water. Welsh Water do not adopt Balancing Ponds but the incoming surface water drainage network could be adopted by Welsh Water. Subject to discussion the pond could be adopted by HC or the Lugg Internal Drainage Board. Subject to discussion, it may be possible for the surface water drain downstream of the balancing pond (and the flow control) to be adopted by HC. However, easements would be required for access. HC cannot deliver a sewer requisition to allow the drain to be built. Accordingly, the applicant may need to consider approaching Albion Water or Ancala Water.</p> <p>19.12.2023 We understand the intent to provide crates below the basin so that the basin can be adopted by Welsh Water</p>	<p>x</p>
<p>Confirmation of proposed adoption and maintenance arrangements for the surface water drainage system</p>	<p>Proposed adoption of the drainage system has not been clarified. Welsh Water will not adopt above ground storage features, and would not adopt features that attenuate between the 30 year and 100 year events. If Welsh Water adoption of the below ground network is required, Herefordshire Council would be required to adopt the ponds. The applicant also references the option for third-party adoption by a management company. As the drainage strategy promotes discharge to a watercourse rather than public sewer then adoption by a management company could be acceptable if Welsh Water and Herefordshire Council cannot adopt the proposed drainage system. If adoption by Herefordshire Council is promoted, reference must be made to the Herefordshire SuDS Handbook.</p> <p>.19.12.2023 We understand the intent to provide crates below the basin so that the basin can be adopted by Welsh Water</p>	<p>x</p>

Information required	Reviewer comments	✓ ✗
Demonstration that appropriate access is available to maintain SuDS features (including pumping stations)	Review of the site layout indicates that access to SuDS features should be achievable. We stress that this must be demonstrated as part of the reserved matters application – noting that vehicular access must be available. If adoption by Herefordshire Council is promoted, reference must be made to the Herefordshire SuDS Handbook that clarifies maintenance requirements. We note that the pond would be on two staggered levels	✓

Foul Water Management Strategy

A foul water management strategy should be submitted that includes the following information:

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

Information required	Reviewers comments	✓ ✗
Description of the proposed foul water drainage system including proposed discharge locations	The Applicant proposes to discharge foul water to the nearby Welsh Water sewer network. The connection point is unclear.	✓
Identification of the public foul sewerage network within the vicinity of the development and assessment of the viability to connect to this network	The Applicant has been in contact with Welsh Water regarding the capacity of the network located to the south of the site. As the development is located on the periphery of Bromyard it is expected that a public sewerage connection is sought. Pumping to the Welsh Water sewerage network will be required.	✓
Discharge to sewerage network		
Demonstration that the suitability and capacity of the public sewerage system has been explored in consultation with the relevant authority, and that a viable connection can be made	Consultation has been undertaken with Welsh Water regarding the intended connection. Whilst this is acceptable in principle, Welsh Water has confirmed that there is currently insufficient capacity in the network to receive foul discharge from the development. It is understood that ongoing discussions are being held between Welsh Water and the applicant to agree the required upgrade works.	✓
General		
If the development is to be delivered in phases, demonstration of proposed delivery and ability to maintain key design criteria	It is understood that these proposals relate to Phase 1 and a separate strategy may be used if the site is extended	✓
Access, adoption and maintenance		
Confirmation if access or works to third party land will be required and, if so, confirmation of the party with which agreement will be required	It is unclear if access to third party land will be required, although it is considered likely that the connection to the public sewerage network can be achieved by the adopted road network and not via private land.	✓
Confirmation of proposed adoption and maintenance arrangements for the foul water drainage system	It is assumed that the foul drainage system will be adopted in its entirety by Welsh Water or another water company.	✓

Information required	Reviewers comments	✓ x
Demonstration that appropriate access is available to maintain drainage features (including pumping stations)	The Applicant will need to demonstrate that appropriate access is available for the foul water pumping stations. This can be demonstrated as part of the reserved matters application.	x

Overall Comment

APPROVAL

The drawings issued do not demonstrate that Pond 1 has been adequately sized to accommodate rainfall arising from the respective design storm referenced above. However, we accept that it should be possible to install geocellular crates to meet the design criteria described below.

Development sites usually increase the amount of impermeable area. This leads to an increased runoff rate.

At this site the proposed outfall is into a ditch upstream of the River Frome. The impact of an increased flow rate in the ditch could cause localised surface water flooding at the ditch, but this would be on a remote area of farmland.

The increased runoff rate leads to an increased volume of water being conveyed into the river in less time. This causes extra flow in the river. The implications are that downstream areas are more likely to flood. This cannot be allowed to happen. Accordingly, the SuDS should be designed to retain the extra runoff volume on the site during the respective rainstorms. This is why the National Standards for Peak Flow and Volume Control were introduced.

National Standards for Peak Flow and Volume Control

Peak flow control

S2 For Greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 100% Annual Exceedance Probability rainfall event and the 1% Annual Exceedance Probability rainfall event should never exceed the peak Greenfield runoff rate for the same event.

S3 For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 100% Annual Exceedance Probability rainfall event and the 1% Annual Exceedance Probability rainfall event must be as close as reasonably practicable to the Greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

Volume control

S4 Where reasonably practicable, for Greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1% Annual Exceedance Probability, 6 hour rainfall event should never exceed the Greenfield runoff volume for the same event.

S5 Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1% Annual Exceedance Probability, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the Greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event.

S6 Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with S4 or S5 above, the runoff volume must be discharged at a rate that does not adversely affect flood risk.

As explained above, although the Peak Flow Control is quoted in DEFRA literature, there would be no immediate implications to the residents of Bromyard if the peak flow in some rainstorms exceeded greenfield rates.

However, there would be increased flood risk if the Volume Criteria were not met.

We recognise that due to the inclined nature of the site it is difficult to design a Basin that can store a large amount of water. To meet both the Peak Flow Control and Volume Control criteria it would be necessary to store all water relating to a 100 year +CC storm and discharge it at a 2 year storm flow rate. Clearly this creates a large storage volume that would need to be accommodated in the pond.

The applicant has suggested using two or more flow controls, this concept is accepted subject to further discussion

The applicant has included a Sediment Treatment Proposals document in their submission. The basin is an integral component of the SuDS and it's use would improve water cleanliness. If the crates were used then details in this document would hold no meaning. However we understand that there are no SACs in the immediate vicinity of the site, however the issue of sediment transport needs to be considered.

We assume the intent is to present the entire surface water drainage system to Welsh Water for adoption.

Because there are no SuDS Approval Bodies (SABs) in England, Welsh Water have needed to alter their adoption strategy to accommodate below ground storage at drainage basins built in England. This is normally achieved by providing adoptable below ground storage (geocellular crates) located below a Dry Basin, sized to meet the 30 year storm criteria referenced in Sewers for Adoption. The dry basin is provided to facilitate the outstanding attenuation requirements up to the 100 year + Climate Change storm criteria

The Herefordshire SuDS Handbook explains that at Strategic Sites, an exemplar approach to the design of SuDS is required. Accordingly, site layouts should seek to incorporate green SuDS which mimic natural processes to clean water.

The original surface water attenuation proposals relied on the provision of a Drainage Basin that would store ALL stormwater to 100 years + Climate Change. Deviating from this design to rely on the provision of below ground storage would lead to the following :-

- During daily rainfall events, no water would collect in the Drainage Basin. The basin itself would remain dry and would only receive water once every few decades. This may have biodiversity implications and the vegetation shown on the landscape drawings would not grow
- The basin would not function as a Pollution Control feature (refer to the Herefordshire SuDS Handbook item 7.8).

The water companies that operate within England hold different approaches to adopting basins. We consider that it would be beneficial to engage with Welsh Water to explore opportunities to explore the concept of aligning their own adoption policies with recent changes made to adoption criteria by other companies.

Severn Trent have researched the legalities of defining a line on the base of the basin as a sewer. This allows them to adopt a strip along the base of the basin. Severn Trent hold access rights to desilt the base of the pond. Maintenance of the pond normally falls to the landowner or a private management company.

Recently the government has expressed their intent to implement Schedule 3 of the Flood and Water Management Act during 2024. This measure would create SABs in England. This may present a means for Local Authorities to receive funding to maintain basins.

As LLFA we recognise the impracticalities of seeking to deliver green SuDS on a sloping site. Owing to the isolated location of the outfall we can offer the applicant revised discharge criteria that could be used to develop an alternative design.

The revised design could feature below ground storage (possibly geocellular crates) uphill of the attenuation basin. These crates would need to be designed to fill up throughout a short duration rainstorm. Accordingly, a flow control would need to be selected to operate throughout the short duration rainstorm. A weir would allow incoming water arising from larger storms to cascade on into the basin. This would allow more water to be stored within the site.

We recognise that there is sufficient space within the open spaces to accommodate below ground storage.

The basin would then need to be designed allowing for a 1 in 3 slope, which may create more storage than the 1 in 4 slopes that have been proposed. As explained in our commentary we also consider the tall retaining wall to be a risk to all site users, so efforts would need to be made to reduce the likelihood of personnel injury arising from the inclusion of the wall. The applicant should also consider moving the pond towards the north west.

Subject to further design it may be possible to lower the discharge rate to the 30 year rate, which would mobilise more storage in the pond. The volumetric criteria for the 30 year and 100 year + CC storms would however need to be achieved

The submission included Section 38 drawings related to the proposed adoption of highways. As explained in our commentary the roads could only be adopted if all of the surface water sewers were adopted by a Water Authority.

In summary, we recognise the desire to ensure that the surface water drainage is adopted by Welsh Water. We recommend discussions are held with Welsh Water to establish whether changes can be made to their adoption policy. This may allow a design to be developed that utilises crates that are installed on higher land, so that the water all drains through the basin. The alternative would be to install the crates below the basin.

We recognise that the details presented for the outline submission require refinement, but in principle we can accept the proposal that this design can be delivered under a drainage condition. This drainage condition should include a focus on the desire to take all reasonable steps to facilitate a design utilising green SuDS.