

Ageas Bowl, Hampshire

Flood and Drainage Addendum

A Flood Risk Assessment (FRA) for the proposed development of the site at the Ageas Bowl (planning reference number F/22/93194) was provided by Andy Clay Consulting (ACC) in August 2022.

An updated FRA was provided in July 2023. The LPA are Eastleigh Borough Council (EBC) and the LLFA are Hampshire County Council (HCC). LPA and LLFA comments on the July 2023 FRA were received in November 2023.

For clarity and information, ACC is now operating as Sustain Environmental Ltd (SE). There is therefore consistency, as the previous works have informed the approach and information that has been provided in this Flood and Drainage Addendum.

The FRA included drainage design input from Tumu Consulting Ltd and also flood modelling input by Thomas Mackay Ltd. In response to the comments from the LPA and LLFA, this Flood and Drainage Addendum includes a slight update to the drainage design and landscape plans, as summarised below:

- **Appendix A1 to A4** – Drainage Network Calculations
- **Appendix B1 to B10** – Proposed Drainage Strategy
- **Appendix C1 to C4** – Drainage Catchment Areas
- **Appendix D1** – Surface Water Modelling Classification
- **Appendix E1 to E2** – Two-Stage Channel Layout and Sections
- **Appendix F1 to F8** – Pre- and Post-Development Exceedance Flows
- **Appendix G1** – Proposed Landscape Detail for Existing Lakes

This Flood and Drainage Addendum makes reference to the previous LLFA comments that were received on the August 2022 FRA and follow on FRA Addendum, included here as **Appendix H1**, and the more recent LLFA and LPA comments that were received on the July 2023 FRA, included here as **Appendix I1**.

The response has collated these comments under a number of headings and then provided a response, with the aim to reach a position of agreement.

Comment 1:

Flood and drainage input was provided from an early stage, with the aim to provide an integrated sustainable drainage solution that included landscaped SuDS features and that worked with the various site constraints; the existing hydrological features; and the aspirations of the proposed development.

An existing watercourse (Telegraph Brook) passes through the upper part of the site in a deep culverted section and which appears to be partially blocked at the culvert inlet (outside of the site boundary).

After the outlet from the culverted section, Telegraph Brook passes along the northern site boundary within a semi-natural channel; then into another culverted section; along a shallow graded and relatively featureless sleeper lined channel; and then into lakes in the lower part of the site.

The aim was to incorporate a surface water drainage strategy into the proposed development and improve the existing watercourse where possible. The drainage strategy has included a number of landscaped SuDS solutions together also with areas of permeable paving, a recognised sustainable drainage solution for providing source control.

In summary – we do not concur with the statement from the LLFA, as included in **Appendix I**, that: *“the layout was planned prior to a SuDS being designed (rather than the layout being led by conceptual SuDS planning) and therefore there are now limited opportunities to integrate SuDS throughout the development.”*

Comment 2:

As demonstrated in **Appendix I**, the LLFA have confirmed that the proposed development has met the water quality requirements of the SuDS Manual. However, the LLFA have advised that there are some parts of the proposed development where clarification is needed on the three natural forms of treatment to satisfy EBC’s Policy DM7.

The July 2023 FRA (Para 2.17) advised that the LLFA had agreed that the existing lakes could count as a naturalised form of treatment, although the FRA had noted that there are actually two separate lakes and a third lake that Telegraph Brook passes through prior to being discharged from the overall site.

After review of the previously submitted material, the July 2023 FRA (Para 2.28) advised that the LLFA had accepted the approach to enhance the existing watercourse and lakes.

The LLFA had previously suggested the following condition, as included in **Appendix H**, that:

“No development shall begin until a detailed surface water drainage scheme for the site, based on the principles within the Flood Risk Assessment and Addendums, has been submitted and approved in writing by the Local Planning Authority. The submitted details should include:

- a) A technical summary highlighting any changes to the design from that within the approved Flood Risk Assessment.*
- b) Confirmation that sufficient water quality measures have been included to satisfy the methodology in the CIRIA SuDS Manual C753.*
- c) Details of the Biodiverse Channel and Lakes identifying works proposed to enhance from the current situation and provide sufficient water quality benefits.”*

The July 2023 FRA (Para 6.30) advised that the existing lakes would be re-profiled slightly to accommodate the proposed development. In addition, the lakes would be enhanced by including areas around the edge with stepped banks with appropriate bankside planting to improve biodiversity.

The November 2023 LLFA comments advised that these modifications must form part of the drainage proposals and must be shown to be capable of acting as effective filtration components. However, the earlier response from the LLFA had suggested a condition for providing the details of these works to enhance the lakes, and which we consider to be appropriate.

We have however provided some additional landscape details in response to the request from the LLFA, included as **Appendix G**.

This shows how the northern bank of the existing lake could be re-profiled with a stepped bank and with areas for marginal planting. We would also consider the use of a floating island solution to provide additional biodiversity benefit, such as the FloraFloat plastic free floating islands available from Salix.

In terms of the drainage design detail associated with these works, we feel that this could be addressed as part of an appropriately worded condition, similar to what the LLFA had previously suggested.

Comment 3:

For the residential home, the LLFA advised that the green roof will provide good interception. The majority of the run-off from the roof and the surrounding area will then enter a permeable pavement prior to discharge into an existing surface water drain which continues in a north-east direction. The LLFA advised that this only provides one form of filtration, and does not satisfy EBC's Policy DM7.

To clarify, the drainage from the residential home discharges to a 600mm diameter pipe and then drains north-east towards the lakes, as described above. The lakes would therefore provide additional biodiversity benefit and natural filtration. We would also suggest that rain gardens could be incorporated into the building design, at detailed design stage, to provide additional biodiversity benefit and natural filtration.

In terms of the drainage design detail associated with these works, we feel that this could be addressed as part of an appropriately worded condition, similar to what the LLFA had previously suggested.

Comment 4:

There are three sections of pipe within the surface water drainage strategy that the LLFA have identified and asked if they could instead be open drainage channels, as shown in **Figure 1**.

We have taken a look at the viability of completing this, and unfortunately the depth to the invert levels of the pipes is the main constraint to providing open drainage channels.

Given the requirement to provide 1:3 bank side slopes and with the depth of these pipes, this would require a wide grading to be included either side of any potential open flow channel. This would result in the loss of an area of accessible public open space where benches are currently proposed.

We do not therefore feel that this is viable and the best overall solution for the proposed development.

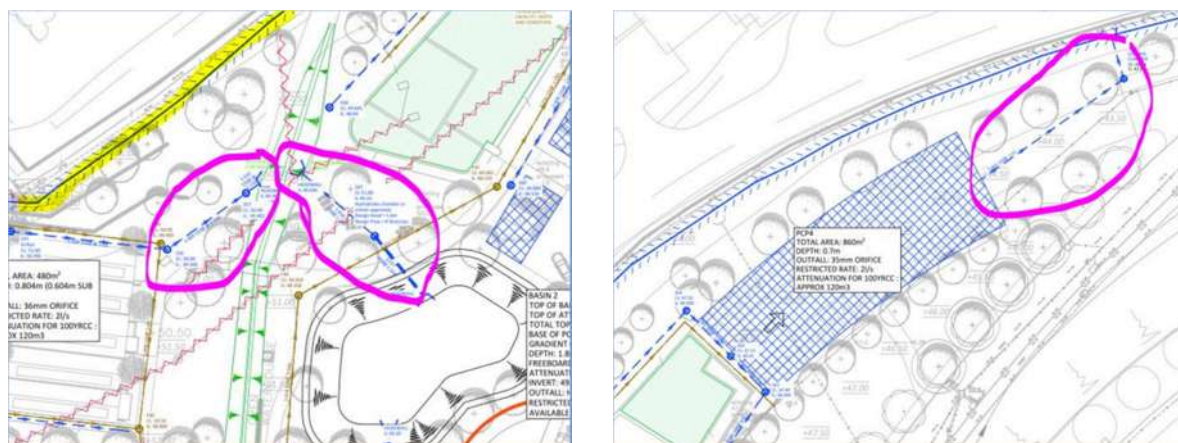


Figure 1 – Sections of Pipe Identified by the LLFA

Comment 5:

The LLFA make reference to a drainage pipe which they highlighted in yellow on **Figure 2**, and advise that this is a new surface water drain but that it does not pass through any form of filtration.

Drainage from the residential home discharges to a 600mm diameter pipe and then drains north-east towards the lakes, as described above. The lakes would therefore provide additional biodiversity benefit and natural filtration. We would also suggest that rain gardens could be incorporated into the building design, at detailed design stage, to provide additional biodiversity benefit and natural filtration.

The LLFA also advise that it was unclear where the surface water pipe marked with a pink X is from. The annotation on the drainage plan clarifies this (as shown on **Figure 2**). It is an existing land drain that is to be diverted, but with the lower section continuing to drain as it does at present (i.e. into the lakes).

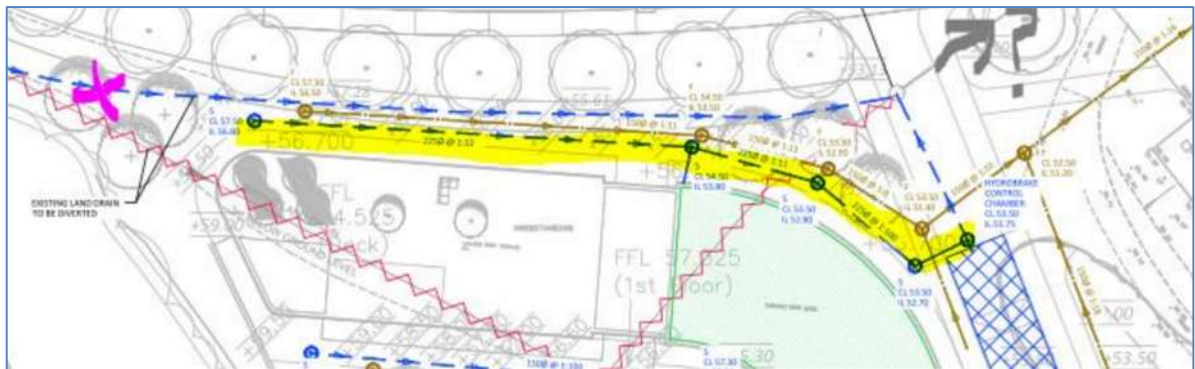


Figure 2 – Section of Pipe Identified by the LLFA

Comment 6:

The LLFA asked whether a site investigation of the car park has been carried out to establish the groundwater level to ensure there is a sufficient depth of unsaturated substrate. The LLFA also asked if the existing substrate meet the required design specifications for infiltration (soil with a good attenuation potential of at least 3000mm in depth) or whether replacement substrate proposed.

A ground investigation has not been completed for this application. However, the proposals are to leave the ground surface as close to existing as possible and to limit the development in this area. To replace the existing soil would work against this approach and would not be a viable or sustainable solution.

The July 2023 FRA (Para 6.32) advised that the surface of the overflow car park is to be reinforced using a geogrid, allowing water to continue to drain naturally. A reinforced gravel path would cross the car park. A gravel filled filter drain would also be located around the north-eastern and eastern periphery of the car park. Water would pass through this filter drain, and then out to the existing drainage channel.

The proposals are to limit development by using only a reinforced geogrid to an area which will largely be unused (i.e. an occasional overflow carpark). It is suggested that any surface water flows in excess of this will be picked up by the gravel filled drains that have been introduced.

In terms of the drainage design detail associated with these works, we feel that this could be addressed as part of an appropriately worded condition, similar to what the LLFA had previously suggested.

Comment 7:

The LLFA provided some comments on the detail of the surface water drainage strategy, such as requesting the addition of sediment traps.

The notation of types of chamber at this stage is considered to be detailed design, and ordinarily this would be provided as part of the detailed drainage design. However, as requested we have brought silt traps into the updated drainage strategy plans, included as **Appendix B**.

Comment 8:

The LPA advised that the: *“basins look like engineer led structures that do not fit within open spaces where their value for amenity and biodiversity is also important alongside managing water quantity and improving water quality.”*

Detention basins were included in the drainage strategy, as these are recognised as a sustainable and landscaped drainage solution for managing surface water runoff. There are design requirements that these detention basins must adhere to for them to provide the required benefit for surface water runoff, which is the primary reason for their inclusion in the layout.

As advised in the July 2023 FRA (Para 7.26), the drainage strategy would provide additional community and environmental benefits, in particular to landscape amenity, ecology, biodiversity and water quality.

The July 2023 FRA (Para 6.24) advised that detention basins would be included within the layout, and provided an extract from the SuDS Manual of a typical detention basin.

In terms of the drainage design, we do agree that there is an opportunity to provide additional benefit with the profile of the basins and therefore propose over-deepening a section at the base of the detention basins adjacent to the outfall. This would result in a part of the detention basins, in addition to the part that has been included for providing attenuation, which would be more frequently wetted.

These parts of the detention basins would therefore be more like a pond, and would be appropriately planted and managed as part of the SuDS operation and maintenance plan. We have brought these detention basins pond areas into the updated drainage strategy plans, included as **Appendix B**.

Summary:

This Flood and Drainage Addendum has been provided in response to the comments raised in November 2023 by the LPA and LLFA on the July 2023 FRA, included here as **Appendix I**.

The LPA and LLFA comments have been collated under a number of headings and with a response and where required additional information provided, with the aim to reach a position of agreement.

This includes a slight update to the drainage strategy plans, included as **Appendix A to F**, and some additional details on the proposed landscaping of the existing lakes, included as **Appendix G**.

After review of the previous material, the LLFA had accepted the approach to enhance the existing watercourse and lakes and previously provided a planning condition, included here as **Appendix H**. This advised that a detailed drainage scheme would need to be provided before development can begin.

In terms of the drainage design detail associated with these works, we feel that this could be addressed as part of an appropriately worded condition, similar to what the LLFA had previously suggested.