

Daphney Haywood
Planning Development Service
Havant Borough Council
Public Service Plaza,
Civic Centre Road
Havant, Hants
PO9 2AX

MJA Ref: SS/19:0693/5992
HCC Ref: SWM/2019/0353
Email: stewarts@mjaconsulting.co.uk

14th November 2019

Dear Daphney,

Response 3: 50 new dwellings together with access, landscaping and open space at Land at Lower Road, Havant, Bedhampton. APP/19/00427

We refer to your comments in regards to the planning application for the above scheme. This letter considers the drainage related comments made on the 1st November 2019. For convenience the responses are set out below, in the same order as the comments were made, whilst the corresponding responses are shown in bold text.

- *Please provide the attenuation volumes for the proposed drainage system.*

The western pond has a storage volume shown within drawing 5992:P01 Rev. B, however no volume has been provided for the eastern pond, please provide this information.

This figure applied to the joint storage volume of both ponds. The pond volumes and areas have been updated and are now clarified in 5992:P01 Rev. D.

- *Evidence that the applicant understands the sensitivity of discharge points relating to the receiving water body.*

Please provide confirmation of the acceptability of the proposed infiltration system by the Environment Agency and its potential impact in aquifers in the area.

Please see correspondence between Bargate Homes, CEP and Stuart Deacon of the EA where he states he is happy with the outline drainage approach.

Provide zone of influence drawings/assessment to demonstrate there is sufficient space between the deep borehole soakaways and there is no detrimental effect on the infiltration rate due to the close proximity of the boreholes.

The boreholes have been separated to 5m apart. The CIRIA and BRE 365 guidance recommends this distance when considering the zone of saturation in relation to foundations and is considered an appropriate separation for these boreholes.



- Information evidencing that the correct level of water treatment exists in the system in accordance with the Ciria SuDS Manual C753.

In addition to the information submitted, please provide details of the treatment level provided by the "Multi-stage Treatment Filter" from Hydro International including the CIRIA Simple Approach Index provided by the unit.

Please see the attached Up-Flo data sheet. The attached FRA and SUDS Management and Maintenance Plan Rev B further details the Up-Flo filter.

Where infiltration is used for drainage, evidence that a suitable number of infiltration tests have been completed. These need to be across the whole site; within different geologies and to a similar depth to the proposed infiltration devices. Tests must be completed according to the BRE 365 method.

In addition, please provide testing demonstrating the suitability for the deep borehole infiltration.

The Flood Risk Assessment & Development Drainage Strategy states "falling head tests in boreholes circa 14-15m below ground level showed higher soakage rates of 1.4×10^{-4} m/s has been obtained, likely due to fissures in the chalk. Please demonstrate how these rates have been derived.

Please see falling head test sheets.

- Provide data confirming the strata at the proposed infiltration depth.

Please see falling head test sheets and borehole logs.

- Provide an assessment demonstrating the deep boreholes are the only viable drainage outflow solution.

The Building Regulations Document H (2015) details the appropriate hierarchy of potential methods for disposing surface water from a development:

1. A soakaway or some other adequate infiltration system, or where that is not practicable;
2. A watercourse, or where that is not possible;
3. A sewer.

Soil permeability rates for the superficial clay are insufficient to use conventional infiltration methods for disposing the surface water runoff generated from the proposed development. There are no watercourses within the vicinity of the development site.

This site lies with Portsmouth Water's service region. With reference to sewer records, there are dedicated surface water sewers along the northern boundary of the site but would require pumping to reach them.

Therefore, infiltration via boreholes has been chosen in accordance with building regulations.

- The site is within a Major Aquifer High groundwater vulnerability zone. Please Provide evidence to demonstrate that the design includes a minimum of 1m unsaturated depth of aquifer material between the infiltration surface and the maximum likely groundwater level.

The Environment Agency has confirmed that discharge directly into the groundwater is acceptable in this instance. Please see correspondence between Bargate Homes, CEP and Stuart Deacon of the EA where he states he is happy with the outline drainage approach and requests a syphon head on the boreholes as further water quality mitigation.



- Evidence that enough storage/attenuation has been provided without increasing the runoff rate or volume. This must be shown for a 1 in 100 year plus climate change event.

The volume required on site to store the 1:100year + 40% climate change + 10% urban creep event is 1718m³. Hydrobrake will limited flows to 1.5l/s before out-falling to the deep borehole soakaways. Please see attached calculations.

Please provide MicroDrainage output showing what modelled pond volume has been used as this has not been shown within the current MicroDrainage output.

Please see attached MicroDrainage Calculations.

Provide unit type, and sizing for the Upflow unit and show it is sized adequately for the area it is draining.

The technical information on Hydro-Internationals website shows that the standard manhole unit will be sufficient for the site.

Technical information

Model	Chamber size (m)	Number of filter modules	Treatment flow rate (L/s) ¹	Hydraulic capacity (L/s) ²	Operating head (mm) ³	Oil storage capacity (L)	Sediment storage capacity (m ³)
Manhole	1.2 m	1-6	1.3-7.8	170	750	190	0.7
Vault	Site-specific	7-19	7.8-24.7	170	750	Site-specific	Site-specific

Notes

1. Treatment flow rates based on >80% removal of Sil-Co-Sil 106 fine sand and silt ($D_{50} = 22 \mu\text{m}$)
2. Maximum flow rate that can pass through the chamber without surcharge to the upstream network
3. Driving head for filter media

- Exceedance flows are considered in the event of the pipe being non-operational. Evidence that exceedance flows and runoff in excess of design criteria have been considered. Calculations and plans should be provided to show where above the ground flooding might occur and where this will pool and flow. This should include flooding depths and volumes. Please provide a drawing showing exceedance flow routes and depths.

Please see MicroDrainage calculations and exceedance flow plan. The site has been modelled so there is no flooding onsite during the 1:100 year +40% climate change +10% urban creep.

- Maintenance regimes of the entire surface water drainage system including individual SuDS features, including a plan illustrating the organisation responsible for each element. Evidence that those responsible/adopting bodies are in discussion with the developer. For larger/phased sites, we need to see evidence of measures taken to protect and ensure continued operation of drainage features during construction.

Some information has already been provided, please also provide details of who will maintain the system once it is built and in operation and details of the maintenance/inspection regime for the proposed deep borehole soakaway and the "multi-stage treatment filter from Hydro International.

Please see SuDS Management and Maintenance Plan.



A penstock is now shown within the proposals. Due to the sensitivity of discharging to a deep borehole soakaway, please provide details of what the procedure would be to ensure an oil/contamination spillage is promptly dealt with and the penstock shut-down mechanism activated to prevent and contamination from reaching the borehole.

Please see SuDS Management and Maintenance Plan.

The maintenance strategy makes reference to Buckinghamshire County Council, please ensure references are updated.

This has been updated.

- *The 'Flood Risk Assessment & Development Drainage Strategy' report states "With reference to the Portsmouth Water flood register; there have been no recorded incidents of flooding from the existing foul or surface water sewers or potable water mains" please provide a copy of the Portsmouth Water/Southern Water response.*

This information was actually taken from the local SFRA's and PFRA's and not the DG5 registers. This is a miss print. However, these documents show no flooding within the area of the development. This reference has been updated within the FRA.

- *Drawing 5992:P01 Rev.B shows the incoming swale entering the pond adjacent to the outfall into the reed bed, which could reduce treatment time at the pond. Consider moving the swale entry point away from the outfall into the reed bed system.*

This outfall headwall has been moved to reflect this concern.

Please also confirm whether the western pond will have any flow restriction devices to ensure surface water has enough treatment time at the pond discharge prior to discharging to the reed bed system.

No. The swales/linear filter trenches, reed bed and Up-Flo filter will provide more than sufficient treatment of the surface water runoff.

Drawing "5992:P01 Rev. B" Drainage Strategy Layout shows a different layout for the proposed deep borehole soakaways than that shown within drawing "5992:P03 Rev." Please clarify which of the two is the correct layout.

Please see updated drawings that accompany this letter for the most up-to-date drawings.

Provide a long-section showing the levels through the pond.

Please see drawing number 5992:P11A.

Please confirm whether the top layer of the infiltration borehole will be sealed and whether there is any screening in place to prevent entry of the debris into the borehole.

The borehole has a raised syphon inlet and sump, as instructed by the EA.

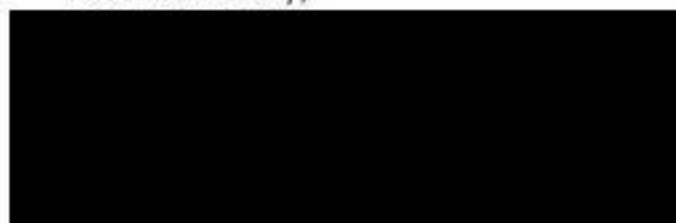
Please confirm how the maintenance vehicles will be able to access the boreholes, ponds, Upflo filter, reed bed and penstock valve.

There is an emergency access which runs down the eastern and southern boundaries. Access to all of these drainage and SuDs features can be achieved via this 6m wide road.



I trust that the above and enclosed provides you with sufficient information for your purposes. If you need any more details please do not hesitate to contact us.

Yours sincerely,



Stewart Smith
Drainage Engineer
FOR MJA CONSULTING

