

At this stage we **would not recommend discharge of conditions** until the following comments are addressed.

1. The proposed drainage is reliant on a connection to a surface water sewer which shows characteristics consistent with it being an error on Southern Waters mapping system. As a result, we would request the applicant confirms the drainage network in this location with a survey.
 - An adjacent application included a diversion of the foul sewer network in this area, however, the large surface water pipe shown on the Southern Water records was not included on Southern Waters mapping at this time, it was also not part of those proposals, providing further evidence that it may be an error.
 - We believe the Southern Water mapping is erroneous and that this error has significant implications for the delivery of the drainage system, as shown on the drainage plans provided.
 - We require evidence from the applicant that the outfall intended for use does actually exist as shown on the drainage plans and is not an error on the mapping.
 - Notwithstanding this, even if the network is shown as Southern Water indicate, we would refuse a connection into the large surface water pipe as currently shown, as it appears that this pipe discharges directly into the adjacent foul network. Consequently, revisions to the point of connection between the site and public sewer system are likely to be required.
 - Please note we will not accept direct or indirect connections to the foul sewer network, as there are alternate dedicated surface water sewers and infrastructure in this area.
2. If a surface water connection to the public sewer is proposed the applicant should confirm whether there is sufficient capacity available for the proposed additional flows. If insufficient capacity is available, an agreement must be made to undertake any necessary upgrade works and evidence provided by the applicant to demonstrate that the proposals will not increase the risk of flooding in the surrounding area.
 - If surveys and calculations show that the new development will not discharge runoff at a higher rate than the existing developed site to the combined or surface water sewer network, then the capacity information stated above is not required.
3. If the sewer network is as shown on the mapping (i.e. combined with the foul wastewater and surface water networks linked together), a non-return/check valve will be required to prevent the backflow of sewage into the storage system and drainage network.
 - Note this comment has been provided in the eventuality that our assumptions in comment 1 is shown to be incorrect.
4. Additional information is required on the design drawings.
 - The type of geotextile membrane (impermeable or permeable) should be stated on the retention system section drawing.
 - Details of the proposed flow control device should be provided.
5. Groundwater levels at the site have only been confirmed by a single test that showed levels to be 1.1m BGL.
 - A plan showing the location of this test pit should be provided.

- Additional groundwater monitoring results over the winter period should be provided. Considering the location of the site in relation to the coastal plain, where tidal influence may be present, we would request specific monitoring, rather than spot heights.
 - The 1m easement traditionally required between the base of SuDS and the groundwater table does not apply on the Arun District coastal plain. As a result, the applicant should explore the use of infiltration SuDS further.
6. Infiltration test results should be provided to accompany the application. These should be undertaken in accordance with BRE365.
 - This infiltration testing is required to confirm that infiltration rates at this location are sufficient to allow for runoff from the proposed carparking to discharge to the ground as designed.
 - Infiltration testing is also required due to the potential for utilising infiltration SuDS at this location - noting Arun District Council's view on the 1m easement to the maximum groundwater level on the coastal plain discussed in point 5.
 7. The Type 1 sub-base proposed for the carparking needs to be replaced by an aggregate with a low content on fine material, e.g. Type 3 aggregate to ensure sufficient infiltration occurs.
 8. Greenfield runoff rate calculations should be provided.
 - These calculations should be undertaken using the same source of data as used for the design calculations.
 9. Calculations for the 1:2, 1:10, 1:30 year return period rainfall events should also be provided.
 10. Justification for limiting the discharge rate to 2.5l/s should be provided.
 - Typically rates of 1.0 - 2.0 l/s are achievable without significantly increasing the risk of blockage, e.g. specifying orifices less than 75mm diameter. The applicant should justify why in this case the minimum discharge rate of 2.5l/s and orifice of 84mm is required.
 - It is recognised that if unachievable and justifiable, 2.5l/s would be considered acceptable given the existing site is partly developed.
 11. The inlets into the geo-cellular storage tank must be designed to ensure they are above the maximum water level in the tank during the critical duration storm with a 1:10 year return period. The section drawing of the attenuation tank, and invert levels on the drainage drawing suggest this has not been achieved.
 12. If the drainage calculations only account for runoff draining from impermeable surfaces, then the calculations should use a CV of 1.0.
 - The requirement to use CV 1.0 is based on recent clarifications from HR Wallingford which suggest the values of 0.84 and 0.75 often used are in error and confirm that a value of CV = 1 should be used in situations where runoff from only the impermeable areas is considered.
 - It is noted that CV 1.0 is only considered applicable to the sizing of the SuDS, and pipework may still be designed to lower values.
 13. Buoyancy calculations should be provided for the tank, permeable surfacing systems and all elements of the drainage system located below the groundwater table.
 - Even in the event that the worst case groundwater level is assumed to be 1.1m BGL, the base of the tank is shown to be almost at, or below the water table.

- These calculations should be based on the results from winter groundwater monitoring in order to ensure the worst-case seasonal groundwater level is considered.
14. The pipe between MH11 and MH10 is shown to drain uphill. This should be corrected.
 15. Water quality criteria have not been met. Information on the water treatment provided by the scheme should be provided.
 16. An exceedance flow route plan should be included. This plan should show the locations where flooding is most likely to occur if the design rainfall event is exceeded, or if a blockage of the flow control device was to occur.
 17. If infiltration SuDS are used, the impact of runoff infiltrating into the ground through the proposed SuDS (at present mainly the permeable carparks) should be assessed to ensure that it has no impacts on the underlying archaeology at the site. A statement to confirm this should be provided.
 18. The crate type and manufacturer specification should be provided.
 19. Catchpits should be included within the design (upstream of the geo-cellular storage tank), and design details provided.
 20. We are pleased to see a bespoke maintenance document has been provided and the applicant has considered maintenance of the SuDS and drainage across the site.
 - Details of how the geo-cellular storage tank will be inspected during maintenance should be provided, e.g. will this be undertaken by CCTV drainage survey similar to the pipework?, or will the tank include access covers for visual inspection?
 - Details of any inspections to be carried out between construction and handover to the site owner should be provided, e.g. confirmation that a survey of the geo-cellular storage system will be undertaken to ensure silt is not present prior to the handover.
 - Measures to prevent silt entering the geo-cellular storage tank should be included within the design and frequencies should be stated.
 - The drainage layout plan should be appended to the maintenance document upon final issue to the site owners, note that this is not required at this time, as the drawing has been submitted alongside this application.
 21. If the non-return valve is determined to be necessary, the design should be tested against the possibility of the system becoming hydraulically blocked by the sewer network becoming surcharged.
 - Sewerage infrastructure is not typically designed to manage the 1:100-year return period rainfall event and therefore, the sewer system is likely to surcharge during such an extreme event. Where this could result in backflow into onsite storage systems, we request that non-return valves/check valves are used to prevent this backflow. Where non-return valves are required, onsite SuDS should be sized to accommodate additional runoff if the outlet is surcharged.
 - Overflow systems can be used as an alternative, but will require justification and are subject to approval.
 22. We note that the 'sump available' option has been used in the drainage model/calculations. If a Hydro-Brake with sump available is specified, as is indicated by the results sheets submitted, this sump will need to be included on the detailed drainage drawings.