

C1967 The Grange, Westergate (Designer reply in red)

Engineers Comments Regarding Surface Water Drainage - Condition 10

Thank you for consulting us on this DOC submission. I have picked up on the following points that require further explanation, adjustment or detail:

1. The infiltration rate calculations use an ap50 value of 0.93m². This value should be 1.08m² on the basis of the trial pit dimensions provided. The correct value will decrease the infiltration rate for the design. Please adjust accordingly.

Please find attached the updated infiltration calculations.

2. Please include a scale bar on the drainage layout so impermeable areas and diffuser distances from structures can be checked. Alternatively please show measurements for the same purpose.

Please find updated drawing attached

3. The design calculations require adjustment in addition to the infiltration rate adjustment mentioned in point 2:
 - a. 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.

Please see the updated drainage plan and drainage calculations attached.

- b. A 20m³ per ha additional storage volume is shown, which is not included within the design. A justification for this value should be provided, or this value reduced to 0.

Please find the updated drainage calculations attached.

- c. A Ratio-R of 0.400 has been used, this needs to be reduced to reflect the FSR map for the area.

The ratio-R of 0.4 has been taken using UKSuds map and is correct for the postcode: PO20 3SQ

- d. Enforce best practice design rules has been crossed, please correct.

Please find the updated drainage calculations attached.

- e. Both base and side infiltration have been allowed for, please only utilise the base.

Please find the updated drainage calculations attached. Can we have a short explanation why the side infiltration should be excluded?

- f. The total impermeable area in the report is listed as 0.083ha but the calculations use an impermeable area of 0.081ha.

Please find the updated drainage calculations attached.

- g. Please supply the calculations for the 1 in 10 year + 40% event.

Please find the updated drainage calculations attached.

- h. The permeable paving invert level is set to 0.380, yet formation level is shown as 9.370 on the drainage layout. The value of 9.370 corresponds with the formation shown in the construction details, therefore please correct the calculations to reflect this.

The proposed voided subbase has been updated and is now 375mm thick so the permeable paving subbase IL is now set as: 9.320

- i. Slope is listed as 1:800 but on the drainage layout it is stated that sub base is laid at 1:500. Please correct.

Please find the updated drainage calculations attached. It is proposed that voided subbase is now laid flat.

- j. The safety factor can be reduced to 3 on the basis of minor inconvenience (surface water on carpark) as a consequence of failure, with a Cv of 1 for an impermeable area of <1000m².

Please find the updated drainage calculations attached.

- k. Please include a 10% allowance for urban creep.

Please note that Arun DC 'Supplementary requirement for surface water drainage proposal' required the addition 10% allowance for urban creep for the major application. Whilst the proposed development is classified as minor application is this still required?

A second design check will be required on the back of these alterations and there may be further comments following an updated design and calculations.

4. Drainage layout

- a. Please include pipe gradients.
- b. Diffuser blocks should be set above the 1 in 10 year +40% critical storm event. They are currently set below the formation level of the permeable paving (diffuser inverts at 9.350 – permeable paving formation at 9.370). These should also be located a minimum of 5m from all controlled structures, see point 3. Please correct.

The proposed diffuser block has been relocated minimum 5m away from the proposed structures. The proposed diffuser tanks act as an outlet (discharge) connection into the subbase formation. We do understand that incoming pipe IL should be set above the 1 in 10 year + 40% CC level for the traditional soakaway system, however the proposed surface water runoff will be discharged into the voided subbase and therefore to achieve this, the proposed subbase IL will need to be dropped by approx. 300mm. This will make the proposed subbase 600mm deep and due to the associated costs not viable. We could propose using a traditional soakaway system however, noting the groundwater levels surface water runoff will therefore need to be attenuated and discharged into the onsite foul drainage system. By doing this, there is a risk of the proposed SW discharge into foul drainage network being refused by statutory undertaker.

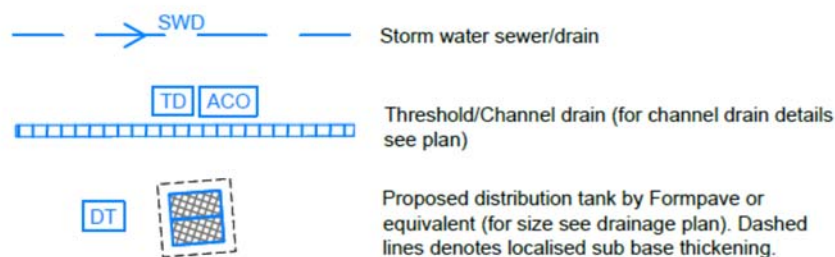
The proposed drainage system has been designed so the surface water level for the 1 in 10 years + 40% is below the proposed access points (rodding eye) ILs.

Furthermore, the proposed FFL has been set at min. 300mm above the top of the proposed voided subbase and the maximum surface water level for the 1 in 100-year rainfall event + 40%CC + 10% UC.

- c. It is not clear why there are apparently random dotted lines on the drainage layout, please can their use be clarified or they be removed.

The dotted lines on the drainage layout around the diffuser tanks are indicated on drainage legend.

PROPOSED FEATURES



- d. Please detail sump depths for catchpits.
5. Please amend Typical distribution Tank Outflow Detail to show all diffuser blocks above the 1 in 10 year + 40% critical event as per point 5b.

See 4b reply.

The use of FEH rainfall data would be preferred, however, in this case due to the small scale of the proposed development, FSR rainfall is considered acceptable.

It is also noted that recent changes have been made to climate change allowances (May 2022). As this proposal was submitted prior to these changes being made, this does not need to be considered as part of this submission.

On the basis of the above it is not recommended that Condition 10 imposed under AL/28/21/PL is discharged at this time. A second design check will be required on the back of these alterations and there may be further comments following an updated design and calculations. Please reconsult me once further information and detail has been provided.