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From: Sarah Burrow <Sarah.Burrow@arun.gov.uk>

Sent: Monday, November 14, 2022 7:57 AM

To: Kyanna Hodge [REDACTED]
[REDACTED]

Subject: RE: 23452 Stakers Farm, Yapton - Y/52/22/DOC Designers Response

Hi Kyanna,

Thank you for your email. These documents and your response need to be uploaded to the application via planning. The planning officer, Maria (now copied in) will then reconsult us and I can refer everything back to the same engineer who did the original review.

Kind regards

Sarah Burrow
Engineering Assistant, Coastal Engineers and Flood Prevention
[REDACTED]

Usual working pattern: 8am – 2:30pm Monday to Friday

Arun District Council, Civic Centre, Maltravers Rd
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From: Kyanna Hodge [REDACTED]

Sent: 11 November 2022 17:06

To: Sarah Burrow <Sarah.Burrow@arun.gov.uk>
[REDACTED]

Subject: 23452 Stakers Farm, Yapton - Y/52/22/DOC Designers Response

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Hi Sarah

Further to LLFA Response dated 20 September 2022 for information on the Discharge of Condition application Y/52/22/DOC, we have attached updated drainage drawing 201A_Proposed Drainage Plan together with revised calculations and construction details based on the comments received.

We reply to the following responses below in green as follows:

All changes agreed below have been updated under the new Discharge of Condition Application [Y/107/21/PL](#).

Engineers Comments Regarding Surface Water Drainage

Please see the response below prepared by our external consultant. I apologise for the delay in our consultation.

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

1. Additional information is required on the design drawings.
 - The invert level for the diffusion boxes has been provided, however, we request that the invert levels of the paving sub-base / bed levels are also provided in these locations, as the section drawing shows these to be different. This is also being requested to enable us to check that the diffusion boxes are located above the critical 1:10 (+40% climate change) water level within the sub-base. Without these values insufficient information is available to confirm that the peak water level within the paving sub-base will be contained within the sub-base. The paving subbase formation level is 5.970m for the northern area and 5.400m for the southern area as shown on the drainage drawing 201A, copy attached. The design is not based on infiltration to ground and there is no requirement within Arun District Council Guidance or National Planning Practice Guidance for distribution tanks to be located above the 1 in 10 year storm event for storage systems.
 - Service corridors for other services provided to the buildings should be shown, or a statement provided detailing how these will be successfully implemented within the scheme. Service trench corridors have been included within the drainage strategy noted on drawing 201A, copy attached.
 - The Hydro-Brake manhole is deeper than 1m, building regulations recommends manholes of this depth to have rungs or a ladder, which is not shown on the cross-section drawing. Justification for why this has not been shown should be provided, or the drawings updated accordingly. Construction details have been updated, hydrobrakes are proposed at less than 1m in depth, please see drawings 501B_Proposed Construction Details and 201A_Proposed Drainage Plan
2. 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. Calculations have been updated to use a CV value of 1 and a factor of safety of 1.5 which is in accordance with Arun District Council's Surface Water Drainage Proposal Checklist Factor of Safety Table, a copy of the updated calculations are attached.
 - 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. Noted
3. The drainage calculations include a 20m³ per ha additional storage volume, which is not included within the design. A justification for this value should be provided, or this value reduced to 0. 20m³ per hectare accounts for the additional storage within gully pots and lateral drains, this has however been set to 0 as requested which is noted on page 1 of the updated calculations, a copy is attached.
4. The applicant should explore the potential to connect into the existing highway drainage network, prior to proceeding with the proposed connection to the public foul sewer system, which should be taken as a last resort. We require confirmation of approval for any highway or sewer connection.

- We appreciate a reduction in flows has been achieved, however, we need to see agreement with Southern Water for any connection to the public sewer system. In this case, we also note our mapping shows a surface water highway drain on the opposite side of the road to the proposed development, which would present a preferred point for discharge in our hierarchy of discharge options. We therefore require:
 - The design to be amended so that runoff is discharged into the highway drainage network, alongside an agreement with West Sussex Highways for this connection. Approval for a connection to West Sussex existing highway drainage has been requested, however, as there are no surface water sewers within the area, it is likely that the highway drain either discharges to the public foul sewer or to a soakaway. If it is to a soakaway, there will be no capacity to accommodate additional surface water drainage from the site. If it is to a foul sewer, we would propose a direct connection as indicated on the submitted drawings

Or

- Justification for why a highway connection is not possible, (e.g. confirmation from Highways that they will not permit a connection in this area) and an agreement with the sewerage undertaker for the proposed connection.
- This is particularly important as the development site is located within the Lidsey treatment catchment. Highway approval has been requested, although we note there is no right of connection to a highway drain. Southern Water has a statutory duty to accept surface water into the public foul sewer provided that the options for discharge from the drainage hierarchy have been followed. There is therefore a connection available for the surface water discharge from the site and the connection should be discharged.
- 5. The applicant should be aware that if the base of the permeable paving sub-base needs to increase, such that it intersects the water table, measures will need to be put in place to prevent the discharge of groundwater to the highway drainage network, or public sewer system. This is likely to require tanking the permeable sub-base, in which case, buoyancy calculations for the permeable paving system will be required.
- We are concerned that the use of Type B drainage system (infiltration and overflows to the sewer system or highway drainage network) could create a new pathway for groundwater to enter the existing drainage network. This is likely to be a major concern for both the sewerage undertaker and highways in regard to permitting any offsite discharge, due to existing groundwater ingress within this catchment. On this basis, we would permit the tanking of the permeable sub-base, should this become an issue. However, we would require buoyancy calculations to demonstrate that the system will not become buoyant if groundwater levels were to become elevated. All permeable paving is proposed to be tanked and there will not be any route for groundwater to enter any drainage system. The density of the stone used in the subbase is 2,700 kg/m³. The equivalent density of the stone subbase with 30% voids is 1,800kg/m³. The density of water is 1,000kg/m³. The voided stone subbase has a greater mass by volume than that of the water displaced. I.e. the downward force created by the stone will always be greater than the upward force of groundwater even assuming it were at ground level. There is no possibility of the stone subbase becoming buoyant.
- 6. The drainage calculations should typically include an allowance for urban creep. In this case, we are satisfied that there are limited opportunities for including additional hardstanding, however, the applicant should provide a justification for its exclusion within the report or calculations. 10% Urban creep has been included within the calculations. The impermeable area of the proposed roofs is 715m² and with 10% urban creep of the roofs of 72m², the total area used for the roof is 787m² and the area for the carpark used is 1000m². The total area used for the calculations including the urban creep is 1787 m² or 0.179ha as shown on drawing 103A__Impermeable Areas Plan and the updated calculations.

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

Trust that the information supplied is now sufficient, any queries please do let us know.

Kind Regards,
Kyanna

Kyanna Hodge
[REDACTED]



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