

From: Amanda Scholes on behalf of Planning.Responses
Sent: 11 November 2020 10:43
To: Planning Scanning
Subject: FW: FW: A/109/20/RES - Land South of Water Lane, Angmering - revised drainage plans
Attachments: 2020-11-10 Arun Detailed Drainage Comments.pdf

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Save the environment - think before you print.

From: Laura Gibbons <laura.gibbons@adur-worthing.gov.uk>
Sent: 10 November 2020 14:15
To: Planning.Responses <Planning.Responses@arun.gov.uk>
Cc: Paul Cann <Paul.Cann@arun.gov.uk>; Michael Eastham <Michael.Eastham@arun.gov.uk>
Subject: Re: FW: A/109/20/RES - Land South of Water Lane, Angmering - revised drainage plans

Michael,

Thank you for re-consulting us regarding land south of water lane. Progress has been made on overcoming our holding objection. However, at this time it still remains.

To summarise evidence needs to be submitted regarding:

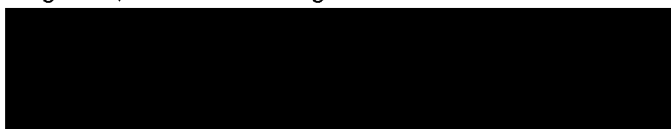
- groundwater levels at the northern basin,
- the applicants use of cv,
- how water will be retained safely on site for all events up to and including the 1 in 100 year plus 40% climate change event (with appropriate urban creep applied).

Please see attached for our detailed comments on this application.

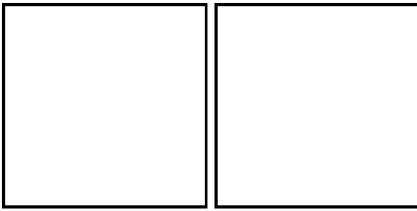
As stated previously the level of detail is not not sufficient to discharge surface water drainage conditions

Kind regards,

Laura Gibbons
Engineer, Adur & Worthing Councils



Address: Facilities & Technical Services, Worthing Town Hall, Chapel Road, Worthing, West Sussex, BN11 1HA



On Thu, 5 Nov 2020 at 13:59, Michael Eastham <Michael.Eastham@arun.gov.uk> wrote:

Hi Paul and Laura,

EMAIL 1 OF 4

Please find attached the revised drainage plans for reserved matters application **A/109/20/RES** relating to Land South of Water Lane, Angmering.

I look forward to receiving your consultation response.

Kind regards,

Michael

Michael Eastham

Principal Planning Officer,

Planning Department



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Key

ADC comment 28/09/20

ALP response

ADC further comment 10/11/20

1. *Please can the applicant confirm the depth of groundwater observed at the proposed attenuating and infiltrating locations.*

The winter ground water monitoring was undertaken during outline planning by others and confirmed by Paul Cann to be suitable for the design moving forward. We have included the results in the appendix but also this is referred to in the Drainage Statement provided at Reserved Matters (RM). To confirm depths the following results are applicable:

- Southern Basin – MDH03 – Depth to water below ground – DRY
- Northern Basin – MDH05 – Depth to water below ground – 2.83m-7.34m
- Western Attenuation – MDH02 – Depth to water below ground – DRY

Therefore, as the infiltration is located at the southern and western areas only, the ground water is considerably in excess of the invert level and minimum 1m clearance.

N.B. Following our meeting it was requested a ground level for the Northern Basin at MDH05. MDH05 and MDH04, which are the nearest boreholes located to the proposed basin, have an approximate cover

level of 16.00m AOD with the depth to water below ground level in MDH05 being 2.83m-7.34m and the depth to water below ground level in MDH04 being 7.94m-8.15m.

There is no evidence of ground water spilling on the site and as discussed, the extreme 1 in 100 year plus climate change flood level of the Black Ditch is around 11.04m AOD. In addition, the northern basin is lined and draining by positive discharge only. Therefore, it is not envisaged high groundwater will affect the drainage scheme or its ability to drain.

MDH05 is located away from the basin. If peak groundwater level is at 13.17mAOD at MDH05, assuming a constant g.w. level (unlikely to be the case, but not possible to say conclusively) it is evident that the I.L. of the basin is below this. There is no way for us to conclusively say whether the basin design is adequate with the information provided. The effects of flotation must be considered if the basin is lined.

2. *Please can the applicant supply a manhole schedule.*

A Manhole schedule is provided for all networks in the Micro Drainage output files. As discussed, this will need to be provided outside of the MD output for discharge of conditions as we need to ensure consistency between calculations and proposals.

3. *Calculations should either apply a cv of 1 or use FEH to be compliant with WSCC policy for the management of surface water.*

The Wallingford Rational method states the Cv should be between 0.6 and 0.9 and therefore defaults to 0.75. This default has been used for all designs, including at outline stage. The range in Cv is due to the 'permeable' nature of even impermeable surfaces, such as cracks, fissures, etc and also to account for areas that are not wholly impermeable that is included in

area calculations such as grass verges, etc. In addition not all rainfall that lands on a surface enters the drainage system, irrelevant of the surface, as rainfall landing on, asphalt for example, will only run off once the surface is 'saturated' and even then once the rainfall has stopped will dry by transpiration as opposed to run off. Therefore, the range of Cv and the default is appropriate.

The WSCC policy states "Where calculations involve use of the Coefficient for Volumetric Runoff (Cv) Sewers for Adoption (7th Edition) recommends that a Cv of 1.0 should be used whenever calculating runoff from impermeable surfaces (roofs and paved areas should have an impermeability of 100%)". However, SfA does not recommend or discuss the Cv but only "roofs and paved areas should have an impermeability of 100%".

Within Micro Drainage the Cv is a global parameter which is overridden by individual areas, which can be set to whichever Cv is appropriate. In our calculations we have used 100% impermeability (PIMP) for all hardstanding areas. Therefore, the discussion regarding the overriding Cv value is irrelevant in the calculations and thus we will amend, but this does not preclude your ability to approve the design.

In addition, and in line with normal practices, we have also calculated the whole adoptable highway corridor within our calculations and again stated this as 100% impermeable. This is irrelevant of whether there is footway or grass verge and also includes for the large grass verge that runs the length of the spine road. To this end an overriding Cv of 0.75 is appropriate but also can you confirm whether this grass verge should be included at 100% or a portion thereof, as to include all parameter stated above would suggest an overlay onerous design.

N.B. A screen shot of the PIMP for an area is included within the appendices.

As discussed, please provide a printout with Cv set to 1 to demonstrate your point. If results differ, we will need to see cv set to 1.

4. Please confirm if the rain falling on basins is included in calculations.

Currently the rain falling on the basins is not included. Many years ago this argument was formed between LPA's and consultants and it was established that it would be impossible to replicate the rainfall falling on a basin and therefore this has not been included in any calculations for 10-15 years.

The reason for this is the basins are Greenfield and therefore any rain falling on them would first soak into the ground, be used by the planting or, where any standing water does not reach, drain by evapotranspiration. Only once the basin starts filling up would rain land on any standing water and contribute to any flow, but this was deemed negligible in the scheme of things and thus discounted. To this end the basin areas have not been included in any designs for a number of years.

Please confirm, if you intend for this to be included, as to an appropriate Cv to use for the basin area as 100% is wholly inappropriate and 10% was always deemed acceptable for greenfield areas contributing to run off.

N.B. Following our telephone conversation we have included the basins in all calculations.

Unclear from the impermeable areas plan and network results provided whether this has been included.

5. *Please confirm if an urbanisation allowance has been included for within calculations, please see WSCC policy for the management of surface water for further details on this.*

It is assumed by urbanisation allowance you refer to Urban Creep, as the phrase urbanisation allowance is not found in the WSCC policy. Please refer to paragraphs 3.57 and 3.58 of the submitted drainage statement which confirms an Urban Creep allowance has been included.

N.B. Following our telephone conversation we have included calculations showing Urban Creep.

Please provide complete printouts from MicroDrainage for these.

6. *Please provide exceedance flow plans. Please also indicate where water is expected to flood (according to calculations, and the volumes of flooding expected).*

These will be provided on agreement of the points raised in your objection.

N.B. Following our telephone conversation we have included exceedance flow plans.

The exceedance flow plans show that for the 1 in 100 year plus 40% climate change event water will leave the site and travel down water lane. This is not acceptable. Please ensure that water is contained on site for all events up to and including the 1 in 100 year plus 40% climate change event. We will also need to review gully cover levels, and drive levels to ensure that water will not be directed towards properties/ off site. For example it is apparent that water will emerge from the gullies north of S25 and flood to the highway.

7. *Flow velocities are less than 1m/s in several pipes. Please ensure all pipes achieve 1m/s.*

All pipes are designed with minimal 1m/s flow velocity. However, in accordance with SfA7 paragraph C4.9, where this requirement cannot be met a 150mm diameter sewer can be laid to a gradient not flatter than 1 in 150 and deemed acceptable, which is the only instances within our design where 1m/s is not achieved. *Okay.*

8. *It does not appear that all pages of the results printout have been included for the northern network. I.e. where are the results for manholes 20 to 69.*

The latest drainage statement includes for all pages. *Okay.*

9. *Hydrobrake reference numbers need to be detailed on plan and be consistent with calculations.*

This is a personal preference and should not preclude approval. The Hydrobrake details will be on all construction drawings but whilst the design is subject to change and not yet approved it is not yet stipulated on drawings. However, the Hydrobrake reference is provided in all calculations.

N.B. Following our telephone conversation we have included the Hydrobrake reference on our drawings.

Okay.

10. *Size of attenuation crates needs to be detailed on plan.*

This is a personal preference and should not preclude approval. The size of attenuation crates will be on all construction drawings but whilst the design is subject to change and not yet approved it is not yet stipulated on drawings. However, it is provided in all calculations and

the invert level, water level, cover level and total volume of crates is stipulated on the drawings.

N.B. Following our telephone conversation we have included the size of crates on our drawings.

Okay.

11. Half drain times must be provided for infiltrating catchments.

The half drain times are included in the calculations. In addition, an infiltration scheme is not viable if half drain times cannot be achieved, without approval by the LPA, therefore a robust and compliant scheme has been provided with half drain times achieved. *Okay.*

12. Worst case infiltration rates must be used in design.

It is assumed you refer to the use of average rates between trial pits in the vicinity of the infiltration device as opposed to across the whole site which would be wholly inappropriate. In some cases we used worst case rates and in others we used an average across 2 or more pits. This provides a rate consistent with the ground conditions that range over where the devices are located. However, we will provide calculations with worst case scenarios for the most appropriate pit in relation to the devices.

N.B. Following our telephone conversation we have used worst case infiltration rates, namely:

- Southern Basin – SA3 – 1.93×10^{-4}
- Western Parcel – SA2/SA1 – 4.52×10^{-5}

Okay.

13. Please provide impermeable areas drawings in .dwg format to enable review.

We have included drawing A290-RM-512 P2, Post Development Catchment Areas and Basins, providing the impermeable area plan. Within the RM submission we included drawings A290-RM-501 and 502, Drainage Layouts Sheets 1 and 2, providing all proposed drainage levels and manhole numbers. In addition, within the submitted Drainage Statement (A290-R007) we included all Micro Drainage calculations including impermeable areas draining to each manhole. Therefore, all information has been previously submitted and .dwg are not required. However, we can include drawing A290-RM-512 P2 in .dwg format for your information.

N.B. Following our telephone conversation we have included the cad drawing for reference.

As discussed we will need to see this broken down more at DOC stage. I.e. areas draining to nodes. We can discuss this further if required.

14. Please provide a plan showing a clear 3m buffer around basins.

We confirm that adequate space, 3m minimum from top of water level, plus 300mm freeboard, and/or basin cover level, around all attenuation and infiltration basins, in line with Ciria guidance, has been allowed for in the design and this is shown on all drawings.

N.B. Following our telephone conversation we have included the 3m buffer on our drawings.

Okay, point closed.