

From: Amanda Scholes on behalf of Planning.Responses
Sent: 14 March 2019 08:48
To: Planning Scanning
Subject: FW: Saltbox- Drainage - BE/2/19/DOC

From: Michael Eastham
Sent: 13 March 2019 16:17
To: Planning.Responses
Subject: FW: Saltbox- Drainage - BE/2/19/DOC

Please upload the ADC Drainage Engineer's consultation response onto Ocella for BE/2/19/DOC

From: Laura Gibbons
Sent: 13 March 2019 16:08
To: 'David Omonitan'; Arfon Hughes
Cc: Mr Will Marsh; Keith Sarchett; Chris Thrippleton; Nia Russell; Michael Eastham; Steve hawkins
Subject: RE: Saltbox- Drainage

David,

Thank you for sending me through that information. I have the following comments and have also provided commentary to your responses in red.

1. I am disappointed by the limited extents of permeable paving you are proposing given that infiltration rates are good. Please utilise permeable paving more throughout the site.
2. Infiltration rates found at TP101-TP104 and TP106 are good and I would request you use permeable paving throughout the site. Where half drain times meet our requirements, and adequate capacity is available I would not accept a connection to still be provided to the wider network.
3. You are proposing on using permeable paving in the car park area for unit 2, which is the area where poorest infiltration test results were seen. The infiltration rate in this area is not suitable to rely on infiltration and therefore in this location I agree that a connection to the attenuation areas is required, however insufficient detail has been provided regarding the level at which the connection is to be provided and for which storm events these connections will come on line for. Please provide this detail
4. The use of average infiltration rates is not suitable for design. In design you must use the worst infiltration rate from the nearest infiltration test.
5. Where infiltration is being utilised I would expect the contributing area for QBar calculations to be reduced and proposed outflow rates reduced.
6. I have done my own flotation calculations and I do not believe you have sufficient stabilising forces. I believe the error has come in calculations from you assuming that the displaced water depth is 1.37- 0.4- 0.35. Whereas you should be using 1.37-0.4-0.15 (i.e. the level at which the impermeable liner is at).
7. A factor of safety must also be applied to design for flotation (1.11 or 0.9 applied to resisting forces, and 1.1 applied to destabilising forces). I believe you are actually going to need considerably more stone than currently provided for.
8. I will also need to see that sufficient free volume is still available within ponds.
9. Pond side slopes should be no greater than 1 in 3. 1 in 2 is not suitable.
10. I do not like that maximum modelled water levels in the pond cross section you have provided are getting close to existing ground levels and have therefore resulted in you specifying bunds. Please provide 300mm freeboard below surrounding ground levels.
11. I require further cross sections to be provided of the ponds which clearly show inlet and outlet arrangements. As a minimum I require two cross sections per pond.

12. The type of impermeable membrane, joint requirements, and stone grade all need to be shown on the construction details of the ponds.
13. Calculations for infiltrating structures should comply with our requirements for factors of safety as set out in the checklist.
14. Please provide construction details for flow control devices.
15. Please provide construction details for outfalls.
16. Permeable paving construction details are required.
17. Please provide impermeable area catchment plans.
18. Why is such significant land raising being proposed?
19. Do we know what winter groundwater levels at the locations of the other proposed attenuation ponds are?
20. You have got significant flooded volumes predicted for the 1 in 100 year plus climate change event. Given that you have not modelled a surcharged outflow and that it is likely that actually in significant events the outfalls will be submerged I require that either:
 - a. all surface water is kept below ground/ in attenuation structures for the 1 in 100 year plus climate change event.
 - b. Alternatively, I will require that you model a surcharged outfall, and demonstrate that flood waters will be contained within parking areas and do not represent a hazard in the 1 in 100 year plus climate change event. This surcharged outfall model must also demonstrate no flooding for the 1 in 30 year plus climate change event.
21. Self-clean velocities of 1 ms^{-1} must be demonstrated for all pipes.
22. I will review calculations and drawings further once these key issues have been resolved.

Given the number of points outstanding and the level of work required to rectify these I am going to be recommending that the DOC application for condition 9 (BE/2/19/DOC) is refused at this stage. I am keen to work with you to ensure that when a revised DOC is submitted it meets our requirements.

Kind Regards,

Laura Gibbons, MEng, GMICE
Engineer (Drainage & Coastal)

Laura Gibbons | Engineer (Drainage & Coastal), Engineering Services, Arun District Council | Location: First Floor, Arun Civic Centre, Maltravers Road, Littlehampton, BN17 5LF

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From: David Omonitan [mailto:davidomonitan@kirksaunders.co.uk]

Sent: 12 March 2019 14:58

To: Laura Gibbons; Arfon Hughes

Cc: Mr Will Marsh; Keith Sarchett; Chris Thrippleton; Nia Russell; Michael Eastham; Steve hawkins

Subject: RE: Saltbox- Drainage

Laura,

Thank you for your reply. Please see below reply to your comments.

1. Please find results for shallow infiltration tests in the email from EPS attached, the full report will be provided in the coming days. The average infiltration at the permeable paving location (TP105) was recorded as $3.085 \times 10^{-6} \text{ m/s}$.
The half drain time for the 1 in 10 year plus 40% climate change rainfall does not exceed 24 hours, (see windes calculations attached). However, the permeable paving is connected to the system and excess runoff

ultimately discharges to the basin during extreme rainfall. I have attached the drainage storm network model for the 1 in 1, 1 in 2 and 1 in 30 years rainfall for your perusal. *See comments 1 to 5 above. Please do not use average infiltration rates.*

2. Ordinary watercourse consent application has been forwarded to the relevant authorities and is in progress. *Please confirm if an ordinary watercourse land drainage consent has been applied for in addition to the FRAP.*
3. The client will provide timescale for the demolition of the overhead cables or confirmation that the construction of the outfall to north of the site is constructible. *Okay.*
4. Further readings of the ground water have been received from EPS (see report attached). The highest ground water level 0.413m below ground level was recorded at the southwest corner of the site (BH1). Floatation calculations on drawing (6256 attached) show that there is a buoyancy pressure of 5kn/m^2 spread over the basin area, our proposal is to install 200mm thick stone over the impermeable membrane to keep it in place during heavy rainfall when the ground water is at its highest. Please find attached completed checklist as requested. Calculations for the permeable paving half drain times for 1 in 10 years + 40% and 1 in 100 yrs + 40% for the basin have been attached. *Half drain times have not been provided for the 1 in 100 year plus climate change event. These need to be.* Storm network analysis for 1 in 1, 1 in 2, 1 in 30 and 1 in 100 year + 40% have also been attached.
5. To mitigate against pollution, all vehicle wash down areas in unit 2 are connected into the foul drainage system, full retention petrol interceptor is provided before discharge into the basin, permeable paving cleans surface water, all in accordance with C753 Part E chapter 26. *Please provide confirmation that southern water will be consulted on this, and the appropriate consents sought, i.e. trade effluent licences.*
6. Maintenance Schedule will be revised upon further clarification of responsibility from the client. *Okay, I will await this.*

Please follow the link below to download the following calculations and drawings:

<https://we.tl/t-9NrKbF8aVv>

1. Arun District Surface Water Checklist
2. storm network analysis for rainfall events up to 100 years +40% climate change ref. 6090-Storm Network 1in 1_2_30 years and 6090-Storm Network 1 in 100 years+40% + Climate Change.
3. Half drain time calculations for permeable paving and ponds ref. 6090-Permeable Paving 1 - 1 in 10 years + 40% climate change, 6090-Permeable Paving 2 - 1 in 10 yrs + 40% climate change, 6090-Permeable Paving 3 - 1 in 10 yrs + 40% climate change and 6090 Phase 1 – Basin.
4. Surface Water Network Drawing No. SBX-KSA-ZO-XX-DR-C-6120-D2-P1 6090 Surface Water Drainage Network.
5. Qbar calculation ref. 6090-Qbar
6. Phase 1 Drainage Strategy drawing sheets 1 to 3, - Drawing nos SBX-KSA-ZO-XX-DR-C-6101-D2-P3 6090 Phase 1 Drainage Strategy Sheet 1 of 3, SBX-KSA-ZO-XX-DR-C-6102-D2-P3 6090 Phase 1 Drainage Strategy Sheet 2 of 3 and SBX-KSA-ZO-XX-DR-C-6103-D2-P3 6090 Phase 1 Drainage Strategy Sheet 3 of 3
7. Drainage Details Drawings nos SBX-KSA-ZO-XX-DR-C-6251-D2-P1 6090 Drainage Details Sheet 1 of 3, SBX-KSA-ZO-XX-DR-C-6252-D2-P1 6090 Drainage Details Sheet 2 of 3, SBX-KSA-ZO-XX-DR-C-6253-D2-P1 6090 Drainage Details Sheet 3 of 3.
8. Typical Pond Detail no. SBX-KSA-ZO-XX-DR-C-6256-D2-P1 6090 Typical Pond Section.
9. Ground Water Monitoring results by EPS
10. Preliminary shallow infiltration test results

Please do not hesitate to contact me if you have any questions.

Regards.

David Omonitan
Civil Engineer

kirksaunders
associates



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From: Laura Gibbons [REDACTED]
Sent: 05 March 2019 14:05
To: David Omonitan [REDACTED]; Arfon Hughes [REDACTED]
Cc: Mr Will Marsh [REDACTED]; Keith Sarchett <ksarchett@quadrantprojectsservices.com>; Chris Thrippleton [REDACTED]; Nia Russell [REDACTED]; Michael Eastham [REDACTED]
Subject: RE: Saltbox- Drainage

Hi David,

I will await the further infiltration testing results before providing full further comments. However, I have provided brief comments below in red.

Thanks,

Laura Gibbons, MEng, GMICE
Engineer (Drainage & Coastal)

Laura Gibbons | Engineer (Drainage & Coastal), Engineering Services, Arun District Council | Location: First Floor, Arun Civic Centre, Maltravers Road, Littlehampton, BN17 5LF
[REDACTED]
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From: David Omonitan [REDACTED]
Sent: 26 February 2019 16:06
To: Arfon Hughes; Laura Gibbons
Cc: Mr Will Marsh; Keith Sarchett; Chris Thrippleton; Nia Russell
Subject: RE: Saltbox- Drainage

Good afternoon Laura,

In reference to the outstanding issues referenced in your email to Nia on the 20/02/2019, please find our reply point by point below.

1. Shallow infiltration testing has been instructed and results are expected next week. Drainage strategy will be revised to include infiltration permeable paving if infiltration rates are better than previous results. I will await these results. As stated previously, if the results of this are $\times 10^{-6}$ or greater permeable paving should be implemented as part of the surface water drainage scheme. If it is demonstrated that half drain times exceed 24 hours for the 1 in 10 year plus 40% climate change event a high level overflow to the watercourse can be provided. We would expect this overflow to only come into use when water levels exceed the 1 in 100 year plus 40% climate change event levels. If it is demonstrated that infiltration rates are $\times 10^{-7}$ or less the original scheme should be taken forwards.
2. Please find attached evidence that Flood Risk Activity permit (application form submitted and fees paid on the 21/02/2019) has been applied for as requested. Okay. Please remember to ensure that an ordinary watercourse consent is applied for for the downstream outfall which is to ordinary watercourse. I have attached the application form.
3. Bank erosion issues will be investigated and if confirmed outfall details will be designed to mitigate. Okay.
4. The risk activity permit applied for allows for any structure (pond, outfall headwall) to be constructed within 8m from the bank of the river (see email from the environment agency attached). Okay.
5. The proposed outfall to the north is constructible, overhead cables are to be demolished, client/contractor will provide written confirmation. Please can timeframes be confirmed with this. As stated to Nia we have had difficulties on other sites where the demolition of overhead cables has been delayed and therefore the surface water drainage hasn't been able to implemented in a timely manner. All resulting in occupation/ use being significantly delayed.
6. No basin or pond is deeper than groundwater level, shallowest ground water depth encountered is 1.37m below ground level(level of -0.020m), deepest basin level is 0.210m. Ground water was struck at 4m below ground level at the proximity of the deepest pond. See extract from EPS ground investigation report of January 2018 and 2019. All basins are lined with impermeable membrane see drawing 6253 attached. Basins/ponds will not sink because of these reasons. The extracts that have been provided state that extensive groundwater monitoring has been undertaken and that details of the findings will be issued. Please provide these results and ensure they are referenced to AOD. Please also ensure that submissions are complete and do not rely on any information previously submitted (please refer to our checklist for further information).
7. Surface water will be treated utilizing the permeable paving total area 8030m² located throughout the site, petrol interceptor has also been proposed in unit 2 to separate the oil before it is discharged into the water course, refer to drawings 6201 to 6203. Because of the potential uses of the site please ensure that treatment meets the requirements for sites with heavy pollution as outlined in C753 Part E Chapter 26.
8. Noted, please find attached maintenance schedule as requested. I will review this further once the drainage proposals are confirmed. However, from an initial review I have the following comments:
 - a. Details of financial arrangements and who will conduct maintenance is unclear and requires clarification.
 - b. It must be acknowledged within the manual that the landowner has riparian responsibility for the ordinary watercourse, and that maintenance of this must be completed in accordance with the Land Drainage Act 1991.
9. The Planning agent Arfon Hughes of Mango Planning will submit application in full. Okay.

Please do not hesitate to contact me if you have any questions.

Regards

David Omonitan
Civil Engineer

kirksaunders
associates

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From: Arfon Hughes <[REDACTED]>
Sent: 20 February 2019 16:18
To: David Omonitan <[REDACTED]>
Cc: Arfon Hughes <[REDACTED]>; Mr Will Marsh <[REDACTED]>; Keith Sarchett <[REDACTED]>; Chris Thrippleton <[REDACTED]>; Nia Russell <[REDACTED]>
Subject: Re: Saltbox- Drainage

David

Can you please go back to her with any queries today/tomorrow so we can stay on track with what is already a tight timetable. I understand the EPS instruction is being sorted today.

Many thanks

Arfon

Arfon Hughes
Managing Director
Mango Planning & Development Limited
Number Two Waterton Park
Waterton, Bridgend
CF31 3PH

[REDACTED]

On 20 Feb 2019, at 16:15, David Omonitan <[REDACTED]> wrote:

Arfon,

The requirements listed by Laura are new and not in the original conditions (see attached). But we will endeavour to satisfy these latest conditions.

Regards

David Omonitan
Civil Engineer

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From: Arfon Hughes [REDACTED]
Sent: 20 February 2019 15:50
To: David Omonitan [REDACTED] Mr Will Marsh
[REDACTED]
Cc: Arfon Hughes [REDACTED]; Keith Sarchett
[REDACTED] Chris Thrippleton
[REDACTED] Nia Russell [REDACTED]
Subject: Fwd: Saltbox- Drainage

Will/David

Further to Nia's meeting this morning with the case officer (which Laura Gibbons attended) there appears to be a disconnect between what she has been asking for and what KS is or has provided. She has therefore provided a list below which needs to be confirmed asap. She is on leave next week so it is imperative the action plan is clear in everyone's minds tomorrow. The officer report will need to be written by the 3rd week in March so we don't have much time.

Note that the requirements relate to both the application and the DOC submission.

Thanks

Arfon

Arfon Hughes
Managing Director
Mango Planning & Development Limited
Number Two Waterton Park
Waterton, Bridgend
CF31 3PH

[REDACTED]

From: Laura Gibbons [REDACTED]
Date: 20 February 2019 at 15:42:53 GMT
To: [REDACTED]
Cc: Michael Eastham [REDACTED]
Subject: Saltbox- Drainage

Nia,

Thank you for your time this morning. As promised, below is a summary of the outstanding drainage issues/ my comments.

1. Shallow infiltration testing is going to be conducted at the depths and locations of potential permeable paving areas. If the results of this are $\times 10^{-6}$ or greater permeable paving should be implemented as part of the surface water drainage scheme. If it is demonstrated that half drain times exceed 24 hours for the 1 in 10 year plus 40% climate change event a high level overflow to the watercourse can be provided. We would expect this overflow to only come into use when water levels exceed the 1 in 100 year plus 40% climate change event levels. If it is demonstrated that infiltration rates are $\times 10^{-7}$ or less the original scheme should be taken forwards.
2. As a minimum I require evidence that a Flood Risk Activity Permit application has been made to the Environment Agency to construct outfalls within the main river. Without this I cannot recommend the discharge of the condition as there would technically be no way to dispose of the surface water.
3. There are bank erosion issues upstream, I do not know if this extends into the site. This is something to bear in mind when designing the outfalls and liaising with the Environment Agency.
4. Confirmation will need to be provided that 8m easement is provided to the top of bank of main river, and 3m to the top of bank of ordinary watercourse.
5. I will need confirmation that the proposed outfall to the north is constructible given its proximity to overhead cables. If this cannot be guaranteed the outfall should be repositioned away from the overhead cables.
6. The attenuation basins are proposed to be deeper than groundwater. Therefore the basins will need to be lined. Flotation calculations must be submitted with the DOC application to demonstrate that the design adequately accounts for these forces. If this results in changes to basin footprints revised plans will need to be submitted for BE/135/18/PL.
7. Full details must be submitted of how adequate treatment of surface water is to be achieved via the proposed surface water drainage scheme.
8. A maintenance manual should be submitted.
9. The DOC application (BE/2/19/DOC) should be submitted in full accordance with the advice within the drainage submissions checklist (attached for ease of reference). If pre-commencement conditions are to be avoided on the other application (BE/135/18/PL) the detailed submitted will need to be to level set out within the drainage checklist.

Please note that I am out of the office from this Friday to the 5th March.

Kind Regards,

Laura Gibbons, MEng, GMICE
Engineer (Drainage & Coastal)

Laura Gibbons | Engineer (Drainage & Coastal), Engineering Services, Arun District Council | Location: First Floor, Arun Civic Centre, Maltravers Road, Littlehampton, BN17 5LF

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