



Mrs Sophie Brown
Sustainable Places Planning Advisor
Environment Agency
Guildbourne House Chatsworth Road,
Worthing, West Sussex,
BN11 1LD

Your Ref: HA/2021/123652/01-L01

18 November 2021

Dear Sophie,

OUTLINE APPLICATION WITH ALL MATERS RESERVED EXCEPT ACCESS FOR THE DEMOLITION OF EXISTING BUNGALOW TO FORM NEW ACCESS FOR 6 NO. DETACHED CHALET DWELLINGS (RESUBMISSION FOLLOWING BR/124/21/OUT). TO REAR OF 94 - 100 HOOK LANE BOGNOR REGIS PO22 8AT

Further to your objection comments, please find our responses below. The FRA has also been amended to reflect this. I also refer to previous correspondence with Eleonora Pilla of the Environment Agency in August 2018 (attached) where similar issues were discussed and agreed at the site.

- **Use of defended flood levels**

Even though the site may currently benefit from flood defences, and this should be identified and referred to in the FRA, you must also address the residual risk of those defences failing or being overtopped. Our advice to local planning authorities and developers is to design their flood mitigation measures to ensure that the development is safe for its lifetime (now and in the future) without the reliance upon existing infrastructure. Therefore we would expect at least sleeping accommodations to be set 300mm above the undefended 0.5% EAP taking into account the new climate change allowances (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>). This is because the 2016 Grant Memorandum for Flood Defence Grant in Aid (FDGiA) (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/516680/LIT_10458.pdf) confirms that FDGiA is not eligible for new development and any development built after 2012 will be deducted from a bid for a flood defence scheme. This is based upon the agreements made with DEFRA for the 6 year settlement and on the understanding that as part of PPS 25, and now NPPF, all developments should be safe now and in the future and should assess the residual risks of defence failure and thus should be safe without the reliance upon existing infrastructure.

WSP Response

In line with previous discussions with the Environment Agency regarding this site, sleeping accommodation has been designed to be set 300mm above fluvial modelled levels in a 0.1% AEP event as a conservative representation of the risk taking into account climate change. At the time

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of this previous agreement a climate change uplift of 105% was being considered. Following subsequent revision of the climate change allowances, the guidance recommends the central allowance which is 25% for the 2080s in this management catchment, a significantly lower uplift. It is therefore considered that this is a very conservative design approach.

Whilst there may be risk of breach or overtopping of defences in the future, it does not seem reasonable to expect development to be designed as if the defences are entirely absent. In reality, should a breach or overtop happen the extent, depth and severity of the flood would be significantly less than the undefended tidal extents in the model. In the absence of a tidal breach model, it's reasonable to assume that mitigation already factored into the design against extreme fluvial events will provide sufficient mitigation for a tidal flood in the event of a partial defence failure.

Furthermore, during previous correspondence with the Environment Agency on this site, no objection has been raised regarding the consideration of tidal risk. The FRA has been amended slightly to ensure consistency with the previously agreed flood levels (please see attachments to this letter), which are already extremely conservative and I trust following the reasoning above that this is sufficient to remove this objection.

- **New climate change allowances**

Different climate change allowances have been used to assess future flood risk than those advised in 'Flood risk assessments: climate change allowances', without adequate justification.

WSP Response

The advice within 'Flood risk assessments: climate change allowances' has been updated since the FRA was last reviewed. The guidance as of November 2021 has now been incorporated into the FRA. I trust this satisfies this part of your objection.

- **Voids under buildings**

The proposal to incorporate under floor voids is not a preferable option. Issues with voids include trapped debris and blockages under the buildings, and silt accumulations which is difficult to clean down after a flood event and can potentially lead to public health issues. In some occasions, due to the size of the void openings maintenance could be entirely restrictive. It will need to be demonstrated why a conventional scheme for flood plain compensation is not possible to be implemented, as well as a plan being agreed to ensure that the voids are managed and maintained for the lifetime of the development.

WSP Response

As outlined in the FRA, the site only includes a small area suitable for flood plain compensation due to the modelled flood extents. It has been proposed that this be utilised to allow displacement of flood water from support piers of the proposed dwellings. There are limited further flood plain compensation options within the site, which would be insufficient as an alternative to voids. A plan of the proposed compensation can be viewed in Appendix F of the FRA.

As indicated in the appendices to this letter, The Environment Agency has previously proposed that a detailed design and maintenance regime for the proposed voids should be provided by way of condition. We trust that it would be agreeable to therefore condition this element against the current planning application.



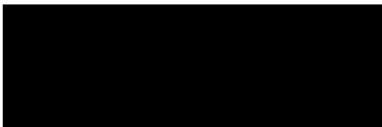
- **Maintenance of flood plain compensation scheme**

We would also need confirmation that the proposed flood plain compensation scheme can be maintained for the lifetime of the development, and who will be responsible and the timing / phasing arrangements.

WSP response

We would request, as above, given the outline stage of this scheme that details of maintenance and responsibility for the flood compensation scheme be required by way of condition against the current planning application.

Yours sincerely



Amy Ruocco
Principal Water and Flood Risk Consultant



Appendices



Eleonora Pilla
Environment Agency
Canal Walk
Romsey
SO51 7LP

70047808-IT1-LTR-001

24 August 2018

Dear Eleonora Pilla,

94 - 100 Hook Lane, Bognor Regis

Thank you for your time on the call, it was very useful to be able to discuss your concerns and agree a way forward with you. We also appreciate you providing the updated flood modelling information for consideration as part of the Flood Risk Assessment.

With respect to your letter dated 7 August 2018 we have provided a summary of our discussions and the proposed resolution for each point.

Objection 1: The submitted FRA fails to assess the surface water back up from the drainage ditch at the south of the development and fluvial interaction, which it is understood had caused some flooding issue in the past.

Response: As we discussed on the call, following an inspection of the Combined Defended Modelled Flood Outlines indicates that the flood extent is similar to the fluvial extent as the topography is lower at the rear of the properties at Hook Lane, effectively creating a bowl. It was agreed that it would be suitable to use the flood levels from the Aldingbourne undefended model scenario, in order to define the requirements for the flood mitigation of the Proposed Development.

We agreed that the flood level to be used was 2.19 mAOD (fluvial undefended water level at the Site) for the combined surface water and fluvial mitigation of the Proposed Development. This will also provide mitigation against potential failure of the Felpham pumping station. This design level has been used in the calculations for the floodplain compensation.

Objection 2: Different climate change allowances have been used to assess future flood risk than those advised in 'Flood risk assessment: climate change allowances', without adequate justification. We would expect you assess the climate change for this development using the new climate change allowances higher central allowances (45%) and upper allowance (105%). We can now provide information to you. Please contact SSD Enquiries under SSDEnquireis@environment-agency.gov.uk to request an update to the Product 4 information.

Response: Following receipt of the new climate change flood levels from you, it was agreed during our phone conversation, that the flood level of 2.19m AOD (1 in 100-year event plus 105% upper climate change allowance), shall be used.

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The proposed new buildings will be designed to allow for 2.19m AOD flood water level consider plus additional 300mm freeboard beneath the ground floor slab.

Objection 3: More information about the proposed flood compensation is needed. Basic requirements for compensatory floodplain storage are as follows

- ③ A volume of floodplain equal to or larger than that lost to the proposed development must be created.
- ③ The volume must apply at all levels between the lowest point on the site and the design flood level. Normally this is calculated by comparing volumes taken by the development and the volume offered by the compensatory storage for a number of horizontal 'slices' through the range defined above.
- ③ The thickness of a vertical slice should typically be 0.2 metres. In the case of large flat sites or very steep sites this may be varied, for example for flat sites to 0.1 or even 0.05 metres. The slice thickness should be set to provide between ten and fifteen slices for such unusual sites

Response: As discussed, the current calculations have been based on assumptions regarding the number of piers and the size of the piers per property. It was agreed that following detailed design the floodplain compensation calculations would need to be revisited, and these would need to be informed by suitable geo-technical investigations.

The estimated total area of the piers equals 5.76m² (450mm diameter piers, 6 No. piers per building; 6 No. buildings at the Application Site)

For each 200mm vertical increase, the piers will displace a volume of water which equals 5.76*0.2=1.15m³

To achieve an increase in floodplain storage, a 20% allowance has been accounted for in the floodplain compensation indicative area. The FRA demonstrates that the northern part of the site, near Hook Lane access, can be used as flood compensation (refer to attached Drawing 47808-FCA-001).

Level	Volume lost (m ³)	Flood compensation area required (m ²)	Flood compensation area identified (m ²)	Flood compensation volume identified (m ³)
1.3 m AOD to 1.5 m AOD	1.15	5.76	7.06	1.41
1.5m AOD to 1.7 m AOD	1.15	5.76	7.06	1.41
1.7 m AOD to 1.9 m AOD	1.15	5.76	7.02	1.41
1.9 m AOD to 2.1m AOD	1.15	5.76	7.07	1.41
2.1 m AOD to 2.19m AOD	0.52	2.6	9.60	1.92

The volume required to achieve the flood plain compensation vertical strip between 1.3 and 1.5m AOD will be achieved in the area specified. It is anticipated that localised reprofiling of the Site will be required to facilitate hydraulic connectivity between the floodplain compensation and the source of flooding.

Objection 4: Due to lack of information, it is not clear if it is proposed to use stilts or voids. This is not floodplain compensation, but rather mitigation of risk by design. The use of stilts reduces the impact on the development but does not guarantee that the floodplain will be retained in the same way as a compensation scheme (which is a form of risk substitution).

Response: It is proposed that the ground floor slab for the buildings will be raised 300 mm above the flood level, with the buildings supported on piers to create a void beneath the buildings. The impact of the piers on the floodplain, and the requirements for floodplain compensation are discussed above.

I hope the responses above have answered the queries and objections raised. If you have any further queries, or would like to discuss the matter further, please do not hesitate to contact Emiliya Stoykova or Steven Brown.



Yours faithfully

Emiliya Stoykova
Assistant Engineer

Cc: Counterpoint Properties Ltd
Encl.: Drawing 47808-FCA-001
Environment Agency's flood risk data and correspondence



KEY:

- Site Boundary
- Contour 0.1m
- Flood Compensation Area footprint
- Flood Compensation Area
 - 1.3 mAOD - 1.5 mAOD - Lowered to 1.3 mAOD
 - 1.5 mAOD - 1.7 mAOD - Lowered to 1.3 mAOD
 - 1.7 mAOD - 1.9 mAOD - Lowered to 1.7 mAOD
 - 1.9 mAOD - 2.1 mAOD - Lowered to 1.9 mAOD
 - 2.1 mAOD - 2.19 mAOD - Lowered to 2.1 mAOD

Pier assumed dia 0.45 m
Pier area 0.16 m.sq. (each pier)
Assumed No. piers per building 6
No. buildings 6
Flood water level = 2.19 mAOD (100year + 105%CC undefended fluvial model)
Flood compensation indicative area 5.76 m.sq.

To achieve an increase in floodplain storage a 20% allowance has been accounted for in the floodplain compensation indicative area, i.e. 7 m.sq.

Localised reprofiling of the Site will be required to facilitate hydraulic connectivity between the floodplain compensation and the source of flooding.

REV	24/08/18	ES	FIRST ISSUE	CHK	APP
DATE	DRW	DESCRIPTION			

STATUS: FOR INFORMATION ONLY

WSP

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CLIENT: COUNTERPOINT PROPERTIES LTD

ARCHITECT: CROSSLEY DESIGN ARCHITECTURE

PROJECT: 94 - 100 HOOK LANE BOGNOR REGIS

TITLE: PROPOSED FLOOD COMPENSATION AREA

DRAWN:	CHECKED:	APPROVED:
QGIS FILE: 70047808.qgs	SCALE @A3: 1:400	DATE: 24/08/18
PROJECT No: 70047808	DRAWING No: 47808-FCA-001	REV:

Level	Volume Lost (cbm)	FCA (m.sq)	FCA identified
1.3 mAOD - 1.5 mAOD - Lowered to 1.3 mAOD	1.15	5.76	7.06
1.5 mAOD - 1.7 mAOD - Lowered to 1.3 mAOD	1.15	5.76	7.06
1.7 mAOD - 1.9 mAOD - Lowered to 1.7 mAOD	1.15	5.76	7.02
1.9 mAOD - 2.1 mAOD - Lowered to 1.9 mAOD	1.15	5.76	7.07
2.1 mAOD - 2.19 mAOD - Lowered to 2.1 mAOD	0.52	2.6	9.60

Arun District Council
Development Control
1, Arun Civic Centre Maltravers Road
Littlehampton
West Sussex
BN17 5LF

Our ref: HA/2018/120569/02-L01
Your ref: BR/139/18/OUT
Date: 18 September 2018

Dear Sir/Madam

Additional information outline application with some matters reserved for the demolition of 1 no. Existing dwelling to form access for 6 no. Residential dwellings

Rear of 94-100 Hook Lane, Bognor Regis, PO22 8AT

Thank you for consulting the Environment Agency on the above application.

Environment Agency Position

Following the submission of a suitable flood risk assessment we are happy to **remove our objection subject to the inclusion of the following 3 conditions**, in any permission granted.

We consider that planning permission could be granted to the proposed development, as submitted, if the following planning conditions are included as set out below. Without these conditions, the proposed development on this site poses an unacceptable risk to the environment and we would object to the application.

Condition 1 – Floodplain compensation

No development approved by this planning permission shall take place until such time as a floodplain compensation scheme has been submitted to, and approved in writing by, the local planning authority.

The scheme shall be fully implemented and subsequently maintained, in accordance with the timing / phasing arrangements embodied within the scheme, or within any other period as may subsequently be agreed, in writing, by the local planning authority.

Condition 2 – Design and maintenance regime for proposed voids

No development approved by this planning permission shall take place until such time as information on detailed design and maintenance regime for the proposed voids beneath the buildings (including size, location and appearance) has been submitted to, and approved in writing by, the local planning authority.

Environment Agency
Canal Walk, ROMSEY, Hampshire, SO51 7LP.

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Reason for condition 1 and 2

To reduce the risk of flooding to the proposed development and future users and to prevent flooding elsewhere by ensuring that compensatory storage of flood water is provided in line with section 9 of the Planning Practice Guidance of the National Planning Policy Framework (NPPF) for Flood Risk and Coastal Change.

Condition 3 – Implementation of Flood Risk Assessment

The development permitted by this planning permission shall be carried out in accordance with the approved Flood Risk Assessment (FRA) (WSP, July 2018) and letter dated 28/08/2018, and the following mitigation measures detailed within the FRA:

- Finished floor levels are set no lower than 300mm above 2.19m AOD (above Ordnance Datum).

The mitigation measures shall be fully implemented prior to occupation and subsequently in accordance with the timing / phasing arrangements embodied within the scheme, or within any other period as may subsequently be agreed, in writing, by the local planning authority.

Reason for condition 3

To reduce the risk of flooding to the proposed development and future occupants in line with section 9 of the Planning Practice Guidance of the National Planning Policy Framework (NPPF) for Flood Risk and Coastal Change.

Advice to Local Planning Authority/Applicant

Flood proofing measures

We recommend that consideration be given to use of flood proofing measures to reduce the impact of flooding when it occurs. Flood proofing measures include barriers on ground floor doors, windows and access points and bringing in electrical services into the building at a high level so that plugs are located above possible flood levels.

Consultation with your building control department is recommending when determining if flood proofing measures are effective.

Reference should also be made to the Department for communities and local Government publication 'Preparing for Floods' go to: <http://www.planningportal.gov.uk/uploads/odpm/4000000009282.pdf> as well as the communities and local Government publication 'Improving the flood performance of new buildings' which can be viewed at: <http://www.communities.gov.uk/publications/planningandbuilding/improvingflood>.

Void/stilt design

Voids or stilts should be designed to allow the free flow of water up to and including the 1 in 100 flood event, with an allowance for climate change. Openings should be designed to be as large as feasible within the proposed development. This is to reduce the risk of the void openings becoming blocked by debris during a flood which could subsequently increase risk to third parties.

It is imperative that the void space beneath the dwelling is kept free from debris throughout the lifetime of the development. This enables the voids to fulfil their flood storage role. The local planning authority should be satisfied that this is achievable and may wish to consider including a condition on any decision notice where permission is granted or requiring the applicant to enter into a legal agreement.

It should be demonstrated to the satisfaction of the local planning authority that the stilts/voids are a suitable form of mitigation.

The FRA should explain why other forms of floodplain compensation are not possible and

Cont/d..

provide the detailed design and maintenance regime for the proposed voids.

Safe access and egress

The Environment Agency does not normally comment on or approve the adequacy of flood emergency response procedures accompanying development proposals, as we do not carry out these roles during a flood. Our involvement with this development during an emergency will be limited to delivering flood warnings to occupants/users covered by our flood warning network.

The Technical Guide to the National Planning Policy Framework (paragraph 9) states that those proposing developments should take advice from the emergency services when producing an evacuation plan for the development as part of the flood risk assessment.

In all circumstances where warning and emergency response is fundamental to managing flood risk, we advise local planning authorities to formally consider the emergency planning and rescue implications of new development in making their decisions.

Should you have any further queries please do not hesitate to contact me.

Yours faithfully

Miss Suz Greenwood
Planning Advisor, Environment Agency

[REDACTED]

[REDACTED]

cc Counterpoint Properties Ltd