

**47 ALDWICK ROAD, BOGNOR REGIS,
WEST SUSSEX PO21 2NJ**

**GROUND FLOOR CHANGE OF USE
FROM COMMERCIAL TO RESIDENTIAL**

Flood Risk Assessment

Prepared on Behalf of

Mr. J Thorp

D2272/FRA1.0

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DOCUMENT CONTROL

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Ground Floor Change of Use from Commercial to Residential

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Appendix C	BGS Historic Borehole Records
Appendix D	Southern Water Public Sewer Records
Appendix E	Environment Agency Correspondence
Appendix F	Arun District Council Strategic Flood Risk Assessment Extracts

1 INTRODUCTION

1.1 Background

- 1.1.1 BP Civils is instructed by Mr. J Thorp to prepare a Flood Risk Assessment to accompany a planning application for the ground floor change of use from commercial to residential at 47 Aldwick Road, Bognor Regis.
- 1.1.2 This report has been undertaken in accordance with National Planning Policy Framework (NPPF) and The Planning Practice Guidance on the use of SuDS for achieving sustainable development.
- 1.1.3 The proposed development will involve a change of use and conversion of the existing commercial office space at ground floor level to the rear of the building to provide a single dwelling, as demonstrated by the development proposals contained within **Appendix A**.
- 1.1.4 In preparing this report, BP Civils has referred to the following documents and information:
- Arun District Council Strategic Flood Risk Assessment
 - British Geological Survey Records
 - Environment Agency Product 4 Response
 - Environment Agency Flood Maps for Planning
 - Long Term Flood Risk Information; Flood Risk Maps
 - Southern Water and Local Authority Drainage Records
- 1.1.5 This report has been prepared to assess flood risk at the site, and to advise of any mitigation which may be required in order to ensure that the proposed development remains safe for its design life in accordance with current design standards.
- 1.1.6 This report has been prepared for the benefit of the named client only.

1.2 Site Location and Description

- 1.2.1 The National Grid Reference for the site is SZ 92791 98770. The site measures 340m².
- 1.2.2 The proposed change of use and conversion relates to the rear of the existing building at 47 Aldwick Road, Bognor Regis, which is currently occupied by Farndell Estate Agents.
- 1.2.3 The southern boundary is located c. 120.00m north of Aldwick Beach.
- 1.2.4 A topographic survey has been undertaken at the site by Medlam Surveys Limited, dated December 2018, and is contained within **Appendix B**. The topographical survey demonstrates external levels in the range of 5.882m AOD and 6.101m AOD.
- 1.2.5 The site as existing is 100% impermeable (340m²).

1.3 Ground Conditions

- 1.3.1 In the absence of site-specific geotechnical investigation, reference has been made to the British

Geological Survey (BGS) website.

1.3.2 The BGS Geology of Britain Viewer identifies a London Clay bedrock.

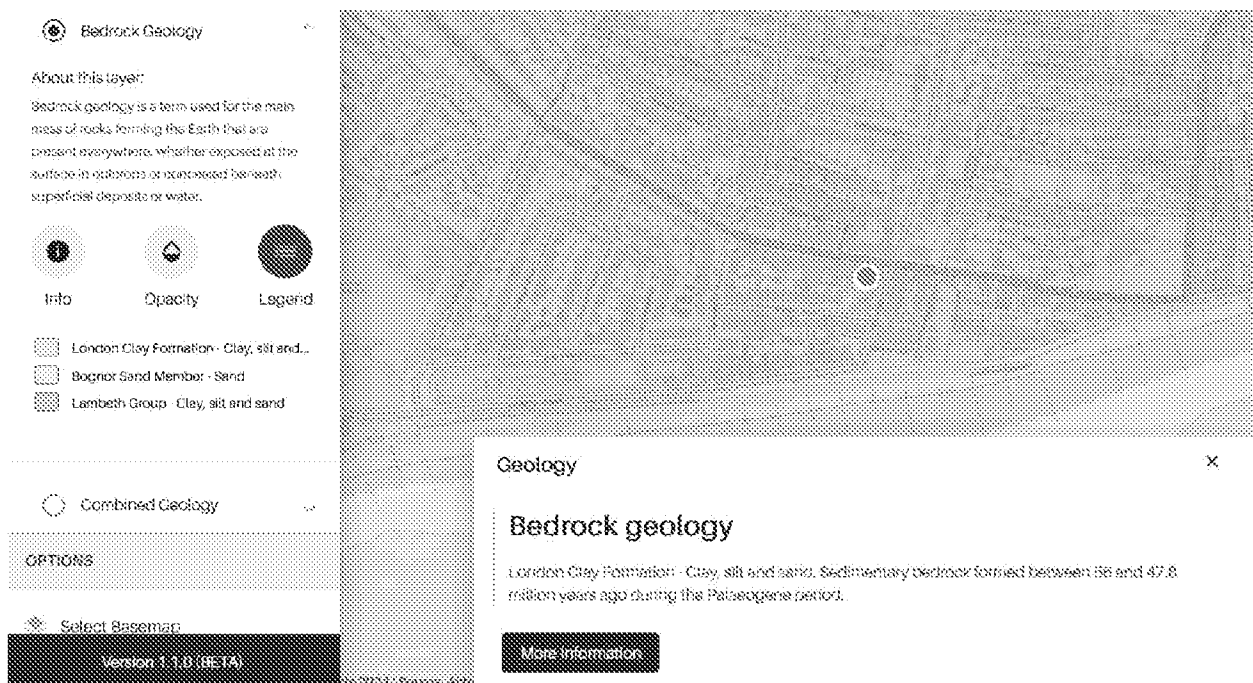


Figure 1. Geology of Britain Viewer – Bedrock Geology (BGS)

1.3.3 Superficial Deposits are recorded as 'River Terrace Deposits – Sand, silt and clay'.

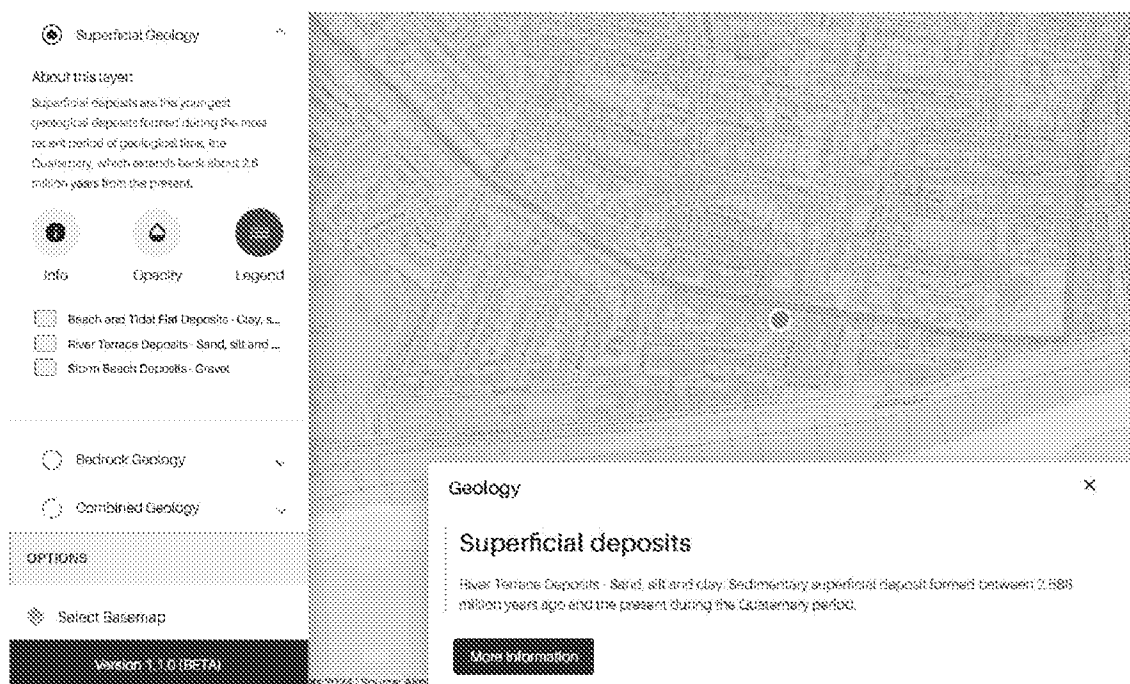


Figure 2. Geology of Britain Viewer – Superficial Deposits (BGS)

1.3.4 Historic borehole records from the Single Onshore Boreholes Index (SOBI) on the BGS website have also been reviewed in the absence of site-specific geotechnical investigation. The locations of the nearest boreholes are identified in Figure 3, below.



- ## 1.4 Groundwater

-

Figure 4. Bedrock Aquifer Designation Map (MAGIC)



Figure 5. Superficial Drift Aquifer Designation Map (MAGIC)

1.4.5 The Groundwater Vulnerability Map confirms that the site falls within a 'Medium - Low' groundwater vulnerability zone.

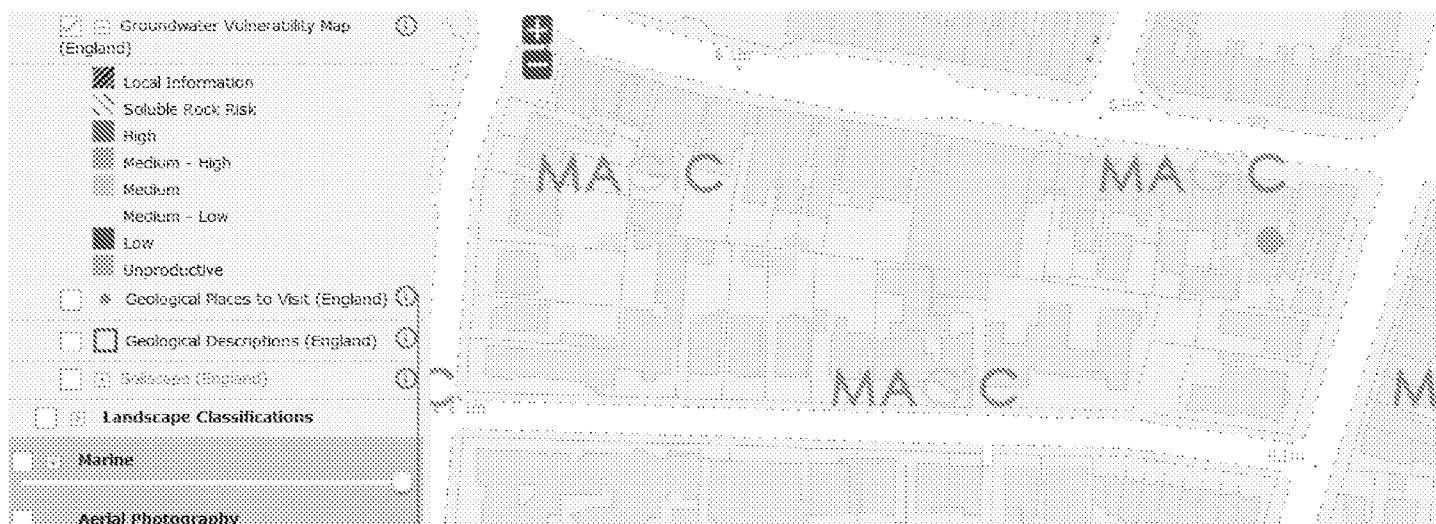


Figure 6. DEFRA Groundwater Vulnerability Map (MAGIC)

1.4.6 The site is not indicated as within or in the vicinity of any Drinking Water Protected Areas, Drinking Water Safeguard Zones or a Source Protection Zone.

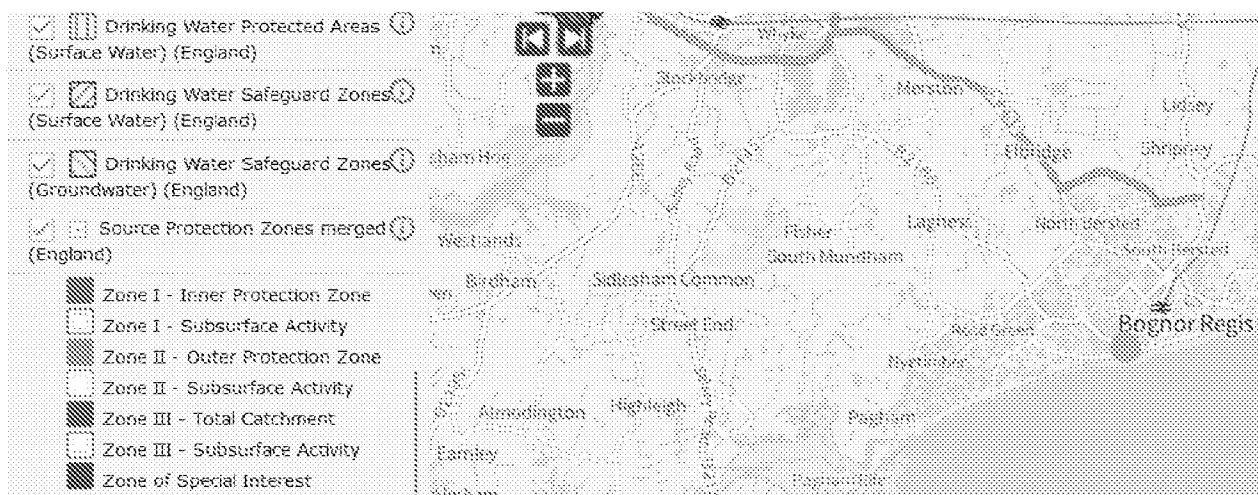


Figure 7. Drinking Water Protected Areas, Drinking Water Safeguard Zones and Source Protection Zones Map (MAGIC)

1.5 Existing Drainage

1.5.1 The local sewerage authority is Southern Water. Public sewer records have been obtained from Southern Water, as contained within this report in **Appendix D**.

1.5.2 Surface Water:

- (a) The Southern Water public sewer records identify a 300mm diameter surface water sewer located beneath Aldwick Road, to the north of the site.
- (b) The site currently drains to a combined drain located in the alleyway along the eastern boundary of the site. This drain is understood to discharge to the public foul water sewer located beneath Aldwick Road.
- (c) There are no ordinary watercourses and/or Main Rivers located within the immediate vicinity of the site.
- (d) Aldwick Beach is located c. 120.00m south of the site.
- (e) A greenfield run-off rates have been established in relation to the site area (340m²) using HR Wallingford's 'Greenfield run-off rate estimation' tool on a pro-rata basis, based on a minimum site area of 1,000m² (0.10Ha).
- (f) Greenfield run-off rates have been calculated as follows;
 - $Q^{BAR} = 0.0984\text{l/s}$
 - 1 in 1 Year – 0.0816l/s
 - 1 in 30 Year – 0.2244l/s
 - 1 in 100 Year – 0.3094l/s
 - 1 in 200 Year – 0.3638l/s
- (g) In view of the existing building on site and the associated impermeable area, the rate of run-off generated will be greater than that of the greenfield run-off rates established above.
- (h) Based on a flat rainfall rate methodology with a rainfall intensity of 50mm an hour, the impermeable area of 340m² will generate a rate of run-off totalling 4.72 l/s.

1.5.3 Foul Water:

- a) The Southern Water public sewer records identify a 375mm diameter public foul water sewer located beneath Aldwick Road, to the north of the site.
- b) The site currently drains to a combined drain located in the alleyway along the eastern boundary of the site. This drain is understood to discharge to the public foul water sewer located beneath Aldwick Road.

1.5.4 Highway Drainage:

- (a) Aldwick Road is served by traditional road gullies which are understood to discharge to the Southern Water public surface water sewer located beneath Aldwick Road.

2 PROBABILITY

2.1 Sources of Information

2.1.1 The NPPF requires that all sources of flooding are considered being Tidal, Fluvial, Pluvial, Groundwater, Sewers and Man-made reservoirs/canals.

2.1.2 The likelihood of the site flooding has been established by reviewing the following information:

- Environment Agency Flood Maps for Planning
- Environment Agency Product 4 Data (Flood Risk Assessment Information)
- Long-Term Flood Risk Map for Rivers or the Sea
- Long-Term Flood Risk Map for Surface Water
- Long-Term Flood Risk Map for Reservoirs
- Arun District Council Strategic Flood Risk Assessment

2.2 Flood Maps and Modelling

2.2.1 The Environment Agency's Flood Maps for Planning identifies the site as falling within Flood Zone 1.



Figure 8. Flood Maps for Planning (Gov.uk)

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 0.1% annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map for Planning – all land outside Zones 2, 3a and 3b).
Zone 2 Medium Probability	Land having between a 1% and 0.1% annual probability of river flooding; or land having between a 0.5% and 0.1% annual probability of sea flooding. (Land shown in light blue on the Flood Map).
Zone 3a High Probability	Land having a 1% or greater annual probability of river flooding; or land having a 0.5% or greater annual probability of sea. (Land shown in dark blue on the Flood Map).
Zone 3b The Functional Floodplain	<p>This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of function floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise:</p> <ul style="list-style-type: none"> Land having a 3.3% or greater annual probability of flooding, with any existing flood management infrastructure operating effectively; or Land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability flooding). <p>Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map).</p>

2.2.2 The Environment Agency has also confirmed in direct correspondence that the site is located in Flood Zone 1.

2.2.3 In further correspondence, the Environment Agency has confirmed a future flood risk at the site in view of the Tidal Undefended 0.5% (2070) and 0.5% (2115) Annual Exceedance Probabilities. Modelled flood levels have been provided as follows:

Node Ref	NGR		Modelled Flood Levels in Metres AOD			
	Eastings	Northings	Undefended Annual Exceedance Probability			
			0.5%	0.5% (2070)*	0.5% (2115)*	0.1%
1	492797	98785	-	-	-	-
2	492787	98774	-	-	-	-
3	492791	98760	-	5.99	6.01	-
4	492785	98755	-	-	-	-

Figure 9. Environment Agency Modelled Flood Level Data – Tidal Undefended

2.2.4 Correspondence with the Environment Agency is contained within **Appendix E**.

2.2.5 The Long-Term Flood Risk Map for Rivers or the Sea does not identify the site as being at risk of flooding from such sources.

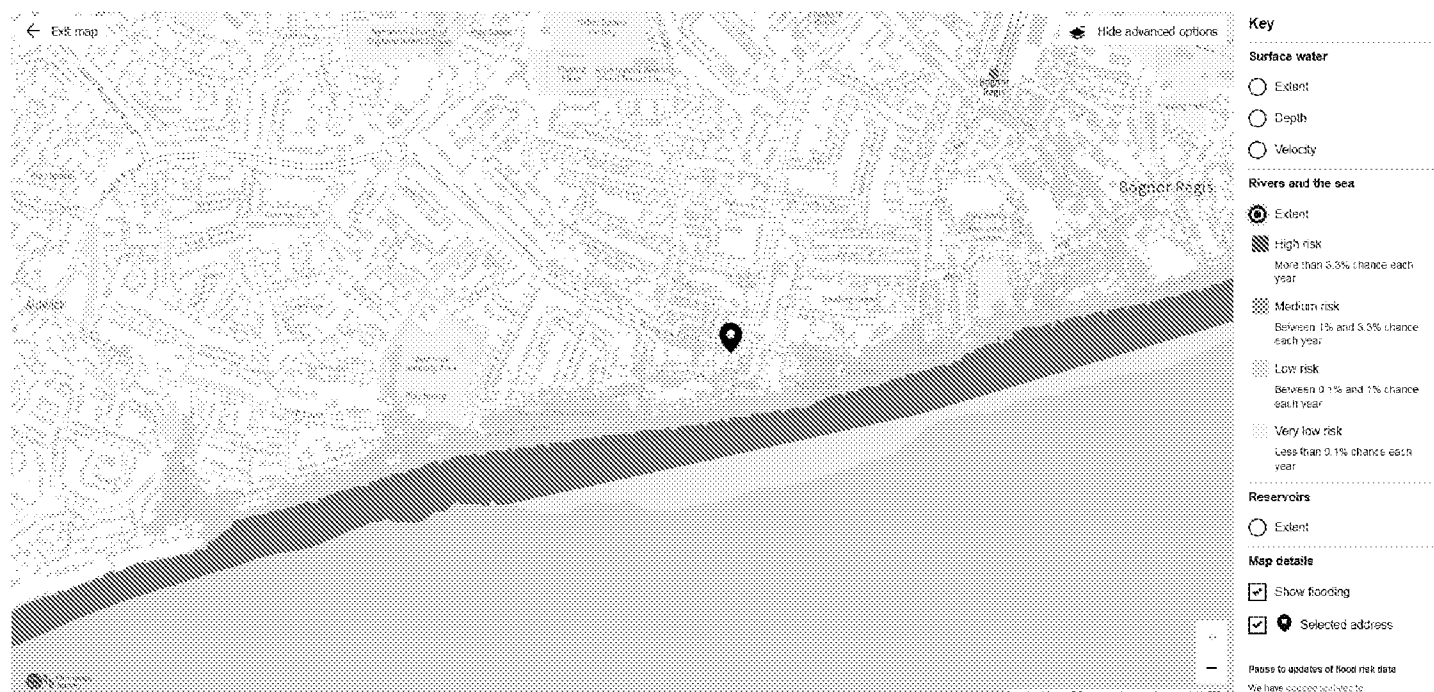


Figure 10. Long-Term Flood Risk Map, Rivers or the Sea (Gov.uk)

2.2.6 The Long-Term Flood Risk Map for Surface Water identifies the site as being at 'Very Low' risk of surface water flooding. Aldwick Road is identified as being at increased risk of surface water flooding, albeit still at 'Low' risk of surface water flooding.

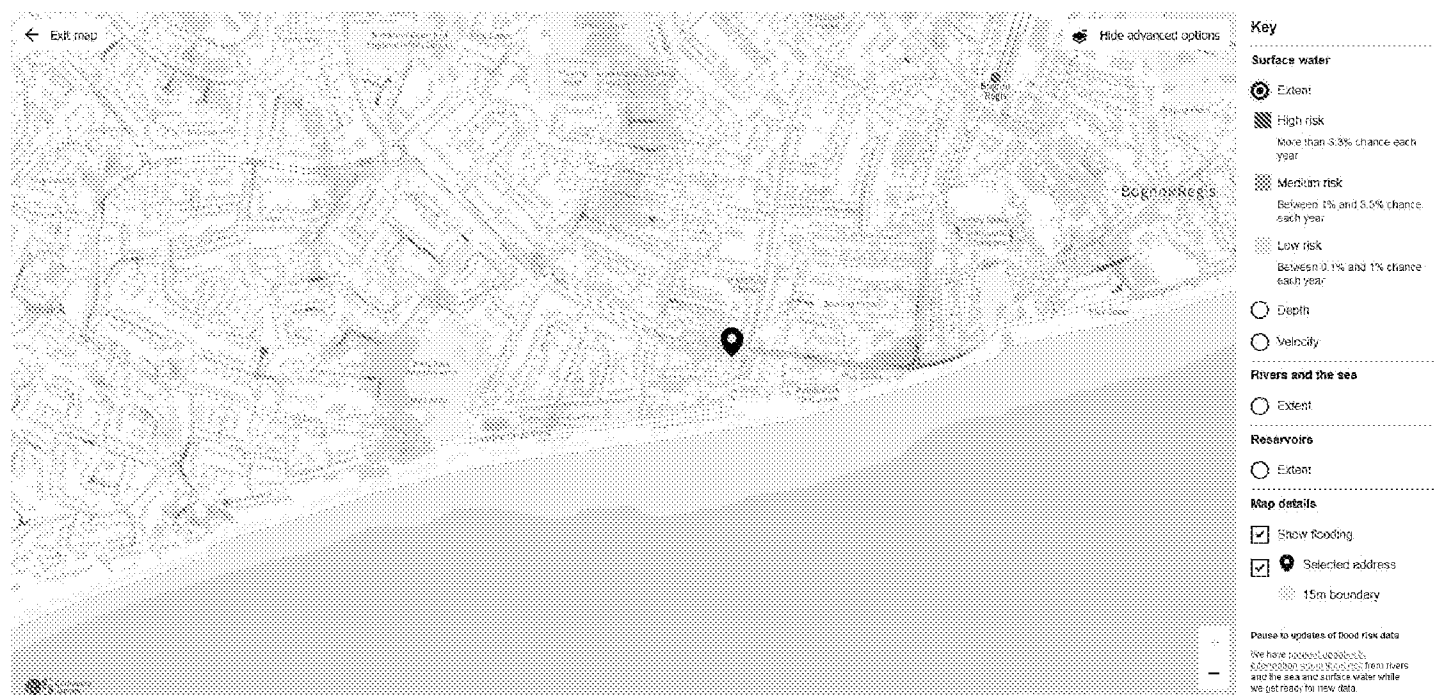


Figure 11. Long-Term Flood Risk Map, Surface Water (Gov.uk)

2.2.7 In 'Low' risk scenarios, the anticipated depth of surface water flooding on Aldwick Road is indicated as being 'Below 300mm'.

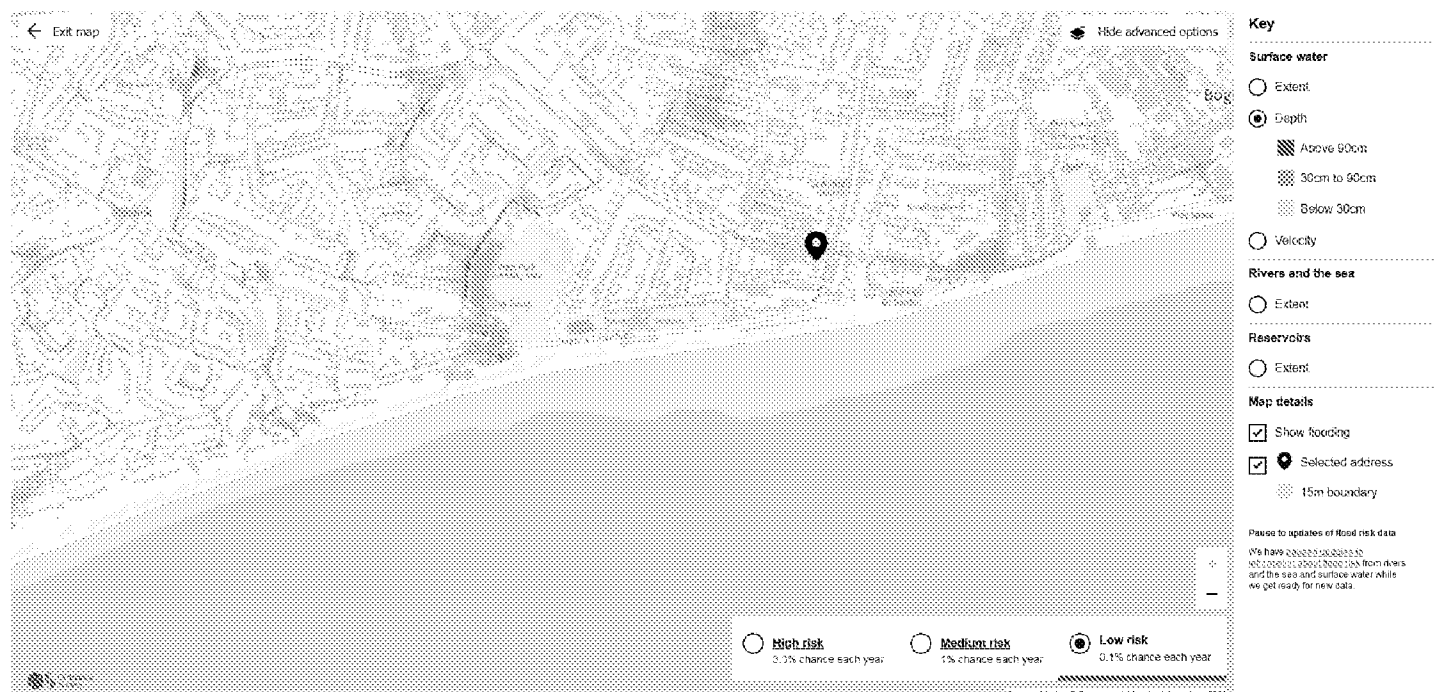


Figure 12. Long-Term Flood Risk Map, Surface Water – 'Low' Risk Depths (Gov.uk)

2.2.8 The Long-Term Flood Risk Map for Reservoirs does not identify the site as being at risk of flooding from such sources.

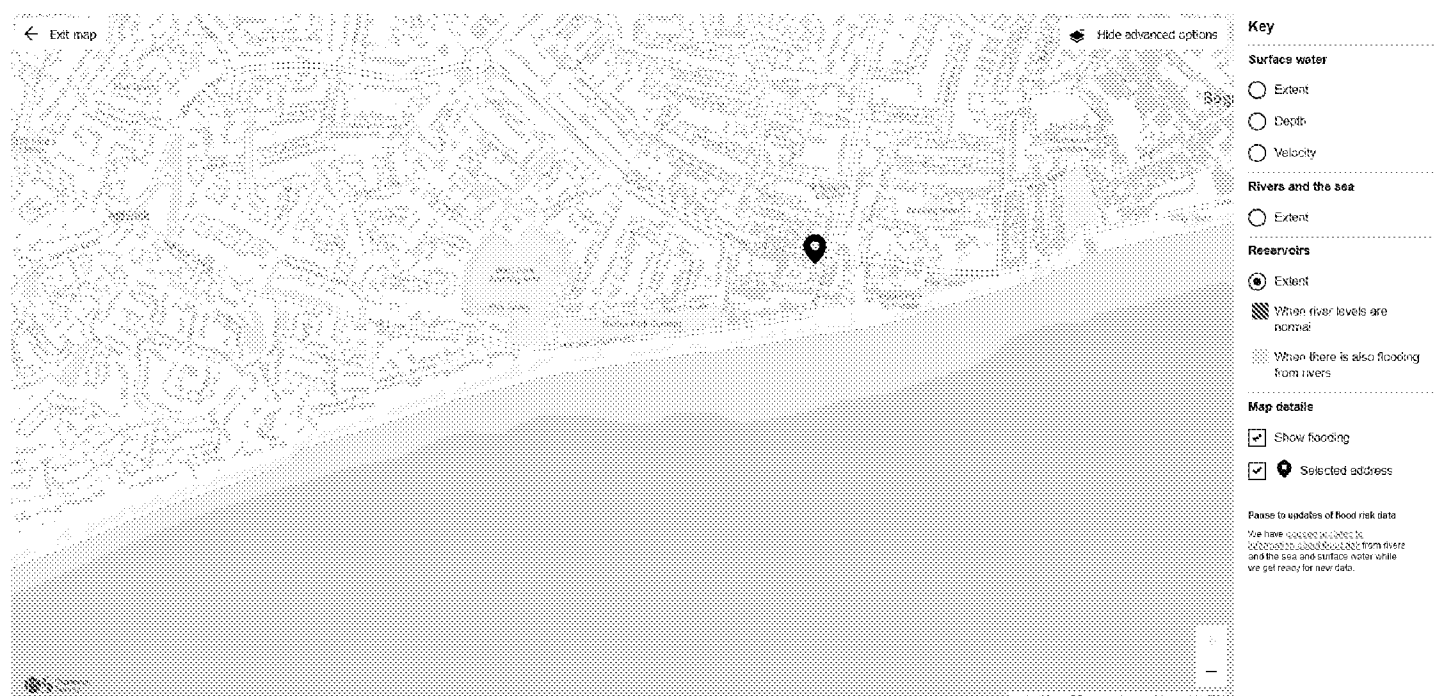


Figure 13. Long-Term Flood Risk Map, Reservoirs (Gov.uk)

2.3 Strategic Flood Risk Assessment

- 2.3.1 Arun District Council has a published combined Level 1 and Level 2 Strategic Flood Risk Assessment dated November 2016.
- 2.3.2 Mapping contained within the Arun District Council Strategic Flood Risk Assessment confirms that the site is located in Flood Zone 1.
- 2.3.3 Climate change mapping contained within the Arun District Council Strategic Flood Risk Assessment does not identify the site as being at risk of flooding in view of climate change considerations including Future Flood Zone 3a (2031), (2061) and/or (2111).
- 2.3.4 The surface water flood risk mapping contained within the Arun District Council Strategic Flood Risk Assessment is consistent with the other surface water flood mapping reviewed; the site is identified as being at 'Very Low' risk of surface water flooding, with Aldwick Road identified as being at 'Low' risk of surface water flooding.
- 2.3.5 The groundwater flood risk map within the Arun District Council Strategic Flood Risk Assessment identifies the site as being at a greater than or equal to a 25% chance of groundwater flooding, but less than 50% chance of groundwater flooding (low risk).
- 2.3.6 No instances of historic flooding are identified as per the historic flooding records map within the Arun District Council Strategic Flood Risk Assessment.
- 2.3.7 The Arun District Council Strategic Flood Risk Assessment confirms that the Sequential Test does not need to be applied for individual developments where a change of use is proposed.
- 2.3.8 Extracts, including mapping, from Arun District Council's Strategic Flood Risk Assessment are contained within **Appendix F**.

2.4 Historic Flooding

- 2.4.1 No instances of historic flooding have been identified in the undertaking of this flood risk assessment, from the sources of information reviewed.

2.5 Summary of Flood Risk

- 2.5.1 The potential sources of flooding are:

Source of Flooding	Level of Risk
Rivers and Coastal	<p>Low</p> <p>The site is located in Flood Zone 1 and is protected by existing elevated surrounding land and existing sea defences.</p>

Surface Water	<p>Very Low</p> <p>The Long-Term Flood Risk Map for Surface Water identifies the site as being at 'Very Low' risk of surface water flooding.</p> <p>The risk of surface water flooding within the adjacent carriageway (Aldwick Road) is identified as being 'Low', with anticipated depths of 'Below 300mm'.</p>
Groundwater	<p>Low</p> <p>The Arun District Council Strategic Flood Risk Assessment identifies the site as being at 'Low' risk of groundwater flooding ($\geq 25\%$ $< 50\%$)</p> <p>Historic borehole records reviewed within the vicinity of the site suggest groundwater levels at 2.10m below ground level.</p> <p>Site-specific groundwater investigation has not been undertaken.</p>
Sewers	<p>Low</p> <p>No instances of sewer flooding have been identified in the undertaking of this flood risk assessment, in relation to the sources of information reviewed.</p>
Artificial Sources	<p>None</p> <p>The site is not shown to be at risk of flooding due to artificial sources.</p>

3 PROPOSED DEVELOPMENT

3.1 Description of Development

- 3.1.1 The proposed development will involve a change of use and conversion of the existing commercial office space at ground floor level to the rear of the building to provide a single dwelling, as demonstrated by the development proposals contained within **Appendix A**.
- 3.1.2 The site is located within Flood Zone 1. The type of development proposed falls within the "More Vulnerable" flood risk vulnerability classification (Annex 3: Flood risk vulnerability classification, NPPF) and is appropriate in Flood Zone 1 (Flood Risk and Coastal Change Table 2).

Flood Zones	Flood Risk Vulnerability Classification				
	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Flood Zone 1	✓	✓	✓	✓	✓
Flood Zone 2	✓	Exception Test Required	✓	✓	✓
Flood Zone 3a†	Exception Test Required †	✗	Exception Test Required	✓	✓
Flood Zone 3b*	Exceptions Test Required *	✗	✗	✗	✓
✓ = Development is appropriate ✗ = Development should not be permitted					

- 3.1.3 The proposed development concerns a change of use, therefore no changes are proposed externally in terms of changes to the impermeable area at the site, or to existing drainage methods.

4 SEQUENTIAL AND EXCEPTION TESTS

4.1 Sequential Test

- 4.1.1 Flood Maps for Planning shows that the site is located fully within Flood Zone 1, however a future flood risk has been identified in relation to data provided by the Environment Agency, in Tidal Undefended scenarios, relating to the 0.5% (2070) and 0.5% (2115) Annual Exceedance Probabilities.
- 4.1.2 The proposed development concerns a change of use, therefore in accordance with National Planning Policy Framework (NPPF) and Arun District Council's Strategic Flood Risk Assessment, application of the Sequential Test is not required.

4.2 Exception Test

- 4.2.1 The site is confirmed as being located within Flood Zone 1, however, as referred to above, a future flood risk has been identified in relation to data provided by the Environment Agency. This future flood risk relates to Tidal Undefended scenarios, specifically the 0.5% (2070) and 0.5% (2115) Annual Exceedance Probabilities.
- 4.2.2 In view of the above, consideration has been afforded to the second aspect of the Exception Test, which requires that it must be demonstrated that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.
- 4.2.3 The proposed development concerns a change of use; converting an existing office space into a single dwelling at ground floor level, to the rear of the existing building at 47 Aldwick Road.
- 4.2.4 The proposed development will result in 'no change' in terms of the impermeable area at the site, and no changes are proposed to the existing drainage arrangements.
- 4.2.5 The site is protected by existing elevated surrounding land and existing sea defences.

5 PROPOSED DRAINAGE STRATEGY

5.1 Surface Water

- 5.1.1 The proposed change of use will not introduce any new buildings or areas of impermeable surfacing, as a result the existing surface water drainage arrangements are to be retained.
- 5.1.2 The site will continue to drain as existing, to the combined drain located in the eastern alleyway at the site, which discharges to the public sewer network in Aldwick Road.

5.2 Foul Water Drainage

- 5.2.1 The site will continue to drain to the existing combined drain located in the eastern alleyway at the site, which discharges to the public sewer network in Aldwick Road.
- 5.2.2 Post development, the new single dwelling is estimated to contribute up to 0.046 l/s peak foul water flows (based on Sewer Sector Guidance, Appendix C - Design & Construction Guidance).
- 5.2.3 It is not expected that any marginal change in foul discharge will impact the foul sewer network capacity, however, the infrastructure and connection charges (OFWAT Charging Rules) place the onus on the sewerage undertaker to reinforce their network should there no longer be sufficient capacity to serve the new development. Funding for this is provided by revised charging arrangements for infrastructure and connection charges for each dwelling constructed comprising a Network Reinforcement Charge and Site-Specific Charges. The revised charging arrangement (funded by the developer) covers alterations to the Existing Sewer Network and the sewerage undertaker remains responsible for the cost of reinforcing their Strategic Assets.

6 RESIDUAL RISK AND MITIGATION

6.1 Residual Risk

6.1.1 The following residual risks have been identified in relation to the proposed development:

- i. Flooding of buildings identified as falling within future flood risk extents, as per Environment Agency modelled flood level data

6.2 Mitigation

6.2.1 Consideration has been taken to the residual risks stated in Section 6.1, and the following mitigation measures are proposed:

- i. No mitigation is deemed necessary as the site is located in Flood Zone 1 and is protected by existing elevated surrounding land and existing sea defences.