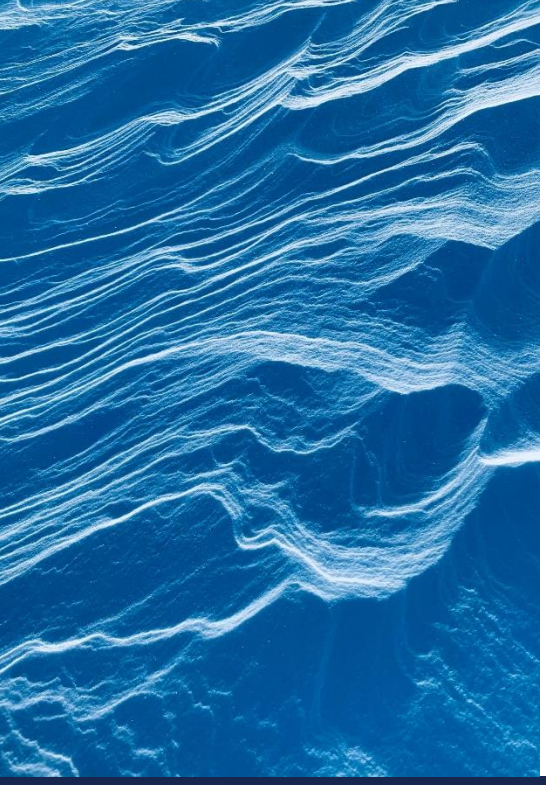



Flood Risk Assessment
AEG3230_BN15_Adur_01

Site Address: 174 & 174a Brighton Road
Lancing
Adur
West Sussex
BN15 8LH

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Flood risk, water and environment

UK Experts in Flood Modelling, Flood Risk Assessments, and Surface Water Drainage Strategies

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Document Issue Record

Project: Flood Risk Assessment

Prepared for: Micky R

Reference: AEG3230_BN15_Adur_01

Site Location: 174 & 174a Brighton Road, Lancing, Adur, West Sussex, BN15 8LH

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Please Note:

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Flood risk, water and environment

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Summary

Development Description	Existing	Proposed
Development Type	Two flats (174 & 174a) – one self contained at ground floor, one at first floor.	Extension and reconfiguration of building to form two townhouses. Ground floors to be used as car port, storage, utility, gymnasiums. Habitable space to start at first floor. Providing betterment over the existing self-contained ground floor arrangement.
EA Vulnerability Classification	More Vulnerable	More Vulnerable
Ground Floor Level	Ground floor level 2.21 mAOD based on plans provided by the client.	Ground floor level 2.25 mAOD at the front and 2.60 mAOD at the rear of the proposed development.
Level of Sleeping Accommodation	Ground and first floor	First and second floor. No ground floor sleeping accommodation
Surface Water Drainage	N/A[1]	Surface Water Drainage Strategy recommended prior to detailed design.
Site Size	Approximately 379m^2	No change
Risk to Development	**Summary**	**Comment**
EA Flood Zone	Flood Zone 3	
Flood Source	Tidal	Site located within modelled 1 in 200-year or greater events
SFRA Available	Adur and Worthing Level 1 and Level 2 Strategic Flood Risk Assessment (Adur District Council, 2020)	
Management Measures	**Summary**	**Comment**
Ground floor level above extreme flood levels	No	Ground and first floor level could be affected within modelled 1 in 200-year +CC tidal flooding event. However, scheme presents a betterment over existing site.

Safe Access/Egress Route	Entire surrounding area flooded during 1 in 200-year or greater tidal event	Save refuge to be sought on site at first or second floor in the event of a tidal flood. As the proposal is for the alterations to the existing building to extend the two existing dwellings on site, access/ egress arrangements will not differ from the existing – as the site will contain two units in both the existing and proposed. However the proposed provide a betterment as a place of refuge is created at the first floor and above for both units, whereas the existing provided a self-contained ground floor flat.
Flood Resilient Design	Recommended	Proposed development includes implementation of flood resilience and resistance measures.
Site Drainage Plan	Recommended	Surface Water Drainage Strategy recommended prior to detailed design.
Flood Warning and Evacuation Plan	Yes	Recommended to sign up to the Areas of Shoreham at risk including the High Street, Old Shoreham Road, Shoreham Airport, Riverside Road, Beach Green, Eastern parts of North and South Lancing, Broadway and Willowbrook caravan parks, Adur recreation ground and Aldrington Basin Environment Agency (EA) flood warning service.
Offsite Impacts	**Summary**	**Comment**
Displacement of floodwater	No displacement	Site is within an area of tidal flood risk and thus in accordance with Paragraph 049 of the NPPG, is unlikely to result in significant loss of floodplain storage.
Increase in surface run-off generation	N/A[1]	Surface Water Drainage Strategy recommended prior to detailed design.
Impact on hydraulic performance of channels	Negligible	The nearest ordinary watercourse is an unnamed tributary of the River Adur located approximately 470 m north of the site and ultimately discharges into the River Adur 1.2 km north east of the site.

[1] not required for this assessment

[2] data not available.

1. Introduction

1.1. Aegaea were commissioned by Micky R to undertake a Flood Risk Assessment (FRA) to facilitate a planning application for the proposed development. This FRA has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance.

1.2. This FRA is intended to support a full planning application and as such the level of detail included is commensurate and subject to the nature of the proposals.

Site Overview

1.3. The site of the proposed development is 174 & 174a Brighton Road, Lancing, Adur, West Sussex, BN15 8LH (Figure 1).

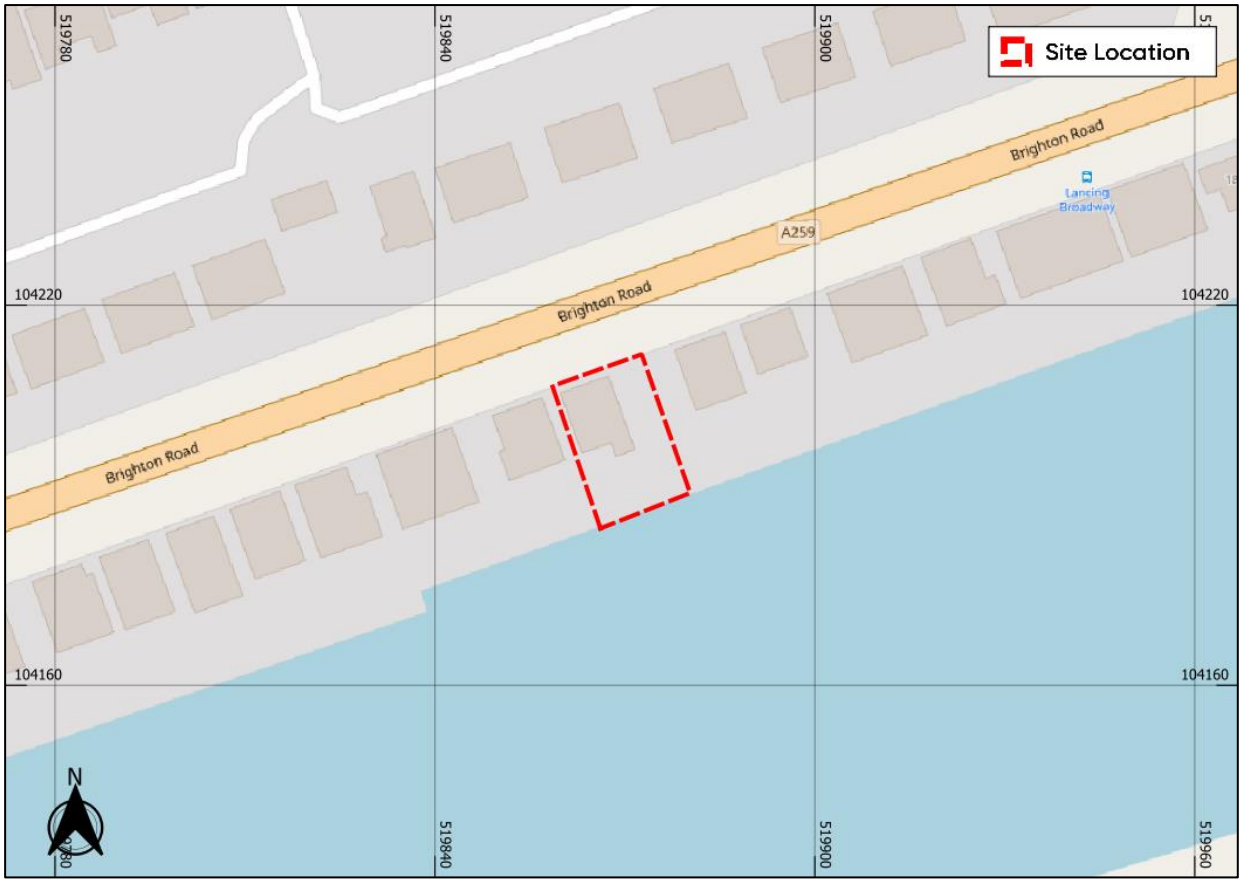

Figure 1: Site Location (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors)

1.4. It is understood that the proposed development is for the extension and alteration to the existing building from two flats into two townhouses. As existing, there is one flat at ground floor and one at first floor.

1.5. The proposed development would consist of no living accommodation on the ground floor and only providing living accommodation on the first and second floor. Proposed layout and plans are shown in Appendix A.

1.6. In the absence of a topographical survey, Environment Agency Light Detection and Ranging (LiDAR) data Digital Terrain Model has been used to review the topography of the site. The LiDAR data shows that the ground elevations of the site vary between approximately 2.2 metres Above Ordnance Datum (mAOD) and 2.9 mAOD (1m LiDAR data), with the site shown to slope to the south (Figure 2).

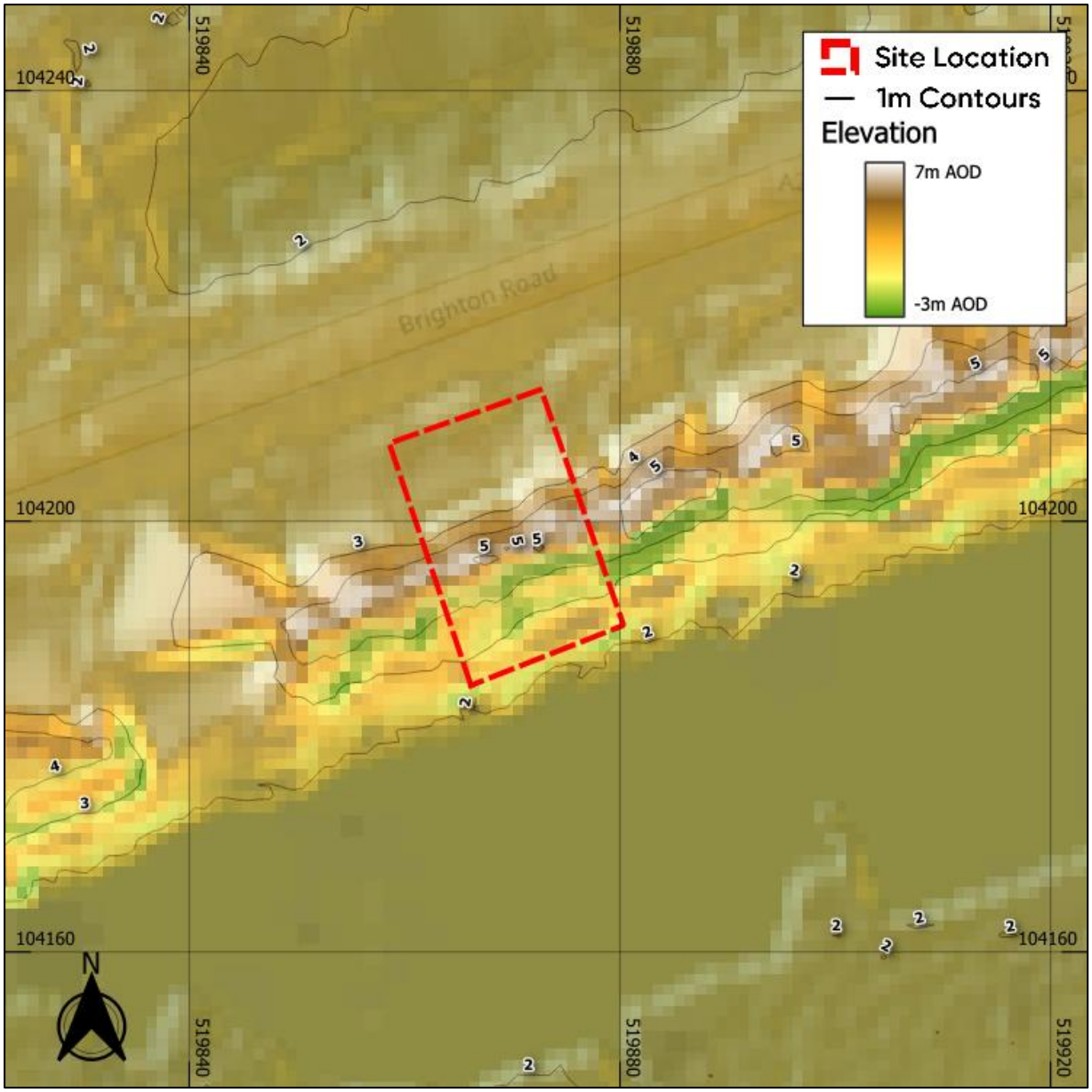

Figure 2: Site Topography (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

1.7. Adur District Council is the Local Planning Authority (LPA) for the site and West Sussex County Council is the designated Lead Local Flood Authority (LLFA). The site sits within the Environment Agency's Solent and South Downs region.

Planning Policy and Guidance

1.8. UK government planning guidance states[1] that an FRA is required for developments which are:

- *in flood zone 2 or 3 including minor development and change of use*
- *more than 1 hectare (ha) in flood zone 1*
- *less than 1 ha in flood zone 1, including a change of use in development type to a more vulnerable class (for example from commercial to residential), where they could be affected by sources of flooding other than rivers and the sea (for example surface water drains, reservoirs)*
- *in an area within flood zone 1 which has critical drainage problems as notified by the Environment Agency*

1.9. The site is located within Flood Zone 3. According to NPPF Footnote 55 an FRA is required.

1.10. The objective of this FRA is to demonstrate that the proposals are acceptable in terms of flood risk. This report summarises the findings of the study and specifically addresses the following issues in the context of the current legislative regime:

- Fluvial/ tidal flood risk
- Surface water flood risk
- Risk of flooding from other sources

[1]https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications#when-you-need-an-assessment

2. Planning Policy

2.1. Inappropriate development in a flood risk area could pose significant risk in terms of personal safety and damage to property for the occupiers of the development or for people elsewhere. The approach taken in the assessment of flood risk at the planning stage is set out in national, regional, and local planning policy and associated guidance. This section summarises the key policies and guidance relevant to the proposed development.

National Planning Policy Framework (NPPF)

2.2. The National Planning Policy Framework[2] (NPPF) (DLUHC, 2023) which includes UK Government policy on development and flood risk states:

> *159. Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.*
>
> *167. When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:*
>
> *a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;*
>
> *b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;*
>
> *c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;*

[2] https://www.gov.uk/guidance/national-planning-policy-framework, **last updated Sept 2023**

d) any residual risk can be safely managed; and

e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

168. Applications for some minor development and changes of use should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 55.

2.3. Footnote 55 of the NPPF states:

A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

2.4. Flood Zones in England are defined as follows:

Table 1: Flood Zone Definitions

Flood Zone	Definition
Zone 1 Low Probability	Land having less than 1 in 1,000 annual probability of river or sea flooding (all land outside Zones 2 and 3).
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding.
Zone 3b The Functional Floodplain	This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise: land having a 3.3% or greater annual probability of flooding, with any existing flood risk 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 of flooding). 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)

2.5. An FRA should be appropriate to the scale, nature, and location of the development. It should identify and assess the risk from all sources of flooding to and from the development and demonstrate how any flood risks will be managed over the lifetime of the development.

2.6. An assessment of hydrological impacts should be undertaken, including to surface water runoff and impacts to drainage networks in order to demonstrate how flood risk to others will be managed following development and taking climate change into account.

2.7. Paragraph 051 of the NPPG defines minor developments as:

- *minor non-residential extensions (industrial/commercial/leisure etc): extensions with a floorspace not in excess of 250 square metres.*
- *alterations: development that does not increase the size of buildings, e.g. alterations to external appearance.*
- *householder development: for example, sheds, garages, games rooms etc. within the curtilage of the existing dwelling,* ***in addition to physical extensions to the existing dwelling itself.*** *This definition excludes any proposed development that would create a separate dwelling within the curtilage of the existing dwelling (e.g. subdivision of houses into flats) or any other development with a purpose not incidental to the enjoyment of the dwelling.*

2.8. The proposal seeks to extend two existing flats on site to provide two larger dwellings. As such, the proposal is for the construction of extensions to the existing dwellings themselves and thus in isolation, would be considered minor developments.

Local Plan

2.9. The Local Plan prepared by the Local Planning Authority, Adur District Council, sets out the policies for development in the local area.

2.10. Policy 36 Flood Risk and Sustainable Drainage outlines the requirements for new development within the area. It states:

The Council will work with relevant bodies to ensure that flood risk in Adur is reduced. A site specific flood risk assessment must be submitted with planning applications for:

- Proposals of 1 hectare or greater in Flood Zone 1

- All development or changes of use to a more vulnerable use in Flood Zones 2 and 3

- All development (excluding 'minor development' as defined in paragraph 046 of the National Planning Policy Framework Planning Practice Guidance) or changes of use to a more vulnerable use, regardless of flood zone or size, where flood risk from other sources (surface water, sewer, groundwater) is identified by the Strategic Flood Risk Assessment.

The flood risk assessment will need to demonstrate that development:

- is appropriately flood resilient and resistant, includes safe access and escape routes where required, and that any residual risk can be safely managed;

- will be safe for its lifetime taking account of the vulnerability of its users;

- will not increase flood risk (including sewer flooding, surface water and groundwater flood risk) elsewhere;

- will, where possible, reduce flood risk overall; and

- will give priority to the use of sustainable drainage systems.

The flood risk assessment will also need to demonstrate that, where possible, higher vulnerability uses have been located on parts of the site at the lowest probability of flooding.

New development within Adur must include some form of Sustainable Drainage System (SuDS) or other appropriate design measures in order to reduce the risks of surface water flooding and to mitigate the risk of pollution to groundwater sources. SuDS should be considered before other forms of disposal. Substantial storage through SuDS will be required to achieve a reduction in runoff to levels below that experienced prior to development. On relevant sites, storage of runoff during the high part of the tidal cycle should be addressed. SuDS must be designed sensitively and must seek to enhance landscapes, increase biodiversity gains, and provide quality spaces.

For all developments, applicants will be required to demonstrate that acceptable management arrangements are in place and funded to ensure the ongoing maintenance of SuDS into the future. Where it is not practical to provide SuDS on site, the development of strategic level SuDS may be considered appropriate. In these circumstances, contributions may be required through s106 undertakings/ CIL.

Sequential and Exception Tests

2.11. The Sequential and Exception Tests are applied in specific cases defined by UK Government policy. Their purpose is to drive developments to areas of low flood risk and to support developments which improve flood risk for developments in areas at risk of flooding.

Sequential Test and Exception Test

2.12. Paragraph 168 of the NPPF states:

> *168. Applications for some minor development and changes of use should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 55.*

2.13. The proposal seeks to extend two existing flats on site to provide two larger dwellings. As such, the proposal is for the construction of extensions to the existing dwellings themselves and thus in isolation, would be considered minor developments.

2.14. As such, the application of the Sequential Test and Exception Test is not considered relevant in this instance.

2.15. The proposed development does not increase the number of units on site and provides a no sleeping accommodation on the ground floor applying a sequential design to the proposed development and a significant betterment to the existing property.

Summary

2.16. This flood risk assessment has been prepared with due consideration to the above local and national policy.

3. Consultation and Review

Consultation

3.1. Aegaea requested flood data for the area and received the Arun to Adur Coastal Modelling (2012) produced by JBA Consulting. The proposed development lies within the model's study area and has been analysed in Section 4 of this report to determine the flood risk to the site. Consultation with the EA is outlined in Appendix B.

Documents and Online Mapping

3.2. Local Governments and Lead Local Flood Authorities provide documents which contain data and policies on flood risk and new development in their areas. These documents are introduced and briefly summarised below. For the purposes of this FRA, these documents have been reviewed for relevant information and any relevant data is discussed within the appropriate sub heading of this report.

3.3. The following sources of information have been reviewed for this assessment:

- Flood Map for Planning on the Environment Agency website *https://flood-map-for-planning.service.gov.uk/*
- Long Term Flood Risk Information on the Environment Agency website *https://www.gov.uk/check-long-term-flood-risk*
- National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing and Communities, 2023)
- Planning Practice Guidance - Flood Risk and Coastal Change (Department for Levelling Up, Housing and Communities, 2022)
- Geoindex Onshore (British Geological Survey, 2023)
- Adur Local Plan 2017 (Adur District Council, 2014)[3]
- West Sussex Preliminary Flood Risk Assessment (West Sussex County Council, 2011)[4]

[3] **https://www.adur-worthing.gov.uk/adur-local-plan/**

[4] **https://www.westsussex.gov.uk/media/1626/west_sussex_pfra.pdf**

- Adur and Worthing Level 1 and Level 2 Strategic Flood Risk Assessment (Adur District Council, 2020)[5]
- West Sussex Local Flood Risk Management Strategy (2013-2018) (West Sussex County Council, 2014)[6]

Preliminary Flood Risk Assessment (PFRA)

3.4. The PFRA, published in 2011, is a high-level appraisal of flood risk across Lead Local Flood Authority West Sussex County Council. The flood risk from all sources, including fluvial, surface water, groundwater, and surcharged sewers is evaluated. It is the basis upon which the Local Flood Risk Management Strategy is produced.

3.5. The PFRA summarises historical flood incidents in West Sussex County Council. The site is not recorded as having been affected by any flood event.

Strategic Flood Risk Assessment (SFRA)

3.6. The SFRA, published in 2020, provides the evidence base for the Local Planning Authority Adur District Council Local Plan and guidance for consideration when determining planning applications. The SFRA seeks to place new development into areas of lower flood risk taking into account current flood risk, future flood risk, and the effect a proposed development would have on the risk of flooding.

3.7. The SFRA mapping provided by Adur District Council has been used throughout production of this report as a source of information, particularly pertaining to historical flood incidents.

Local Flood Risk Management Strategy (LFRMS)

3.8. The Local Flood Risk Management Strategy sets out roles and responsibilities for flood risk management, assesses the risk of flooding in the area, where funding can be found to manage flood risk, and the policies, objectives, and actions of the Lead Local Flood Authority.

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[5] https://www.adur-worthing.gov.uk/planning-policy/joint-aw/adur-and-worthing-background-studies-and-info/flood-risk/

[6] https://www.westsussex.gov.uk/media/1595/local_flood_risk_management_strategy.pdf

3.9. The West Sussex County Council LFRMS is used within this report to identify any flood management infrastructure and historical incidences of flooding.

4. Sources of Flood Risk

Tidal

4.1. Tidal flooding occurs when a high tide and high winds combine to elevate sea levels. An area behind coastal flood defences can still flood if waves overtop the defences or break through them. Tidal flooding can also occur a long way from the coast by raising river levels. Water may overtop the river bank or river defences when tide levels are high.

4.2. The site is located within Flood Zone 3. Flood Zone 3 denotes a risk of flooding from tidal sources greater than 1 in 200 (0.5%), as shown in Figure 3.

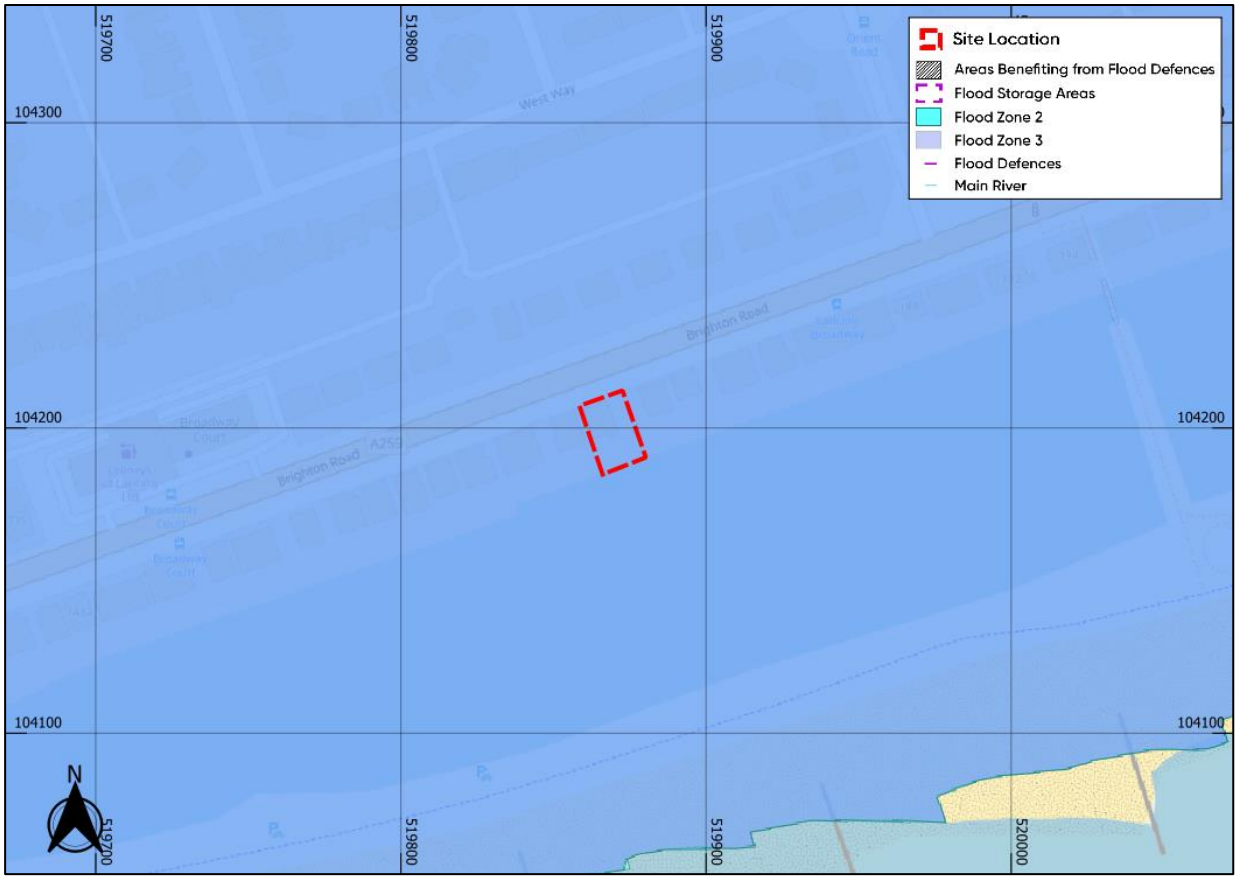


Figure 3: EA Flood Map for Planning (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

Historical Fluvial Flooding

4.3. Based on the EA recorded flood outlines provided the site has not been previously flooded, as shown in Figure 4.



Figure 4: EA Historic Flood Mapping provided within Product 4 data request.

Environment Agency Arun to Adur Coastal Model

4.4. Aegaea has been provided with Product 4 for this area by the Environment Agency which has been used to inform this FRA. This information is based on the Arun to Adur Coastal Modelling (2012). This is understood to be the best available information for this area.

4.5. The 2012 model domain covers the Arun to Adur and provides flood extents, levels and depths for a range of return periods and climate change scenarios. x

4.6. The EA product data provided shows the site is affected during a 1 in 200 year event, the undefended event shows the site has a maximum water level 4.25 mAOD. The defended scenario has a maximum water level 2.42 mAOD which would only affect the front of the proposed development as the ground level is 2.25 mAOD. The rear of the proposed development has a ground level 2.60 mAOD and therefore would be unaffected

4.7. Given that there are flood defences in the form of a beach along the frontage, the defended scenario is considered more realistic.

Climate change

4.8. The 1 in 200 year event plus climate change, 2070 and 2115, events are provided and shown in Table 2. The results show the site would be affected by all events.

Table 2: Undefended and Defended 1 in 200-year plus climate change water levels

	Undefended 1 in 200-year +CC		Defended 1 in 200-year +CC	
	2070	2115	2070	2115
Water level	4.78	5.41	4.46	5.05

4.9. It is acknowledged that there has been updated guidance on climate change allowances since the modelling study refenced above was completed. There have been updates relating to the estimates of extreme sea level (Coastal Flood Boundary Conditions 2017) and also revised guidance from the EA on applying sea level rise for climate change (due to the UK Climate Projections 2018).

4.10. Updating the tidal flood modelling study is not considered commensurate with the scale of the development proposed. In the absence of this the extreme sea level has been calculated and applied to the site, though this may overestimate the flood level at the site as it does not take into account the presence of defences.

4.11. The future sea level for the year 2125 has been estimated from these most contemporary dataset and guidance as set out in Table 3.

0.5% AEP sea level estimate for present day (2017)	'Higher Central' 0.5% AEP sea level estimate for the year 2125 (m AOD)	'Upper End' 0.5% AEP sea level estimate for the year 2125 (m AOD)
4.24	5.34	5.72

Table 3: Extreme sea level estimates for the year 2125 based on the EA's two sea level confidence scenarios from their latest guidance on applying climate change to sea levels, and using the latest coastal flood boundary condition database (2017).

4.12. Based on plans provided by the client, the ground floor FFLs are 2.25 mAOD at the front and 2.60 mAOD at the rear; the first-floor levels are 4.94 mAOD at the front and 5.29 mAOD at the rear. Based on the defended 1 in 200 year water level including a 'higher central' climate change allowance, the ground floor of the proposed development would be flooded to a maximum depth of 3.09m at the front and 2.74m at the rear. The first floor of the proposed development could experience flood depths of 0.40m in this event at its lowest point, with the higher FFLs to the rear considered to flood to a depth of 0.05m.

4.13. The existing property consists of two flats, one of each of the ground and first floors. The existing site therefore contains a self-contained ground floor flat at a high risk of tidal flooding.

4.14. Given the tidal flood risk to the site, the proposed development would consist of no living accommodation on the ground floor providing a significant betterment than the existing property. While the first floor may be partially affected in the defended 1 in 200-year plus climate change event, it should be noted that the proposal provides a significant betterment over the existing situation.

4.15. Furthermore, as the proposals comprise a minor development, this also complies with the EA Standing Advice for Minor Developments in setting the FFLs no lower than the existing.

4.16. As the site is located within the modelled 1 in 200 year plus climate change event, mitigation measures are outlined in Section 5.

4.17. Based on the information above, the tidal flood risk to this site is considered to be High.

Fluvial

4.18. Flooding from watercourses arises when flows exceed the capacity of the channel, or where a restrictive structure is encountered, resulting in water overtopping the banks into the floodplain.

4.19. The site is located within Flood Zone 3 (Figure 3) however is associated with tidal sources located near the site.

Main Rivers

4.20. The nearest main river is River Adur located approximately 1.2km north east of the site.

Ordinary Watercourses

4.21. The nearest ordinary watercourse is an unnamed tributary of the River Adur located approximately 470 m north of the site and ultimately discharges into the River Adur 1.2 km north east of the site.

Summary

4.22. The risk of flooding to this site from fluvial sources is considered to be low.

Canals

4.23. The Canal and River Trust (CRT) generally maintains canal levels using reservoirs, feeders, and boreholes and manages water levels by transferring it within the canal system.

4.24. The site is not located within the vicinity of any CRT maintained canals.

4.25. The risk of flooding to his site from canals is considered to be low.

Pluvial

4.26. Pluvial flooding can occur during prolonged or intense storm events when the infiltration potential of soils, or the capacity of drainage infrastructure is overwhelmed leading to the accumulation of surface water and the generation of overland flow routes.

4.27. Annual surface water flood risk is labelled by the EA as:

- 'High Risk'; >3.3% AEP (annual probability greater than 1 in 30).
- 'Medium Risk'; 1.1% to 3.3% AEP (annual probability between 1 in 100 and 1 in 30).
- 'Low Risk'; 0.1% to 1% AEP (annual probability between 1 in 1000 and 1 in 100).
- 'Very Low Risk'; <0.1% AEP (annual probability less than 1 in 1000).

4.28. Examination of the EA's Flood Risk from Surface Water mapping for High Risk, Medium Risk, and Low Risk AEP flood events shows the site is not affected in any of the modelled surface water flood events, as shown in Figure 5.

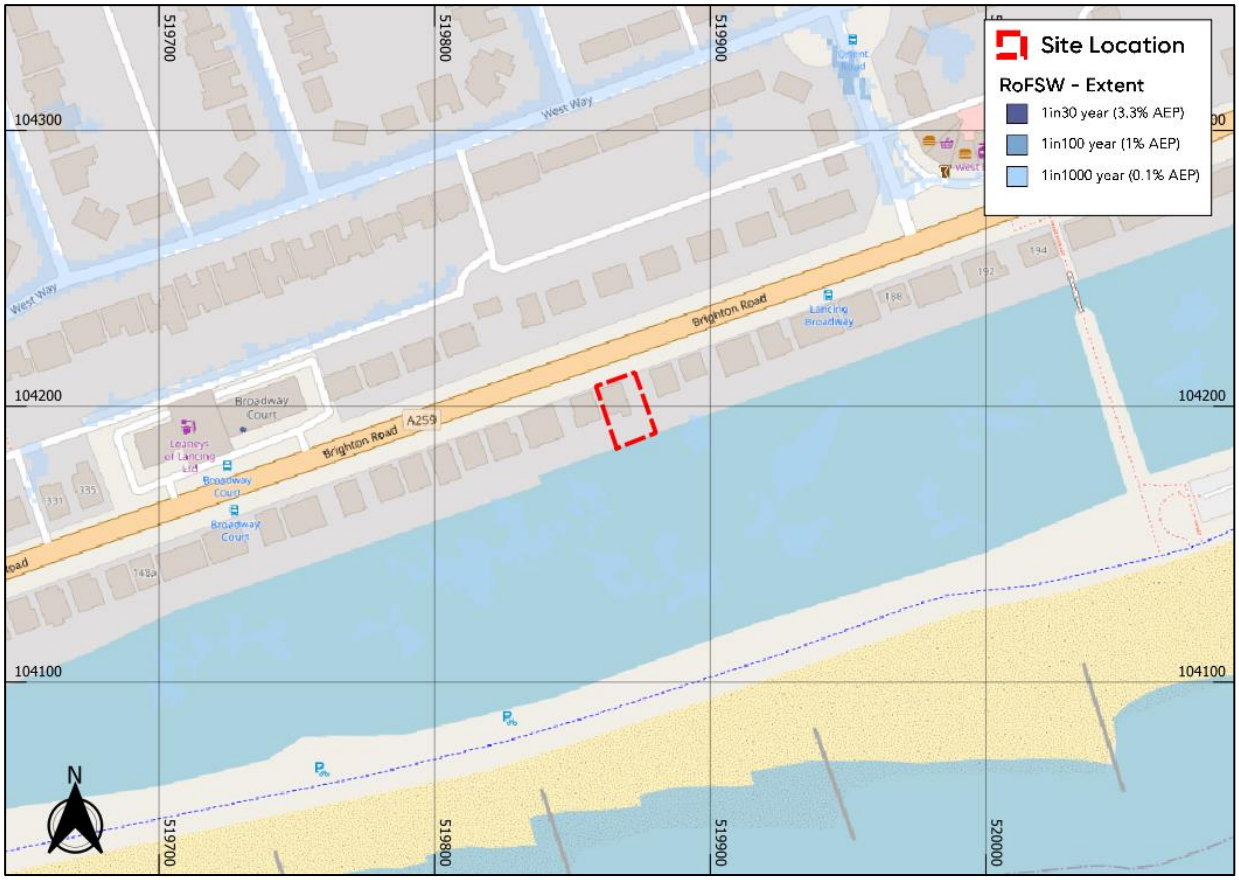


Figure 5: EA Surface Water Flood Risk Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

4.29. In the modelled 1 in 30-year event, the site is shown to be unaffected by surface water flooding, as shown in Figure 6. In addition, access and egress to the site via Brighton Road is unaffected.

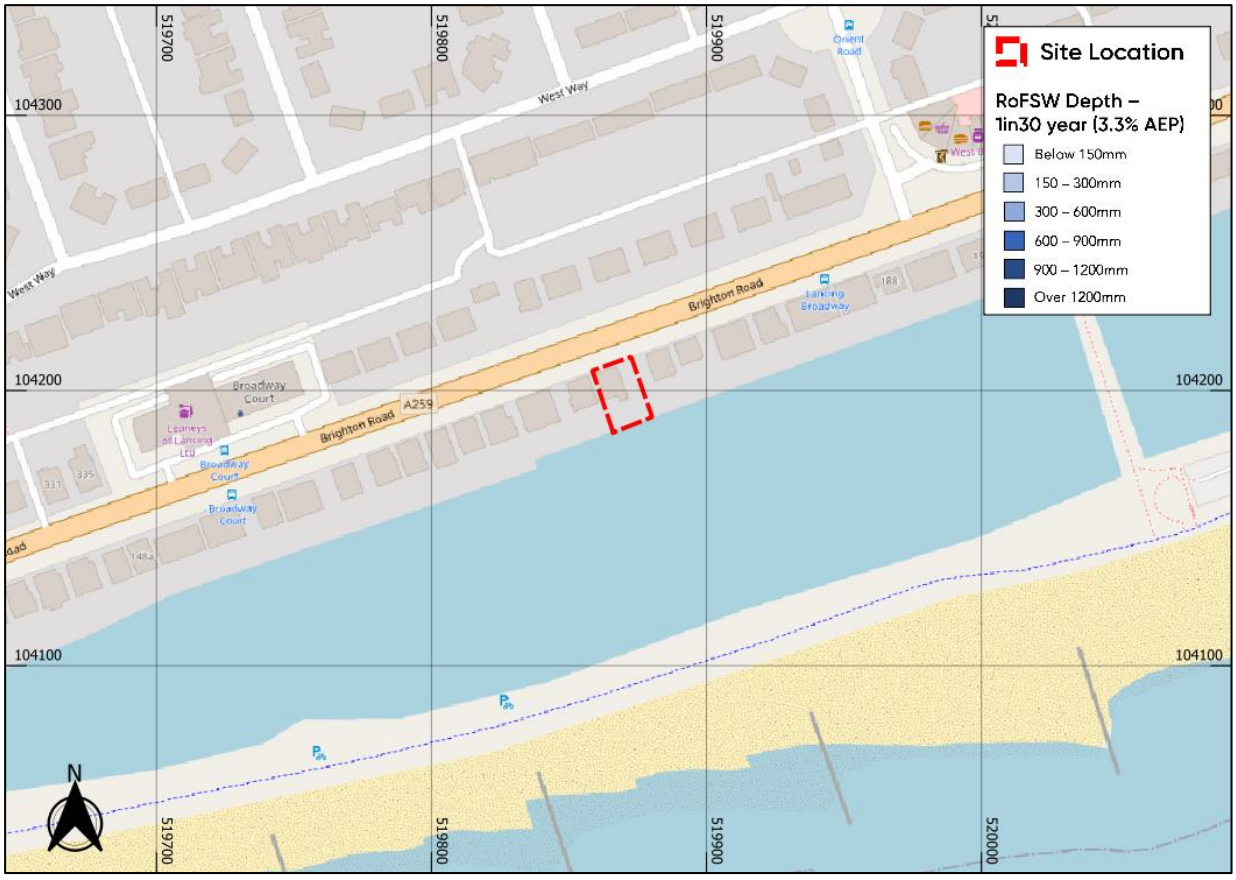


Figure 6: EA Surface Water Flood Risk Mapping 1 in 30-year event depths (Source: Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors, © EA copyright and/or database right 2015)

4.30. In the modelled 1 in 100-year event, the site is shown to be unaffected by surface water flooding, as shown in Figure 7. In addition, access and egress to the site via Brighton Road is unaffected.

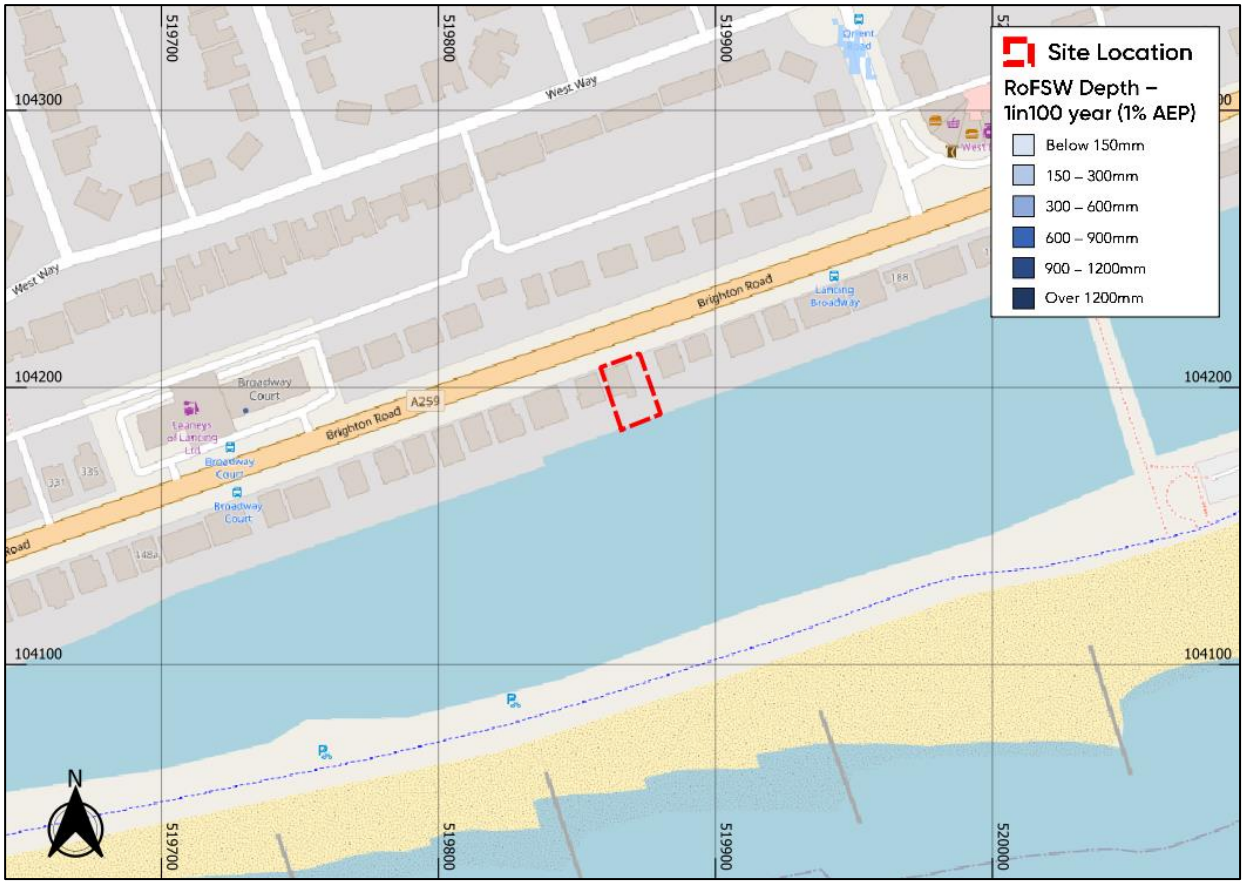


Figure 7: EA Surface Water Flood Risk Mapping 1 in 100-year event depths (Source: Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors, © EA copyright and/or database right 2015)

4.31. In the modelled 1 in 1000-year event, the site is shown to be unaffected by surface water flooding, as shown in Figure 8. In addition, access and egress to the site via Brighton Road is unaffected.

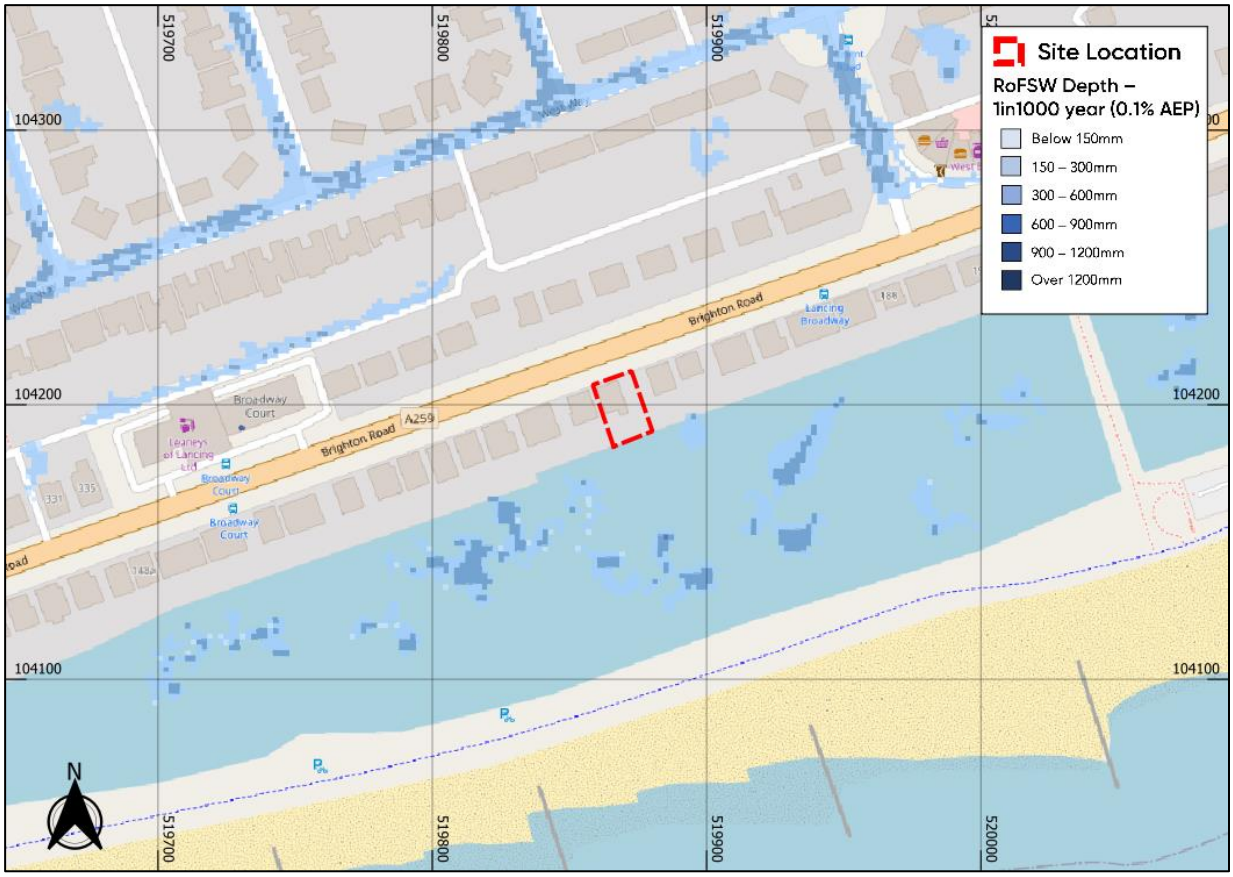


Figure 8: EA Surface Water Flood Risk Mapping 1 in 100-year event depths (Source: Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © https://www.openstreetmap.org and contributors, © EA copyright and/or database right 2015)

4.32. The risk of flooding to this site from pluvial sources is considered to be low.

Reservoirs

4.33. Flooding can occur from large waterbodies or reservoirs if they are impounded above the surrounding ground levels or are used to retain floodwater. Although unlikely, reservoirs and large waterbodies could overtop or breach leading to rapid inundation of the downstream floodplain.

4.34. According to the EA's Flood Risk from Reservoirs mapping the site is outside modelled flood extents in the event of reservoir flooding, as shown in Figure 9.

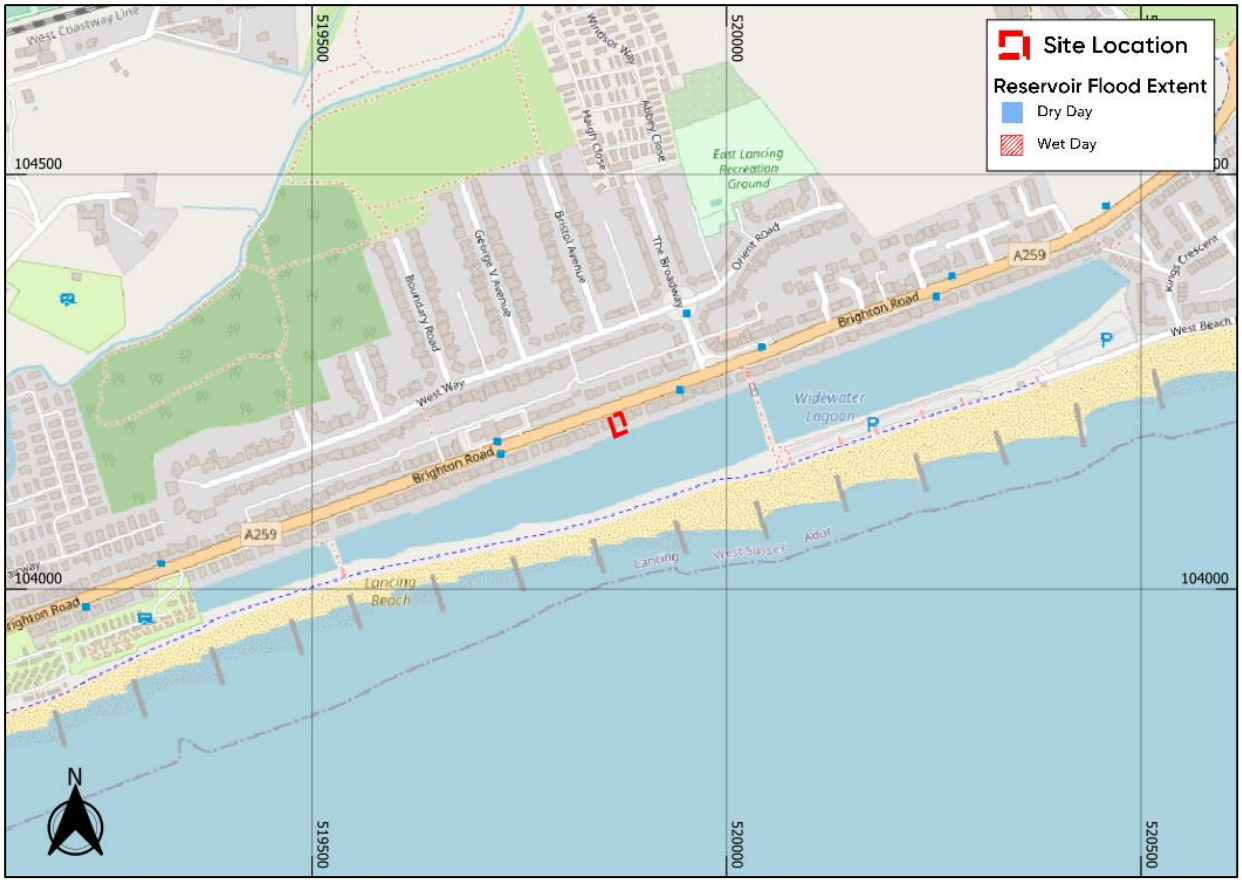


Figure 9: EA Reservoir Flood Risk Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). ©https://www.openstreetmap.org and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

4.35. The site has not been flagged as being at risk of flooding following a reservoir failure.

4.36. The risk of flooding to his site from reservoirs is considered to be low.

Groundwater

4.37. Groundwater flooding occurs in areas where underlying geology is permeable and water can rise within the strata sufficiently to breach the surface.

4.38. The British Geological Survey's (BGS) mapping shows superficial deposits of alluvium – clay, sand and peat underlying the site. The bedrock geology under the site is Lambeth Group – Clay, silt and sand.

4.39. The nearest historical BGS borehole is located 230 m south of the site however is located on the other side of Widewater and therefore may not best represent the sites underlying ground conditions. The second closest borehole is located approximately 300 m northeast of the site

(BGS ID: 583930) and highlights the site is underlaid by 18m alluvium (shingle and sand) followed by 3m of Chalk (chalk and flints). No water was encountered in the borehole.

4.40. The SFRA presents the JBA's Areas Susceptible to Groundwater Flooding mapping, which assesses groundwater levels. The map shows the site is located within an area at 'no risk'.

4.41. As the development proposals do not include any proposed basements, the risk of flooding to this site from groundwater is considered to be low.

Sewers

4.42. Foul or surface water sewers can be a cause of flooding if the drainage network becomes overwhelmed, either by blockage or due to local development beyond the designed capabilities of the drainage system.

4.43. The SFRA provides sewer incident records per postcode area, for the site postcode area, BN15 8, a total of 6 sewer incidents have been recorded. Details regarding the flood events is not provided however based on the historical incidents map, the incidents are located in low lying ground (<2 mAOD). The incidents are located approximately 200 – 250 m north west of the site on West way.

4.44. The site is not located within a Critical Drainage Area.

4.45. The risk of flooding to this site from sewers is considered to be low.

5. Flood Risk Mitigation

Tidal

5.1. It has been demonstrated that the site is at risk of flooding during the 1 in 200-year plus climate change event for both the higher central and upper end climate change scenarios for the year 2125.

5.2. The existing property consists of two flats, one of each of the ground and first floors. The existing therefore contains a self-contained ground floor flat at a high risk of tidal flooding.

5.3. Given the tidal flood risk to the site, the proposed development would consist of no living accommodation on the ground floor providing a significant betterment than the existing property.

5.4. While the first floor may be affected in the defended 1 in 200-year plus climate change event, it should be noted that the proposal provides a significant betterment over the existing situation. The change from ground floor living and bedrooms to a garage, bathroom, utility, gym and storeroom is a significant betterment than the existing property.

5.5. Furthermore, as the proposals comprise a minor development, this also complies with the EA Standing Advice for Minor Developments in setting the FFLs no lower than the existing.

5.6. The applicant also proposes to utilise flood resistance and resilient design and construction methods. Such measures include, but are not limited to:

- Construction of the property to withstand depths outlined within section 4.
- All floors to be tiled including 150mm skirting upstand for ease of cleaning;
- All electrical sockets and mains equipment to be located at high level on the ground floor;
- Solid (i.e. concrete floors) where possible with waterproof membrane;
- Exterior ventilation outlets, utility points and air bricks to be fitted with removable waterproof covers;
- All plumbing insulation to be of closed-cell design;
- Non-return valves to be fitted to all drain and sewer outlets;

- Manhole covers to be secured; and
- Anti-syphon fitted to all toilets.

5.7. In the case of a 1 in 200-year plus climate change event, extensive flooding would occur within the surround area of the site and site and therefore safe access/egress is not possible. Therefore, residents should sign up to the EA Flood Warning Service to warn them of conditions which could result of flooding of the access/egress routes. Given the tidal nature of the flood risk, it is expected there will be at least 12-24 hours advanced warning of conditions which could result in overtopping at the site.

5.8. Nevertheless, as the finished floor levels at the second floor are located above the 1 in 200-year plus climate change levels, safe refuge would be possible within the dwelling.

5.9. As the proposal is for the alterations to the existing building to extend the two existing dwellings on site, access/ egress arrangements will not differ from the existing – as the site will contain two units in both the existing and proposed. However the proposed provides a betterment as a place of refuge is created at the first floor and above for both units, whereas the existing provided a self-contained ground floor flat.

Fluvial, Pluvial, Reservoirs, Groundwater and Sewers

5.10. Flood risk from other sources is considered to be low, therefore mitigation is not required.

Increase to Flood Risk Elsewhere

5.11. Paragraph 049 of the Flood Risk and Coastal Change Planning Practice Guidance (PPG) states:

> *The loss of floodplain storage is less likely to be a concern in areas benefitting from appropriate flood risk management infrastructure or where the source of flood risk is solely tidal.*

5.12. As such, the proposed development in an area of tidal flood risk should have a negligible impact on flood risk elsewhere.

Flood Warnings

5.13. The site is in the Environment Agency (EA) 'Areas of Shoreham at risk including the High Street, Old Shoreham Road, Shoreham Airport, Riverside Road, Beach Green, Eastern parts of North and South Lancing, Broadway and Willowbrook caravan parks, Adur recreation ground and

Aldrington Basin' flood warning service area. This service allows site owners to register an address along with contact details so that, in the event of a flood being forecast, they are sent an alert. As a further precaution and risk reduction, the owner of the site should sign up.

5.14. Flood warnings/alerts can be enforced at any time of the day or night. Signing up for this service provides site owners some notice before a flood event. The amount of time afforded before a flood occurs depends on the site-specific location (e.g. proximity to the source of flooding, topography of the surrounding area) and the flood mechanism (e.g. bank over topping versus a breach event). Flood alerts and warnings provide site managers with time to take necessary action, e.g. communication of the risk of flooding to occupants/employees etc, evacuation of occupants offsite or to a safe level, removal of valuable items out of reach of flooding and the mounting of site-specific flood defences.

6. Conclusions

6.1. This FRA has been undertaken with reference to the requirements of NPPF and Planning Practice Guidance with respect to the development at 174 Brighton Road, Lancing, Adur, West Sussex, BN15 8LH. It has been written to support a planning application and has been prepared with due consideration to the nature of the proposed development to provide the appropriate level of detail.

6.2. An assessment of the risk of flooding from all sources has been undertaken and is summarised in the table below:

Source of Flooding	Flood Risk Summary
Tidal	The site is located within Flood Zone 3. Analysis of the flood level data provided by the EA indicates that in the modelled defended 1 in 200 year plus climate change event ('higher central' scenario), the ground floor of the proposed development would be flooded to a maximum depth of 3.09m at the front and 2.74m at the rear. The first floor of the proposed development could experience flood depths of 0.40m in this event at its lowest point, with the higher FFLs to the rear considered to flood to a depth of 0.05m. Given the tidal flood risk to the site, the proposed development would consist of no living accommodation on the ground floor providing a significant betterment than the existing property. While the first floor may be affected in the defended 1 in 200 year plus climate change event, it should be noted that the proposal provides a significant betterment over the existing situation. The change from ground floor living and bedrooms to a garage, bathroom, utility, gym and storeroom is a significant betterment than the existing property. Furthermore, as the proposals comprise a minor development, this also complies with the EA Standing Advice for Minor Developments in setting the FFLs no lower than the existing. The applicant also proposes to utilise flood resistance and resilient design and construction methods.
Fluvial Tidal Reservoirs	The site is considered to be at low risk from these sources.

Groundwater Sewers Canals	

6.3. The FRA supports the planning application and demonstrates that there is an acceptable level of flood risk to the site if the mitigation strategies recommended are implemented in the scheme. The development does not increase flood risk off site or to the wider area.

6.4. The proposed development represents a significant betterment in terms of flood risk to occupants of the site given that the proposal is for alterations to the building to extend the two flats (one of which a self-contained ground floor flat) to two townhouses.

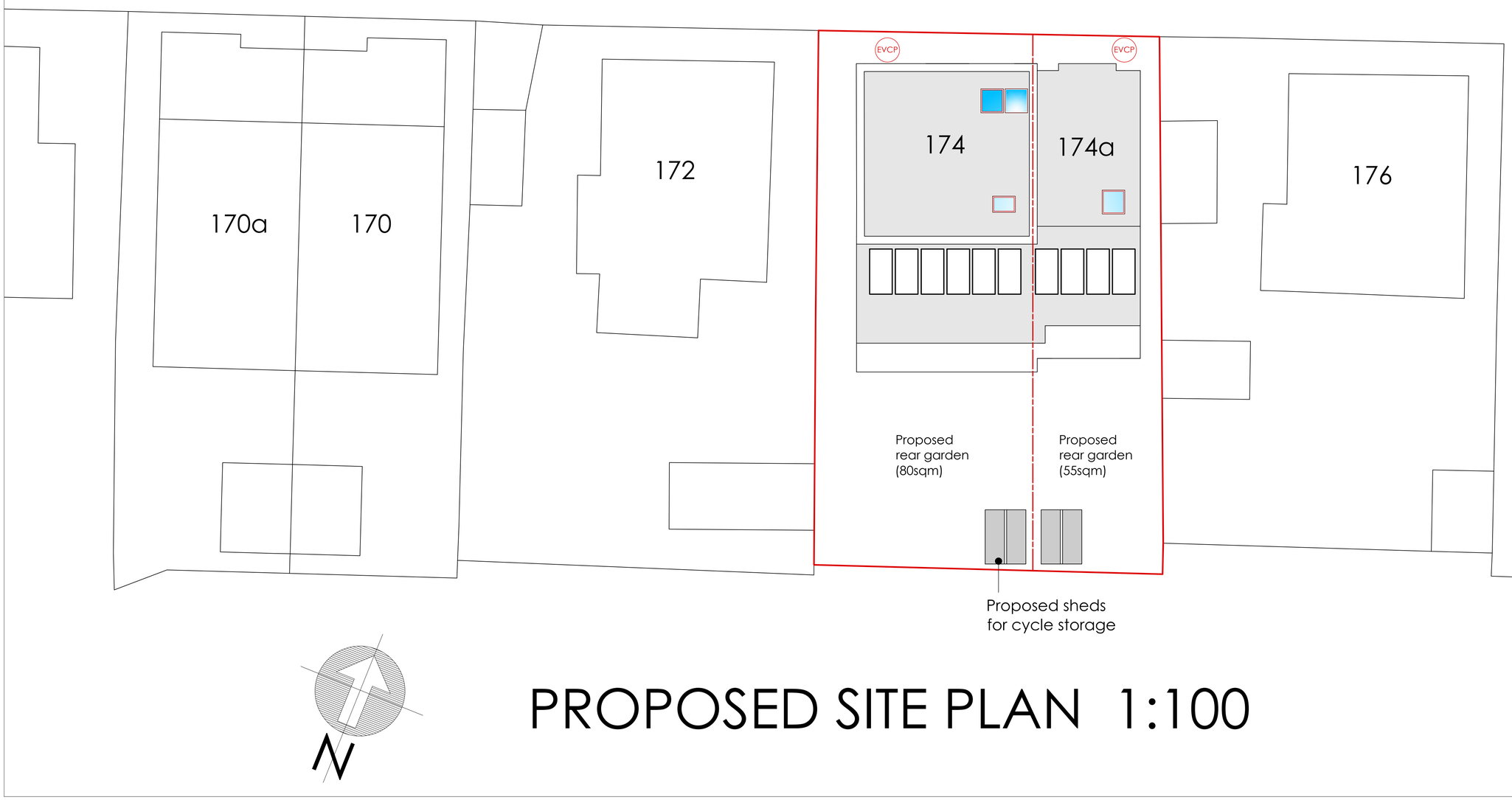
6.5. This Flood Risk Assessment should be submitted as part of the planning application to satisfy the requirements under NPPF.

Appendix A - Development Proposals

174 BRIGHTON ROAD, LANCING

BRIGHTON ROAD

EVCP — Electric vehicle charging point - position to be agreed with the client



N

PROPOSED SITE PLAN 1:100

Scale Bars:

1:1250

1:500

1:200

1:100

1:50 — 0m 1m 2m

1:10 — 0 200 400

1:5

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atterbury moore associates

Unit 1 Gosling Croft Business Park
Long Furlong
Clapham Worthing
West Sussex BN13 3UT

01903 871131
carl@atterburymoore.co.uk

Client:

Address of Works: 174 Brighton Road, Lancing, West Sussex, BN15 8LL

Drawing Title: PROPOSED 2No. DWELLINGS PLANNING

Paper Size:	A1	Date:	August 2023

Job Number:	Drawing Number:	Revision:
AD-236	02	Revision

General Notes:

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6: All dimensions to be checked on site prior to ordering any materials, kitchens or bathrooms.
7: All existing foundations and lintels taking any additional loads are to be exposed and agreed with the Building Control Officer.

Revision	Date	Amendment

External level =
2.10m AOD

No.172

No.174

FLAT 1

manhole

Existing benchmark on
wall = 2.774m AOD

Note: The existing garage is only 2.4m wide internally and cannot be used as a parking space. Therefore there is only 1 existing car parking space for 2No. dwellings.

Bedroom 3

Ground floor level
= 2.21m AOD

Bedroom 1

Bedroom 2

svp

Bath.

Parking

garage

No.176

garage

UP

Lounge

Kitchen

porch

Ground floor level
= 2.21m AOD

UP

Utility

UP

EXISTING GROUND FLOOR PLAN 1:50

No.174

Bedroom 1

cup'd

First floor level =
4.94m AOD

Bedroom 3

Bath.

First floor level =
4.94m AOD

Lounge

Bedroom 2

garage

No.176

garage

UP

DOWN

Kitchen
(existing
extension)

First floor level =
4.93m AOD

External level =
4.80m AOD

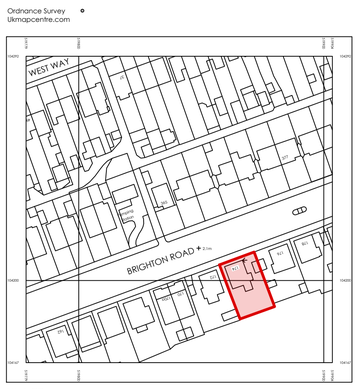
FLAT 2

DOWN

EXISTING FIRST FLOOR PLAN 1:50

Garden





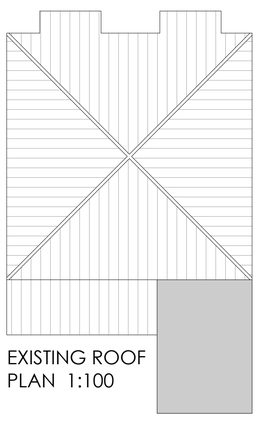
LOCATION PLAN 1:1250



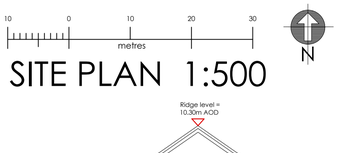
EXISTING NORTH ELEVATION 1:100



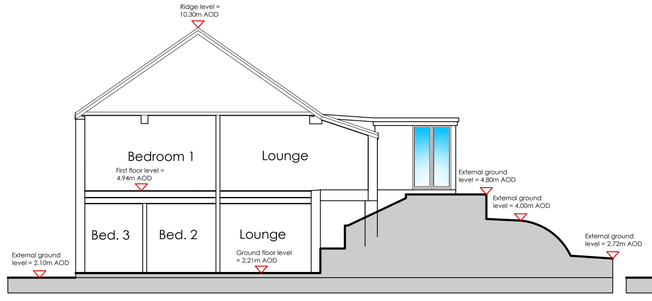
EXISTING SOUTH ELEVATION 1:100



EXISTING ROOF PLAN 1:100



SITE PLAN 1:500



EXISTING SECTION 1:100



EXISTING WEST ELEVATION 1:100



EXISTING EAST ELEVATION 1:100

Scale Bars:

1:1250

1:500



1:200



1:100



1:50

1:10



1:5



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Unit 1 Gosling Croft Business Park
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carl@atterburymoore.co.uk

Client:

Address of Works: 174 Brighton Road
Lancing
West Sussex
BN15 8LL

Drawing Title: PROPOSED 2No. DWELLINGS
PLANNING

Paper Size:	A1	Date:	August 2023

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AD-236	01	Revision

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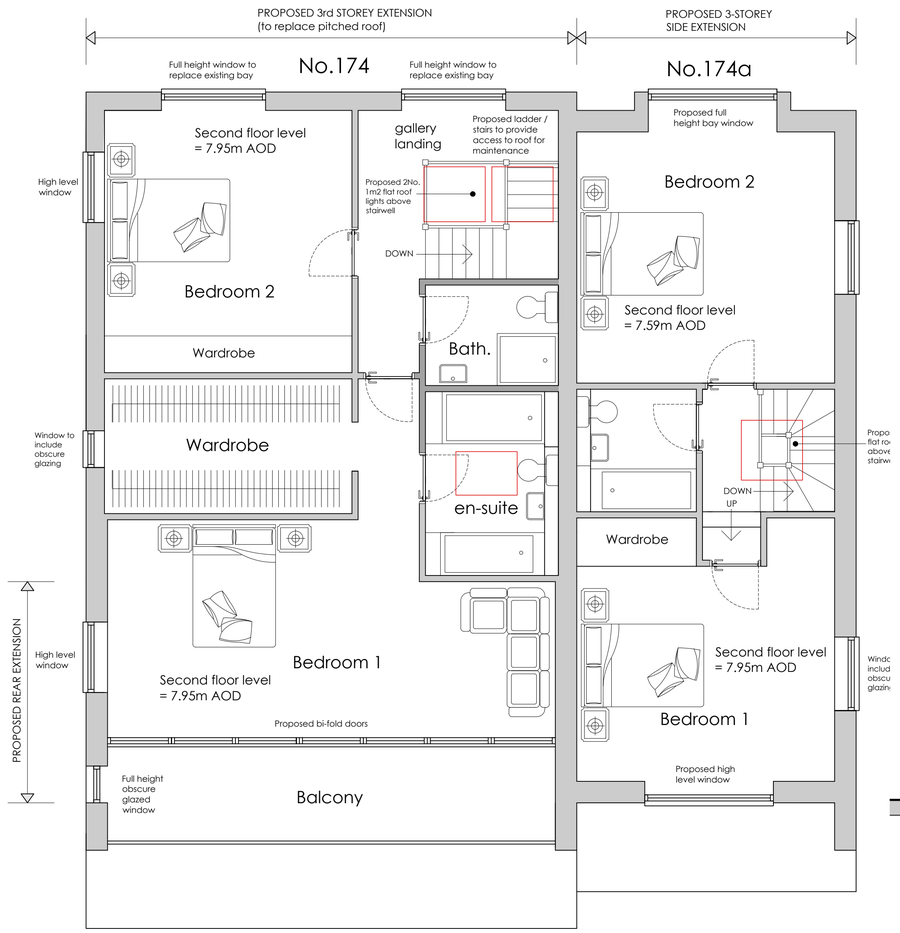
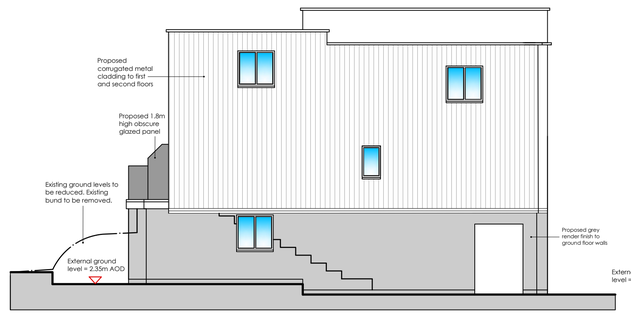
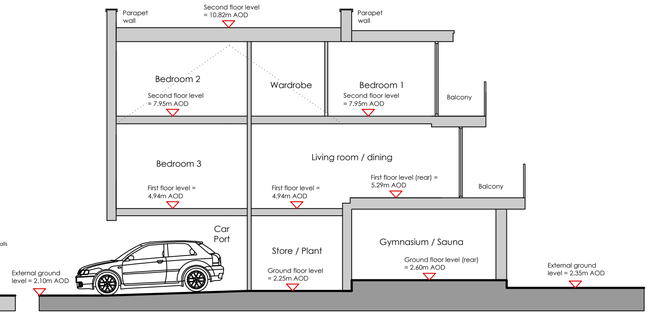
Revision	Date	Amendment



PROPOSED SECOND FLOOR PLAN 1:50



PROPOSED EAST ELEVATION 1:100



PROPOSED SECTION 1:100



EXISTING STREET SCENE 1:100

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1:500 — 0m 5m 10m 15m 20m

1:200 — 0m 2m 4m 6m 8m

1:100 — 0m 1m 2m 3m 4m

1:50 — 0m 1m 2m

1:10 — 0 200 400

1:5 — 0 20 40 60 80 100 200

174 BRIGHTON ROAD, LANCING



PROPOSED STREET SCENE 1:100

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Unit 1 Gosling Croft Business Park
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West Sussex BN13 3UT
01903 871131
carl@atterburymoore.co.uk

Client:

Address of Works: 174 Brighton Road
Lancing
West Sussex
BN15 8LL

Drawing Title: PROPOSED 2No. DWELLINGS
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Paper Size:	A1	Date:	August 2023

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AD-236	02	Revision

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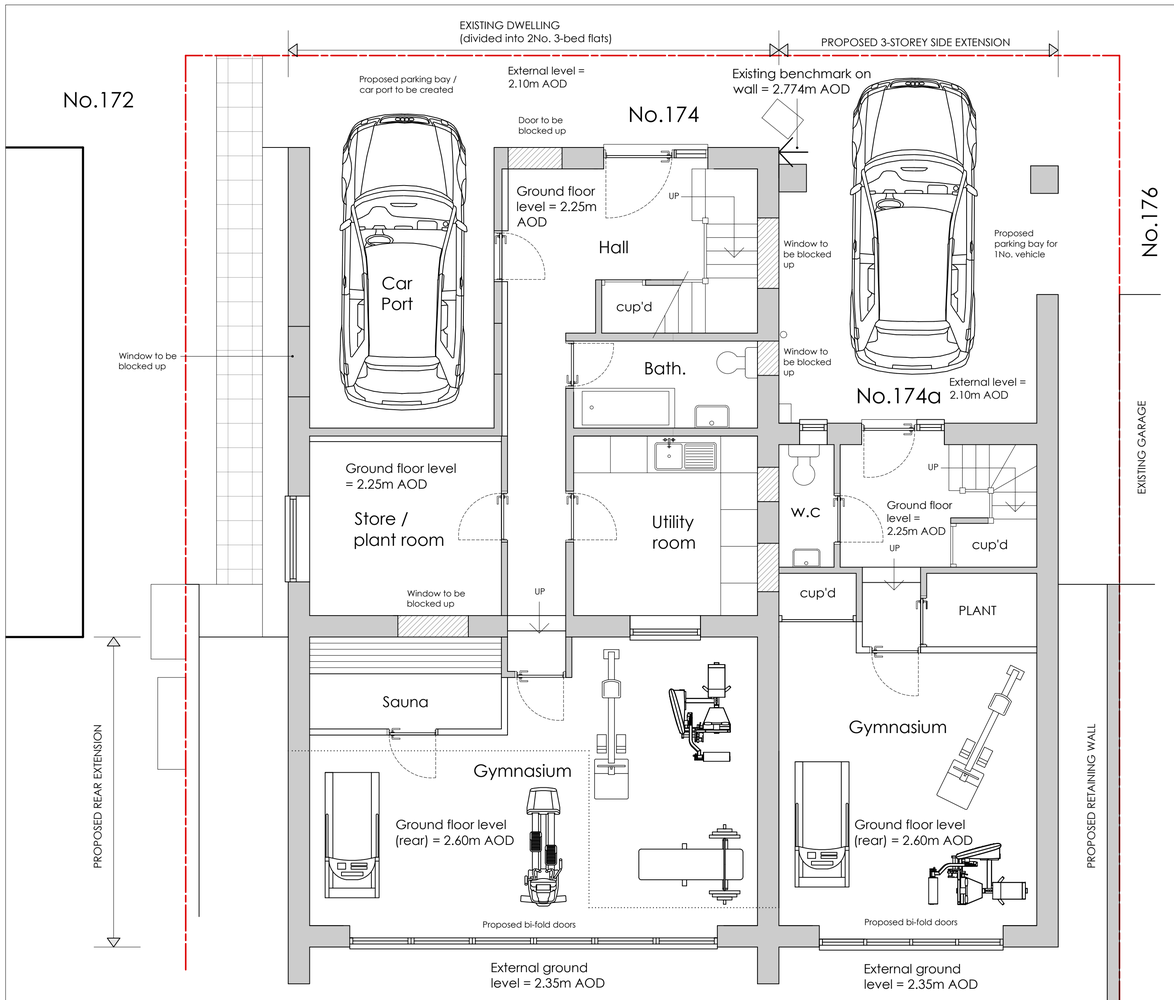
Revision	Date	Amendment



PROPOSED GROUND FLOOR PLAN 1:50

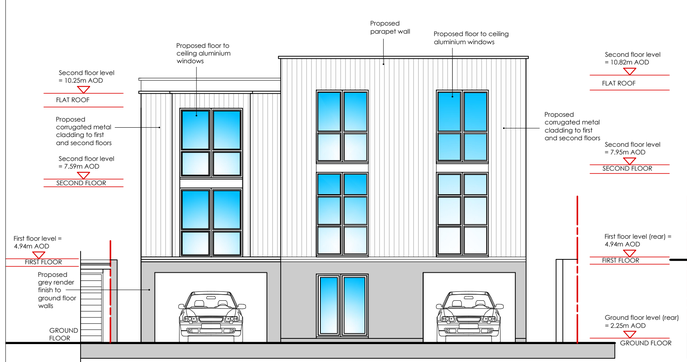


PROPOSED FIRST FLOOR PLAN 1:50

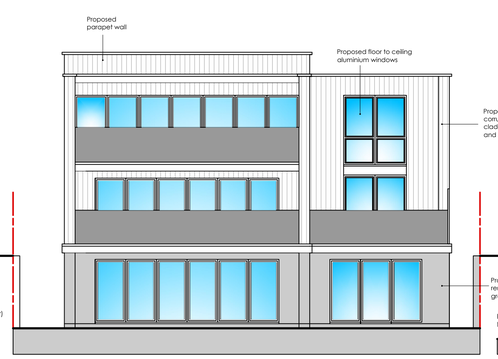
FLOOD MEASURES TO GROUND FLOOR

- Ground floor to be utilised as a garage/storage/gymnasium/plant (less vulnerable use) space;
- All floor to be tiled including 150mm skirting upstand for ease of cleaning;
- All electrical sockets and mains equipment to be located at high level;
- All habitable rooms to be located on the first floor and above;
- Solid (i.e. concrete floors) where possible with waterproof membrane;
- Exterior ventilation outlets, utility points and air bricks to be fitted with removable waterproof covers;
- All plumbing insulation to be of closed-cell design;
- Non-return valves to be fitted to all drain and sewer outlets;
- Manhole covers to be secured;
- Anti-syphon fitted to all toilets,
- Residents required to sign up to the EA flood warning service.

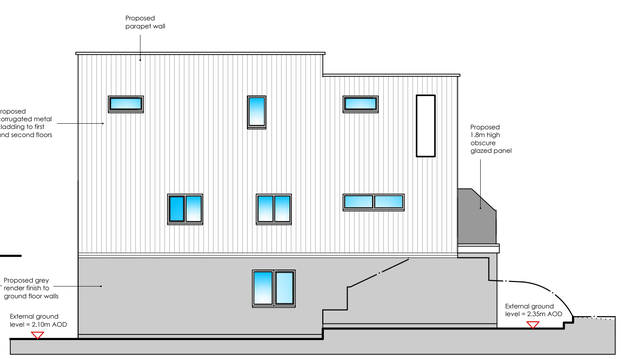
174 BRIGHTON ROAD, LANCING



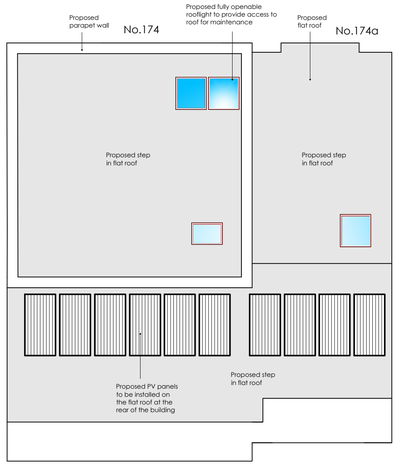
PROPOSED NORTH ELEVATION 1:100



PROPOSED SOUTH ELEVATION 1:100



PROPOSED WEST ELEVATION 1:100



PROPOSED ROOF PLAN 1:100

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1:500



1:200



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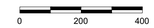

1:5



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Revision	Date	Amendment

Appendix B - EA Data

Lisa Slater
Aegaea

Our ref: SSD329916
Your ref: 3230
Date: 24/10/2023

Dear Lisa Slater,

Enquiry Regarding Product 4 for Flood Risk Assessment for 174 Brighton Road, Lancing, BN15 8LH.

Thank you for your enquiry which was received on 28 September 2023.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004. The information is attached.

The information on Flood Zones in the area relating to this address is as follows:

The site is in an area located within Flood Zones 1, 2 and 3 as shown on our Flood Map for Planning (Rivers and Sea).

Note - This information relates to the area that the above named property is in and is not specific to the property itself as it is influenced by factors such as the height of door steps, air bricks or the height of surrounding walls. We do not have access to this information and is not currently used in our flood modelling.

Flood Zone definitions can be found at www.gov.uk/guidance/flood-risk-and-coastal-change#Table-1-Flood-Zones

Flood Defences
There are flood defences in the form of a sand and shingle beach, and timber groynes. This frontage is maintained by the Environment Agency.

Model Information
The model used was the Arun to Adur Coastal Modelling, completed by JBA Consulting in 2012.

Flood History
An area close to this site experienced flooding in August 1960 (Flood Event ID: 1972), and in August 1992 (Flood Event ID: 2094). These events were caused by local drainage/surface water and overtopping of the sea defences respectively.

Please note our records are not comprehensive and may not include all events. I recommend contacting the Lead Local Flood Authority, **West Sussex County Council** or the Local Authority, **Adur District Council** for a more comprehensive flood history check.

FRA advisory text

Name	Product 4
Description	Detailed Flood Risk Assessment Map for **174 Brighton Road, Lancing, BN15 8LH.**
Licence	Open Government Licence
Information Warnings	The flood risk data provided is based on existing EA hydraulic models with an allowance for climate change. Please note the climate change allowances provided are not up to date. These were updated on 27 July 2021. You should refer to 'Flood risk assessments: climate change allowances' for the most up to date allowances. You will need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence.
Information Warning - OS background mapping	*The mapping of features provided as a background in this product is © Ordnance Survey. It is provided to give context to this product. The Open Government Licence does not apply to this background mapping. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial purposes for the period during which the Environment Agency makes it available. You are not permitted to copy, sub-license, distribute, sell or otherwise make available the Licensed Data to third parties in any form. Third party rights to enforce the terms of this licence shall be reserved to OS.*
Attribution	Contains Environment Agency information © Environment Agency and/or database rights. Contains Ordnance Survey data © Crown copyright 2020 Ordnance Survey 100024198.

Data Available Online

Many of our flood datasets are available online:

- Flood Map For Planning (Flood Zone 2, Flood Zone 3 ,Flood Storage Areas, Flood Defences, Areas Benefiting from Defences)
- Risk of Flooding from Rivers and Sea
- Historic Flood Map
- Current Flood Warnings

Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

Yours sincerely,

Amy O'Donnell
Partnership and Strategic Overview West Sussex, Solent and South Downs
Environment Agency | Guildbourne House, Chatsworth Road, Worthing, West Sussex, BN11 1LD

FRA Site Boundary & Node Points. Centred BN15 8LH. Created 24/10/2023.



Environment Agency

N

Legend

- Site Nodes
- Site Boundary

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:500

0 0.01 0.02
Kilometers

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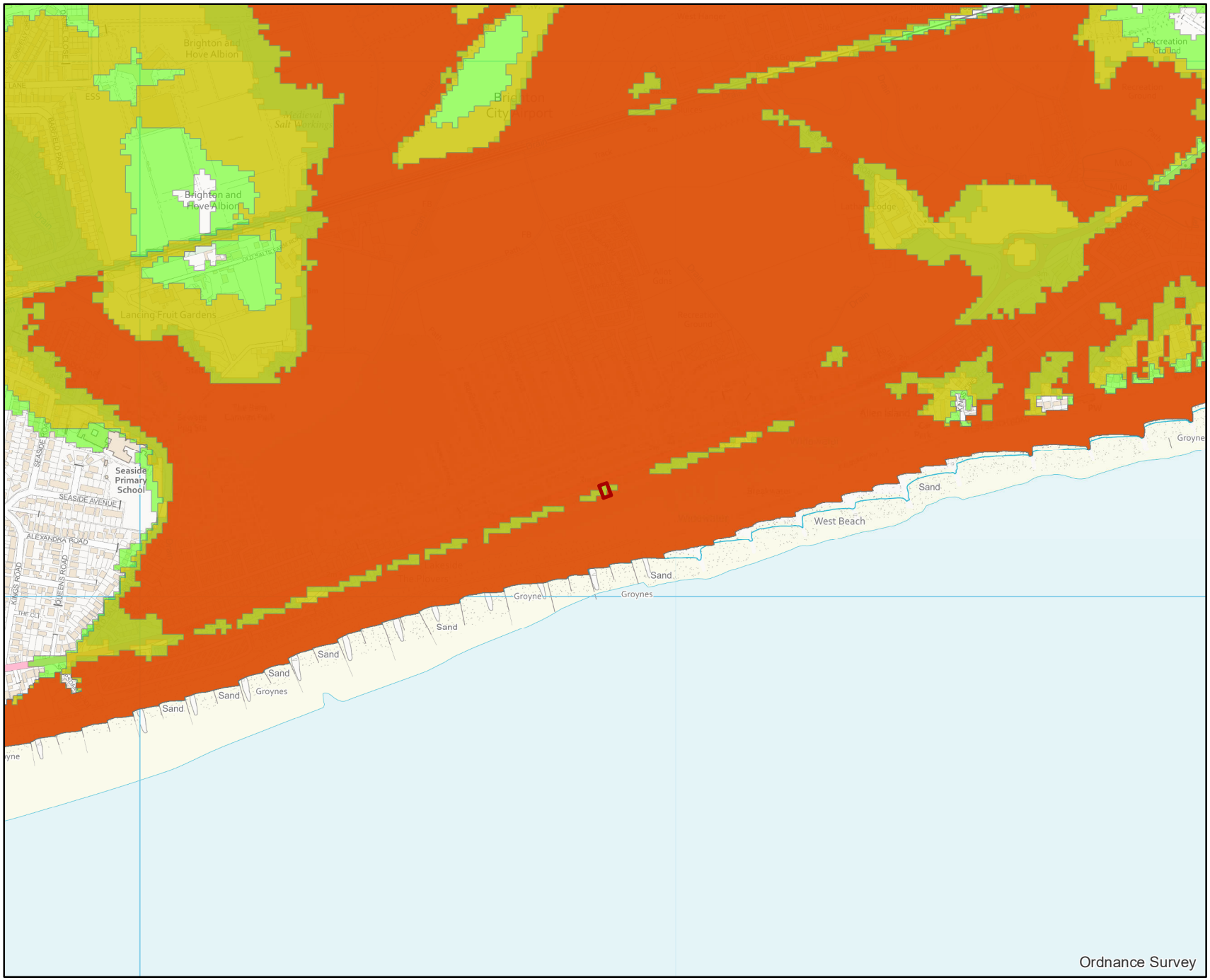
Modelled Flood Outlines (Defended Tidal). Centred BN15 8LH. Created 24/10/2023.



Environment Agency

N

Legend

- Site Boundary
- 0.5% AEP (2012) (Defended)
- 0.5% AEP (2070) (Defended)
- 0.5% AEP (2115) (Defended)
- 0.1% AEP (2012) (Defended)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000

0 0.225 0.45
Kilometers

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Product 4 Flood Risk Data Requested by: Aegaea

Site: 174 Brighton Road, Lancing, BN15 8LH

Table 1: Water Levels: Tidal Undefended

	NGR		Modelled Flood Levels in Metres AOD Undefended Annual Exceedance Probability			
Node Ref	Eastings	Northings	0.5%	0.5% (2070)*	0.5% (2115)*	0.1%
1	519862	104205	4.25	4.78	5.41	4.48
2	519873	104205	4.25	4.78	5.41	4.48
3	519865	104194	4.25	4.79	5.41	4.48
4	519877	104191	4.25	4.79	5.41	4.48

Table 2: Water Levels: Tidal Defended

	NGR		Modelled Flood Levels in Metres AOD Defended Annual Exceedance Probability			
Node Ref	Eastings	Northings	0.5%	0.5% (2070)*	0.5% (2115)*	0.1%
1	519862	104205	2.42	4.46	5.05	3.28
2	519873	104205	-	4.46	5.05	3.28
3	519865	104194	-	4.46	5.05	3.28
4	519877	104191	2.42	4.46	5.05	3.28

Table 3: Water Depths: Tidal Undefended

	NGR		Modelled Flood Depths in Metres Undefended Annual Exceedance Probability			
Node Ref	Eastings	Northings	0.5%	0.5% (2070)*	0.5% (2115)*	0.1%
1	519862	104205	2.10	2.64	3.26	2.33
2	519873	104205	1.91	2.44	3.07	2.14
3	519865	104194	1.53	2.07	2.69	1.76
4	519877	104191	2.15	2.69	3.32	2.38

Table 4: Water Depths: Tidal Defended

	NGR		Modelled Flood Depths in Metres			
			Defended Annual Exceedance Probability			
Node Ref	**Eastings**	**Northings**	**0.5%**	**0.5% (2070)***	**0.5% (2115)***	**0.1%**
1	519862	104205	0.10	2.32	2.73	0.97
2	519873	104205	-	2.12	2.38	0.61
3	519865	104194	-	1.75	2.33	0.57
4	519877	104191	0.33	2.37	2.96	1.19

All levels taken from: Arun to Adur Coastal Modelling (2012), completed by JBA Consulting.

Produced on: 24/10/2023

*** The flood risk data provided is based on existing EA hydraulic models with an allowance for climate change. Please note the climate change allowances provided are not up to date. These were updated on 27 July 2021.**

You should refer to 'Flood risk assessments: climate change allowances' for the most up to date allowances. You will need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence.

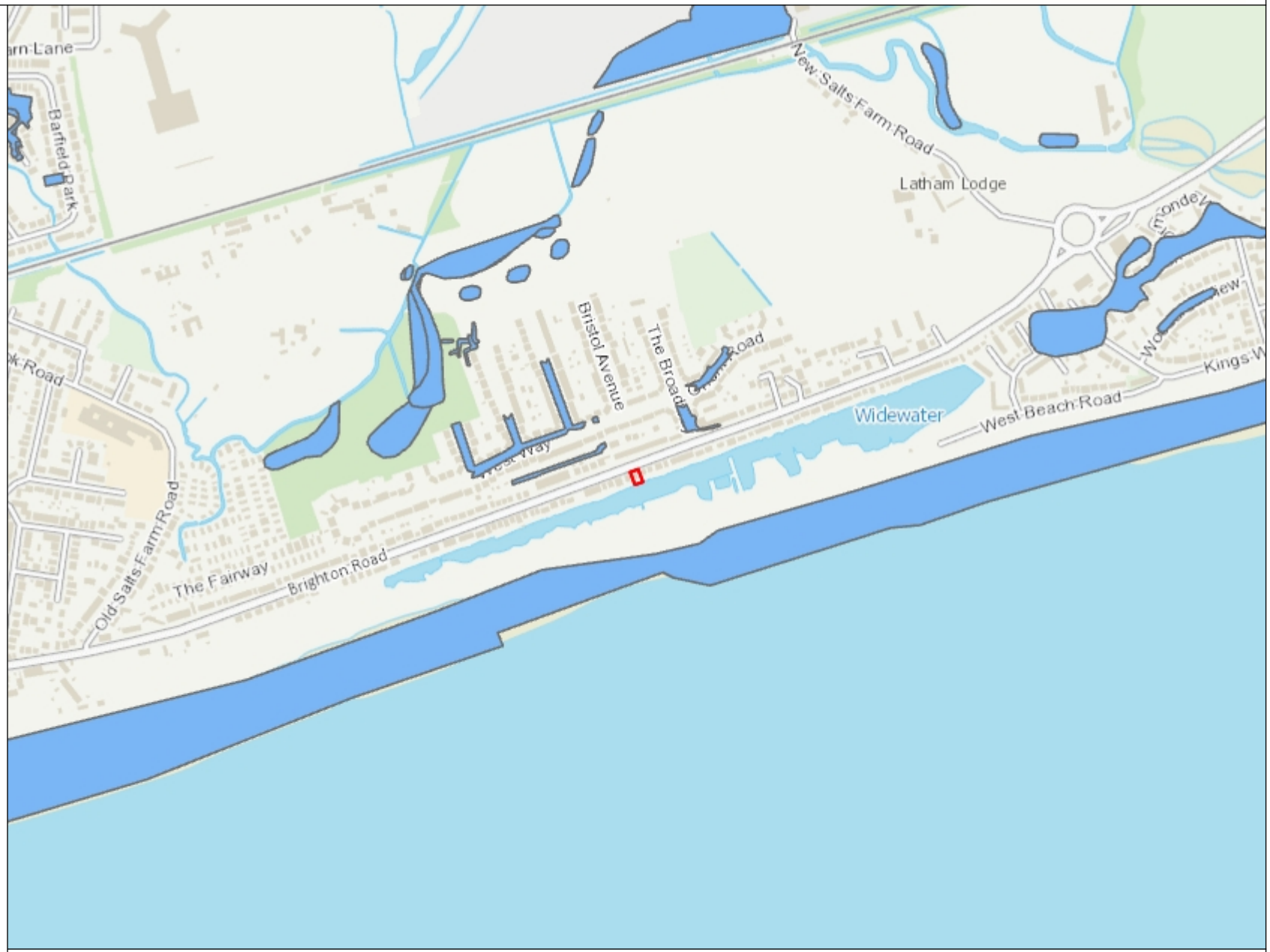
There is no additional information or health warnings for these levels/depths or the model from which they have been produced.

Recorded Flood Outlines. Centred BN15 8LH. Created 23/10/2023.

Environment Agency

Legend

All recorded flood outlines



1: 10,000

0 250

Metres

N

W E

S

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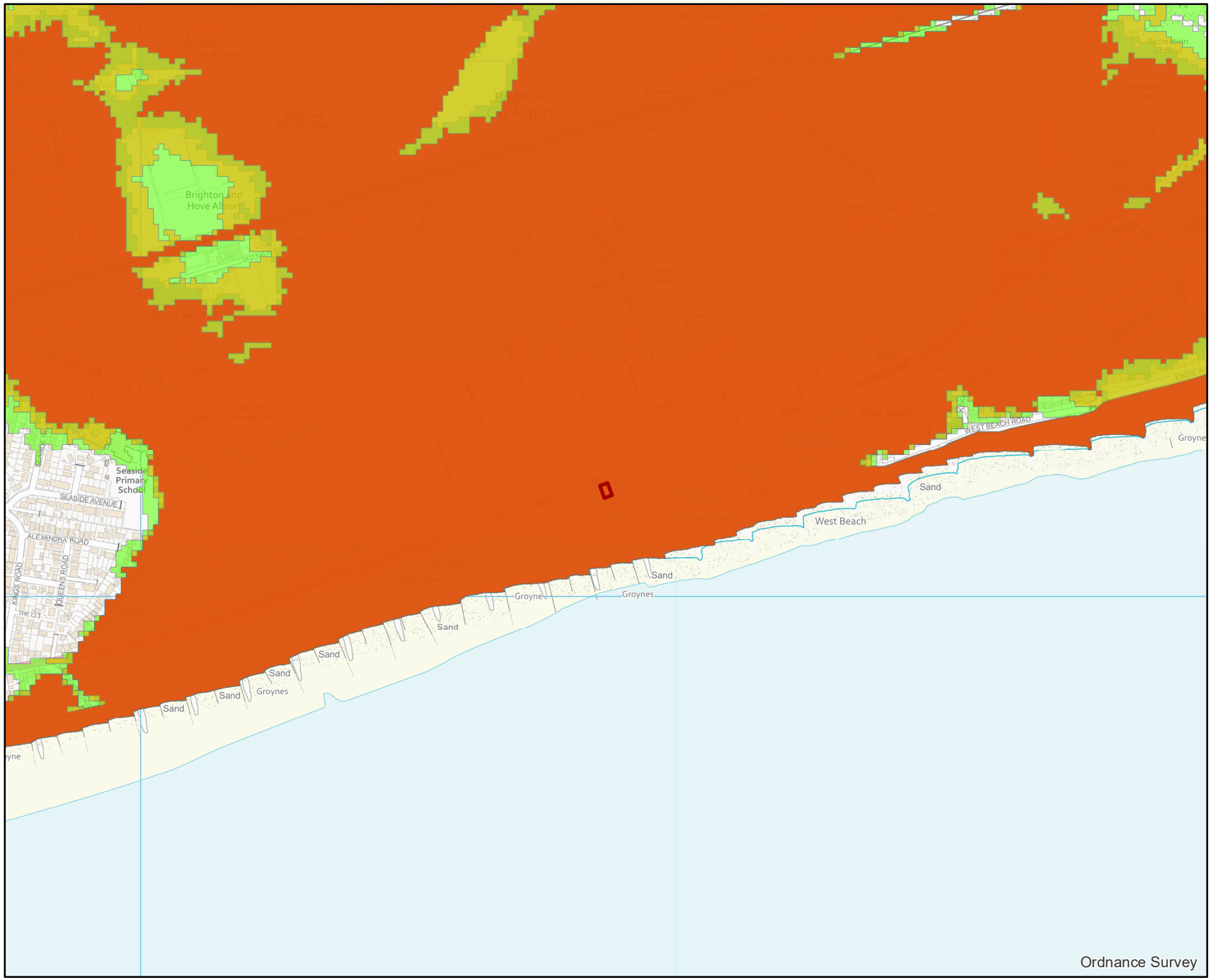
Modelled Flood Outlines (Undefended Tidal). Centred BN15 8LH. Created 24/10/2023.



N

Environment Agency

Legend

- Site Boundary
- 0.5% AEP (2012) (Undefended)
- 0.5% AEP (2070) (Undefended)
- 0.5% AEP (2115) (Undefended)
- 0.1% AEP (2012) (Undefended)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000

0 0.225 0.45
Kilometers

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