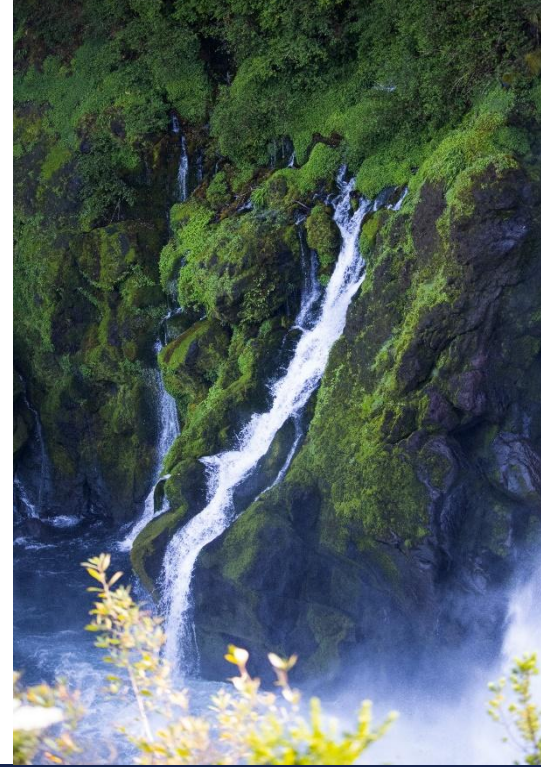




Flood Risk Assessment and Flood Evacuation Plan AEG9536_PO21_Arun_01

Site Address: East Front Road
Pagham
Arun
West Sussex
PO21 4SL

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



Document Issue Record

Project: Flood Risk Assessment

Prepared for: Dean Griggs

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Site Location: East Front Road, Pagham, Arun, West Sussex, PO21 4SL

Issue	Date	Author	Check	Auth.	Comments
1	09/01/2026	Mace Latham	JC	OH	First issue
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Summary

Development Description	Existing	Proposed
Development Type	Existing amusement studio	Part change of use to ancillary staff sleeping accommodation functionally linked to and solely for the operational needs of the existing lawful amusement arcade (not a separate dwelling). The other areas of the amusement studio will remain as per the existing scenario.
EA Vulnerability Classification	Less Vulnerable	More Vulnerable
Ground Floor Level	The Finished Floor Levels (FFLs) of the existing amusement studio range between 3.640m AOD and 4.00m AOD at the proposed location.	No change.
Level of Sleeping Accommodation	N/A ¹	Ground Floor
Surface Water Drainage	N/A ¹	To drain via the existing scenario on-site. Small scale SuDS, such as rainwater planters and water butts could be included in external areas to provide a betterment.
Site Size	Approximately 500m ²	No change
Risk to Development	Summary	Comment
EA Flood Zone	Flood Zone 3	Site only is affected in the 1 in 200 year + CC (2115) epoch event.
Flood Source	Tidal	
SFRA Available	Level 1 and Level 2 Strategic Flood Risk Assessment (Arun District Council, 2016)	
Management Measures	Summary	Comment

Ground floor level above extreme flood levels	No	Proposed development is affected in the 1 in 200 year + CC (2115) epoch event.
Safe Access/Egress Route	No	Prior evacuation is recommended and is detailed in Section 6 of this report.
Flood Resilient Design	Mitigation measures recommended.	See details in Section 5.
Site Drainage Plan	N/A ¹	To drain via the existing scenario on-site. Small scale SuDS, such as rainwater planters and water butts could be included in external areas to provide a betterment.
Flood Warning and Evacuation Plan	N/A ¹	Recommended to sign up to the Pagham Environment Agency flood warning service.
Offsite Impacts	Summary	Comment
Displacement of floodwater	No	No increase in additional built footprint.
Increase in surface run-off generation	No	No increase in additional built footprint.
Impact on hydraulic performance of channels	No	There are no identified watercourses within 1.0km of the site.

¹ not required for this assessment

² data not available.

1. Introduction

- 1.1. Aegaea were commissioned by Dean Griggs 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 East Front Road, Pagham, Arun, West Sussex, PO21 4SL (Figure 1).

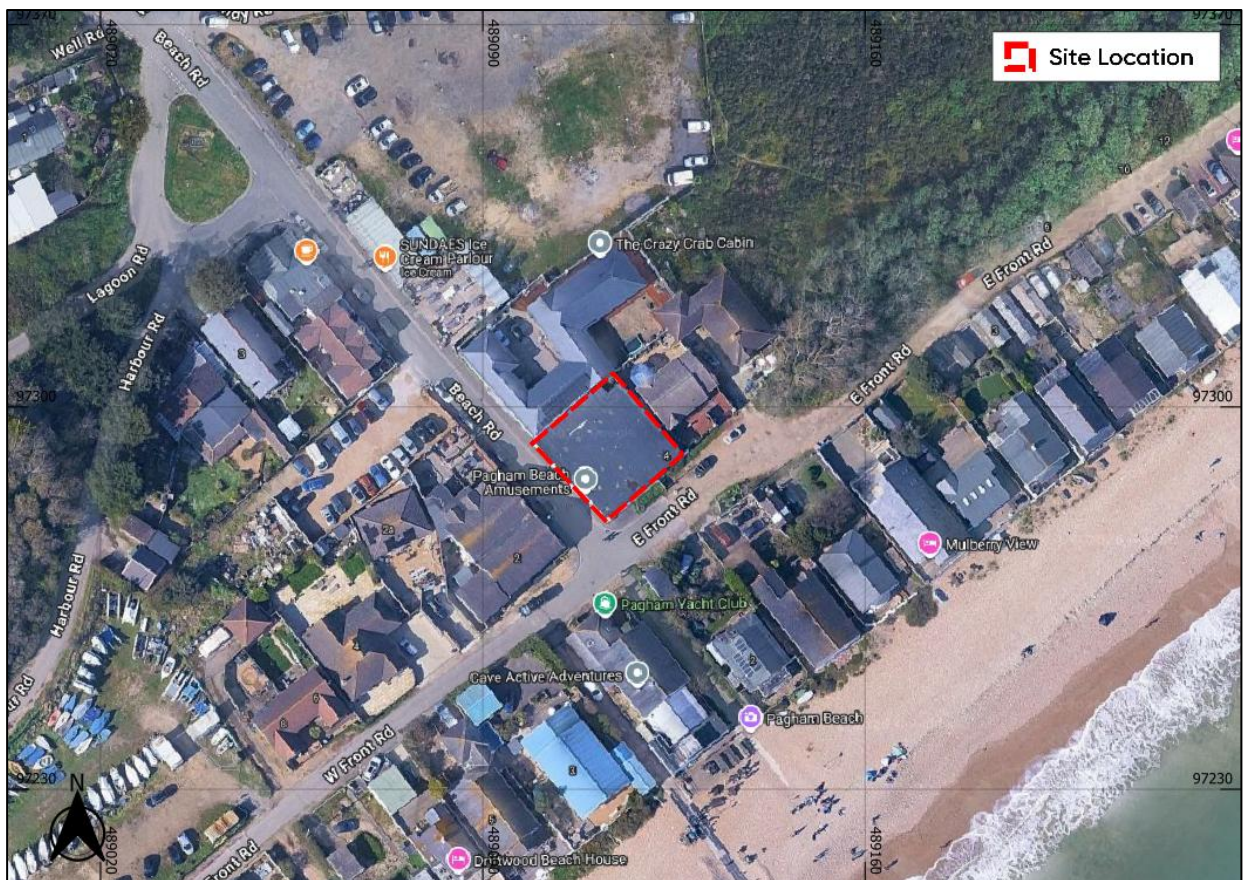


Figure 1: Site Location (Base map and data from Google Satellite Imagery ©)

- 1.4. The existing site consists of an amusement studio. It is understood that the proposals include the part change of use to Part change of use to ancillary staff sleeping accommodation

functionally linked to and solely for the operational needs of the existing lawful amusement arcade (not a separate dwelling) (resubmission following P/48/20/PL). This site is in CIL zone 4 and is CIL Liable as new dwelling. All proposed plans can be found in Appendix A of this report.

- 1.5. 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 (Figure 2). The EA LiDAR data shows the ground elevation of the site varies between approximately 3.07m AOD (metres Above Ordnance Datum) and 3.75m AOD. Analysis of topographic levels indicates that the site generally slopes with a fall to the south-east towards the nearby coastline.
- 1.6. It is noted that the plans provided (Appendix A) also include Finished Floor Levels (FFLs) of the existing amusement studio, proposed development location and immediate vicinity. The existing amusement studio is situated at FFLs of 3.640m AOD, with two steps up to the proposed development (change of use) - located at FFLs of 4.00m AOD.

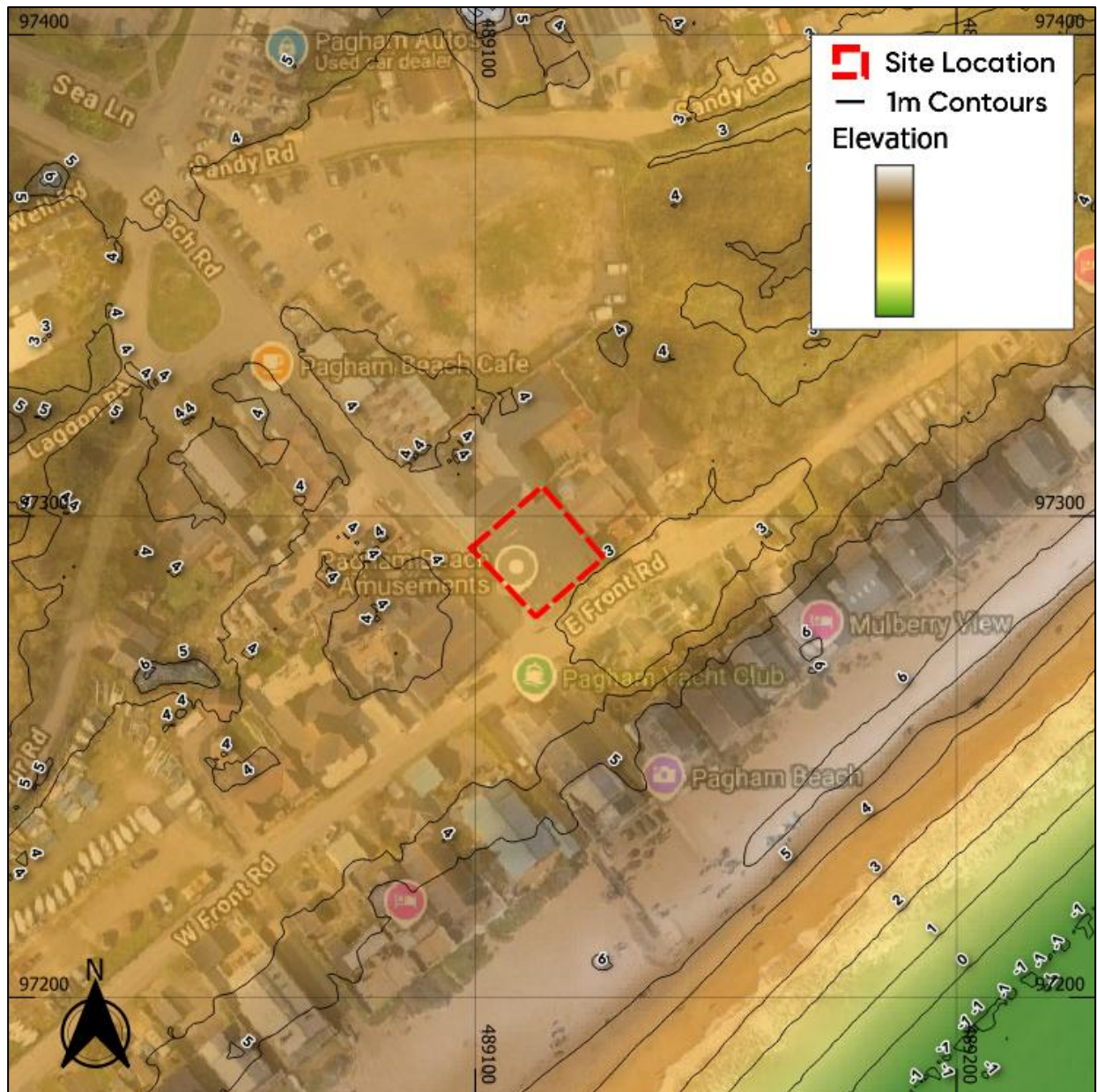


Figure 2: Site Topography (Base map and data from Google Satellite Imagery ©. Contains public sector information licensed under the Open Government Licence v3.0)

- 1.7. Arun 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 states¹ that an FRA is required for developments which are:

- *in flood zones 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 entirety of the site is situated within the EA's Flood Zone 3, as per the EA's Flood Map for Planning. Thus, an FRA is required to be submitted alongside the planning application in line with the NPPF.

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 Framework² (NPPF) (MHCLG, 2024) which includes UK Government policy on development and flood risk states:

170. 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.

176. Applications for some minor development and changes of use should also not be subject to the sequential test, nor the exception test [set out below], but should still meet the requirements for site-specific flood risk assessments set out in footnote 63.

181. 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;*

² <https://www.gov.uk/government/publications/national-planning-policy-framework-2>, last updated Dec 2024

- 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;*
- 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.*

2.3. Paragraph 051 of the Flood Risk and Coastal Change Planning Practice Guidance (PPG) states:

Minor development means:

- *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.*

2.4. As such, the proposal would be considered a Minor Development under the PPG.

2.5. Footnote 63 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.

2.6. 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)

- 2.7. 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.
- 2.8. 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.

Local Plan

- 2.9. The Local Plan prepared by the Local Planning Authority, Arun District Council, sets out the policies for development in the local area.
- 2.10. Policy W DM2 Flood risk outlines the requirements for new development within the area. It states:

Development in areas at risk from flooding, identified on the latest Environment Agency flood risk maps and the Council's Strategic Flood Risk Assessment (SFRA), will only be permitted where all of the following criteria have been satisfied:

- a. The sequential test in accordance with the National Planning Policy Guidance has been met.*
- b. A site specific Flood Risk Assessment demonstrates that the development will be safe, including access and egress, without increasing flood risk elsewhere and reduce flood risk overall.*
- c. The sustainability benefits to the wider community are clearly identified.*
- d. The scheme identifies adaptation and mitigation measures. - e. Appropriate flood warning and evacuation plans are in place; and*
- e. New site drainage systems are designed to take account of events which exceed the normal design standard i.e. consideration of flood flow routing and utilising temporary storage areas.*

The reports prepared as part of the criteria above must take into account contingency allowances, taking climate change into account as set out in Flood Risk Assessments: climate change allowances section of the NPPG.

In locations where strategic flood defence or resilient and resistant construction measures are necessary within the site itself, proposals will be required to demonstrate how measures have been incorporated as an intrinsic part of the scheme in a manner which is compatible with the latest Strategic Flood Risk Assessment.

All development proposals must take account of relevant Surface Water Management Plans, Catchment Flood Management Plans and related Flood

Defence Plans and strategies such as the Lower Tidal River Arun Strategy. The council may require financial contributions from development on sites where measures to address flood risk or to improve the environmental quality of watercourses have been identified by these Plans and Strategies.

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 development to areas of low flood risk and to support developments which improve flood risk for developments in areas at risk of flooding.
- 2.12. Under the NPPF, all new planning applications should undergo a Sequential Test in accordance with Paragraph 172. This test should be implemented by local planning authorities with a view to location; particularly vulnerable new developments outside of the floodplain.
- 2.13. However, Paragraph 176 of the NPPF states:

*176. Applications for some minor development and **change of use** should also not be subject to the sequential test nor the exception test, but should still meet the requirements for site-specific flood risk assessments set out in footnote 63.*

- 2.14. As such, a site-specific Sequential and Exception Test for the proposed change of use is not considered necessary in line with the NPPF.

Summary

- 2.15. 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 hold a copy of the Product 6 data from their Emsworth to Littlehampton Model – Arun to East Head (2016). The Product 6 data include extents, depths, heights and hazards for multiple return periods. The model also includes an allowance for climate change in order to fully analyse the flood risk to the site. This is further discussed in Section 4 of this FRA.

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) (Ministry of Housing, Communities and Local Government, 2024)
 - Planning Practice Guidance - Flood Risk and Coastal Change (Ministry of Housing, Communities and Local Government, 2022)
 - Geoindex Onshore (British Geological Survey, 2024)
 - Arun Local Plan (Arun District Council, 2018)³

³ <https://www.arun.gov.uk/download.cfm?doc=docm93jjm4n12844.pdf&ver=12984>

- West Sussex Preliminary Flood Risk Assessment (West Sussex County Council, 2011)⁴ and Preliminary Flood Risk Assessment Addendum (West Sussex County Council, 2017)⁵
- Level 1 Strategic Flood Risk Assessment (Arun District Council, 2016)⁶
- West Sussex Local Flood Risk Management Strategy (2013-2018) (West Sussex County Council, 2014)⁷

Preliminary Flood Risk Assessment (PFRA)

- 3.4. The PFRA, published in 2011 and 2017, 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 2016, provides the evidence base for the Local Planning Authority Arun 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 Arun District Council has been used throughout production of this report as a source of information, particularly pertaining to historical flood incidents.

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

⁵ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/698548/PFRA_West_Sussex_County_Council_2017.pdf

⁶ <https://www.arun.gov.uk/download.cfm?doc=docm93jjm4n9414.pdf&ver=9270>

⁷ https://www.westsussex.gov.uk/media/1595/local_flood_risk_management_strategy.pdf

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.
- 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

Fluvial / Tidal

- 4.1. 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.
- 4.2. 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.

Main Rivers and Watercourses

- 4.3. According to OS mapping, there are no identified watercourses within 1.0km of the site. However, it is noted that the site is approximately 50m from the coastline in the southeastern direction.

EA Flood Map for Planning

- 4.4. The entirety of the site, including the proposed change of use, is situated within Flood Zone 3 (Figure 3). Flood Zone 3 denotes 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.
- 4.5. Further interrogation of this Flood Zone shows that the extent is derived from sea / tidal models only. Thus, the fluvial flood risk is considered to be low.

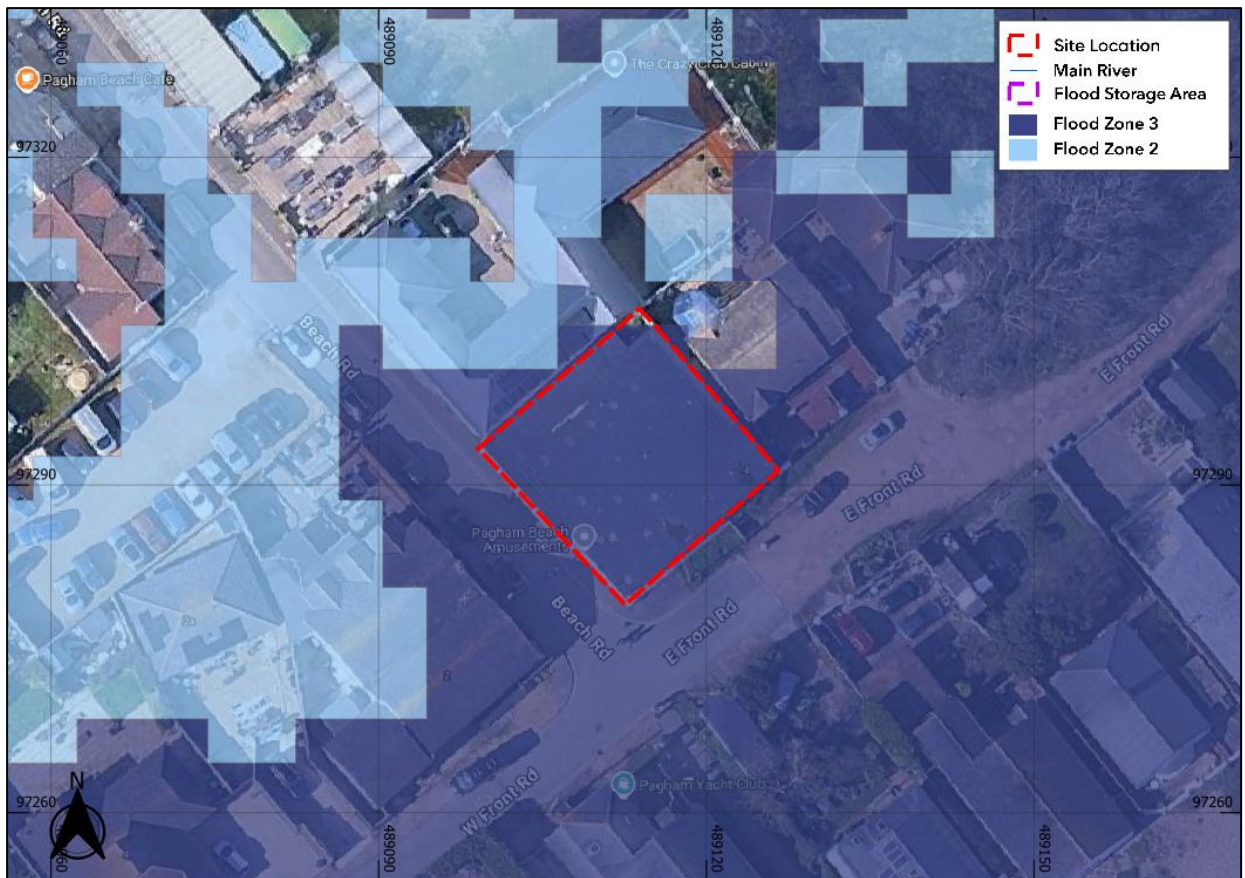


Figure 3: EA Flood Map for Planning (Base map and data from Google Satellite Imagery ©. Contains public sector information licensed under the Open Government Licence v3.0)

Historical Flood Outlines

- 4.6. Based on the EA Recorded and Historical Flood Outlines, the site lies outside the extent of a recorded flood event (Figure 4).

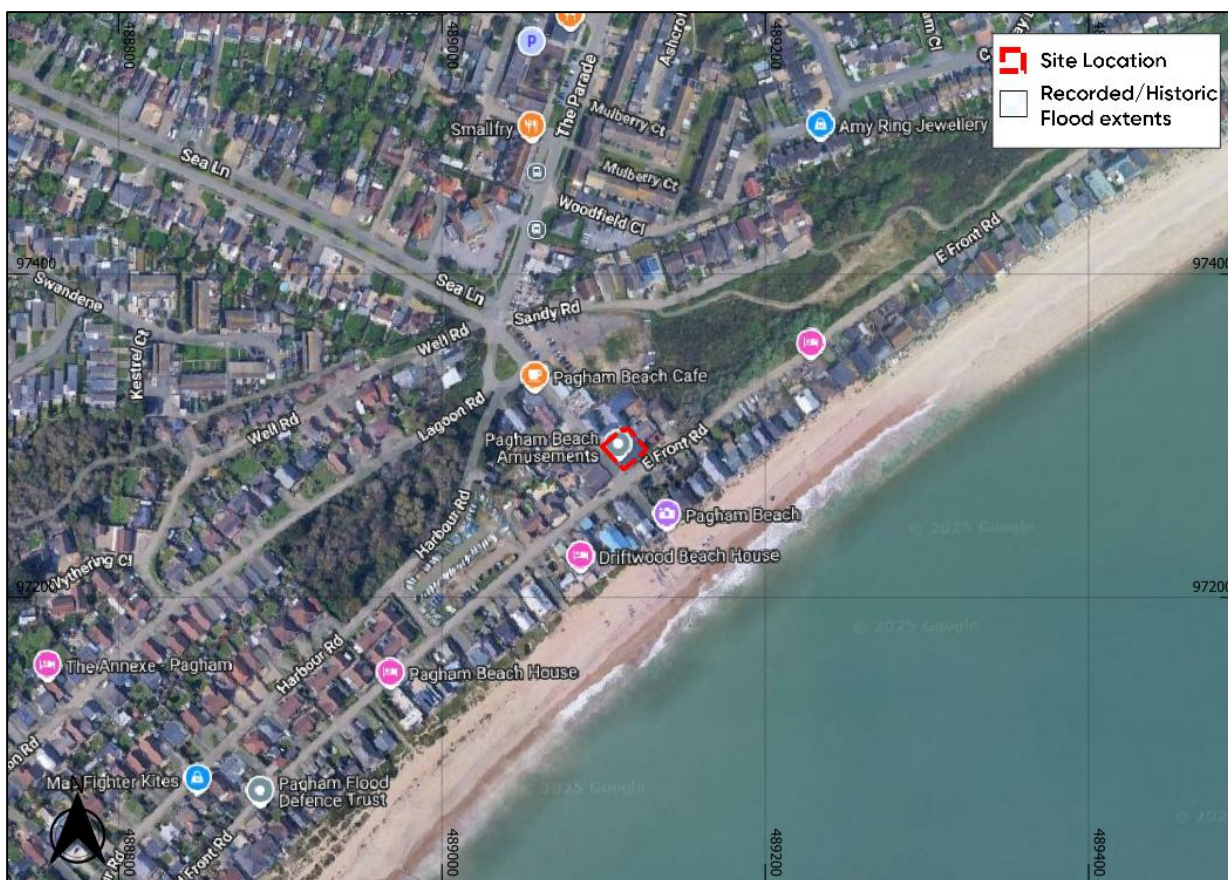


Figure 4: EA Historic Flood Mapping (Base map and data from Google Satellite Imagery ©. Contains public sector information licensed under the Open Government Licence v3.0)

Flood Defences

- 4.7. It is noted that based on the EA AIMS⁸ dataset, the site is behind a flood defence in the form of a 'Beach'. It is further noted that the current standard of protection for this defences is stated as '200' years.

Emsworth to Littlehampton Model – Arun to East Head (2016)

- 4.8. Aegaea hold a copy of the 2016 Emsworth to Littlehampton Model, which has been considered the most appropriate data to use to fully understand and assess the tidal flood risk to the site

⁸ <https://environment.data.gov.uk/asset-management/index.html>

and proposed development. This model includes several return period events in addition to scenarios including various climate change allowances.

- 4.9. Based on the provided flood model extents, the site is shown to be affected in the 1 in 200 year + CC (2115) scenario which used NPPF Guidance for sea level rise values (Figure 5). It is also noted that the site is outside the modelled 1 in 30 year flood extent thus is not considered to be Flood Zone 3b. The site is also outside the present day defended 1 in 200 year and 1 in 1000 year modelled flood outline given the presence of beach defence.

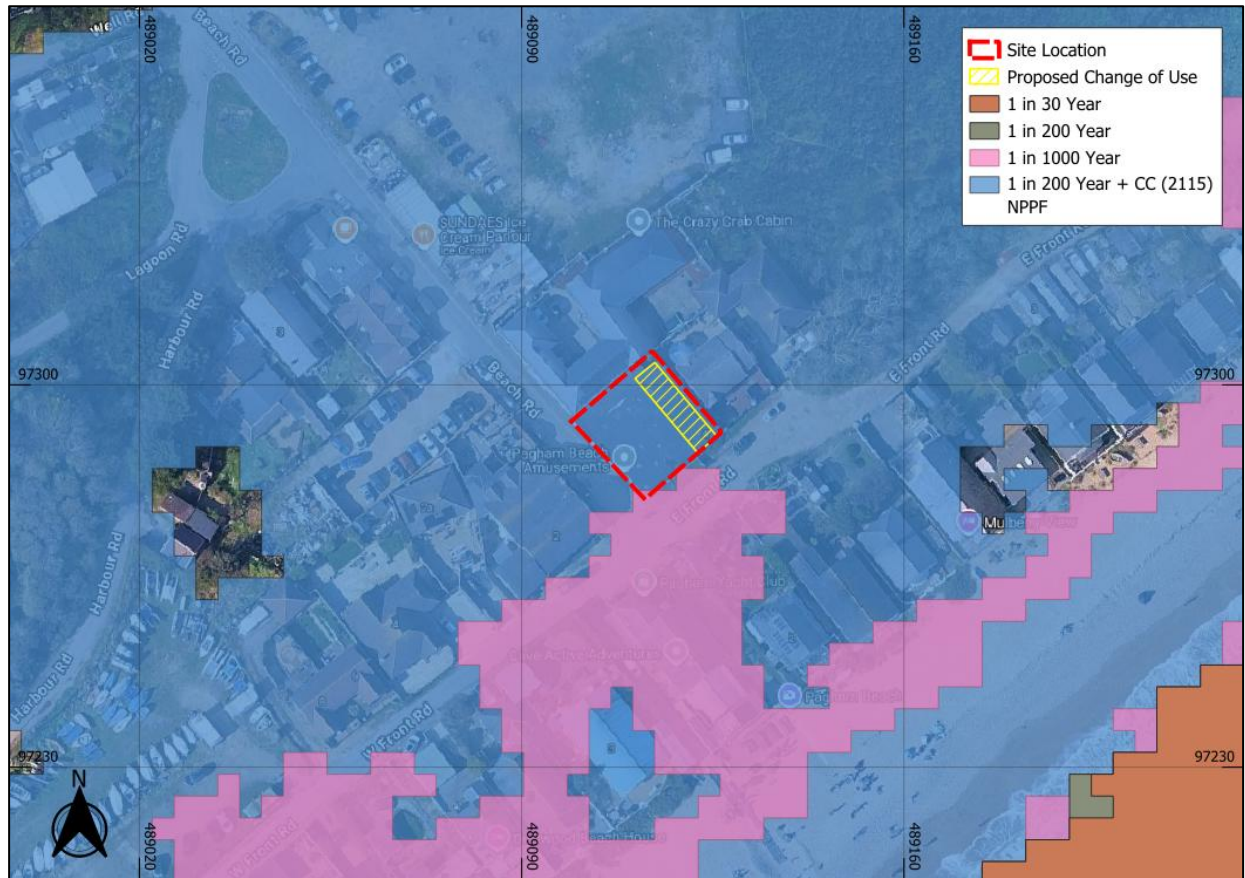


Figure 5: Modelled Flood Extents (2016 Emsworth to Littlehampton Model) (Base map and data from Google Satellite Imagery ©. Contains public sector information licensed under the Open Government Licence v3.0)

- 4.10. The site is located within the Arun and Western Streams Management Catchment, which has an Upper End Sea Level Rise (SLR) allowance of +1.6m along with Higher Central SLR allowance of +1.2m for the 2125 epoch event (1 in 200 year + SLR allowances).
- 4.11. The 2016 Emsworth to Littlehampton Model included the 2115 epoch depths, levels and extents (extent visualised above in Figure 5) which was derived from the NPPF SLR Guidance. It is important to note that the NPPF SLR allowance for the 2115 epoch is +1.13m.

- 4.12. Review of the flood levels at the proposed development during the 2115 epoch event, shows that the development could experience maximum flood levels of 4.37m AOD and therefore maximum internal flood depths of 0.37m (based on an FFL of 4.00m AOD provided in Appendix A).
- 4.13. However, the flood depth value is based on the SLR allowance being +1.13m when the site needs to consider +1.2m (Higher Central) and +1.6m (Upper End) due to the site being situated in the Arun and Western Streams Management Catchment. Therefore, the difference the Arun and Western Streams Management Catchment SLR allowances and NPPF SLR allowance can be calculated to add onto the modelled 2115 flood depths.
- 4.14. An increase of +0.07m (Higher Central) and +0.47m (Upper End) can be calculated based on the above analysis. Therefore, this increases flood depths at the proposed development to between 0.44m (Higher Central) and 0.84m (Upper End). These values are referred to as the 2125 epoch event as they are based on current climate change allowance values.

Tidal Flood Risk Summary

- 4.15. Based on the analysis above, the proposed development could experience maximum internal flood depths of 0.44m (HC) and 0.84m (UE) during the 2125 epoch event (1 in 200 year+CC), therefore the tidal risk to the development is considered to be high when considering the impacts of climate change. Based on the above, mitigation measures are recommended in Section 5 of this report.

Canals

- 4.16. 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.
- 4.17. There are no canals that have been identified as per the UK CRT Network mapping⁹.
- 4.18. Therefore, the risk of flooding to this site from canals is considered to be low.

⁹ <https://canalrivertrust.org.uk/canals-and-rivers>

Pluvial

- 4.19. 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.

RoFSW Data Analysis

- 4.20. The National Flood Risk Assessment (NaFRA2) has updated the Risks of Flooding from Surface Water (RoFSW) products which shows the chance of flooding from surface water to areas of land.
- 4.21. The RoFSW products are an assessment of where surface water flooding may occur when rainwater does not drain away through the normal drainage systems or soak into the ground but lies on or flows over the ground instead. It includes information about flooding extents and depths including the potential impact of climate change on flood risk, based on the latest UK Climate Projections (UKCP18).
- 4.22. Risk is displayed as one of three likelihood categories:
- High – greater than or equal to 1 in 30 (3.3%) chance of flooding in any year.
 - Medium – less than 1 in 30 (3.3%) but greater than or equal to 1 in 100 (1%) chance of flooding in any given year.
 - Low – less than 1 in 100 (1%) but greater than or equal to 1 in 1000 (0.1%) chance of flooding in any given year.
- 4.23. The RoFSW depth mapping shows the annual chance of flooding (based on the three risk categories listed above) **beyond a specific depth**, for depths at the following intervals from 20cm to 120cm:
- 0.2m, 0.3m, 0.6m, 0.9m and 1.2m
- 4.24. As well as present day risk of flooding from surface water, climate change scenarios have been produced to indicate the predicted impacts of climate change on future flood risk. The climate change allowances are based on the latest UK Climate Projections (UKCP18) from the Met Office, using the Representative Concentration Pathway (RPC) 8.5. A near-term epoch (2040 – 2060 “2050s” epoch) and central allowances are being used initially, to support short and medium-term decisions informed by the highest flood likelihood projections.

- 4.25. Given the present day and climate change scenarios are similar, the climate change scenario has been assessed below as a 'worst-case' scenario.

RoFSW Climate Change Scenario

- 4.26. The 'Flood Risk from Surface Water – Climate Change' mapping indicates that the majority of the site is at low likelihood of experience surface water flooding during the climate change scenario (Figure 6).



Figure 6: EA Surface Water Flood Risk Mapping (Base map and data from Google Satellite Imagery ©. Contains public sector information licensed under the Open Government Licence v3.0)

- 4.27. However, it is noted that the majority of Beach Road remains outside the modelled low, medium and high likelihood categories. When reviewing the proposed plans (Appendix A), the proposed development is situated approximately 0.73m above Beach Road given this road is situated at levels of approximately 3.27m AOD.

- 4.28. Given the majority of Beach Road is situated outside the modelled likelihood extents and is approximately 0.73m below the proposed development, it is considered that the model over-estimates the surface water flood risk to the site and proposed development.
- 4.29. Thus, it is considered that the proposed development is located outside all modelled flood risk extents and therefore considered to be low risk from experience surface water flooding.

Reservoirs

- 4.30. Large waterbodies or reservoirs that have walls built above the surrounding ground level pose a risk of flooding. Walls could fail due to old age, accident, or because excess flood water has been added to the reservoir. Although a breach is unlikely the consequences would be significant, leading to rapid inundation of the downstream floodplain.
- 4.31. According to the EA's Flood Risk from Reservoirs mapping the site is outside flood extents in the event of reservoir flooding (Figure 7).

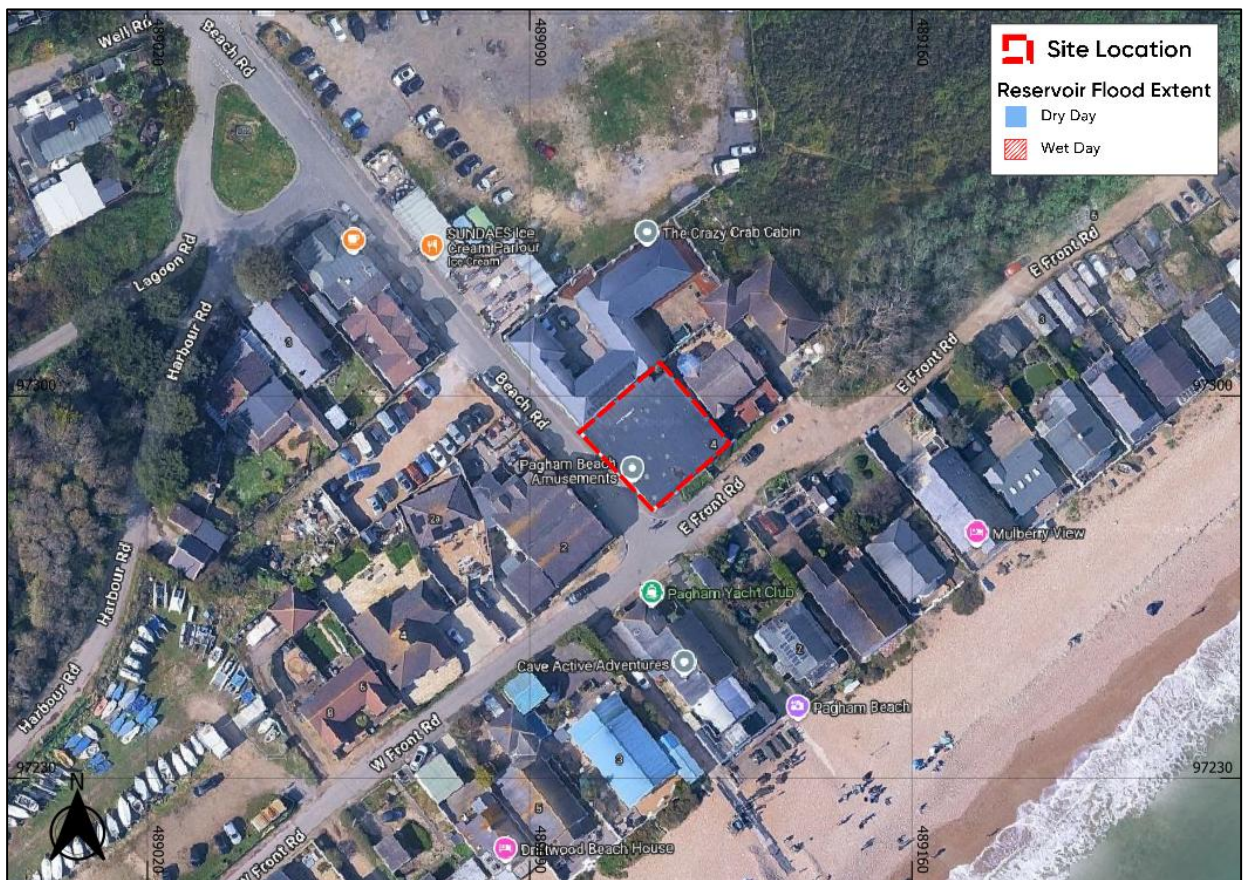


Figure 7: EA Reservoir Flood Risk Mapping (Base map and data from Google Satellite Imagery ©. Contains public sector information licensed under the Open Government Licence v3.0)

4.32. The site is therefore considered low risk from reservoir flooding.

Groundwater

- 4.33. Groundwater flooding occurs in areas where underlying geology is permeable and water can rise within the strata sufficiently to breach the surface.
- 4.34. The British Geological Survey's (BGS) mapping shows superficial deposits of Storm Beach Deposits comprised of gravel underlying the site. The bedrock underlying the site is London Clay Formation comprised of clay, silt and sand.
- 4.35. There are no identified historical BGS boreholes within a 300m radius of the site.
- 4.36. The SFRA (2016) presents the JBA Areas Susceptible to Groundwater Flooding mapping (Figure 8). The site is shown to lie within a 1km grid square of which ' $\geq 50\% < 75\%$ ' is considered susceptible to groundwater flooding.

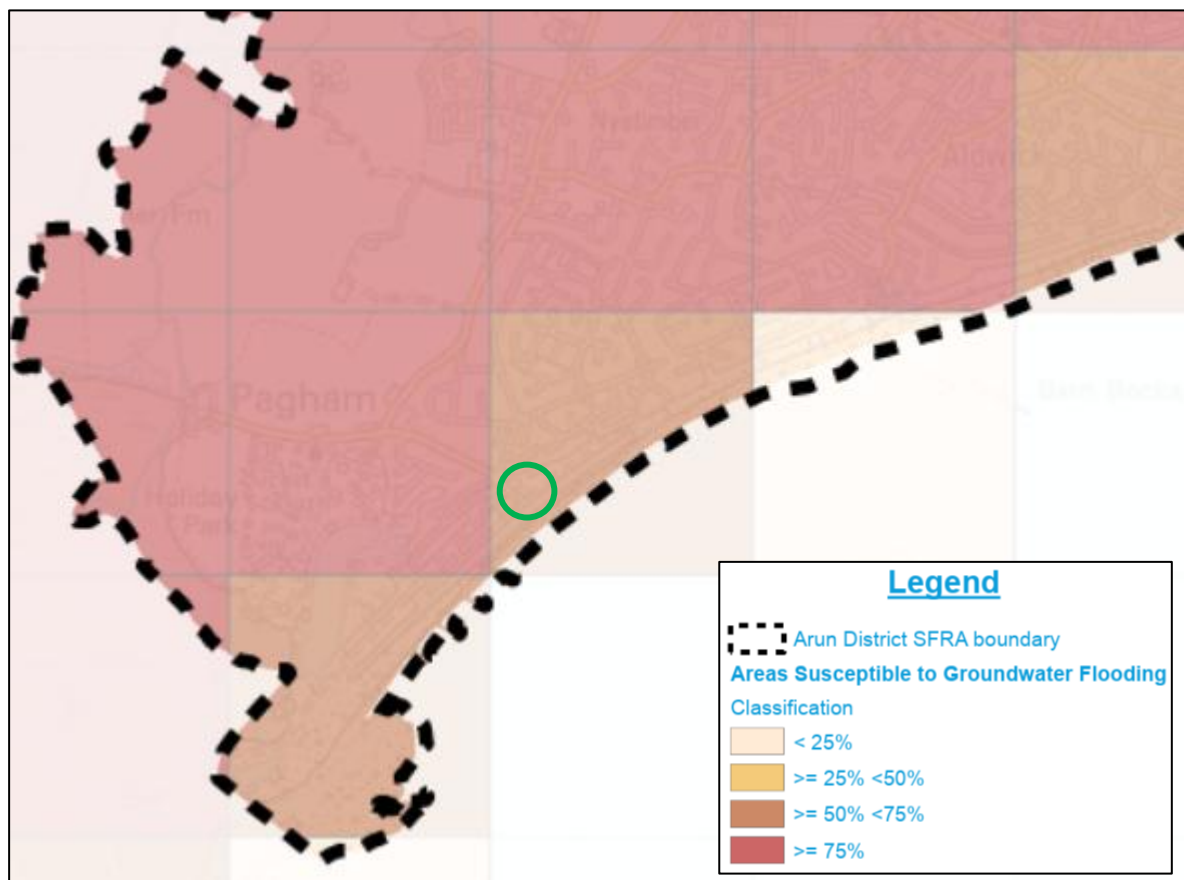


Figure 8: JBA Areas Susceptible to Groundwater Flooding (Arun Council SFRA, 2016). The approximate location of the site is represented by the green circle

- 4.37. However, it is noted that no further information is provided to assess the groundwater flood risk to the site.
- 4.38. Given the development proposal only include development above ground level, the risk of groundwater flooding to the proposed development can be considered low.

Sewers

- 4.39. 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.
- 4.40. The SFRA (2016) provide a table (Table 5-2) which shows information from the Sewer Incident Report Form (SIRF) database, which is supplied from Southern Water, and records the number of sewer incidents per postcode in the region. The site is within the postcode area 'PO21 4' and has recorded 20 sewer incidents.
- 4.41. However, there is no evidence to show that the site has been affected by these recorded flood incidents within the postcode area.
- 4.42. The development is therefore considered to be at low risk of flooding from sewers, unless there is evidence to suggest that the site is near a recorded flood even or has been directly affected from sewer flooding.

5. Flood Risk Mitigation

Tidal

- 5.1. Based on this assessment, the proposed development is considered to be at a high risk of tidal flooding.

Finished Floor Levels (FFLs)

- 5.2. Due to limitations such as floor to ceiling heights, it is not considered possible to raise the Finished Floor Levels (FFLs) of the development whilst having habitable floor to ceiling height. Thus, the FFLs of the proposed development will remain as per existing, set at 4.00m AOD.

Flood Resistance and Resilience Measures

- 5.3. Therefore, to reduce the risk of tidal flooding, the development should be retrofitted in a flood resilient and resistant manner in accordance with CLG Report *Improving the Flood Performance of New Buildings Flood Resilient Construction (2007)* (standards for the installation and retrofit of resistance measures are available in British Standard 851188-1:2019+A1:2021). The following mitigation measures are recommended, if practical:

- *Non-return valves are to be installed on the new drainage systems throughout the site. It is also recommended that these valves are retrofitted on to any existing sewer connections to prevent back-flow of diluted sewage. Maintenance of these valves is important to ensure their continued effectiveness so should be maintained in line with manufacturers recommendations.*
- *Damp Proof Membranes (d.p.m.) should be included in any design to minimise the passage of water through ground floors. Impermeable polythene membranes should be at least 1200 gauge to minimise ripping. Effective methods of joining membrane sections are overlaps of 300mm and also taping (mastic tape with an overlap of 50mm minimum).*
- *External renders are effective barriers to water penetration and should be used with blocks (or bricks) to at least the predicted flood level (approx. 0.3m),*

ideally with an additional 0.3m freeboard. External cement renders with lime content (in addition to cement) can induce faster surface drying.

- Cavity insulation should preferably incorporate rigid closed cell materials as these retain integrity and have low moisture take-up. Other common types are not generally recommended as they can remain wet several months after exposure to flood water which slows down the wall drying process. Blown-in insulation can slump due to excessive moisture uptake, and some types can retain high levels of moisture for long periods of time (under natural drying conditions).*
- Ground floor to be solid (i.e. concrete floors), with waterproof membrane/screed.*

Fluvial, Canals, Pluvial, Reservoirs, Groundwater and Sewers

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

Increase to Flood Risk Elsewhere

- 5.5. It is understood that the proposed development is for the change of use of the existing building on-site. As such, there is not an increase in additional built footprint thus the development would not increase flood risk elsewhere through the displacement of flood water.
- 5.6. Furthermore, it is recommended that small scale SuDS such as rainwater planters, water butts and rainwater downpipes are incorporated into external areas to provide betterment over the existing situation.

6. Flood Evacuation Plan

- 6.1. This FEP is intended to support a prior approval planning application and as such the level of detail included is commensurate and subject to the nature of the proposals.

Requirement for a Flood Risk Emergency Plan

- 6.2. Guidance set out by the Association of Directors of Environment, Economy, Planning & Transport (ADEPT) notes that a FEP should be provided as part of the FRA, or as a separate document accompanying the FRA, if relevant pedestrian and / or vehicular access and escape routes from a site would be affected during:
- A design flood from any source (with an appropriate allowance for climate change) with any existing flood risk management structures or features operating as intended; or
 - A design flood from any source (with an appropriate allowance for climate change) with a failure of any relevant flood risk management structures or features.
- 6.3. The key aim of the FEP is to provide the regulators and operator with clear information to show how flood risk has been appropriately considered and to set out clear guidelines as to how the site should be evacuated in the unlikely event of a flood emergency.
- 6.4. The FEP should be considered a live document and is therefore subject to update / review whenever there is a change to any of the contact numbers, names or roles set out within the FEP.
- 6.5. The initial FEP should be approved by Arun District Council as the Local Planning Authority (LPA), and West Sussex County Council as the designated Lead Local Flood Authority (LLFA). All subsequent updates and reviews of the FEP shall be documented and recorded to ensure that an up-to-date version of the FEP is available at all times.

Safe Access/Egress

- 6.6. The requirements for safe access and exit from new developments in flood risk areas are as follows, in decreasing order of preference:
- Safe dry route for people and vehicles;
 - Safe dry route for people;

- If a dry route for people is not possible, a route for people where the flood hazard (in terms of depth and velocity of flooding) is low and should not cause a risk to people; then,
- If a dry route for vehicles is not possible, a route for vehicles where the flood hazard (in terms of depth and velocity of flooding) is low to permit access for emergency vehicles. However, the public should not drive vehicles in floodwater.

- 6.7. Where a dry route is not possible and a route with low flood hazard is identified, the route should not have any service covers that could be removed, or other underwater hazards. It is often difficult to see underwater hazards even in shallow water, particularly at night or if the water is silty.
- 6.8. As shown on Figure 9, there is no 'dry' escape route from the site, given analysis of the 1 in 200 + CC (2115) NPPF extent hazard mapping shows that the majority of the flood extents in the area would be considered to be 'Danger for Most'. Therefore, the fastest route from the site, away from the flood risk, has been mapped as the best alternative.
- 6.9. This approach would be to exit the site onto East Front Street where the hazard rating is 'Danger for All' (>2.00) and travel approximately 20m until residents should turn right onto Beach Road. It is noted that the residents would have to travel approximately 30m to travel outside of the 'Danger for All' rating and within the 'Danger for Most' (1.25 – 2.00) rating. Once on Beach Road, residents should travel approximately 130m in the northwest direction and in which is predominately 'Danger for Most' rating.
- 6.10. Residents should then turn in right to travel along The Parade. Once residents have travelled approximately 55m along The Parade, they travel outside all modelled hazard ratings. The residents should then follow in the northeastern direction away from the flood extents.

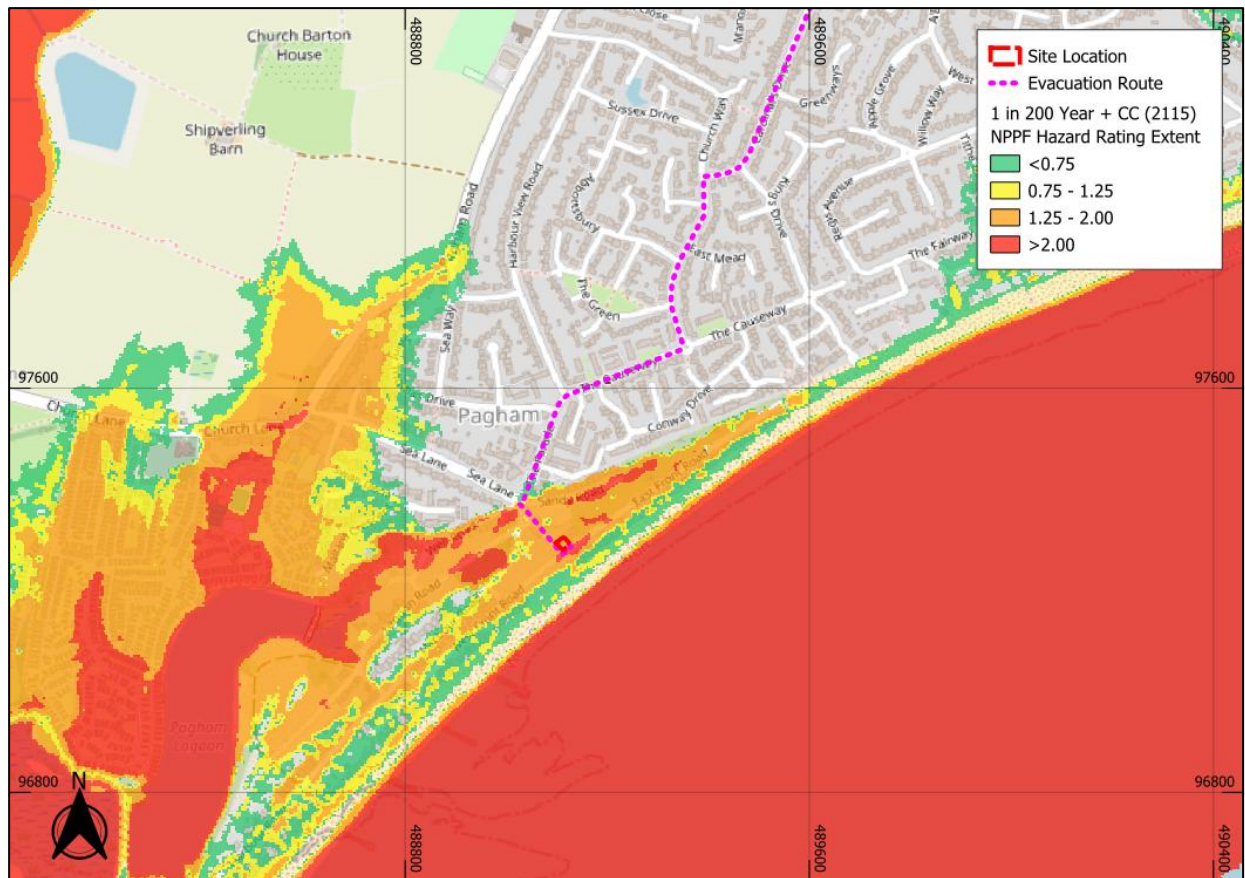


Figure 9: Evacuation Routes Overlain with Flood Zones (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

- 6.11. Given the proposals are located on the ground floor, it is imperative that residents evacuate as soon as an EA Flood Warning is issued.

EA Flood Warnings

- 6.12. All management staff/site owners/residents should sign up to the EA Flood Warning Service for the 'Coastal Areas of Pagham'¹⁰.
- 6.13. This service allows occupants to register an address, which is at risk of flooding, along with contact details so that in the event of a flood being forecast, the occupants will be sent an alert

¹⁰ <https://www.gov.uk/sign-up-for-flood-warnings>

directly to their chosen method of contact. The occupants should sign up to this and make this service available to all future residents where applicable.

- 6.14. EA aim to provide a minimum of 6 hours for tidal or coastal locations¹¹.
- 6.15. The Flood Alert stage is used to warn of the possibility of flooding. It is issued earlier than a flood warning, to give advance notice of the possibility of flooding. The EA aims to provide between 2 and 12 hours lead time between a Flood Alert being issued and possible flooding occurring.
- 6.16. As such it would be expected that should the service function as intended, a Flood Alert would be issued between 2 and 12 hours before flooding, and a Warning issued up to 6 hours in advance.
- 6.17. Given the proposals are located on the ground floor, it is imperative that residents evacuate as soon as an EA Flood Warning is issued.

Trigger Events

- 6.18. Three trigger stages have been identified, namely,
 - green alert (residents to implement a review of the FEP procedures),
 - amber alert (evacuate on warning);
 - or issue a red alert (danger to life).
- 6.19. Environment Agency flood warnings¹² should be used to set evacuation triggers. There are three levels of flood warning:
 - EA Flood Alert.
 - EA Flood Warning.
 - EA Severe Flood warning.

¹¹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/297923/Flood_Warning_-_Data_Integrity_Guide_v2_0.pdf

¹² <https://check-for-flooding.service.gov.uk/alerts-and-warnings>

6.20. Residents should follow the instructions in Table 2. The proposed flood evacuation procedures outlined in Table 2 should be reviewed on a regular basis.

Table 2: Evacuation Triggers and Procedures

Warning trigger	Trigger stage	Procedures
 EA Flood Alert <i>A flood alert means you need to prepare, flooding is possible.</i>	Green Alert - Review FEP	Green Alert represents a state of readiness ahead of a potential flood situation. - Check your flood risk: https://check-for-flooding.service.gov.uk/alerts-and-warnings - Keep up to date with the latest situation - call Floodline on 0345 988 1188 or follow @EnvAgency and #floodaware on X (formerly Twitter) for the latest flood updates. - Ensure site users (including amusement) are aware of the situation and know what to do should the situation escalate. - Have a bag ready with vital items like insurance documents and medications in case you need to leave your home. - Check you know how to turn off your gas, electricity and water mains supplies. - Plan how you'll move family and pets to safety
 EA Flood Warning <i>A flood warning means you need to act, flooding is expected.</i>	Amber Alert	Amber Alert means you should be prepared to act, if necessary, ahead of a potential flood situation. - Evacuate as soon as possible. - Move vehicles to higher ground if it's safe to do so. - Secure any materials or large loose items that may float and cause damage during a flood. - Move family and pets to safety. - When evacuating the site, turn off gas, electricity and water supplies if it's safe to do so (never touch an electrical switch if you're standing in water). - If any occupants are unable to leave the site, then they should contact the emergency services for assistance immediately.

Warning trigger	Trigger stage	Procedures
		- Both commercial and residential unit are to be closed and not to reopen until the flood warning has been lifted. - If warnings are given out of opening hours, and the decision is taken to not open then this information should be disseminated to all members of staff. - If possible, use social media to notify visitors of the flood warning and subsequent temporary closure.
 EA Severe Flood Warning <i>A severe flood warning means there is danger to life, you must act now.</i>	Red Alert	Red Alert means that you must act. - Call 999 if you're in immediate danger. - Follow advice from the emergency services and evacuate if you're told to do so. - Avoid driving or walking through flood water: just 30cm (1 foot) of fast flowing water could move your car and even shallow moving water can knock you off your feet. It may also contain heavy debris, sharp objects, open manhole covers, sewage and chemicals. - Use allocated evacuation route to facilitate / direct the safe evacuation of all site users (including commercial). - Both commercial and residential unit are to be closed and not to reopen until the flood warning has been lifted.

Emergency Services

- 6.21. It is important to immediately leave the site if a Flood Warning is in place.
- 6.22. This is so that additional strain is not put on the emergency services. Blue light responders (i.e. the emergency services) will automatically become the 'first responder' during a flood event. Any instruction from the emergency services will supersede the information provided in this document. The instructions from the emergency services should be followed.
- 6.23. Table 3 provides contact numbers for relevant Emergency Services.

In an emergency where there is a real and immediate threat to life or property always dial 999.

Table 3: Key contact numbers for emergency services

Organisation	Contact Number
West Sussex Fire and Rescue Service	Main Switchboard: 01243 777100 Non-emergency: 101 Emergencies: 999
Pagham and Rose Green Police	Non-emergency: 101 Emergencies: 999
Environment Agency	Incident Hotline: 0800 80 70 60 Floodline (24 hour service): 0345 988 1188 (quick dial code: 316029) Main switchboard: 03708 506 506

Preparation for Flood Events

6.24. There are a multitude of ways that occupants can prepare for the potential of a flood event. These are set out as follows:

- Occupants to review the FEP and familiarise themselves with their responsibilities and roles.
- Sign up to the Environment Agency flood alert and warning service which will notify you by telephone/email/SMS when flooding is likely.

What to Do to Prepare/ During Flooding

6.25. This FEP should be communicated to and provided to all occupants. The summary (Appendix B) should be displayed in the commercial unit and be made easily available.

6.26. The main priority during a flooding event is the safety of all site users. As such a key part of protecting everyone is making sure that you are fully aware of the ongoing situation and know where to access the most up to date information. Below is a list of advised actions that should be carried out during a flood event:

- Where possible, switch off all electrical and gas appliances at the mains. Do not turn on your electrical or gas supplies until they have been checked by a professionally qualified electrician or engineer. Take care of gas leaks – do not smoke or use open flames.

- Monitor websites distributing flooding information including <https://check-for-flooding.service.gov.uk/alerts-and-warnings>
- Monitor local press, radio, and regional TV.
- Pay close attention to the advice given by emergency services and local authority. Take all of the warnings seriously and respond quickly.
- Do not drive through flood water. Less than two feet of flood water can be enough to float a vehicle.
- Do not walk through flood water and avoid contact with flood water when possible. Flood water is typically contaminated with sewage and other hazardous substance. Wear rubber gloves and boots and wash thoroughly if you do come into contact with flood water. Do not attempt to swim through flood water.
- Do not enter a building that has been flooded unless you are sure it is structurally safe. If in doubt, have the property checked by a professional.
- Do not use petrol or diesel generators indoors as they produce carbon monoxide.

6.27. In addition, it is advised you prepare a flood kit which can be quickly accessed when flooding is imminent to equip you with everything you may need. You should consider the following:

- Important documents such as passports and insurance certificates – if these cannot be safely stored within the property it would be advised to take them with you as they are expensive to replace.
- Torch – In the case that it floods at night and power is affected (Wind Up torch is preferred)
- Radio – A wind up or battery radio will help to monitor local news and weather broadcasts for the latest flooding situation.
- Batteries – Have spare batteries in order to power the torch and radio should it be required.
- Bottled Water – Water from the tap could become contaminated during a flood so bottled water should be available.
- First Aid Kit – Keep a first aid kit to hand in case of minor injuries. Put any prescription medication in your kit so that you can have easy access to it.

- Mobile Phone – Keep a fully charged mobile with you so that you can contact people in an emergency or call for help. If the phone has internet access, you can use it to monitor the local news and latest flood situation.
- Waterproof Clothing – Keep wellies and rubber gloves available should you need to enter the flood water.
- Non-Perishable or Tinned Food.

Places of Safe Refuge

- 3.18 Once site users have followed the proposed evacuation route to Flood Zone 1 the site should not be re-occupied until the flood warning has been lifted.

On Site Safe Refuge

- 3.19 If flooding has already occurred which means evacuation cannot occur, then safe refuge must be sought within the building, and the emergency services must be notified.
- 3.20 However, it is extremely important to note that prior evacuation should be sought before flooding occurs. Do not wait for flooding to occur to react. It should be reiterated that prior evacuation is the preferred option and safe refuge on site should only be sought in the very worst-case scenario where flooding occurred, and the refuge on site is to mitigate the risk to life.

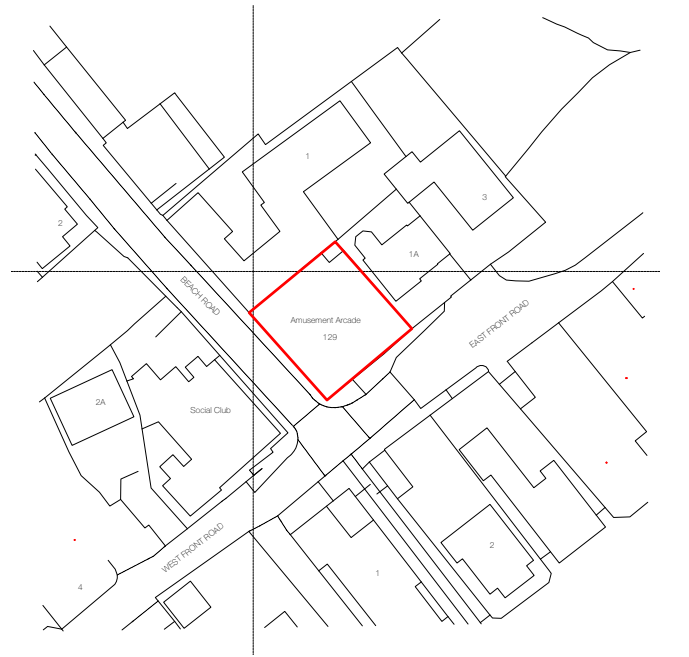
7. Conclusions

- 7.1. This FRA has been undertaken with reference to the requirements of NPPF and Planning Practice Guidance with respect to the development at East Front Road, Pagham, Arun, West Sussex, PO21 4SL. It has been written to support a planning application and prepared with due consideration to the nature of the proposed development to provide the appropriate level of detail.
- 7.2. 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	Based on the analysis above, the proposed development could experience maximum flood depths of 0.44m (HC) and 0.84m (UE) during the 2125 epoch event (1 in 200 year +CC). Therefore, the tidal risk to the development is considered to be high when considering the impacts of climate change.
Fluvial Pluvial Reservoirs Groundwater Sewers Canals	The proposed development is considered to be at low risk from other analysed sources of flooding.

- 7.3. 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.
- 7.4. This Flood Risk Assessment should be submitted as part of the planning application to satisfy the requirements under NPPF.

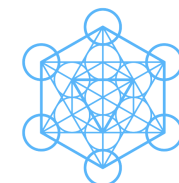
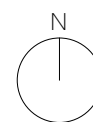
Appendix A - Development Proposals



Location Plan 1:1250



Block Plan 1:500



pete sonntag
ARCHITECT

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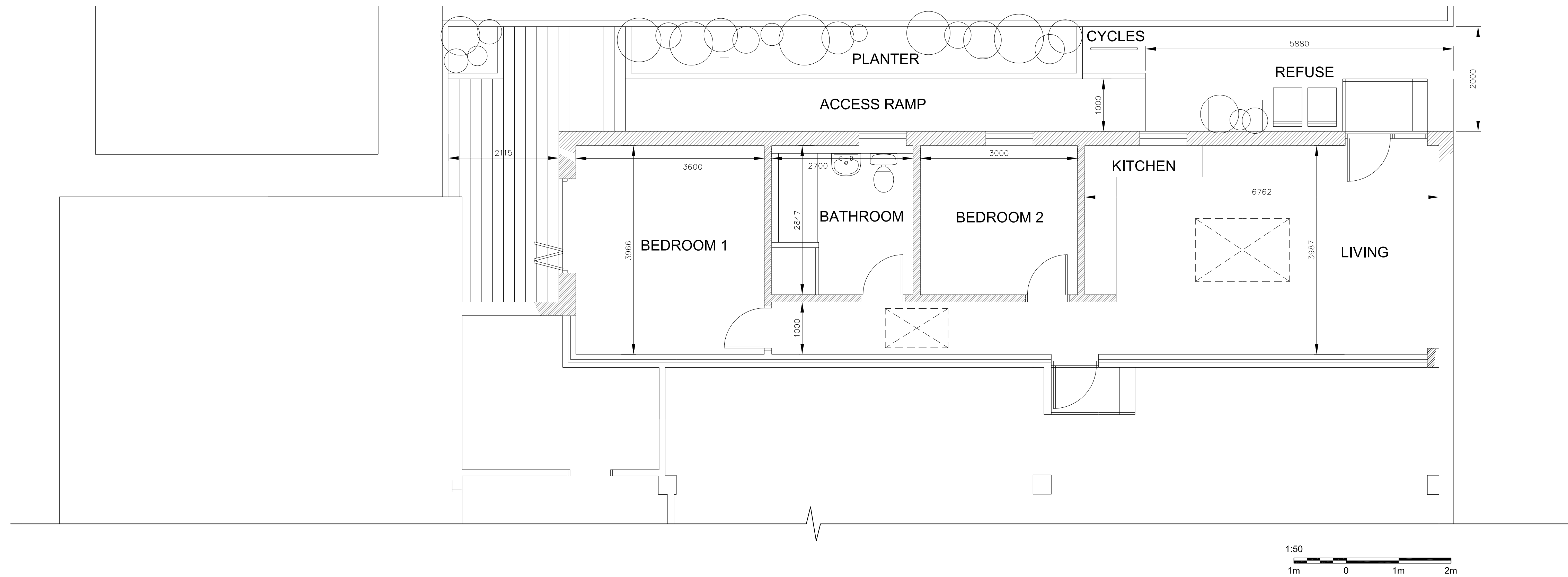
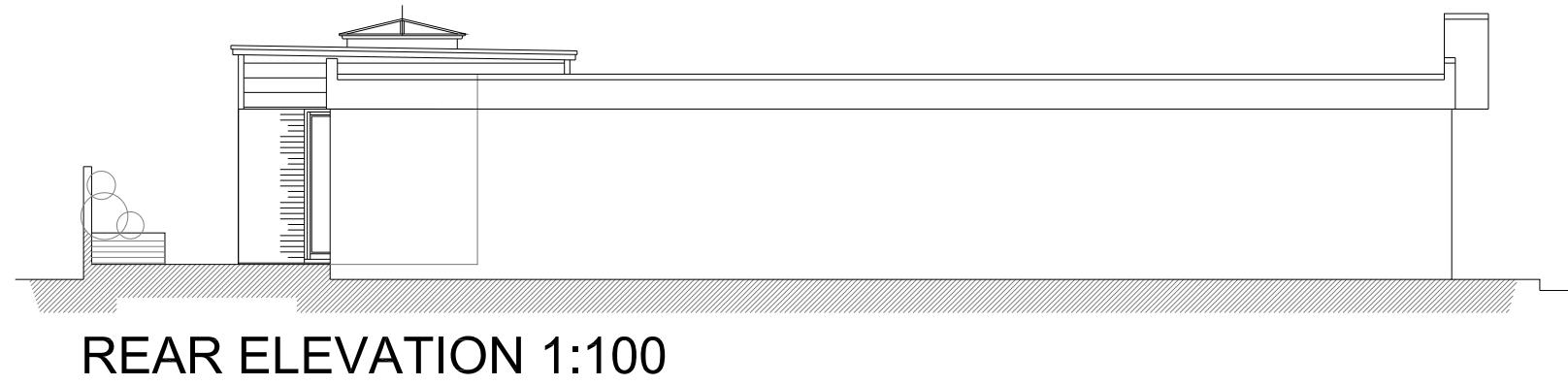
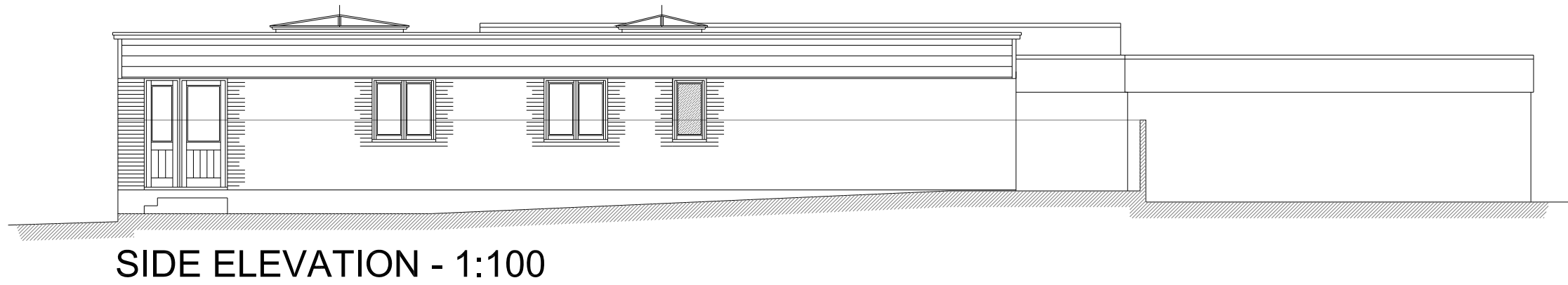
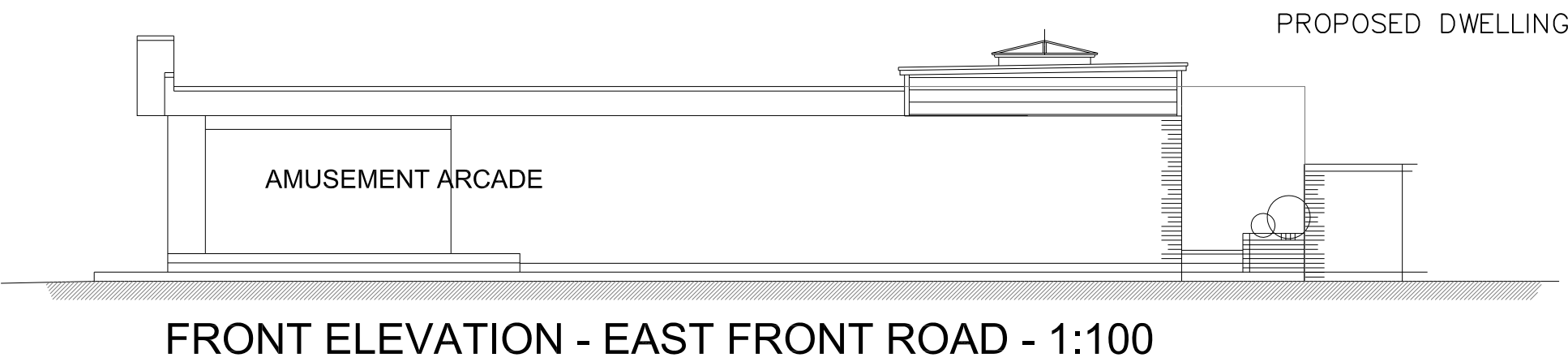
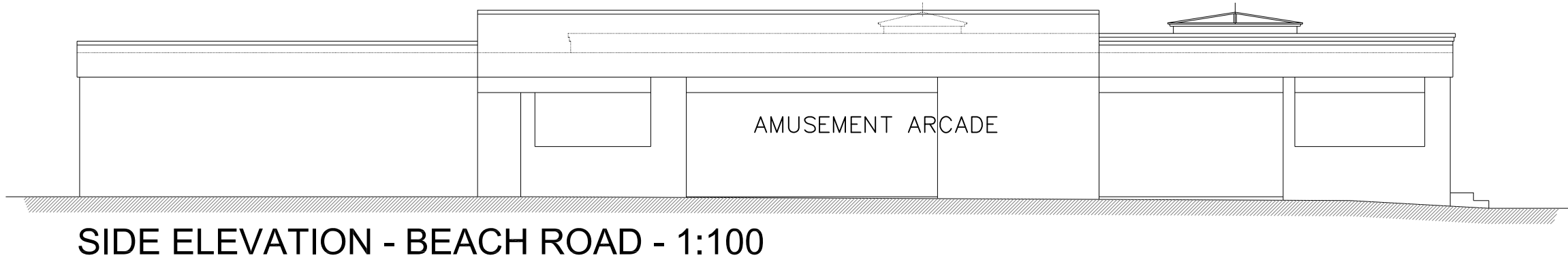
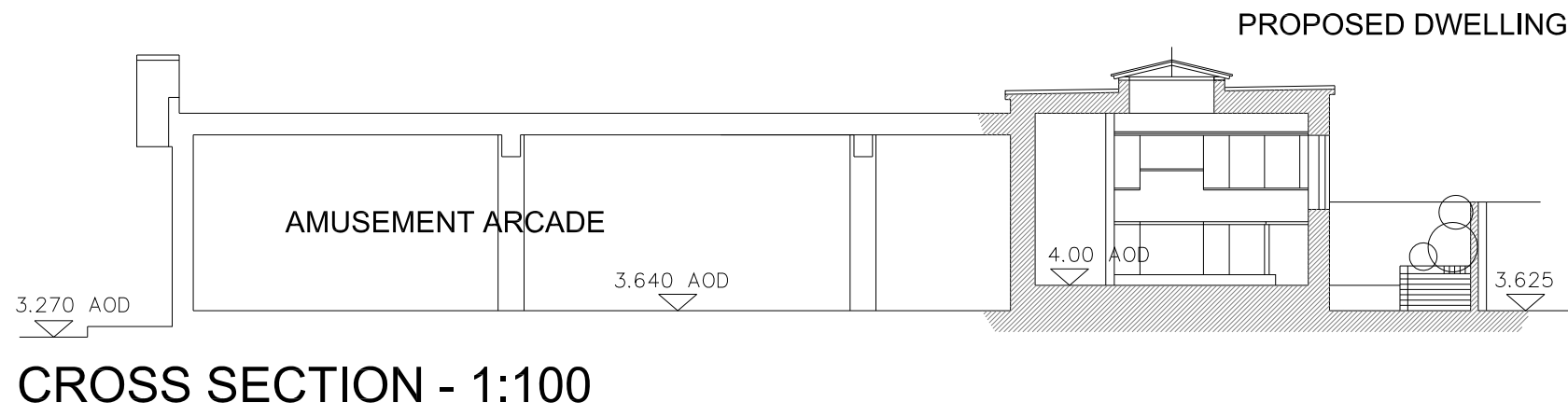
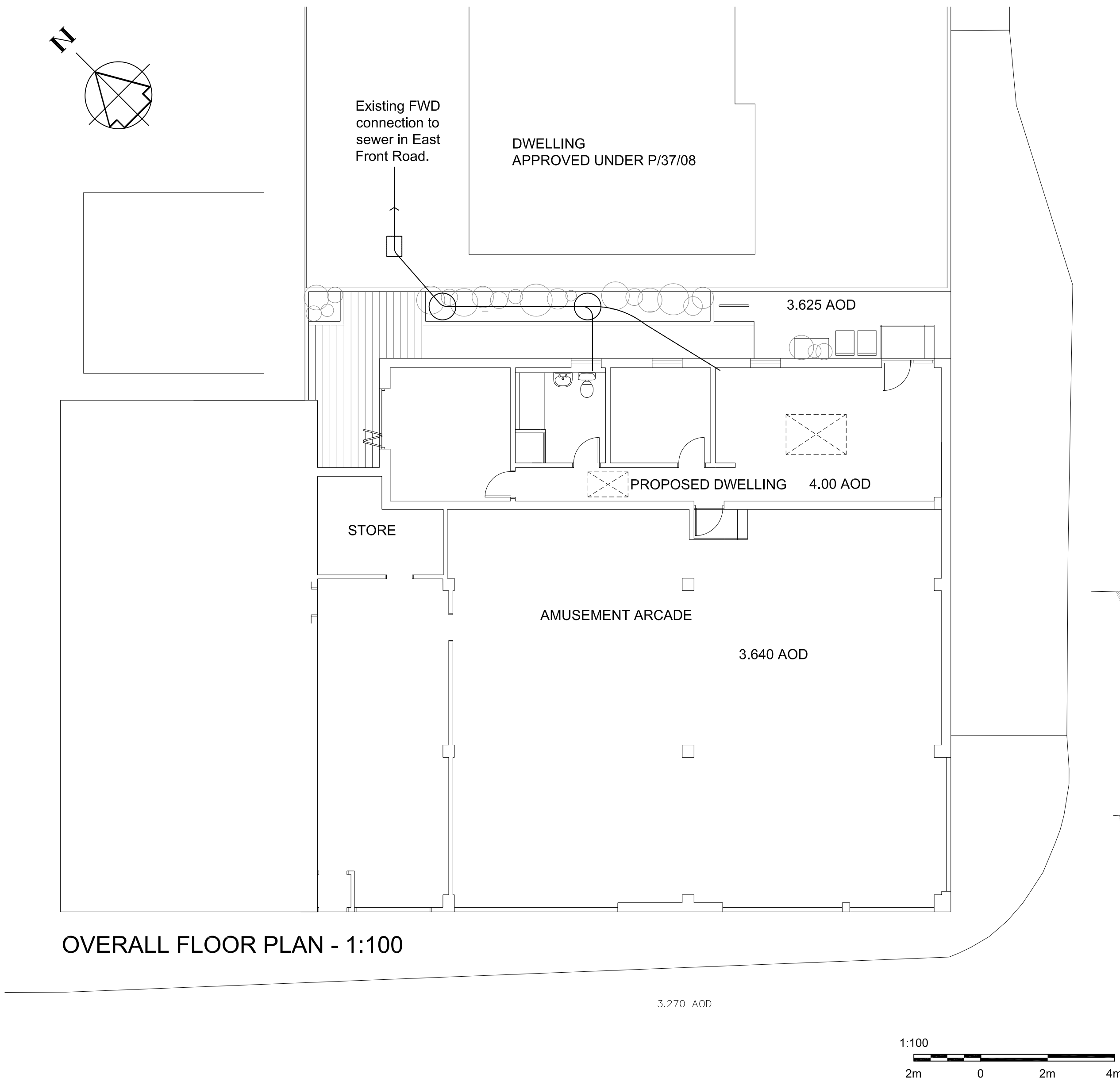
e:pete@petesonntag.co.uk

tel:07879 274409

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Date:

E-001
Location and Site/Block Plan
Amusement Arcade, 129 Beach Road, PO21 4SX
Mr D Griggs
Stated@A3
PLANNING
PS
January 2026

Rev **



Appendix B - FEP Summary for Site Users

Property:	East Front Road, Pagham, Arun, West Sussex, PO21 4SL
Risk summary:	The site is shown to be at risk from flooding during the 1 in 200 year + CC (2115) scenario. It is important to note that the worst flooding would likely coincide with a storm surge, which is a well understood mechanisms of flooding. It is unlikely that flooding would occur on site without prior warnings being issued. <u>Prior evacuation of the site should be sought as soon as a Flood Warning is issued by the Environment Agency.</u>

Preparedness:	Recommended evacuation route:
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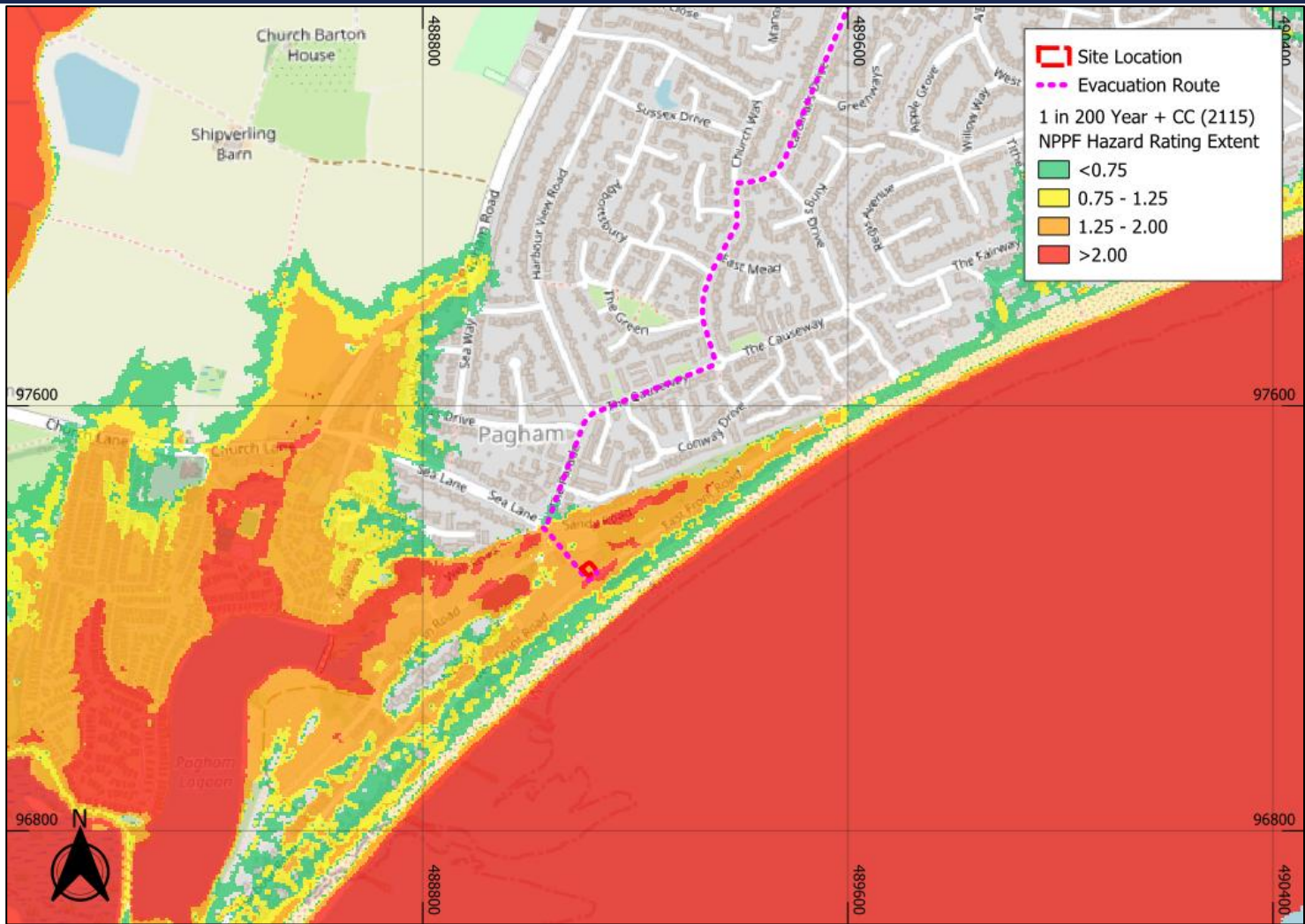
- Make a list of emergency contacts.
- Review FEP periodically.
- Sign up to the EA Warning System

Flood warning actions:

 FLOOD ALERT Flooding is possible, be prepared.	Future residents should check the details of the forecast and consider taking steps to minimise impacts, including: • Plan how you'll move family and pets to safety • Review the FEP and familiarise themselves with their responsibilities and roles. • Ensure all site users (including commercial) are aware of the situation and know what to do should the situation escalate. • Have a bag ready with vital items like insurance documents and medications in case you need to leave your home.
 FLOOD WARNING Flooding is expected – immediate action is required.	Continue to monitor the forecast. Do not wait for a severe warning to act. Make a decision on whether to evacuate the property following the agreed evacuation route. • Evacuate as soon as possible. • If warnings are given out of opening hours, and the decision is taken to not open then this information should be disseminated to all members of staff. • If possible, use social media to notify visitors of the flood warning and subsequent temporary closure to ensure additional people do not put themselves at risk. • Retail unit should not reopen until flood warning has been lifted. • Flood wardens to check staff registers are complete and available to ensure all staff are accounted for post-evacuation.
 SEVERE FLOOD WARNING Severe flooding with danger to life	Follow advice from the emergency services and evacuate if you are told to do so. • Avoid driving or walking through flood water: just 30cm (1 foot) of fast flowing water could move your car and even shallow moving water can knock you off your feet. It may also contain heavy debris, sharp objects, open manhole covers, sewage and chemicals. • Use allocated evacuation route to facilitate / direct the safe evacuation of all residents. • Contact the Emergency Services if you, or anyone, cannot leave. • The unit should not be reoccupied until the flood warning has been lifted or unless instructed that it is safe to do so.

The emergency services (blue light responders) become the first responders during a flood event. The instruction they give should be followed at all times, even if it contradicts the details of this FEP report.

Occupants should be signed up to the following:
Environment Agency flood warning service
<https://www.gov.uk/sign-up-for-flood-warnings>



Ensure prior evacuation is actioned as soon as a Flood Warning is issued.

IN AN EMERGENCY, CALL 999.

Emergency Contacts:		Emergency cut-off locations:	
Emergency Contact 1:		Electricity cut-off location:	
Emergency Contact 2:		Gas cut-off location:	
Emergency Contact 3:		Water cut-off location:	
Emergency Contact 4:		Insurance policy number:	
Emergency Contact 5:		Location of Flood Kit:	