JOFLOWS

FLOOD RISK & DRAINAGE



FLOOD RISK ASSESSMENT
80 Old Shoreham Road, Shoreham-by-sea, BN43 5TD

Doc ref. JOF0123-RP-FRA-001 REV 01
Craig Construction Services Ltd

Flood risk. Drainage. Hydraulic Modelling.

JOFLOWS

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80 Old Shoreham Road, Shoreham-by-sea, BN43 5TD
Flood Risk Assessment
December 2024

REPORT REF: JOF0123-RP-FRA-001 REV 01

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REGISTRATION OF AMENDMENTS

Date	Rev	Comment	Status	Prepared By
November 2024	(-)	First issue	Issue for client comment.	**Joao Gil** **BSc. MSc. GMICE** Civil Engineer
December 2024	01	Second issue	Issue for planning. Comments from LPA (regarding overland surface water) addressed.	**Joao Gil** **BSc. MSc. GMICE** Civil Engineer

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EXECUTIVE SUMMARY

Site Address	80 Old Shoreham Road, Shoreham-by-sea, BN43 5TD
Site Description and Setting	The land within the ownership of the Client is generally flat and contains a main workshop store and garage store room in the rear yard.
Proposed Development	The proposed development is for the creation of an additional Ancillary Storage room to partially infill the yard between the existing main workshop store and the garage store room.
Flood Risk	In accordance with the Flood Map for Planning, the Application Site lies within the present-day undefended Flood Zone 3 i.e. at a risk of flooding equal to or higher than the 1.0%AEP from rivers and 0.5%AEP from the sea. Publicly available LiDAR elevation shows the average ground levels at the location of the Ancillary Storage to be circa 3.84m AOD. The Product 6 obtained from the Environment Agency shows the Application Site to remain mostly free of flooding for the defended 0.5%AEP2124CC tidal flood event, when wave overtopping is not taken into account. However, Product 6 also shows that wave overtopping puts the Application Site at risk of tidal/fluvial flooding for the defended 0.5%AEP2124CC wave overtopping flood event – showing a flood depth of circa 1.3m. The defended 0.5%AEP2124CC wave overtopping tidal/fluvial flood event is taken as the design flood event for the purpose of this assessment (5.14m AOD). Given the impracticability to raise Finished Floor Level of the new Ancillary Storage to 300mm above the design flood level and the impracticability to provide flood storage compensation, resilience measures are preferred in detriment of resistance measures, which would lead to displacement of flood waters. This approach is in accordance with the requirements of the Level 1 SFRA. In terms of off-site surface water flood risk, the EA's national-scale modelling approach is known to ignore the presence of micro topographic features, which are deemed to significantly affect flood patterns in the area. As such, the wood panel fences, timber gravel board and concrete walls are deemed to obstruct to a potential flood route between Orchard Close and the gardens at the rear of Old Shoreham Road. Therefore, no additional mitigation measures are required other than i) incorporating flood resilience measures in detriment of resistance measures and ii) maintaining the door to the alleyway along the northwest boundary of the Application Site. These measures will prevent the displacement of surface water food volume. Under the gov.uk 'Statutory Guidance for Excluded Floor Risk Activities' , the applicant has the right to deploy temporary flood protection devices attached to buildings, without the need for a permit. Under this context, flood storage compensation becomes irrelevant if the rear yard is protected by temporary flood protection devices. Albeit the Ancillary Storage does not lead to an increase of users within the Application Site, current users and staff should follow a development-specific Flood Warning and Evacuation Plan in the event of flooding, prepared alongside the present Flood Risk Assessment. Site users are also recommended to sign up for Flood Alerts & Warnings and follow the advice from emergency services.
Sequential & Exception Tests	The development is classed as a minor extension (non-residential extension of less than 250m^2) and therefore it is exempt from both the Sequential Test and the Exception Test.

This summary should be read in conjunction with the full report and reflects an assessment of the site based on information received at the time of production. No liability is accepted for issues arising as a result of limitations in the information provided.

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1.0 INTRODUCTION

1.1 Joflows has been commissioned by Craig Construction Services Ltd (hereafter referred to as 'the Client') to produce a flood risk assessment for the construction of an additional store room (hereafter referred to as the 'Ancillary Storage') to support the operation at the of a current workshop store at 80 Shoreham Road, Shoreham-by-Sea (hereafter referred to as the 'Application Site'). The development plans are included in **Appendix A**.

1.2 The proposed development takes place at E521070 N105556. The total footprint of the Application Site owned by the client covers approximately 515m^2, whilst the Ancillary Storage covers 42.5m^2.

1.3 The assessment has been prepared using our best engineering judgement however there are levels of uncertainty implicit in the historical data and methods of analysis. The report is based on the following information:

- The Environment Agency's Flood Map for Planning and Long-Term Flood Risk Map;
- British Geological Survey (BGS);
- Location Plan ref. 24-P10-01, by Platform 3;
- Proposed block plan ref. 24-P10-02, by Platform 3;
- Proposed Store Room (Existing Plans) ref. 24-P10-10 rev. B, by Platform 3;
- Proposed Store Room (Proposed Plans) ref. 24-P10-60 rev. B, by Platform 3;

1.4 No intrusive investigations had been undertaken to infer the risk of groundwater flooding at the date this report was written. No site-specific topographic survey was available at the date this report was written.

1.5 The Local Planning Authority for the area is Adur District Coundil, whilst West Sussex County Council is the Lead Local Flood Authority

Disclaimer

1.6 Joflows has completed this report for the benefit of the individuals referred to in paragraph 1.1 and any relevant statutory authority which may require a reference in relation to approvals for the proposed development.

1.7 Joflows accepts no responsibility or liability for:

- The consequence of this documentation being used for any purpose or project other than that for which it was commissioned i.e. to inform a planning application;
- Any damages to third-parties resulting from the limited information and dataset(s) available at the date this report was written;
- The issue of this document to any third party with whom approval for use has not been agreed.

2.0 SITE DESCRIPTION & FLOOD RISK

Site Location & Proposals

2.1 The Application Site covers an area of approximately 515m^2 (solid red line) and comprises a workshop store at the front to Old Shoreham Road, alongside the respective yard and a garage store. The new Ancillary Storage will be located in the yard of the Application Site (dashed red line). A site location aerial view is shown in Figure 1.

2.2 The site location plan, block plan and proposed detailed plans of the Ancillary Storage can be found in **Appendix A.**

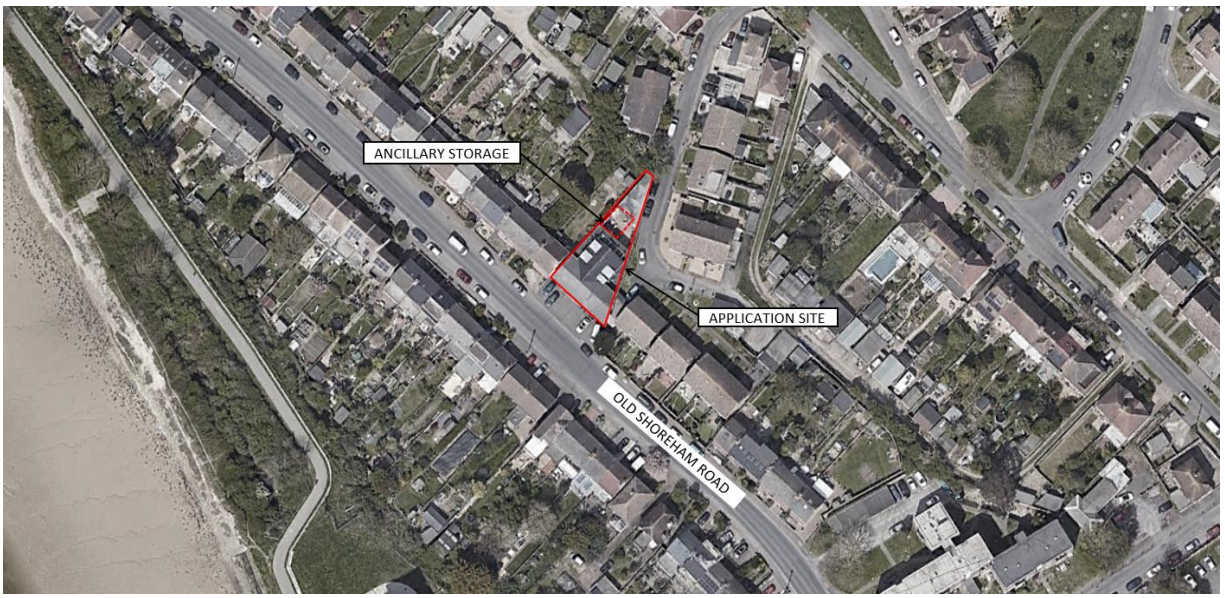

Figure 1 – Location plan of Application Site (solid red line) and new Ancillary Storage (dashed red line). Imagery extracted from Google Earh Pro.

Fluvial and Surface Water Flood Risk

2.3 Information relating to the current flood risk to the Application Site has been obtained from the Environment Agency and *gov.uk* websites and *wms* datasets. Other sources of flood risk information are discussed throughout Chapter 4.0.

2.4 The publicly available Environment Agency's *wms* datasets show the Application Site to be located within the undefended present-day Flood Zone 3 i.e. at an yearly chance of flooding equal to or higher than 1% from rivers and 0.5% from the sea – Figure 2.

2.5 The EA's surface water flood risk *wms* layers show the Application Site to be affected by the 0.1%AEP flood extents, including the footprint of the new Ancillary Storage – Figure 3. The Application Site remains unaffected by the 3.3%AEP and 1.0%AEP surface water flood events.



Figure 2 – EA's Flood Zone 3 and Flood Zone 2 *wms* datasets. Application Site shown in solid red and Ancillary Storage shown in dashed red. Extract from EA's Flood Zone *wms* layer.

2.6 An extract from the EA's surface water flood extents *wms* layer is shown in Figure 3.



Figure 3 – EA's surface water flood depth for the 3.3%AEP, 1.0%AEP and 0.1%AEP storm events. Application ite shown in solid red and Ancillary Storage shown in dashed red. Extract from EA's Flood Zone *wms* layer.

Geological Data

2.7 Information published by the BGS indicates that the site is directly underlain by Head (clay, silt, sand and gravel), which are in turn underlain by the Newhaven Chalk Formation (Chalk). The nearest publicly available borehole record is located approximately 215m to the southeast of the Application Site, and shows a layer of made ground down to a depth of 1ft, underlain by layers of clay and silt down to a depth of 14ft (4.3m), which are then underlain by chalk and flints.

2.8 Other local borehole records show the permanent groundwater rest level at over 3m below ground level.

Rivers & Watercourses

2.9 The Environment Agency *wms* layers show a designated Main River 120m to the southwest of the Application Site – River Adur.

2.10 The estuary of River Adur is located 1.63mi to the southwest of the Application Site.

Hydrology

2.11 The Application Site falls within a predominantly urban catchment, deemed to be drained by a system of underground drains and sewers.

2.12 The pre-development greenfield runoff rates and volumes were estimated via ICP SuDS (IH124) and FSR. This method is deemed acceptable given the limited applicability of greenfield runoff rates in this study.

2.13 The greenfield runoff rates and volumes were estimated for an area of 1ha and pro-rated to an area of 42.5m^2. The results are shown in Table 1. Autodesk Infodrainage calculation outputs can be found in **Appendix B**.

Table 1 – ICP SuDS (IH124) greenfield runoff rates and FSR volumes for the 50%AEP, 3.3%AEP and 1%AEP storm events.

Annual Exceedance Probability	Standard Area (1ha)		Ancillary Storage (42.5m^2)	
	Greenfield runoff (l/s)	Greenfield Volume (m^3) *	Greenfield runoff (l/s)	Greenfield Volume (m^3) *
50%AEP	2.7	-	0.01	-
3.3%AEP	6.9	-	0.03	-
1%AEP	9.8	266.6	0.04	1.24

* 6hrs storm event

Topographic Data

2.14 No site-specific topographic survey was made available at the date of this report.

2.15 Alternatively, the Environment Agency's publicly available LiDAR was used to inform this assessment. As shown in Figure 4, the ground levels at the Application Site are relatively flat, varying between 3.50m AOD and 4.00m AOD.

2.16 At the location of the new Ancillary Storage, the average ground level is circa 3.84m AOD. This level will be used to assess flood risk throughout the report.

2.17 It is worth noting that LiDAR has an RSME of -/+ 150mm, which can be significantly affected by trees, buildings and presence of water features (e.g. watercourses). The levels presented in this report should be confirmed with a site-specific topographic survey prior to construction.

Public Sewers

2.18 No public sewer asset records were available at the date of this study.

2.19 However, given the density of dwellings in the area, the presence of sewers is very likely. This assumption should be verified at the subsequent stages of the design.

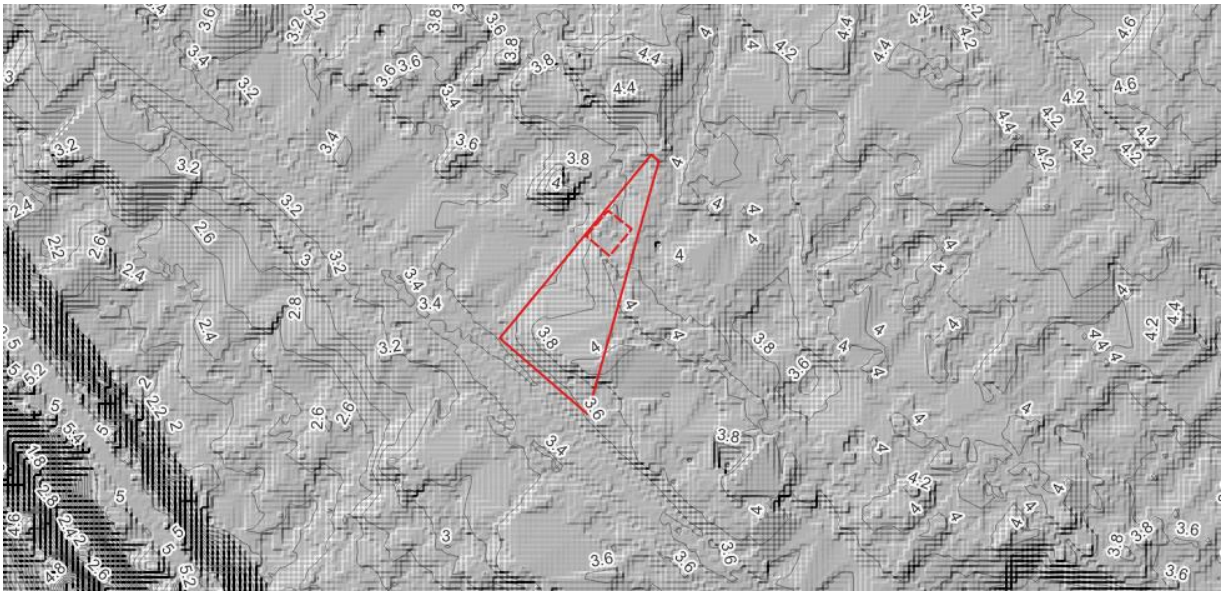

Figure 4 – Topographic contours derived from publicly available LiDAR. Content available under the Open Government Licence v3.0 © Crown Copyright 2024. Application shown in solid red and footprint of proposed Ancillary Storage in dashed red.

3.0 CONSULTATION

National Planning Policy Framework ['NPPF']

3.1 The National Planning Policy Framework sets out strict tests to protect people and property from flooding which all local planning authorities are expected to follow measures to avoid, control, manage and mitigate flood risk should also not increase flood risk elsewhere.

3.1 The development is classed as a minor extension, as it constitutes a non-domestic extension with a floor space of less than 250m^2.

3.2 The NPPF maintains a strong policy on avoiding and managing flood risk, based on local planning authorities preparing local plans and deciding planning applications and granting planning permissions.

Adur Local Plan 2017, by Adur District Council (2017) ['Local Plan']

3.3 Policy 35 of the Local Plan stipulates that developments should not have an unacceptable impact on the quality and potential yield of local water resources and water environment. The policy gives particular attention to key features in Adur i.e. the River Adur SSSI estuary and the Teville stream, alongside groundwater Source Protection Zones.

3.4 The Local Plan assessed multiples sites for various uses, with the NPPF approach used to ensure that flood risk was properly taken in account to avoid inappropriate development in areas at risk of flooding. The Local Plan recognises that it has not been possible to allocate all strategic sites within areas at low risk of flooding due to the limited capacity of Adur for further development.

3.5 Policy 36 of the Local Plan requires that flood risk assessments are submitted with planning applications for all development within Flood Zones 2 and 3. Furthermore, the same policy stipulates that developments should not increase flood risk elsewhere.

3.6 In terms of surface water drainage, Policy 36 stipulates that new developments in 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.

Policies Map & Recent Developments in the Vicinity of the Application Site

3.7 The Adur Policies Map 2023 identified an industrial site adjacent to the flood defence line alongside River Adur, the railway line and to the east of A283. This site has since been developed and currently comprises multiple residential blocks of flats.

3.8 The residential estate mentioned above is located approximately 150m to the south of the Application Site.

Adur and Worthing Level 1 Strategic Flood Risk Assessment ['Level 1 SFRA']

3.9 The Level 1 SFRA recommends that the sequential approach is adopted for all future development. This reference does not however distinguish between minor developments, non-major developments

and major developments.

3.10 The Level 1 SFRA considers the effect of wave overtopping along the coastline, by including its effect in the delineation of Flood Zone 3b, as the risk of waves overtopping sea walls can lead to a significant flood hazard.

3.11 The Level 1 SFRA states that flood storage compensation may be required for individual developments, where increases in impermeable area within a catchment, if not properly managed, can cause loss of floodplain storage, amongst other effects. **However, the same document recognises that resilience measures, rather than resistance measures, should be adopted if the provision of flood plain compensation is not practicable.**

3.12 The level 1 SFRA stipulates that minimum finished floor levels should be set at least 300mm above the estimated flood level, which is defined as the 0.5%AEP tidal plus climate change.

3.13 The Level 1 SFRA Appendix L shows flood defences along the northern frontage of River Adur to comprise a mixture between natural high ground and embankments.

3.14 The Level 1 SFRA Appendix E shows the Application Site to be wholly affected by the 0.5%AEP fluvial and tidal flood extents with climate change, including all allowances between the central and upper end.

3.15 The low resolution of Level 1 SFRA Appendix G appears to suggest the Application Site is at risk of flooding from 1%AEP25CC surface water flood extents. Appendix I of the same source, suggests that the Application Site is affected by Zone SW3 (at risk of surface water flooding from climate change only and above present day tidal level but below future tidal level) and Zone SW4 (at risk of surface water flooding without climate change and below present day tidal level).

3.16 The JBA's groundwater mapping (Appendix J of the Level 1 SFRA) does not show high groundwater levels at the Application Site.

3.17 The Level 1 SFRA shows a flood incident (recorded by West Sussex County Council) in the vicinity of the Application Site.

3.18 The Level 1 SFRA shows the Application Site to fall within a Flood Alert & Warning Area.

Environment Agency

3.19 The Environment Agency (EA) was consulted and provide detailed flood risk data (Product 4 and Product 6) at the Application Site. The correspondence and Product 4 are included in **Appendix C**.

3.20 As part of the standard Product 6 request the Environment Agency provided two sets of information, derived from two distinct models: i) the Adur Coastal Model (ACM) 2012, and ii) the Shoreham Adur Tidal Walls Defended Model Update (SATWDMu) 2018. In their correspondence, the Environment Agency suggests that the later contains the most relevant information for the area of interest.

3.21 The SATWDMu 2018 shows the Application Site to be protected by the local flood defence line along River Adur frontage up to the defended 0.5%AEP2117CC tidal flood event. Nonetheless, this event appears to reach the west boundary of the Application Site, with flood levels reaching **3.54m AOD**. The same model shows the tidal flood extents for the present-day defended 0.5%AEP flood event to remain within the channel of River Adur (4.08m AOD). This shows that the flood mechanism triggers a flood route from the north, where the defences are overtopped near the Shoreham Bypass.

3.22 The Environment Agency uses the ACM 2012 model to inform the undefended flood extents. This dataset puts the undefended 0.5%AEP2115CC flood level at **5.36m AOD**, which puts the whole Application Site is a risk of flooding from fluvial and tidal sources.

3.23 As part of the ACM 2012 model, the Product 6 also provides a wave overtopping scenario, where the present-day defended 0.5%AEP overtopping flood event is shown to reach 3.81m AOD, whilst the defended 0.5%AEP2115CC overtopping flood event reaches **5.04m AOD**.

4.0 FLOOD RISK ALLOCATION

Tidal & Rivers Flood Risk

4.1 An extract from the Adur Coastal Model 2012 is shown in Figure 5. The flood extents show the Application Site to be wholly within the undefended 0.5%AEP2115CC flood extents. The defended 0.5%AEP2115CC wave overtopping flood extents are also shown in Figure 6, where flood levels reach **5.04m AOD**, thus putting the footprint of the Ancillary Storage at an average flood depth of 1.2m.

4.2 An extract from Shoreham Adur Tidal Walls Defended Model is shown in Figure 7. The flood extents show the Application Site to remain mostly protected for the defended 0.5%AEP2117CC tidal flood event for a flood level of **3.54m AOD**. The footprint of the Ancillary Storage is wholly located above this flood event.

4.3 In the absence of modelling outputs for the most up to date climate change allowances, the flood levels above were updated to the 2124CC, using the procedure below. Albeit this procedure provides an estimate, it is deemed suitable for the scale of the development:

- Under the old sea level climate change allowances (2019), the sea level increases between 2018 and 2117 by a total of 1,232.7mm[1], whilst the latest sea level climate change allowances lead to a sea level increase of 1458.1mm. This leads to an **update ratio of 1.183**;
- The impact of the sea level increase in the depth of flooding at the Application Site was assessed by updating the difference between the present-day defended 0.5%AEP wave overtopping flood event and the defended 0.5%AEP2115CC wave overtopping event. This update was undertaken with the ratio of 1.183;
- Following this, it was found that flood depths increased by approximately 14.55mm each year and this figure was adopted to extrapolate flood levels from 2117 to 2124.

4.4 As part of this assessment, the ACM defended 0.5%AEP2124CC wave overtopping flood level (**5.14m AOD**) was taken as the design flood event, as it is considered a residual flood risk at the Application Site.

4.5 The various flood depths assessed under this assessment are summarised in Table 2.

Table 2 – Flood levels and depths extracted from the Adur Coastal Model 2012 and from the Shoreham Adur Tidal Walls Defended Model 2018. Flood depths maps provided by Environment Agency (Product 6).

Modelling Source & Reference	Defended?	Wave Overtopping?	Flood level		Flood depth at the Ancillary Storage	
			Year		Year	
			2115	2124	2115	2124
ACM 2012	No	No	5.36	5.46	1.52	1.62
ACM 2012- wave overtopping	Yes	Yes	5.04	5.14	1.20	1.30
Shoreham Tidal Defended 2018	Yes	No	3.54	3.64	Dry	Dry

[1] Level taken from the *gov.uk* 'Flood risk assessments: climate change allowances', dated from July 2019

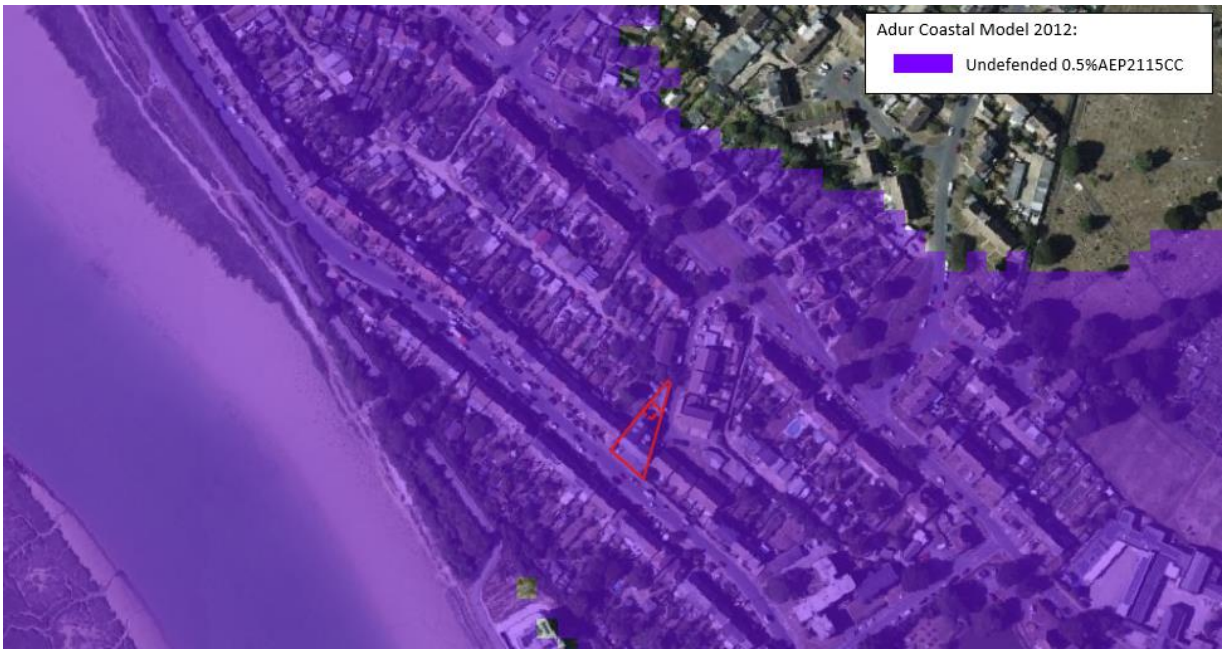

Figure 5 – Extract from the Adur Coastal Model 2012 flood maps for the undefended 0.5%AEP2115CC tidal flood event. Application Site shown in solid red and proposed footprint of Ancillary Storage shown in dashed red.

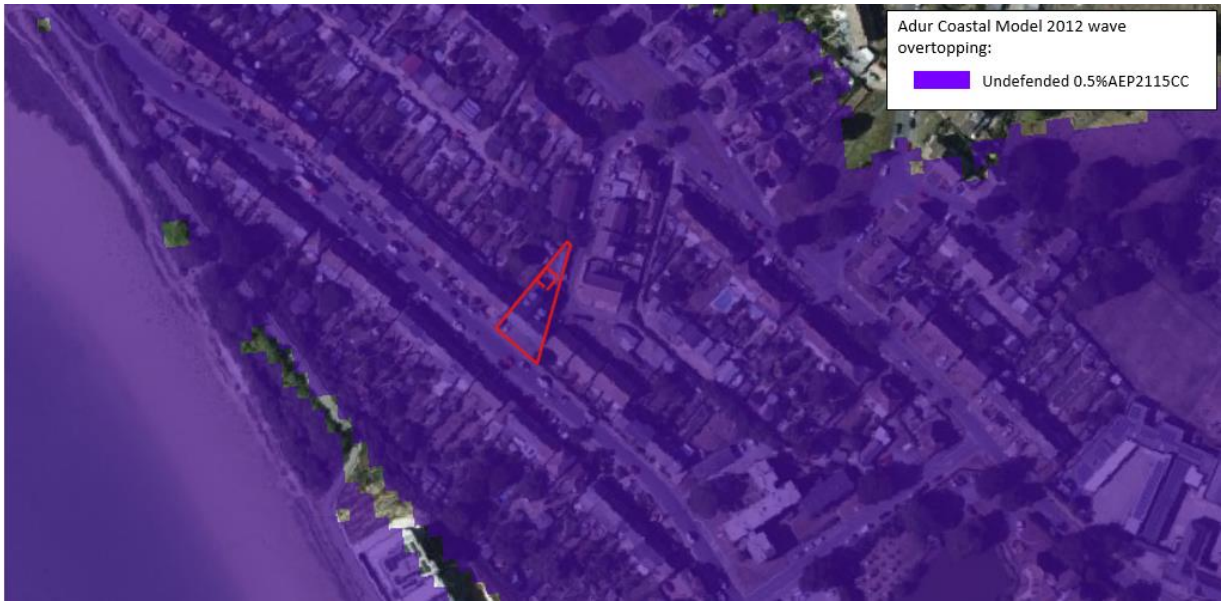

Figure 6 – Extract from the Adur Coastal Model 2012 flood maps for the defended 0.5%AEP2115CC wave overtopping tidal flood event. Application Site shown in solid red and proposed footprint of Ancillary Storage shown in dashed red.

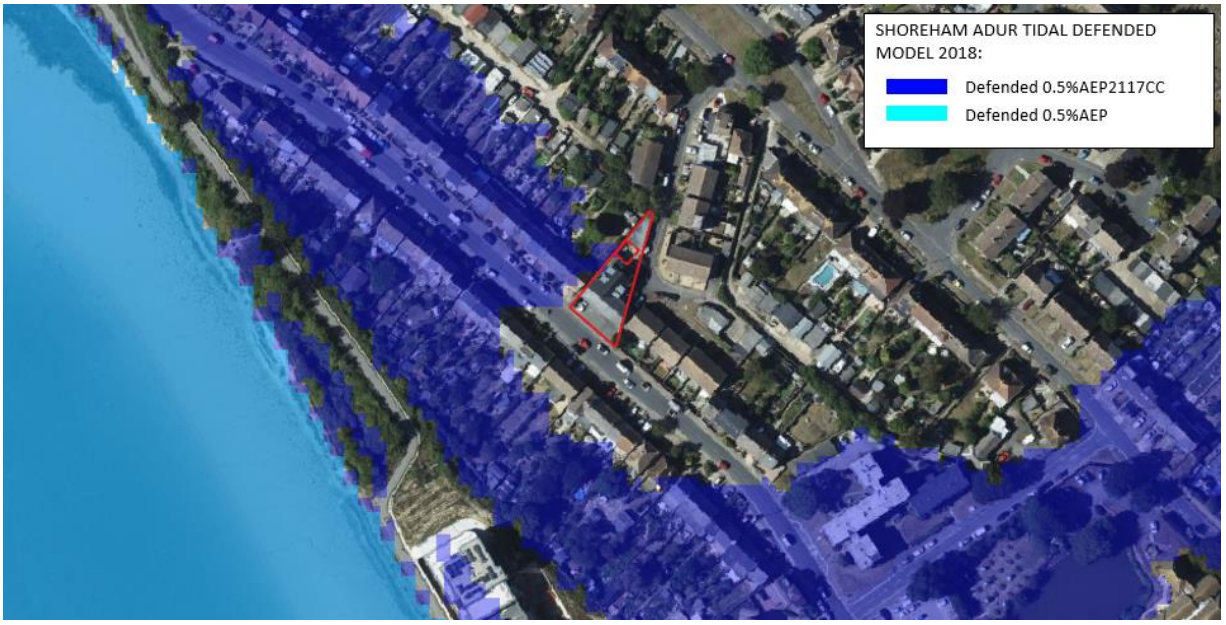

Figure 7 – Extract from the Shoreham Adur Tidal Walls Defended Model Update 2018 flood maps for the defended 0.5%AEP2117CC tidal flood event. Application Site shown in solid red and proposed footprint of Ancillary Storage shown in dashed red.

Surface Water Flood Risk Allocation

4.6 Albeit the Level 1 SFRA contains information on the 1%AEP25CC and 1%AEP45CC surface water flood events, the low resolution of the respective flood maps does not allow to understand whether the Application Site is affected by these events.

4.7 In the absence of flood events for the respective climate change allowances, the RoFSW 0.1%AEP surface water flood extents were used to inform this assessment – Figure 9. This source of information shows the Application Site and the footprint of the proposed Ancillary Storage room to be affected by the 0.1%AEP surface water flood event.

4.8 The surface water flood depths with the Application Site are generally up to 150mm, with depths reaching as much as 300mm in the footprint of the proposed Ancillary Storage.

4.9 The LPA have raised concerns regarding the displacement of surface water volume associated with the flood path between Orchard Close and Shoreham Road.

4.10 After review of the of the EA's Long-Term Flood Risk Maps, it is not clear how the surface water flood mechanism area behaves. It is possible that flows travelling from Connaught Avenue into Orchard Close overflow into the gardens at the rear of Old Shoreham Road, but it is also possible that flows that reach the rear gardens of Old Shoreham Road via various routes partly back up towards Orchard Close.

4.11 Regardless of the exact flood mechanism, the modelling approach adopted to produce the EA's Long-Term Flood Risk Map[2] surface water flood extents is known to ignore micro topographic features in the area. Albeit the approach lowers roads by 125mm to account for the height of kerbs, the maps do not take in account panel fences and brick walls surrounding the curtilages of the properties. Based on

[2] What is the Risk of Flooding from Surface Wate map? Report v2.0 (by the Environment Agency, April 2019)

previous hydraulic modelling studies by Joflows, these micro topographic features are shown to cause significant deviations in surface water flood patterns and trigger different flood routes and storage areas.

4.12 According to street view imagery shown in Figure 8, the curtilage of the Application Site is shown to be limited by a mixture of wood panel fences (to Orchard Close), timber gravel boards and brick walls (to the rear gardens of Old Shoreham Road). These features are deemed to deviate and obstruct any flows between Orchard Close and the rear gardens of Old Shoreham Road. Note that the presence of these features is not limited to the Application Site, with nearby curtilages also including wood panel fences and brick walls.

4.13 The national-scale surface water flood extents for 0.1%AEP are therefore deemed not to be representative of the real flood patterns in the area. The presence of wood panel fences, timber gravel boards and brick walls are believed to steer flows towards the lower parts of Orchard Close, rather than prompting a flood route towards the rear gardens of Old Shoreham Road.



a) *Google Street* imagery at Orchard Close, looking at the eastern boundary of the site.



b) *Google Street* imagery at Orchard Close, looking at the brick wall near 19, Orchard Close.

Figure 8 – *Google Street* imagery at Orchard Close, looking at the Application Site. Wood panel fences and brick walls shown along the boundaries of the Application Site.

Flood Risk from Other Sources

4.14 The Environment Agency's *wms* datasets do not shown the Application Site to be at risk of flooding from artificial sources.

4.15 Neither the 'Check your Long Term Flood Risk'[3] *gov.uk* webservice nor the Level 1 SFRA identify the Application Site to be at risk of flooding from groundwater.

[3] https://check-long-term-flood-risk.service.gov.uk/risk#

Historic Flood Records

3.24 The Historic Records provided by the EA's *wms dataset* do not show the Application Site to have been affected by flooding.

4.16 The Level 1 SFRA shows a recorded flood incidents in the immediate vicinity of the Application Site. This reference does not however distinguish the source of flooding. The Level 1 SFRA shows a total of 8 flooding incidents in BR43 5.

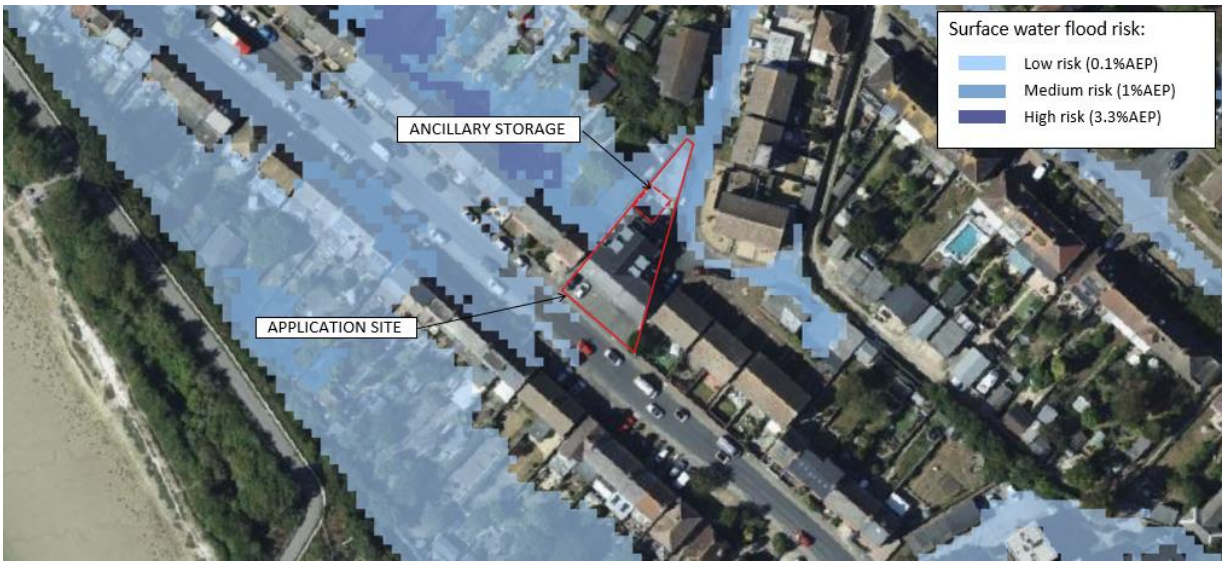

Figure 9 – Extract from the Environment Agency's RoFSW *wms* dataset. Flood events for the 3.3%AEP, 1.0%AEP and 0.1%AEP.

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5.0 FLOOD RISK ASSESSMENT & MITIGATION

Flood Risk Assessment Methodology & Objectives

5.1 It is essential that the proposed development does not increase flood risk to adjacent land or downstream of the site, and protects the development from flooding itself. Current guidance on development and flood risk identifies several key aims for development to ensure that it is sustainable in flood risk terms:

- The development should not be at significant risk of flooding and should not be susceptible to damage due to flooding;
- The development should not be exposed to flood risk such that the health, safety and welfare of the users of the development, or the population elsewhere, are threatened;
- Safe access/egress to and from the development should be possible during flood events (without relying on emergency services, as much as reasonably practicable);
- The development should not increase flood risk elsewhere;
- The development should not prevent safe maintenance of watercourses or maintenance and operation of flood defences;
- The development should not be associated with an onerous or difficult operation and maintenance regime to manage flood risk. The responsibility for any operation and maintenance required should be clearly defined;
- Future users of the development should be made aware of any flood risk issues relating to the development;
- The development should not lead to the degradation of the environment; and
- The development should meet all of the above criteria for its entire lifetime, including consideration of the potential effects of climate change.

5.2 The development is classed as a minor extension with a footprint of 42.5m^2.

Project Scope

5.3 In order to achieve the aims outlined above, this Flood Risk Assessment has been undertaken in accordance with current best-practice guidance, including the National Planning Practice Guidance. A scoping study was initially undertaken to identify all potential sources of flooding at the site, which may warrant further consideration. Any potential flooding issues identified in the scoping study have subsequently been considered within this Flood Risk Assessment. The aim of the scoping study is to review all available information and provide a qualitative assessment of the flood risk to the site and the impact of the site on flood risk elsewhere. The report has been undertaken with due regard to the EA's National Standing Advice on Development and Flood Risk.

Scoping Study

5.4 All potential sources of flooding must be considered for any proposed development.

5.5 Using the EA detailed modelling (Product 6), the EA Flood Zone mapping, the EA's publicly available LiDAR and Ordnance Survey maps, a summary of the potential sources of flooding and a review of the potential risk posed by each source to the Application Site is presented in Table 3.

Table 3 – Potential Risks posed by Flooding Sources in accordance with the Long-Term Flood Risk Map and the LEA's Product 6. Not quantifiable risks highlighted as 'N/Q'.

Sources of Flooding	Risk Classification			
	High	Medium	Low	Very low
Fluvial & Tidal			x (residual under defended condition & no wave overtopping)	
Surface Water			x	
Groundwater				x
Sewer			N/Q	
Artificial water bodies				x (residual)

Fluvial & Tidal Flood Risk Mitigation

5.6 As previously discussed, the design flood event was taken as the defended 0.5%AEP2124CC wave overtopping flood event, which equates to **5.14m AOD**. This puts the new Ancillary Storage under a maximum flood depth of 1.30m throughout its whole lifetime.

5.7 The above means it is not practicable to set the Finished Floor Level of the new Ancillary Storage to 300mm above the design flood level. As such, mitigation measures are proposed in 5.17 to 5.20 to address the residual risk from tidal sources.

Surface Water Flood Risk Mitigation

5.8 As the EA's Long-Term Flood Risk Map surface water modelling approach is known to ignore the presence micro topographic features such as brick walls, panel fences and gravel boards, the local flood patterns in the area are deemed to be significantly different from the *web* maps.

5.9 In particular, the gravel board and the base of the wood panel fences to Orchard Close and the brick wall near 19 Orchard Close are deemed to oppose to flow routes that may travel to the rear of Old Shoreham Road.

5.10 Therefore, no particular mitigation measures are required to manage off-site surface water runoff, other than:

- Maintaining the door to the alleyway that forms the northwest boundary of the Applications Site, as shown in the proposed site plans in **Appendix A**;
- Apply flood resilience measures in detriment of flood resistance measures, in line with 5.17 to 5.20, to prevent the displacement of surface water volume.

5.11 Under the *gov.uk* 'Statutory Guidance for Excluded Floor Risk Activities'[4], the applicant has the right to deploy temporary flood protection devices attached to buildings, without the need for a permit. Under this context, flood storage compensation becomes irrelevant if the rear yard is protected by temporary flood protection devices.

Flood Storage Compensation

5.12 The Application Site remains mostly protected for the defended 0.5%AEP2124CC tidal flood event, if wave overtopping is not taken into account. In this instance, the new Ancillary Storage does not lead to the displacement of flood waters.

5.13 However, in the event of wave overtopping, the flood levels at the Application Site reach as much as 5.14m AOD, with flood depths reaching as high as 1.3m at the location of the Ancillary Storage. This translates to a flood storage of 55.25m^3 within the Ancillary Storage.

5.14 Given the limited space on site, the offset for flood storage loss is not deemed achievable and resilience measures should be preferred in detriment of resistance measures, to prevent displacement of flood waters.

5.15 Therefore, flooding of the building is deemed acceptable to prevent cumulative impacts in the area from decreasing the flood storage available in the area, which could in turn lead to an increase of flood risk off-site.

5.16 However, it is worth noting that the management company or the regular users may choose to protect the Application Site from flooding in the imminence of a flood event, under the *gov.uk* 'Statutory Guidance for Excluded Floor Risk Activities' [5]. In the event of an imminent flood event, the users of the Application Site may act to protect the building and respective rear yard (surrounded by walls under baseline conditions), and choose to deploy temporary flood protection devices attached to buildings, without the need for a permit. Under this context, flood storage compensation becomes irrelevant if the rear yard is protected by temporary flood protection devices.

Flood Resilience and Resistance

5.17 Any flood resilience and resistance measures described in this report should be set to a minimum level of 5.14m AOD, unless otherwise specified. This approach is deemed to be as close to the Level 1 SFRA requirements and the *gov.uk* guidance for vulnerable developments as reasonably practicable.

5.18 The *gov.uk* guidance stipulates that flood resilience plans should be in line with the CIRIA Code of

[4] https://www.gov.uk/government/publications/excluded-flood-risk-activities-environmental-permits/excluded-flood-risk-activities
[5] https://www.gov.uk/government/publications/excluded-flood-risk-activities-environmental-permits/excluded-flood-risk-activities

Practice for Property Flood Resilience (C790F), whilst installation and retrofit of resistance measures should be implemented in accordance to BS851188-1:2019+A1:2021.

5.19 Flood resilience works are measures to make the fabric and services of the building more robust and easier to clean, dry out, and reinstate and enable the building to be reoccupied quickly in the event of floodwater entering the building. On the other hand, flood resistance measures oppose or delay the ingress of water into properties. Resistance measures are not however recommended at the present development, as these may displace flood waters. It is recommended the following are measures are implemented for this site:

- Raising equipment in the building and any stored goods or equipment above the design flood level. Should this not be practicable, these should be raised to an absolute minimum of 600mm above Finished Floor Level;
- Incorporating a slight fall to assist pumping out any floodwater entering the yard and Ancillary Storage;
- Raising gas and electric intakes and piping/cabling, and electric sockets and cabling, to the minimum level of 5.14m AOD, or to an absolute minimum of 600mm above FFL's;
- Installing backflow valves on sanitary drains to prevent sewage surging up through W. C's, sinks, baths and showers in the event of a flood;
- Using flood resistant materials for floors, walls and fixtures.

5.20 Further guidance on flood resilient techniques can be found in Improving the Flood Performance of Buildings[6].

Access and egress from site

5.21 In the absence of flood hazard information for the defended 0.5%AEP2124CC wave overtopping design flood event, the defended 0.5%AEP2115C wave overtopping tidal flood event was adopted to assess the safe access and egress from the Application Site - Figure 10.

5.22 The flood hazard in the immediate vicinity of the Application Site is shown to vary between 'danger for most' to 'danger for all', including the extension of Old Shoreham Road at the front of the site.

5.23 The above suggests that safe access/egress is not achievable from/to the Application Site, without the intervention of emergency services. Albeit the proposed Ancillary Storage will not put additional people at risk of flooding, the users may have to find safe refuge within the upper floors of the workshop store.

[6] Improving the Flood Performance of New Buildings, by Department for Communities and Local Government: London (May 2007)

Flood Warning and Evacuation

5.24 The Application is part of an EA-designated Flood Alert & Warning Area and it is recommended that the site users sign up for flood alerts and warnings with the Environment Agency, by using post code BN43 5TD. This can be done online at (https://www.gov.uk/sign-up-for-flood- warnings) or through the Flood Line telephone service on 0345 988 1188.

5.25 As the Application Site and surrounding area is at risk from significant flood depths during the design tidal flood event, the development could be isolated from flood waters. Under these circumstances, a development-specific Flood Warning and Emergency Plan (FWEP) is recommended to manage residual flood risk.

5.26 Upon a Flood Alert, staff and site users should be ready to follow the flood plan, have the insurance documents and medications ready and move any livestock and equipment away from areas likely to flood.

5.27 If a Flood Warning is received, staff and site users should protect themselves and their loved ones by moving themselves to a safer place (upper floors), turn off the gas, electricity and gas, as should put flood protection equipment in place. Most importantly, residents should follow the recommendations of emergency services and be ready to evacuate at any moment.

5.28 The workshop store is advised to develop a Personal Flood Plan including key contact details of staff and family, and also local Hotels that can be used for Temporary Accommodation until the area is deemed safe to return to after a flood. Ultimately at times of flood, all site users and staff should follow the advice of emergency services.

5.29 A site-specific Flood Warning and Evacuation Plan was prepared to inform the evacuation of the Application Site in the event of flooding and is included in **Appendix D**.

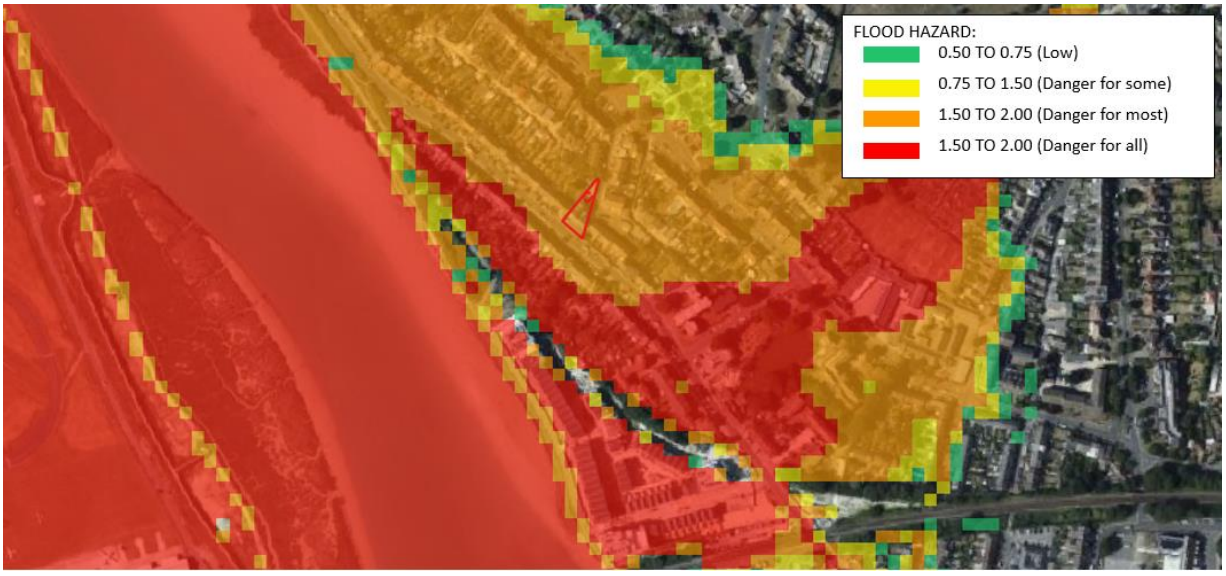

Figure 10 – Extract from Product 6 flood hazard grid for the defended 0.5%AEP2115C wave overtopping tidal flood event.

Flood Risk Mitigation from Other Sources

5.30 The measures proposed to deal with residual flood risk from fluvial and tidal sources are deemed sufficient to address the surface water flood risk at the proposed Ancillary Storage.

5.31 No other mitigation measures are required, other than a site-specific surface water drainage strategy to manage the risk of surface water flooding arising as a result of the development.

Vulnerability Classification of Proposed Development

5.32 The National Planning Practice Guidance: Flood Zone and Flood Risk Tables provide information on the vulnerability classification of various developments. Given the development will serve storage purposes, the end use of this site falls in the “less vulnerable” classification.

5.33 However, the development is ultimately classed as a minor extension, which triggers less strict requirements and design criteria.

5.34 **Sequential & Exception Tests**

5.35 The development is classed as a minor extension (non-residential extension of less than 250m^2) and therefore it is exempt from both the Sequential Test and the Exception Test.

6 CONCLUSIONS

6.0 Joflows was commissioned by Craig Construction Services Ltd to produce a site-specific Flood Risk Assessment to inform the development of a new Ancillary Storage at 80 Shoreham Road, Shoreham-by-Sea. The conclusions of this assessment are as follows:

- The proposed development is for the creation of an additional Ancillary Storage room to partially infill the yard between the existing main workshop store and the garage store room.
- The Flood Map for Planning shows the Application Site wholly within the undefended present-day Flood Zone 3 i.e. at a yearly chance of flooding equal to or greater than 1% from rivers and 0.5% from the sea;
- The Product 6 obtained from the Environment Agency does show the Application Site to remain mostly free of flooding for the defended 0.5%AEP2124CC tidal flood event, when wave overtopping is not taken into account;
- However, Product 6 also shows that when wave overtopping is taken into account, the Application Site is affected by 1.3m of tidal/fluvial flooding for the defended 0.5%AEP2124CC wave overtopping flood event.
- The defended 0.5%AEP2124CC wave overtopping tidal/fluvial flood event is taken as the design flood event for the purpose of this assessment (**5.14m AOD**).
- Publicly available LiDAR elevation shows the average ground levels at the local of the Ancillary Storage to be circa **3.84m AOD**. Given the impracticability to raise Finished Floor Level of the new Ancillary Storage to 300mm above the design flood level and the impracticability to provide flood storage compensation, resilience measures are preferred in detriment of resistance measures, which would lead to displacement of flood waters. This approach is in accordance with the requirements of the Level 1 SFRA.
- In terms of off-site surface water flood risk, the EA's national-scale modelling approach is known to ignore the presence of micro topographic features, which are deemed to significantly affect flood patterns in the area. As such, the wood panel fences, timber gravel board and concrete walls are deemed to obstruct to a potential flood route between Orchard Close and the gardens at the rear of Old Shoreham Road. Therefore, no additional mitigation measures are required other than i) incorporating flood resilience measures in detriment of resistance measures and ii) maintaining the door to the alleyway along the northwest boundary of the Application Site. These measures will prevent the displacement of surface water food volume.
- Under the gov.uk 'Statutory Guidance for Excluded Floor Risk Activities' , the applicant has the right to deploy temporary flood protection devices attached to buildings, without the need for a permit. Under this context, flood storage compensation becomes irrelevant if the rear yard is protected by temporary flood protection devices.
- Albeit the Ancillary Storage does not lead to an increase of users within the Application Site, users and staff should follow a development-specific Flood Warning and Evacuation Plan in the event of flooding, prepared alongside this assessment. Site users are also recommended to sign up for Flood Alerts & Warnings and follow the advice from emergency services.

6.1 With the above measures in place, the development of the site will not exacerbate flood risk for the wider area and it fully addresses the requirements from Adur Local Plan 2017, including compliance with Policy 35 and Policy 36 of this document.

APPENDIX A

SITE PLANS

Proposal shown dark blue shaded

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Drawings not for construction.

A4 page



+BP Block Plan 1:500

Scale in Metres 1:500

0 5 10 15 20 25

N

PLATFORM 3
SURVEY - DESIGN - VISUALISE
www.platform3.design studio@platform3.design

address: Showtec, 80 Old Shoreham Road, Shoreham, BN43 5TD
client: Showtec

project: Rear store room
drawing title: Block Plan

date: July 2024
drg. no: 24-P10-02

scale: as shown@A4
revision:

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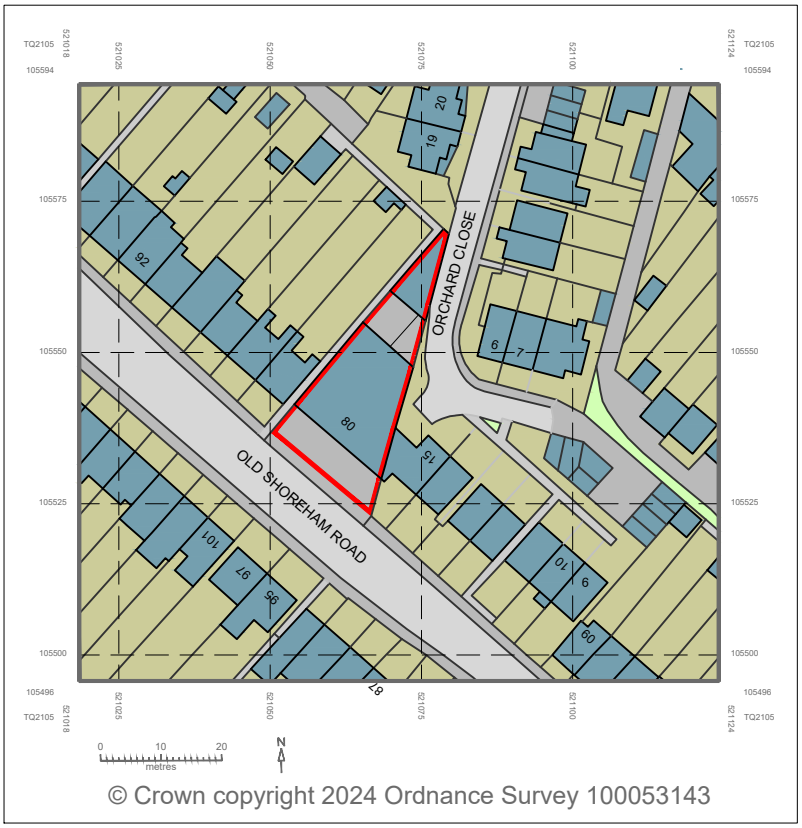

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+LP Location Map 1:1250

Scale in Metres 1:1250

0 10 20 30 40 50

N

PLATFORM 3
SURVEY - DESIGN - VISUALISE
www.platform3.design studio@platform3.design

address: Showtec, 80 Old Shoreham Road, Shoreham, BN43 5TD	project: Rear store room	date: July 2024	scale: as shown@A4
client: Showtec	drawing title: Location Map	drg. no: 24-P10-01	revision:

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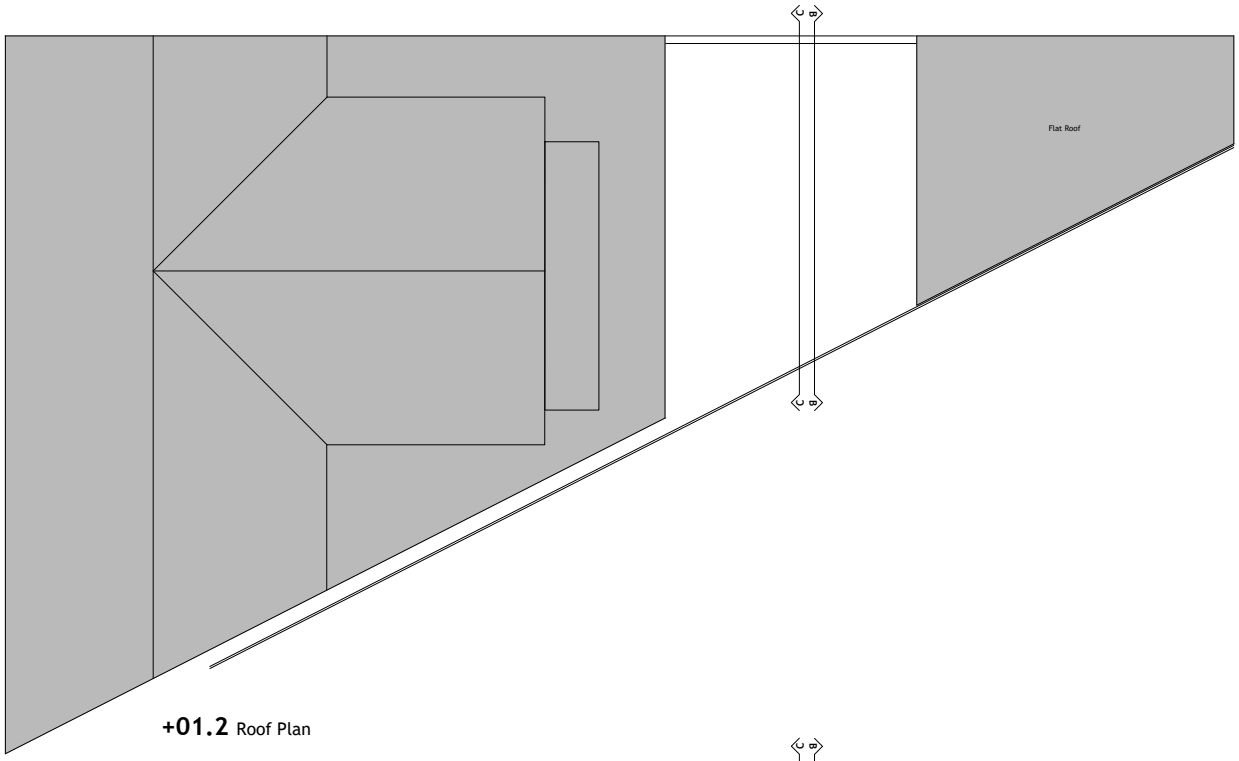
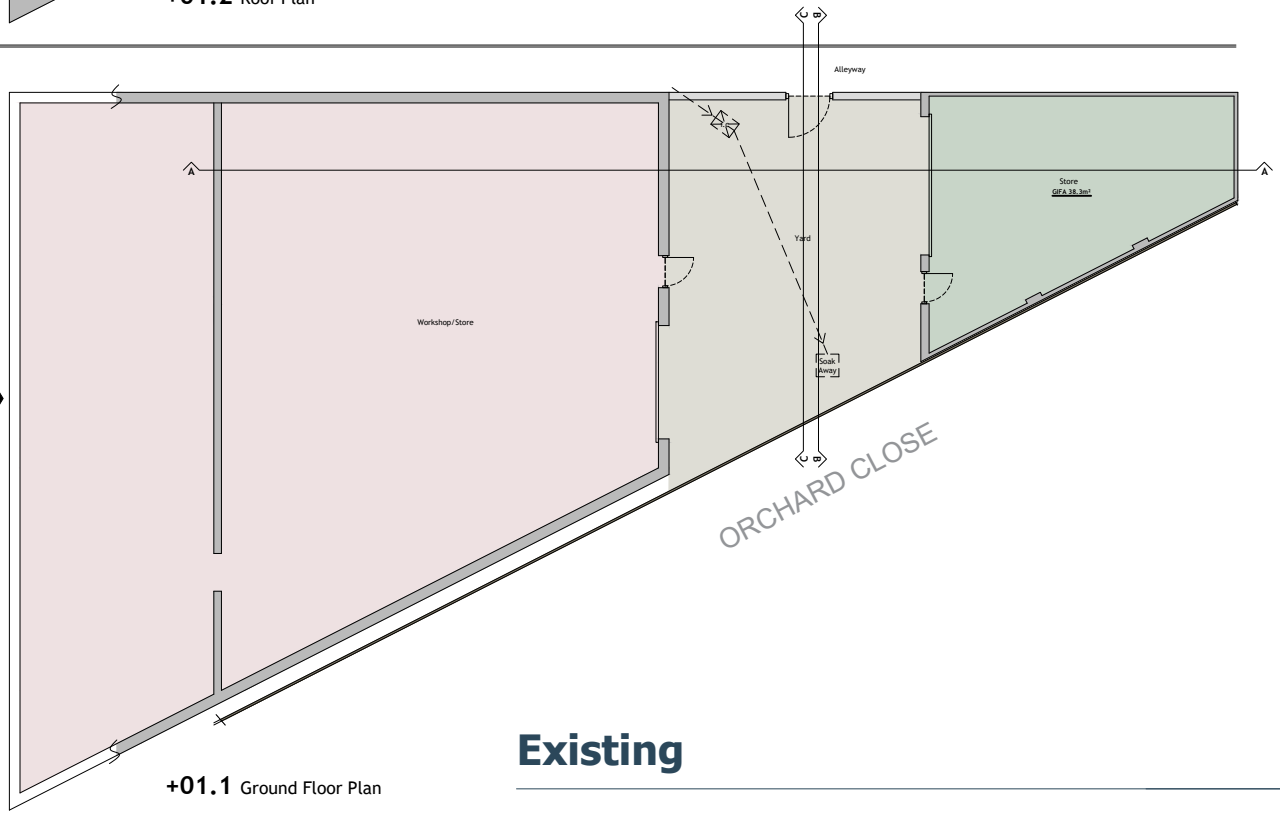


+01.2 Roof Plan



+01.1 Ground Floor Plan

OLD SHOREHAM ROAD

Main Entrance

ORCHARD CLOSE

Existing

	Existing front shop and Store 235m²
	Existing Rear Garage Store 38.3m²
	Existing Yard 59.6m²

Scale in Metres 1:100

0 1 2 3 4 5 6 7 8 9 10

revision date description

PLATFORM 3
SURVEY - DESIGN - VISUALISE

studio@platform3.design - www.platform3.design

project
Showtec
80 Old Shoreham Road
Shoreham BN43 5TD

client
Showtec

date July 2024 | scale 1:100@A2 | drawn rl

drawing
Proposed Store Room
Existing Plans

drawing number 24-P10-10 | revision B

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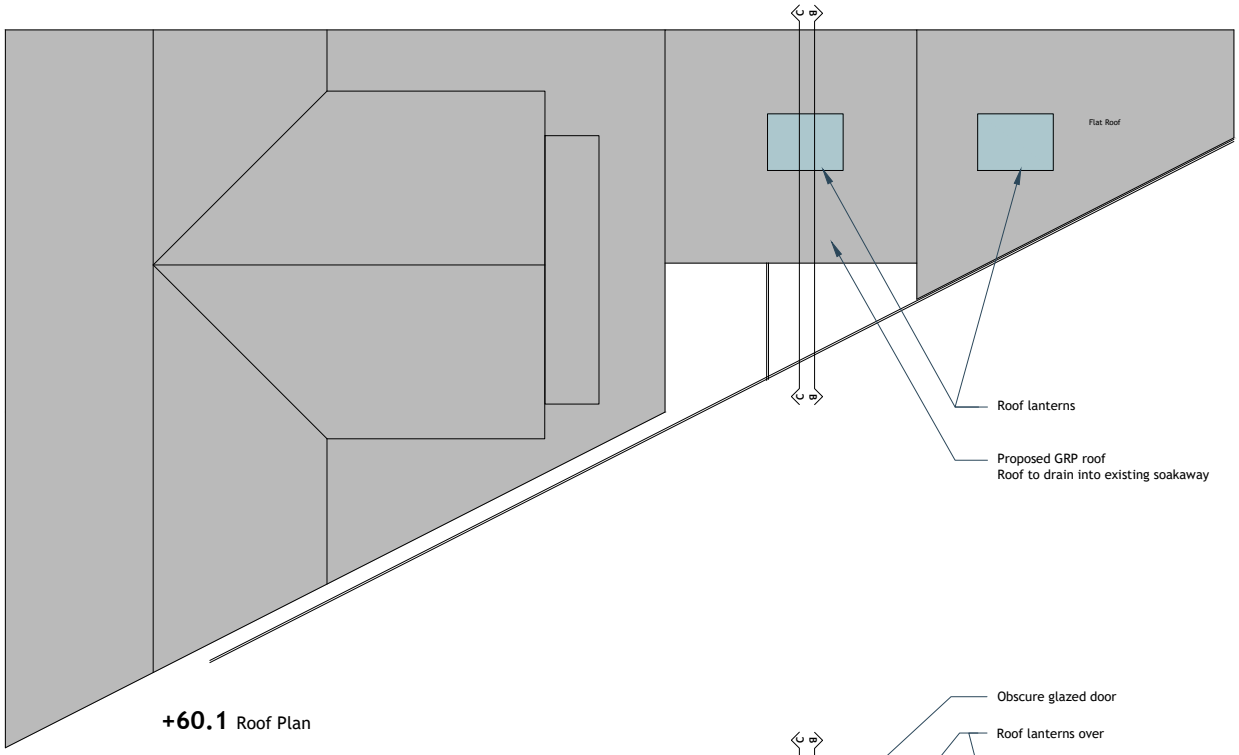
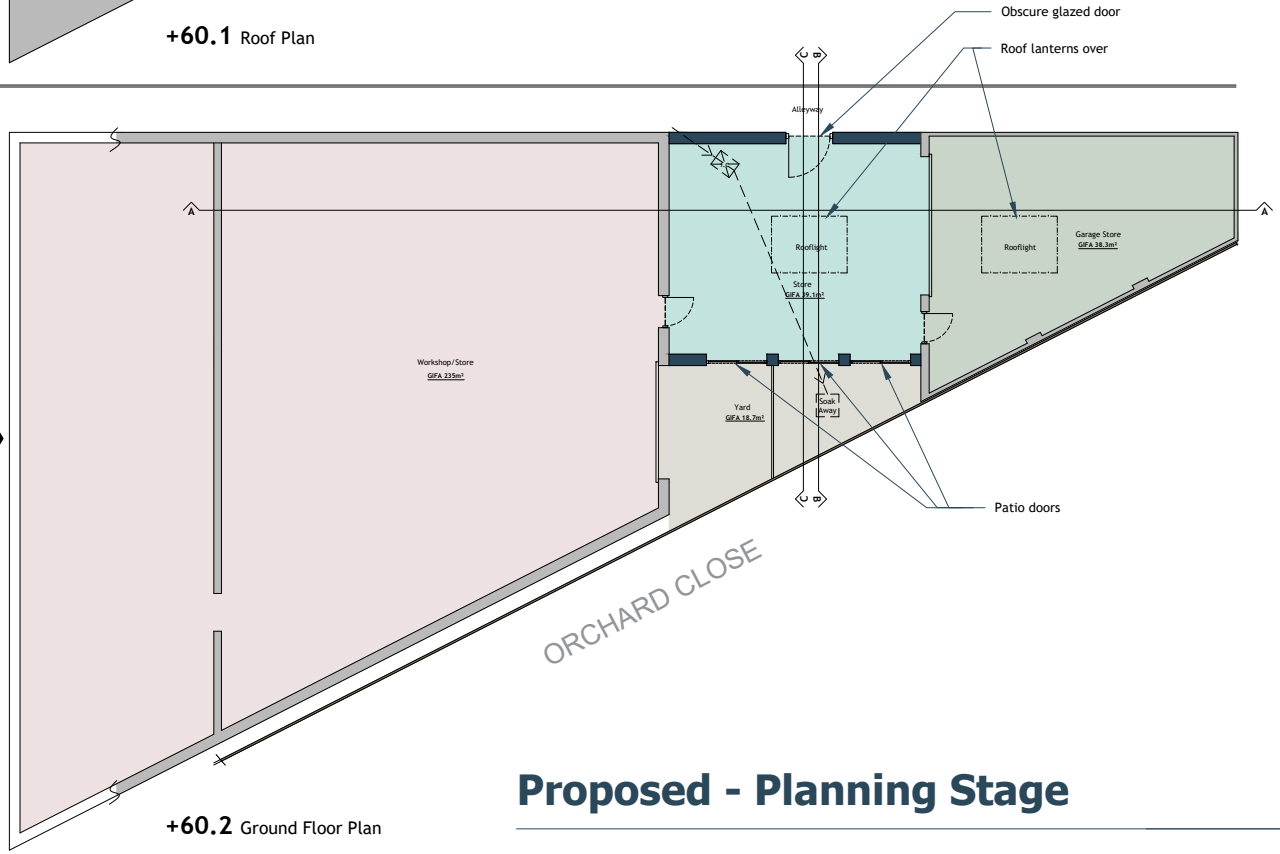
A2 page



+60.1 Roof Plan



+60.2 Ground Floor Plan

Proposed - Planning Stage

Existing walls shown grey shaded

Proposed walls shown dark blue shaded

	Existing front shop and Store 235m²
	Existing Rear Garage Store 38.3m²
	Remaining Yard 18.7m²
	Proposed Store 39.1m²

Scale in Metres 1:100

0 1 2 3 4 5 6 7 8 9 10

revision date description

PLATFORM 3
SURVEY - DESIGN - VISUALISE
studio@platform3.design - www.platform3.design
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project
Showtec
80 Old Shoreham Road
Shoreham BN43 5TD

client
Showtec

date: July 2024 | scale: 1:100@A2 | drawn: rl

drawing
Proposed Store Room
Proposed Plans

drawing number: 24-P10-60 | revision: B

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APPENDIX B

AUTODESK INFODRAINAGE GREENFIELD CALCULATION OUTPUTS

JOF0123: New Ancillary Storage 80 Shoreham Road	Date: 07/11/2024		
	Designed by: JG	Checked by: -	Approved By: -
Report Title: UK and Ireland Rural Runoff Calculator	joflows:		

ICP SUDS / IH 124

Details

Method	ICP SUDS
Area (ha)	1.00
SAAR (mm)	740.0
Soil	0.37
Region	Region 7
Urban	0
Return Period (years)	2

Results

Region	QBAR Rural (L/s)	QBAR Urban (L/s)	Q 2 (years) (L/s)	Q 1 (years) (L/s)	Q 30 (years) (L/s)	Q 100 (years) (L/s)
Region 7	3.1	3.1	2.7	2.6	6.9	9.8

Greenfield Volume

FSR

Details

Region	England And Wales
M5-60 (mm)	20.0
Ratio R	0.3
Area (ha)	1.00
SAAR (mm)	740.0
CWI	110.161
Urban 1990	0
Areal Reduction Factor	1.00
SPR	37
Storm Duration (mins)	360
Return Period (years)	100

Results

PR%	38.14
Greenfield Runoff Volume (m^3)	266.616

APPENDIX C

ENVIRONMENT AGENCY'S CORRESPONDENCE AND PRODUCT 4

Flood risk assessment data

Location of site: 80 Old Shoreham Road, Shoreham by Sea, BN43 5TD
Document created on: 16 October 2024
This information was previously known as a product 4.
Customer reference number: SSD378887

Map showing the location that flood risk assessment data has been requested for.



How to use this information

You can use this information as part of a flood risk assessment for a planning application. To do this, you should include it in the appendix of your flood risk assessment.

> **We recommend that you work with a flood risk consultant to get your flood risk assessment.**

Included in this document

In this document you'll find:

- how to find information about surface water and other sources of flooding
- information on the models used
- definitions for the terminology used throughout
- flood map for planning (rivers and the sea)
- flood defences and attributes
- information to help you assess if there is a reduced flood risk from rivers and the sea because of defences
- modelled data
- climate change modelled data
- information about strategic flood risk assessments
- information about this data
- information about flood risk activity permits
- help and advice

Information that's unavailable

This document **does not** contain:

- past floods

We do not have past flooding data for this location.

Please note that:

- flooding may have occurred that we do not have records for
- flooding can come from a range of different sources
- we can only supply flood risk data relating to floodng from rivers or the sea

You can contact your Lead Local Flood Authority or Internal Drainage Board to see if they have other relevant local flood information. Please note that some areas do not have an Internal Drainage Board.

Surface water and other sources of flooding

Use the long term flood risk service to find out about the risk of flooding from:

- surface water
- ordinary watercourses
- reservoirs

Or you can contact your Lead Local Flood Authority for further information.

Your Lead Local Flood Authority is West Sussex County Council.

For information about sewer flooding, contact the relevant water company for the area.

About the models used

Model name: Adur Coastal Model, 2012
Scenario(s): Undefended tidal
Date: 20 August 2012

Model name: Shoreham Adur Tidal Walls Defended Model Update 2018
Scenario(s): Defended tidal
Date: 2018

This model contains the most relevant data for your area of interest.

Terminology used

Annual exceedance probability (AEP)

This refers to the probability of a flood event occurring in any year. The probability is expressed as a percentage. For example, a large flood which is calculated to have a 1% chance of occuring in any one year, is described as 1% AEP.

Metres above ordnance datum (mAOD)

All flood levels are given in metres above ordnance datum which is defined as the mean sea level at Newlyn, Cornwall.

Flood map for planning (rivers and the sea)

Your selected location is in flood zone 3.

Flood zone 3 shows the area at risk of flooding for an undefended flood event with a:

- 0.5% or greater probability of occurring in any year for flooding from the sea
- 1% or greater probability of occurring in any year for fluvial (river) flooding

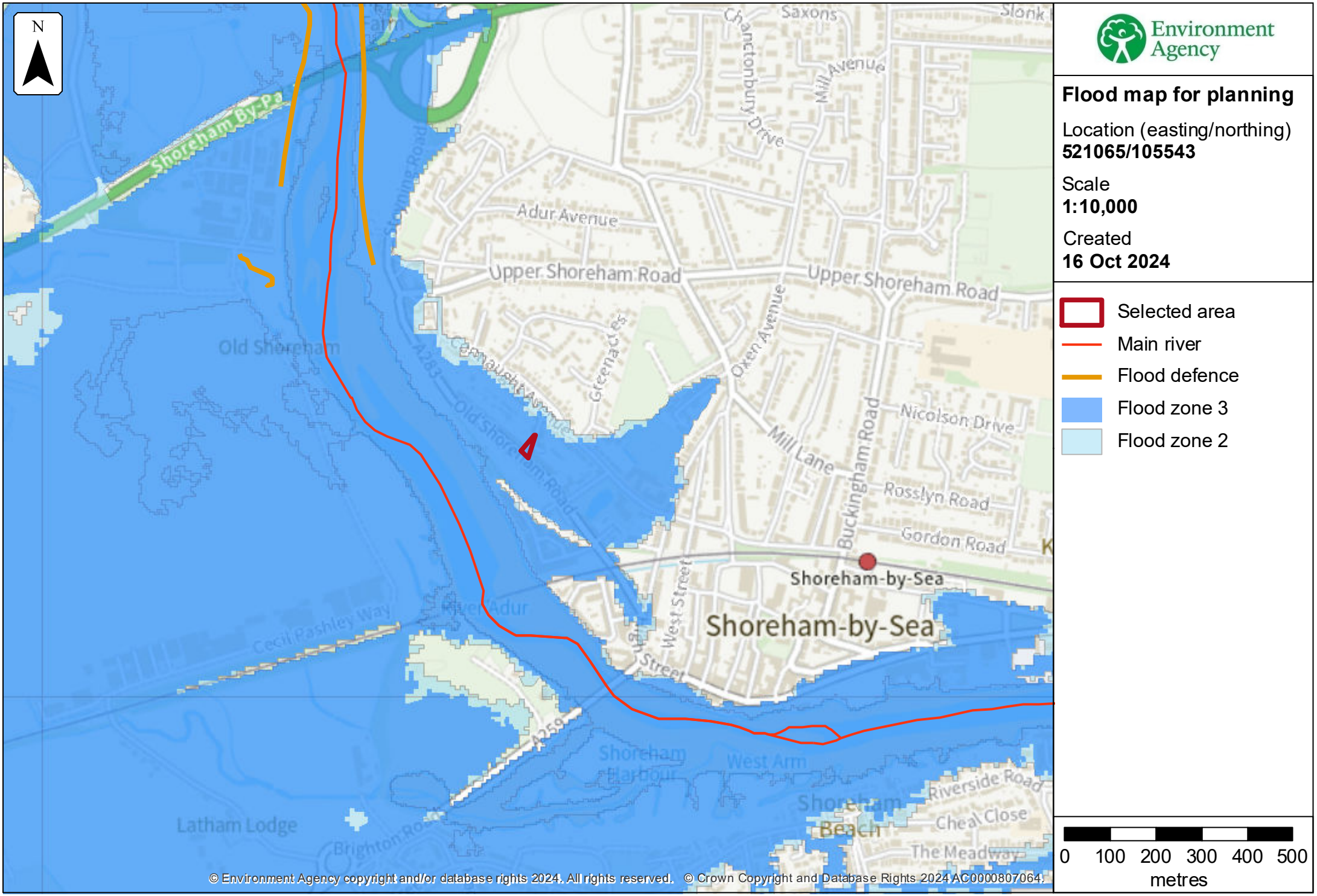
Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- between a 0.1% and 0.5% probability of occurring in any year for flooding from the sea
- between a 0.1% and 1% probability of occurring in any year for fluvial (river) flooding

It's important to remember that the flood zones on this map:

- refer to the land at risk of flooding and do not refer to individual properties
- refer to the probability of river and sea flooding, ignoring the presence of defences
- do not take into account potential impacts of climate change

The flood zones are not currently being updated. The last update was in November 2023. Some of the flood zones may have changed, however all source data is included in the models below.


N
Shoreham By-Pa
Adur Avenue
Upper Shoreham Road
Upper Shoreham Road
Old Shoreham
Old Shoreham Road
Greenacres
Oxen Avenue
Mill Lane
Buckingham Road
Nicolson Drive
Rosslyn Road
Gordon Road
Shoreham-by-Sea
Shoreham-by-Sea
West Street
High Street
Cecil Pashley Way
A259
Shoreham Harbour
West Arm
Shoreham Beach
Riverside Road
Cheal Close
The Meadway
Latham Lodge
Brighton Road
Chanctonbury Drive
Mill Avenue
Saxons
Environment Agency
Flood map for planning
Location (easting/northing)
521065/105543
Scale
1:10,000
Created
16 Oct 2024
Selected area
Main river
Flood defence
Flood zone 3
Flood zone 2
0 100 200 300 400 500
metres
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Flood defences and attributes

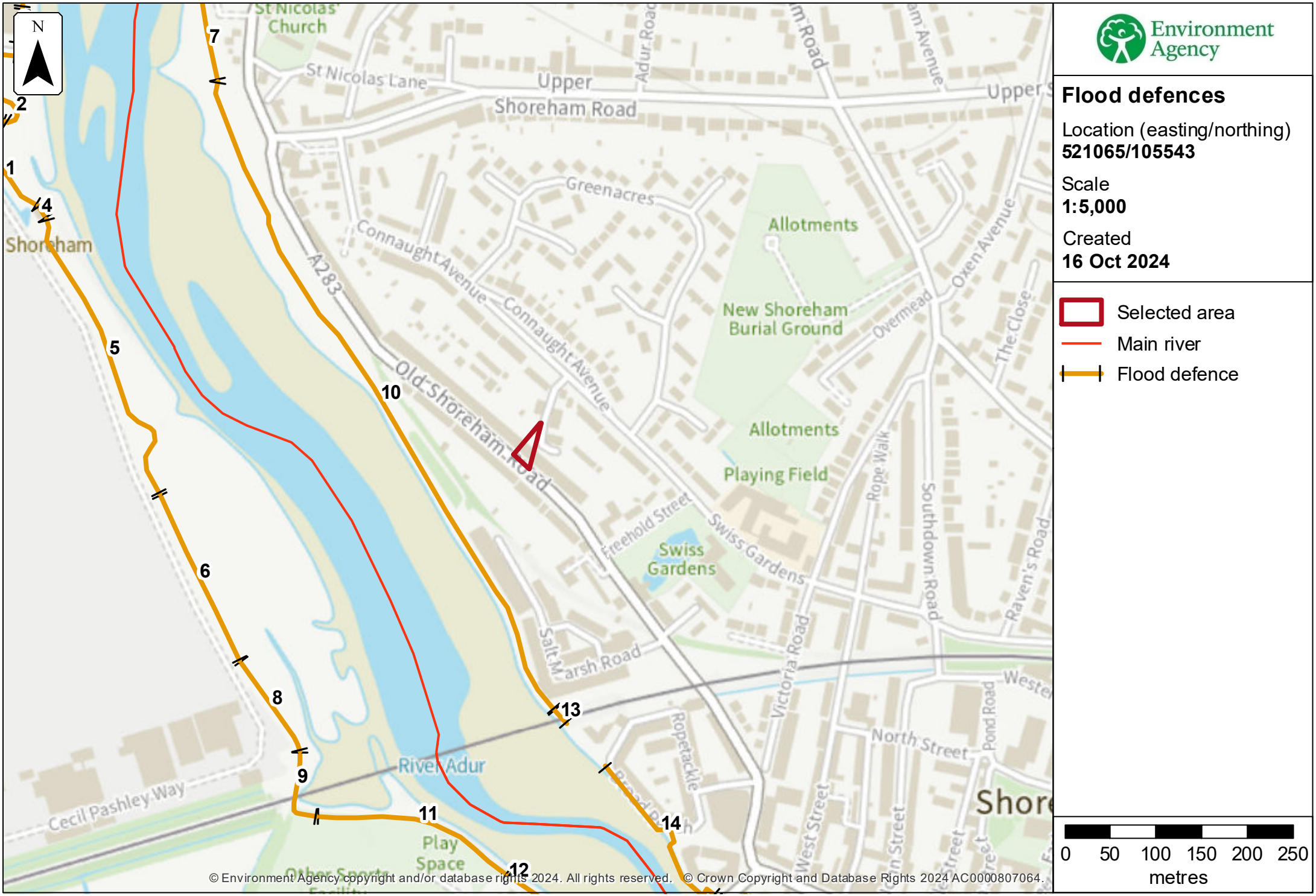
The flood defences map shows the location of the flood defences present.

The flood defences data table shows the type of defences, their condition and the standard of protection. It shows the height above sea level of the top of the flood defence (crest level). The height is In mAOD which is the metres above the mean sea level at Newlyn, Cornwall.

It's important to remember that flood defence data may not be updated on a regular basis. The information here is based on the best available data.

Use this information:

- to help you assess if there is a reduced flood risk for this location because of defences
- with any information in the modelled data section to find out the impact of defences on flood risk



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Environment Agency

Flood defences

Location (easting/northing)
521065/105543

Scale
1:5,000

Created
16 Oct 2024

- Selected area
- Main river
- Flood defence

0 50 100 150 200 250
metres

Flood defences data

Label	Asset ID	Asset Type	Standard of protection (years)	Current condition	Downstream actual crest level (mAOD)	Upstream actual crest level (mAOD)	Effective crest level (mAOD)
1	179518	Embankment	25		5.0	5.0	5.0
2	759252	Wall	100		5.10	5.10	5.10
3	71683	Wall	25		4.0	4.0	
4	761077	Wall					
5	761079	Embankment					
6	182132	Embankment	25		5.0	5.0	5.0
7	117987	Embankment	30		4.06	4.28	
8	172968	Embankment	2		4.0	4.04	
9	144540	Wall	1				
10	82698	Embankment	30		3.97	4.32	
11	130597	Embankment	1				
12	761187	Flood Gate					
13	82697	Bridge Abutment	200				
14	126338	Wall	200		4.71	4.81	

Any blank cells show where a particular value has not been recorded for an asset.

Modelled data

This section provides details of different scenarios we have modelled and includes the following (where available):

- outline maps showing the area at risk from flooding in different modelled scenarios
- map(s) showing the approximate water levels for the return period with the largest flood extent for a scenario and table(s) of sample points providing details of the flood risk for different return periods

Climate change

The climate change data included in the models may not include the latest flood risk assessment climate change allowances. Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

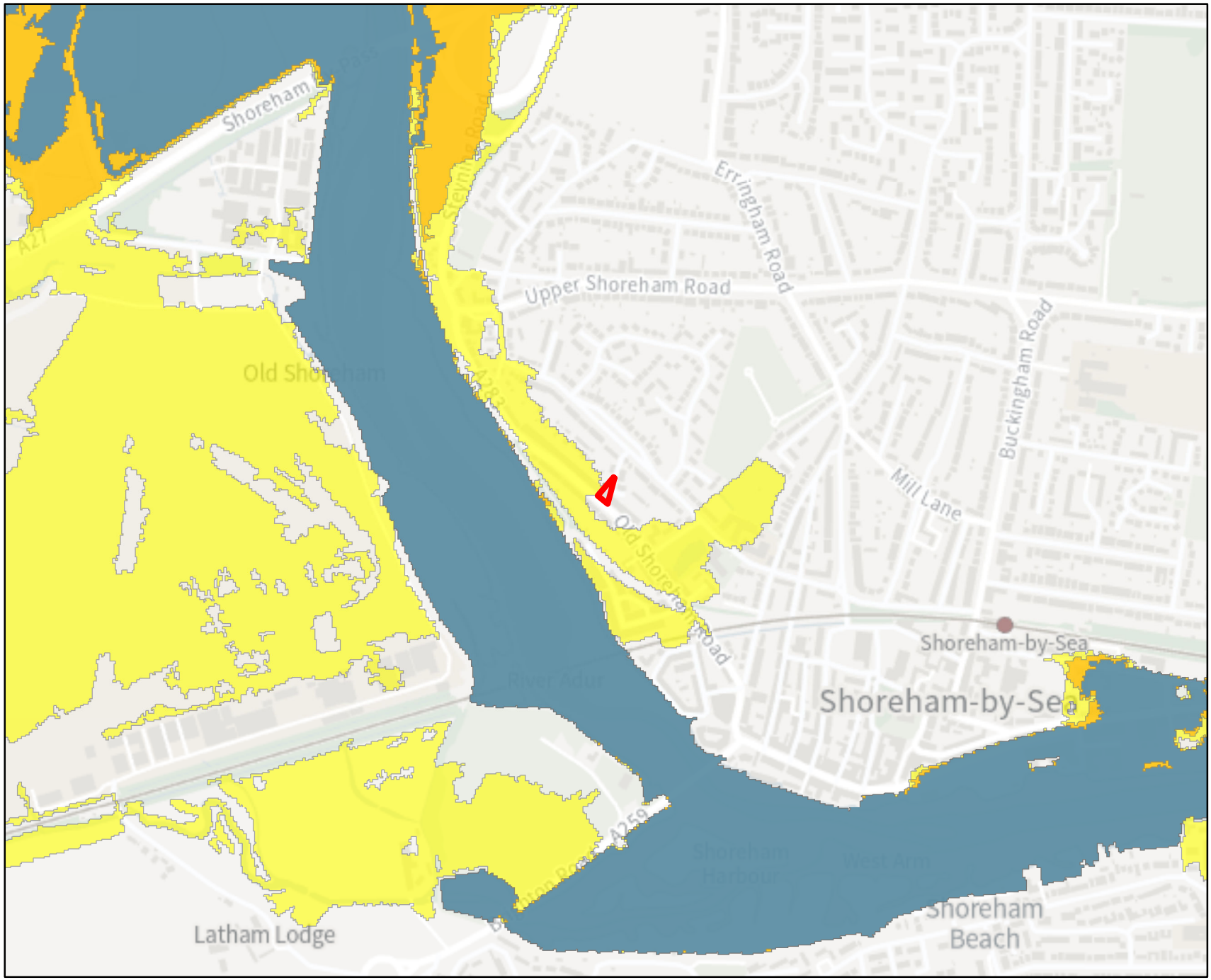
The Environment Agency will incorporate the new allowances into future modelling studies. For now, it's your responsibility to demonstrate that new developments will be safe in flood risk terms for their lifetime.

Modelled scenarios

The following scenarios are included:

- Defended modelled tidal: risk of flooding from the sea where there are flood defences
- Undefended modelled tidal: risk of flooding from the sea where flood defences have been removed

Modelled Flood Outlines (Defended Tidal) Centred BN43 5TD. Created 16/10/2024.



Environment Agency

N

Legend

- Site Boundary
- 0.5% AEP Defended Tidal
- 0.5% AEP (2067) Defended Tidal
- 0.5% AEP (2117) Defended Tidal

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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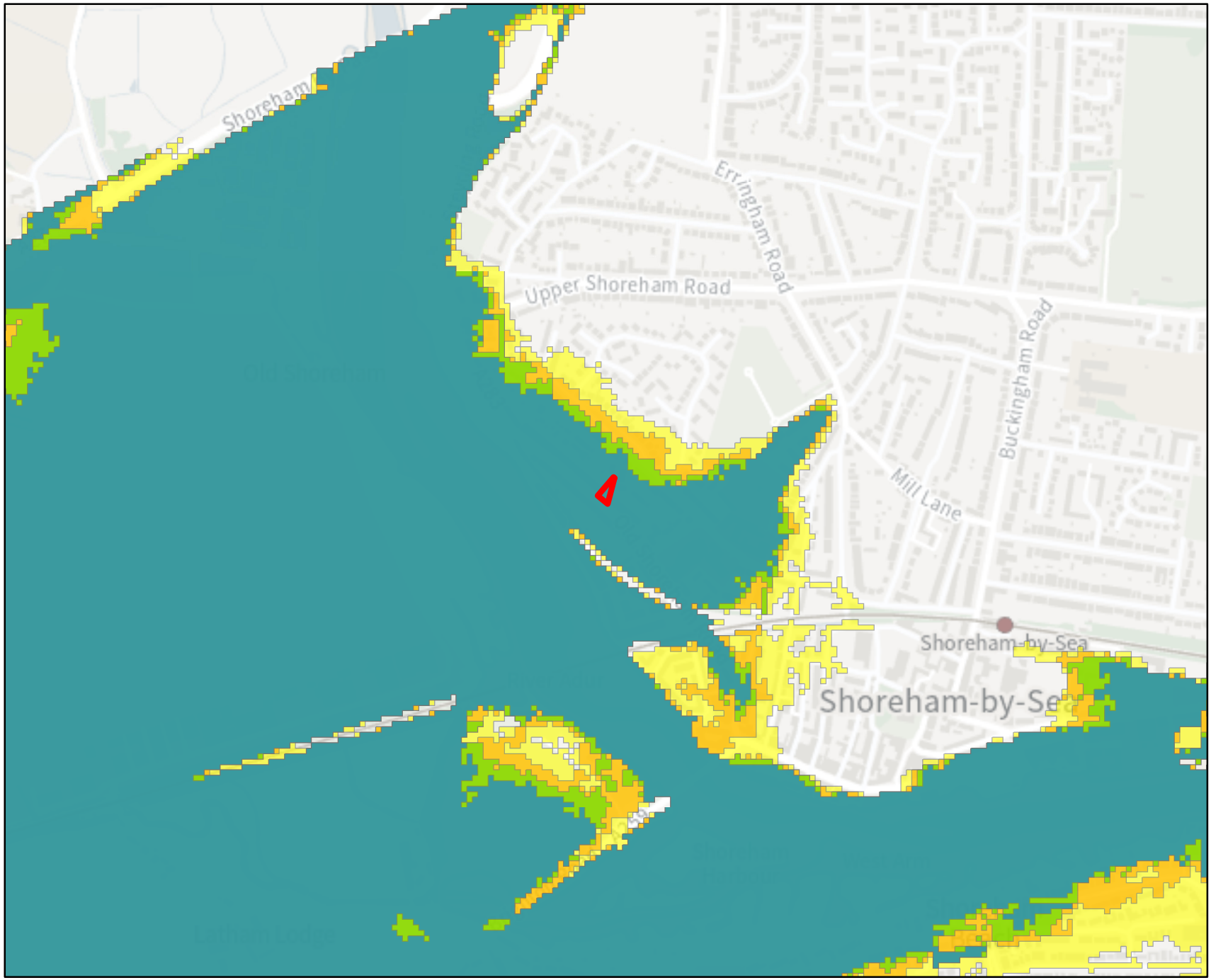
Contact us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506. Email:enquiries@environment-agency.gov.uk

Modelled Flood Outlines (Undefended Tidal) Centred BN43 5TD. Created 16/10/2024.



Environment Agency

N

Legend

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

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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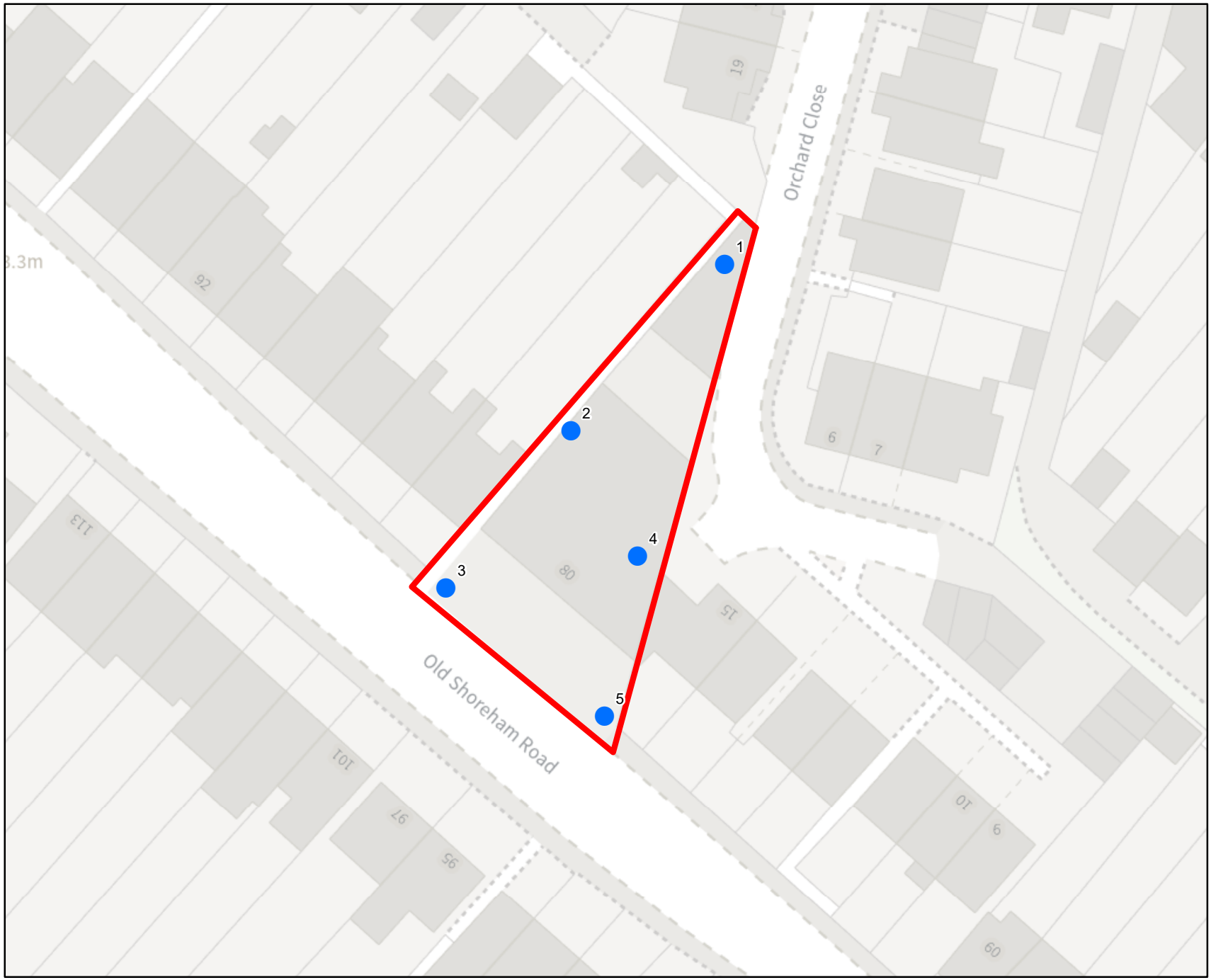
FRA Site Boundary and Node Points. Centred BN43 5TD. Created 16/10/2024.



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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Product 4 Flood Risk Data Requested by: Joao Gil

Site: 80 Old Shoreham Road, Shoreham by Sea, BN43 5TD

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	521077	105566	4.27	4.79	5.36	4.49
2	521062	105551	4.27	4.79	5.36	4.49
3	521051	105536	4.27	4.79	5.36	4.49
4	521069	105539	4.27	4.79	5.36	4.49
5	521066	105524	4.27	4.79	5.36	4.49

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% (2067)	0.5% (2117)
1	521077	105566	-	-	-
2	521062	105551	-	-	3.54
3	521051	105536	-	-	-
4	521069	105539	-	-	-
5	521066	105524	-	-	-

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	521077	105566	0.33	0.84	1.41	0.54
2	521062	105551	0.69	1.21	1.77	0.90
3	521051	105536	0.79	1.30	1.87	1.00
4	521069	105539	0.39	0.91	1.47	0.60
5	521066	105524	0.60	1.12	1.69	0.82

Table 4: Water Depths: Tidal Defended

	NGR		Modelled Flood Depths in Metres Defended Annual Exceedance Probability		
Node Ref	**Eastings**	**Northings**	**0.5%**	**0.5% (2067)**	**0.5% (2117)**
1	521077	105566	-	-	-
2	521062	105551	-	-	0.01
3	521051	105536	-	-	-
4	521069	105539	-	-	-
5	521066	105524	-	-	-

All levels taken from: Arun to Adur Coastal Model 2012, Shoreham Adur Tidal Walls Defended Model Update 2018

Produced on: 16/10/2024

*** Climate Change allowances for this model only show the superseded 20% increase in flows. The current allowances should be checked here: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.**

**** The flood risk data provided is based on existing EA hydraulic models for existing 0.5% annual probability events with an allowance for climate change. Please note the climate change allowances provided are not up to date. These were updated on 17 December 2019.**
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.

Strategic flood risk assessments

We recommend that you check the relevant local authority's strategic flood risk assessment (SFRA) as part of your work to prepare a site specific flood risk assessment.

This should give you information about:

- the potential impacts of climate change in this catchment
- areas defined as functional floodplain
- flooding from other sources, such as surface water, ground water and reservoirs

Your Lead Local Flood Authority is West Sussex County Council.

About this data

This data has been generated by strategic scale flood models and is not intended for use at the individual property scale. If you're intending to use this data as part of a flood risk assessment, please include an appropriate modelling tolerance as part of your assessment. The Environment Agency regularly updates its modelling. We recommend that you check the data provided is the most recent, before submitting your flood risk assessment.

Flood risk activity permits

Under the Environmental Permitting (England and Wales) Regulations 2016 some developments may require an environmental permit for flood risk activities from the Environment Agency. This includes any permanent or temporary works that are in, over, under, or nearby a designated main river or flood defence structure.

Find out more about flood risk activity permits

Help and advice

Contact the Solent and South Downs Environment Agency team at ssdenquiries@environment-agency.gov.uk for:

- more information about getting a product 5, 6, 7 or 8
- general help and advice about the site you're requesting data for

APPENDIX D

FLOOD WARNING & EVACUATION PLAN

JOFLOWS

FLOOD RISK & DRAINAGE



FLOOD WARNING & EVACUATION PLAN
80 Old Shoreham Road, Shoreham-by-sea, BN43 5TD

Doc ref. JOF0123-RP-FWP-001 REV (-)
Craig Construction Services Ltd

Flood risk. Drainage. Hydraulic Modelling.

JOFLOWS

enquiries@joflows.co.uk
07857 447987
joflows.co.uk

80 Old Shoreham Road, Shoreham-by-sea, BN43 5TD
Flood Warning & Evacuation Plan
November 2024

REPORT REF: JOF0123-RP-FWP-001 REV (-)

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REGISTRATION OF AMENDMENTS

Date	Rev	Comment	Status	Prepared By
November 2024	01	First issue	Issue for comment	**Joao Gil** **BSc. MSc. GMICE** Civil Engineer

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APPENDICES

FA. FLOOD WARNING & ALERT CODES

1.0 INTRODUCTION

1.1 Joflows has been commissioned by Craig Construction Services Ltd (hereafter referred to as 'the Client') to produce a Flood Warning & Evacuation Plan (the 'Plan') to support future Site at 80 Old Shoreham Road (hereafter referred to as 'the Site).

1.2 The objective of this Plan is to raise awareness of the risk of flooding at the Site, to detail the Flood Warnings and to detail how the Plan is triggered by who and when, and what actions are required by those people in the area. The Plan describes the evacuation procedure and need for safe refuge.

1.3 This Plan, as well as any evacuation procedures, should be delivered to site users and staff as soon as reasonably practicable.

1.4 This Plan was informed by the following sources:

- The Environment Agency latest guidance on 'Flood Risk Emergency Plans for New Development' (September, 2019);
- Joflows' Flood Risk Assessment ref. JOF0123-RP-FRA-001.

Disclaimer

1.5 Joflows has completed this report for the benefit of the individuals referred to in paragraph 1.1, relevant statutory authorities, as well as any future site users and staff of the development.

1.6 Joflows accepts no responsibility or liability for:

- The consequence of this documentation being used for any purpose or project other than that for which it was commissioned i.e. full planning application and subsequent use of this Plan by the site users;
- Any damages to third-parties resulting from the limited information and dataset(s) available at the date this report was written;
- The issue of this document to any third party with whom approval for use has not been agreed.

2.0 SITE DESCRIPTION & SOURCES OF FLOODING

Site Location and Features

2.1 The Site comprises a main workshop store and ancillary store rooms in the rear yard (E521070 N105556). The Site is bound by Old Shoreham Road to the southwest and by adjacent curtilages - Figure 1.

2.2 The Site is located approximately 120m to the northeast of River Adur, which is shown to be its greatest source of flooding. The Site is located wholly within Flood Zone 3, which is assessed under an undefended scenario - Figure 2.

2.3 At the date this report was written, the Site benefits from the protection provided by the flood defences along River Adur banks. However, the Site is also shown to be affected by flooding for the defended design flood event, without a reasonable safe access/egress without the intervention of emergency services.

2.4 This Plan should not rely on flood warning alone as the only way of managing residual risk, and active planning for response to floods is needed. Due to the impacts of climate change it may not be possible to say exactly how deep flood water will be, and any flooding may be higher or lower than estimated or experienced before. Site users and staff need to be aware of this possibility, and the likely implications on how they can evacuate safely.

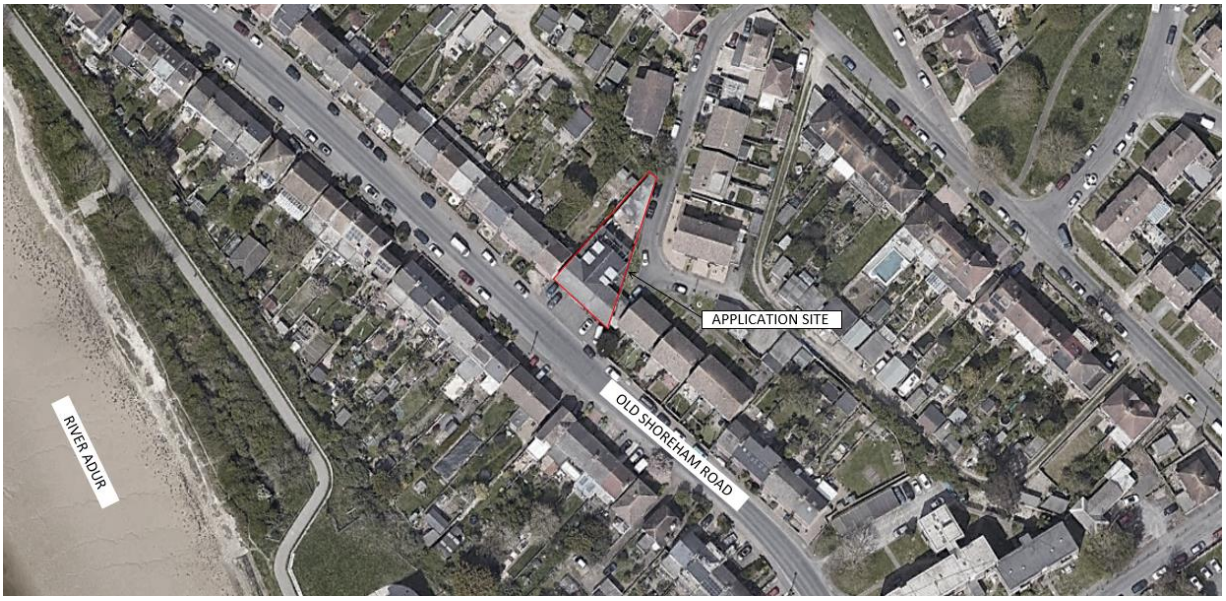

Figure 1 – Location plan of the Site (red line). Imagery extracted from Google Earh Pro.



Figure 2 – EA's Risk of Flooding from rivers and the Sea. Site shown in red. Extract from EA's Flood Zone wms layer.

3.0 FLOOD WARNING

Methods to Obtain Flood Warning

3.1 There are a variety of methods of flood warning available, which are discussed below. However, the best warning comes in the form of the awareness and vigilance of the all site users and staff.

3.2 The Environment Agency (EA) operates a flood forecasting and warning service ('check for flooding in England') in areas at risk of flooding from rivers or the sea, which relies on direct measurements of rainfall, river levels, tide levels, in-house predictive models, rainfall radar data and information from the Met Office. This service operates 24 hours a day, 365 days a year.

3.3 The EA also has a service of flood warnings via the gov.uk, which provides area specific information on flooding. This is a free service that provides flood warnings directly to those registered, by telephone, text, email. Site users and staff should register themselves for flood warnings. Post code BN43 5TD is eligible to be signed up for flood warnings under the *gov.uk* flood warning platform[1].

3.4 Alternatively, site users and staff may also call the 'Floodline' for advice on flooding warnings via 0345 988 1188 or by texting 0345 602 6340. This line is operated 24 hours a day, 7 days a week.

3.5 If flooding is forecast, alerts and warnings are issued using a set of easily recognisable codes. A description of the codes is shown in **Appendix F-A**.

Response to Flood Warnings

3.6 Should flood warnings be obtained sufficiently in advance, site users and staff should follow the set of procedures described below to protect i) themselves, ii) neighbours and iii) the respective properties and assets, thus minimising any potential damage arising as a result of flooding.

3.7 Site users and staff should undertake as much preparation as possible during the day, as flood events are often associated with power cuts that may limit activities during the night.

3.8 Upon hearing a flood warning, site users and staff should take the following steps:

- Alert their neighbours, particularly the elderly;
- Cooperate with the Management Company in charge of the implementation of this Plan, emergency services and Local Authorities
- Unplug all electric items and store them in higher places
- Protect any items, which may be lying in lower places, including rugs, furniture and personal possessions;
- Move any object prone to float to safer locations, including those present in storage rooms;
- Move cars to higher grounds to avoid damage;
- Activate any flood protection measures, if applicable;

[1] https://www.fws.environment-agency.gov.uk/app/olr/home

3.9 On top of these measures, staff are also advised to have Flood Kits ready, which should have been prepared in advance i.e. as soon as this Plan is handed out to staff management. The Flood Kit should comprise, at least, the following items:

- Torch with spare batteries;
- A portable battery radio and mobile phone;
- Telephone contacts for the Emergency Insurance, local councils, emergency services, family and friends;
- Bottled water;
- Non-perishable food items;
- Blankets, duvets and warm clothes;
- Welling boots, waterproof clothing and rubber gloves;
- First aid kit.

4.0 FLOOD PROCEDURES AND DUTY FOR CARE

Key Roles and Responsibilities

4.1 In the event of a serious flood event affecting the Site, the competent warning authority is the EA, which operates the flood warning services described in section 3.0.

4.2 Although this Plan has been prepared to minimise the burden on emergency services, when a flood is expected the Local Authority and emergency services will be responsible for public care and safety.

4.3 A Management Company will be responsible to make staff and regular Site users aware of the present Plan and brief/train them accordingly. The Management Company will also be responsible to implement any specific measures proposed in this document. However, the duty of seeking information from the competent authorities will rely upon site users and staff and/or regular users of the Site.

Estimated Flood Warning Time

4.4 The flood warning time is described as the time between the Environment Agency sending out the warning and the time flooding might occur.

4.5 As described in section 2.0, the Site lies wholly within defended Flood Zone 3, which relies upon flood defences along River Adur. As such, no flooding mechanism can be predicted at this stage, as this will depend on the exact location of breach and/or wave overtopping.

4.6 The above means that the flood warning time cannot be determined at this stage, and site users and staff should seek to find this information prior to any flood event.

Low lying Areas designed to Flood

4.7 No areas have been specifically designed to flood within the Site itself.

4.8 The Management Company in charge of implementing this Plan should make arrangements to place passive warning systems with signs highlighting the susceptibility of flooding, including clearly signed routes to direct site users and staff to the first level of the workshop store, and above.

Flood Response Actions & Considerations

4.9 In the event of breach/overtopping of the existing flood defences there might be no available escape route from the Site.

4.10 Should the above be the case, staff and users are urged to seek refuge in the upper floors and be preapred to egress the Site by boat.

4.11 However, in the first instance staff and regular site users are urged to seek and adhere to any instructions from the EA, Local Authority and/or any competent emergency services. Should no information be available before a flood event, site users and staff are urged to seek safe refuge within the Site, by directing themselves to upper floors.

4.12 For further information on key contacts refer to section 6.0.

4.13 The recommendations described in this Plan should be carried out with personal safety considered first and foremost. If any of the recommendations outlined in this Plan cannot be carried out without undue risk, they should be ignored in favour of protecting people. Staff and regular users of the Site should bear in mind the following:

- Safety comes first and above any recommendations outlined in this Plan;
- Don't try to walk through flood water, if unsure you will be able to do it safely. Flood water can be dangerous to walk through due to its depth, velocity or physical hazards like drain covers, open manholes and kerbstones;
- Never try to swim through fast flowing water, as they might be swept away or hit by floating objects;
- Do not walk on riverbanks or cross bridges and these might collapse in extreme flood event;
- Be mindful of vulnerable people on every action you take;
- Follow recommendations from emergency services in the first place;

4.14 The recommendations described in this Plan should be carried out with personal safety considered first and foremost. If any of the recommendations outlined in this Plan cannot be carried out without undue risk, they should be ignored in favour of protecting people.

Deploying Flood Protection

4.15 Due to the lack of protection up to the design flood event, it is recommended that the Site is prepared for the use of temporary flood protection barriers for doors at ground floor level, as a minimum.

4.16 The Management Company is responsible for ensuring any barriers are in good conditions and to prepare site users and staff to deploy these as soon as a Flood Warning is issued.

Safe Refuge

4.17 The Site contains a first floor in the main workshop store, which should be used as a safe refuge in the event of flooding.

4.18 It is expected that at least one window on each storey of the Site is sized appropriately to allow the egress of site users and staff and users by boat.

4.19 Staff and regular site users should only leave Sire if told to do so or if egressing the Site is deemed totally safe. Site users and staff should be prepared to stay in the Site for as long as it is required for flood waters to lower to acceptable levels, which could take several hours to days.

4.20 Depending on the cause of flooding, site users and staff are recommended to make use of their Flood Kit, as described in 3.9.

Reoccupation of The Site

4.21 After a flood event, there may be environmental hazards, loss of utilities and other such issues which may have to be rectified before people are allowed back to premises. The Management Company, management staff and/or regular users of the Site are therefore required to seek instructions from the relevant authorities and emergency services on the reoccupation of the Site;

4.22 Should the Site be safe to be reoccupied, staff and regular site users are advised to undertake the following steps:

- Carefully inspect the Site and premises to infer damage to properties;
- Open doors and windows to ventilate Sites if required;
- The help of an external company may be considered to clean the property and fix any damaged parts/items;
- Contact the local Electricity and Water/Sewage suppliers to seek advice before using appliances;

4.23 It is common that fluvial waters get in contact with foul water during flood events. Site users and staff should throw away any food that may have been in contact with flood waters;

4.24 Call their insurance within on their emergency helpline to seek more information on getting back to normal. The management company or management staff should also keep a record of the flood damage and retain correspondence with insures after the flood;

4.25 Restock the Flood Kit with food, water, batteries and any other items that need replaced;

4.26 Contact the Floodline for any advice on repairing and restoring damaged property.

5.0 DOCUMENT CONTROL

5.1 Flood risk to the Site may evolve and/or change as a result of a number of parameters, including climate change, poor maintenance of defences etc.. Therefore, this Plan should not be deemed valid in perpetuity for the whole lifetime of the development.

5.2 A Management Company will responsible for maintaining this Plan and required to undertake annual reviews of the document, where the following items should be addressed.

- The list of contacts and key responsibilities should be reviewed and updated accordingly;
- The EA should be contacted to understand whether flood risk to the Site has been updated in any way;
- The Management Company should ensure they're enrolled on the forecasting and warning service ('check for flooding in England'), or any other service in operation at the time of the review;
- Ensure staff are aware of their responsibilities within this Plan;
- Inform staff and regular site users of any new relevant findings or any alterations to this Plan

6.0 WHO CAN HELP?

The Environment Agency (EA)

6.1 In England, the EA is responsible for maintaining and operating flood defences and for flood warning, including issuing warning to the public.

6.2 The EA operates a flood forecasting and warning service ('check for flooding in England') and a 'Floodline' for advice on flooding warnings via 0345 988 1188 or by texting 0345 602 6340. This line is operated 24 hours a day, 7 days a week.

Local Authorities

6.3 Local authorities work with the police, fire and rescue services and the EA to coordinate the response during severe flooding. They set up rest centres for people evacuated from their homes and arrange temporary housing if required. They also deal with road closures and may provide sandbags and other flood protection equipment to local site users and staff.

6.4 The Local Authority for the area is Adur District Council (ADC), which can be contacted via 01903 239999 or 07713889128.

The Police

6.5 The police will coordinate with emergency services and Local Authorities. It is common to see the police on the ground during flood events and they can be of help to local site users and staff.

6.6 The Shoreham-by-Sea Police Station can be contacted via 0845 6070999.

The Fire Service

6.7 The fire service is responsible primarily for life saving, rescue and recovery. They may also pump out floodwater (there may be a charge for this service to owners).

6.8 The Shoreham Fire Station is located at 2 Stoney Ln, Shoreham-by-Sea BN43 6LA.

6.9 **Citizens Advice Bureau (CAB)**

6.10 The local CAB will assist after the flood event, by helping people to get back to normal. They can help site users and staff to manage claims with their insurance companies and provide advice on their rights as customers

6.11 The Shoreham-by-Sea Citizens Advice Bureau can be contacted via 01273 45 3756

APPENDIX FA

FLOOD WARNING CODES

 FLOOD ALERT	**FLOOD ALERT** What does it mean? ○ Flooding is possible, be prepared. When is it used? ○ Two hours to two days in advance of flooding. Triggers ○ Forecasts that indicate flooding from rivers may be likely. ○ Forecasted intense rainfall for rivers that respond very rapidly. ○ Forecast of high tides, surges, or hind winds. What to do? ○ Prepare to act on your flood plan. ○ Prepare a flood kit of essential items ○ Monitor local water levels, flood forecast, and weather conditions. ○ Call Floodline on 0345 988 1188 for up-to-date information
 FLOOD WARNING	**FLOOD WARNING** What does it mean? ○ Flooding is expected – immediate action is required. When is it used? ○ Half an hour to one day in advance of flooding. Triggers ○ High tides, and surges coupled with strong winds. ○ Heavy rainfall forecast to cause flash flooding of rivers. ○ Forecast flooding from rivers. What to do? ○ Move people, pets, and valuables to a safe place. ○ Turn of gas, electricity and water supplies (if safe to do so). ○ Put flood protection equipment in place (if possible). ○ Call Floodline on 0345 988 1188 for up-to-date information ○ **Evacuate from your home following the agreed evacuation plan**. **Prior evacuation of the site should be sought as soon as a Flood Warning is issued by the Environment Agency.**
 SEVERE FLOOD WARNING	**SEVERE FLOOD WARNING** What does it mean? ○ Severe flooding with danger to life. When is it used? ○ When flooding poses a significant threat to life or severe disruption to communities. Triggers ○ Actual flooding where the conditions pose a significant risk to life and/or distribution to the community. ○ On sire observations from flooded locations ○ A breach in defences or failure of a barrier that is likely to cause significant risk to life. ○ Discussions with partners. What to do? ○ **Prior evacuation of the site should be sought as soon as a Flood Warning is issued by the Environment Agency. If flooding has already occurred by the time a Severe Warning is issued**, stay in a safe place with a means of escape. Only when instructed to evacuate by Emergency Services, leave the property and follow the agreed evacuation plan. ○ Co-operate with emergency services.