

+44(0) 1443 803 540
info@ashfieldsolutions.com
ashfieldsolutions.com

Residential Property

Flood Risk Assessment
Hardwick Hartley Partnership
43 High Street, Littlehampton, BN17 5EJ

Document Control

Client	Hardwick Hartley Partnership
Report Title	Flood Risk Assessment - 43 High Street, Littlehampton, BN17 5EJ
Report Reference	144122-F01
Report Status	Final
Prepared by	J. Read
Checked by	A. Jones
Approved by	C. Marshall
Date of Issue	15/03/2022
Issue Method	PDF

Distribution

Hardwick Hartley Partnership

Henry Hardwick

Legal

This report has been prepared by Ashfield Solutions Group Ltd (Ashfield) exercising all reasonable skill, care and diligence within the terms of our agreement with the client, incorporating our general Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client. This report should not be used by the client in relation to any other matters not covered specifically by aforementioned scope. Unless otherwise and explicitly stated this report is intended for the sole use of the client and may not be copied, forwarded or in any other way distributed to any other party without the knowledge and written consent of Ashfield. We accept no responsibility to third parties to whom this report, or any part thereof, is made available and any such party relies on the report at their own risk. If this report does not contain a signature in the Document Control window, then this is an uncontrolled electronic copy and we cannot give any assurances on the source or content of the document. By receiving this report and acting on it, the client or any other person accepts that no individual is personally liable for breach of statutory duty, or otherwise in connection with its content.

Ashfield Solutions Group Ltd (Reg. No. 09729216), Ashfield Solutions Ltd (Reg. No. 5831575) and Ashfield Flood Risk Solutions Ltd (Reg. No. 09327524) are registered in England and Wales. Registered Office: Owm Cynon Business Centre, Mountain Ash, CF45 4ER.

Contents

1	Introduction	4
1.1	Authorisation and Context	4
1.2	Aims and Objectives	4
1.3	Information Sources Used	4
1.4	Report Limitations	5
1.5	Site Setting	5
1.6	Topographic Mapping	5
1.7	Local Hydrology	5
1.8	Flood History	5
1.9	The Design Flood	6
1.10	Climate Change	6
2	Flood Risk Evaluation	8
2.1	Fluvial & Tidal Flood Risk	8
2.2	Surface Water Flooding	10
2.3	Reservoir Failure	10
2.4	Groundwater	11
2.5	Artificial Flood Sources	12
2.6	Summary	12
3	Flood Risk in Planning Context	13
3.1	Flood Risk Status	13
3.2	Development Viability	13
3.3	Impacts on Flooding Elsewhere	13
3.4	Design Principles for Development	13
4	Conclusion	15

Drawings

Drawing 01	Site Location Plan
Drawing 02	LiDAR Derived Ground Levels Plan
Drawing 03	EA Flood Map for Planning
Drawing 04	EA Recorded Flood Outlines
Drawing 05	Tidal Defended Present Day Flood Outlines - Arun to Adur Flood Modelling, JBA Consulting, August 2012
Drawing 06	Tidal Defended Climate Change Flood Outlines - Arun to Adur Flood Modelling, JBA Consulting, August 2012
Drawing 07	1 in 200 Year Event (2070 Scenario) - Arun to Adur Flood Modelling, JBA Consulting, August 2012
Drawing 08	1 in 200 Year Event (2115 Scenario) - Arun to Adur Flood Modelling, JBA Consulting, August 2012

Drawing 09	1 in 1000 Year Event (2115 Scenario) – Arun to Adur Flood Modelling, JBA Consulting, August 2012
Drawing 10	EA Risk of Flooding from Surface Water
Drawing 11	EA Risk of Flooding from Reservoir Failure

Appendices

Appendix A	Existing & Proposed Site Plans
Appendix B	EA Product 4 Data

Executive Summary

Ashfield Flood Risk Solutions ("Ashfield") was commissioned in January 2021 by Hardwick Hartley Partnership ("the client") to undertake a Flood Risk Assessment ("FRA"), in support of a planning application for a conversion of first floor offices to a self-contained flat at 43 High Street, Littlehampton, BN17 5EJ ("the site").

The River Arun (EA designated Main River) is tidally influenced and located approximately 290m to the south-west of the site at its nearest location, flowing in a southerly direction before discharging into the English Channel approximately 950m to the south.

The EA Flood Map for Planning shows that the site is located within Flood Zone 2, 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. The Flood Zones do not include representation of any flood defences that exist. The EA Risk of Flooding from Rivers and Sea mapping (which does account for the effects of local flood defences) locates the site within a 'Low' risk area. Low means that each year this area has a chance of flooding of between 0.1% and 1%.

To inform this report, Product 6 data was requested from the EA with this derived from the Arun to Adur Flood Modelling Study undertaken by JBA Consulting in August 2012. The data comprises modelled flood outlines (shapefiles) and output grids, including flood levels (to mAOD) and flood depths (m), for a range of return periods. From comparing LiDAR derived topographical level data, with on-site predicted flood levels, the site is not expected to be at risk from the 1 in 5 year event up to and including the 1 in 1000 year present day event, however, it is indicated to be at risk of tidal flooding at the 1 in 200 year and 1 in 1000 year Climate Change epochs (to the year 2070 & 2115).

The design flood event is the 1 in 200 year tidal return period, with sea level rise (CC) accounted for 100 years to represent the lifetime of the development. The anticipated flood depth at the design flood event is approximately 1.09m with this identified at the access to the self-contained flat. The flat itself is located on the first floor and therefore not considered to be at risk.

Flood risk from tidal flooding is considered low-moderate (for the flat access at ground floor level) in future from sea level rise, with fluvial, groundwater and artificial sources all considered to pose a low risk. Surface water is considered to pose a very low risk and reservoir flooding considered to pose a negligible risk to the site.

It is recommended that the occupants of the proposed self-contained flat register to the EA Flood Warning service and that a Flood Management Plan (FMP) is in use prior to occupation of the proposed self-contained flat.

Therefore, this FRA demonstrates that the proposed development at the site:

- ✧ Is suitable in the location proposed and will be adequately flood resistant and resilient;
- ✧ Is unlikely to place additional persons at risk of flooding, and will offer a safe means of access and egress through provision and use of a Flood Management Plan; and
- ✧ Is unlikely to increase flood risk elsewhere as a result of the proposed development through the loss of floodplain storage, impedance of flood flows or increase in surface water runoff.

1 Introduction

1.1 Authorisation and Context

Ashfield Flood Risk Solutions ("Ashfield") was commissioned in January 2021 by Hardwick Hartley Partnership ("the client") to undertake a Flood Risk Assessment ("FRA"), in support of a planning application for a conversion of first floor offices to a self-contained flat at 43 High Street, Littlehampton, BN17 5EJ ("the site"). The site location can be seen on Drawing 01 for reference.

1.2 Aims and Objectives

The aim of this FRA is to assess any potential issues that the proposed conversion may have in a flood risk context and how to overcome these. Both the existing and proposed site plans can be seen in Appendix A for reference. This FRA has been undertaken in accordance with the most up to date local and national policies on development and flood risk by::

- ✧ Assessing whether the site is likely to be affected by flooding from different sources.
- ✧ Providing an assessment of the vulnerability of the proposed conversion and it's suitability in relation to the identified flood risks; and,
- ✧ Providing an opinion in relation to the likely impacts of the proposed conversion on flooding elsewhere;

1.3 Information Sources Used

In order to prepare this FRA, the following information sources and general guidance documents have been used:

- ✧ National Planning Policy Framework (NPPF), Flood Risk and Coastal Change Planning Practice;
- ✧ Site Location Plan (Drawing No – 2021-29-05) – DVD Building Design, January 2022;
- ✧ Existing Site Plans (Drawing No's – 2021-29-01/03) – DVD Building Design, January 2022;
- ✧ Proposed Site Plan (Drawing No – 2021-29-04) – DVD Building Design, January 2022;
- ✧ Alternative Flood Plans (Drawing No – 2021-29-06) – DVD Building Design, January 2022;
- ✧ West Sussex County Council Preliminary Flood Risk Assessment (PFRA) – West Sussex County Council, May 2011;
- ✧ Arun District Council Strategic Flood Risk Assessment (SFRA) – JBA Consulting, August 2016;
- ✧ West Sussex County Council Local Flood Risk Management Strategy (LFRMS) – West Sussex County Council, May 2014;
- ✧ Environment Agency (EA) Interactive Online Flood Mapping - Accessed March 2022;
- ✧ EA Product 6 Data (Weare Giffard Flood Risk Mapping & Modelling Study) – JBA Consulting, August 2012 – Received February 2022;
- ✧ 1m resolution LiDAR Data – Downloaded March 2022; and;
- ✧ British Geological Survey Drift & Geology Maps - Accessed March 2022.

1.4 Report Limitations

This assessment of flood risk has looked to use the most accurate and up to date flood mapping for the location. The proposed site boundary has been supplied by the client and the assessment of risk is based on this. This report has been prepared with due care and diligence in accordance with industry best practice and guidance. The conclusions in this report are valid only to the extent that the information provided to Ashfield was accurate and complete at time of receipt.

1.5 Site Setting

The site is located at coordinates XY: 502801,102136 (nearest post code: BN17 5EJ) to the west of Littlehampton town centre, occupying an overall area of approximately 180m². The site currently comprises the existing ground floor shop and first floor office with the site entrance accessed via an High Street immediately to the south.

The site is bound to the north and east by existing residential/commercial buildings, to the south by High Street and to the west by Duke Street.

1.6 Topographic Mapping

In absence of a site-specific topographical survey, freely available 1m resolution Light Detection and Ranging (LiDAR) data has been downloaded for the site and local area. A LiDAR Derived Ground Levels Plan can be seen within Drawing 02 for reference.

The ground levels in the vicinity of the site building are shown to fall from north to south, with the lowest ground level in the southern region of the building footprint shown to be approximately 3.88mAOD. The greatest ground level within the northern region of the building footprint is approximately 4.90mAOD.

The ground levels within High Street to the south of the site are shown to fall from west to east, with levels ranging between 3.37mAOD – 4.15mAOD respectively.

1.7 Local Hydrology

The River Arun (EA designated Main River) is tidally influenced and located approximately 290m to the south-west of the site at its nearest location, flowing in a southerly direction before discharging into the English Channel approximately 950m to the south. The River Arun is illustrated on Drawing 03 for reference.

No ordinary watercourses which are shown to pose a risk to the site are located within close vicinity.

1.8 Flood History

The EA recorded flood outlines open-source GIS datasets indicates that the nearest EA recorded flood outline to the site is located approximately 255m to the south-west. This event occurred in February 1983 due to the overtopping of flood defences of the nearby River Arun. The Recorded Flood Outlines can be seen on Drawing 04 for reference.

Product 4 data was requested from the EA which can be seen within Appendix B for reference. This included recorded flood outlines which are shown to be the same extent of that mentioned above (February 1983); however, no further information including the date etc has been provided.

The Strategic Flood Risk Assessment (SFRA) states that the most significant flood events reported to have affected the district, have occurred in 1968, 1974, 1980/01, 2020 and 2012. Furthermore flooding to more than 150 properties occurred in Littlehampton following a tidal surge on the 1st of February 1983. There is no information locating the site within any of these events.

The Local Flood Risk Management Strategy (LFRMS) states that 600 properties flooded within Littlehampton in 1980/01. There is no information locating the site within this event, and no further information on the event has been provided.

There are no reportable instances of historic flooding located at the site location within either the Preliminary Flood Risk Assessment (PFRA) or Surface Water Management Plan (SWMP).

1.9 The Design Flood

The Planning Practice Guidance identifies that new developments should be designed to provide adequate flood risk management, mitigation, and resilience against the 'design flood' for their lifetime.

This is a flood event of a given annual flood probability, which is generally taken as fluvial (river) flooding likely to occur with a 1% annual probability (a 1 in 100 chance each year), or tidal flooding with a 0.5% annual probability (1 in 200 chance each year), against which the suitability of a proposed development is assessed and mitigation measures, if any, are designed.

1.10 Climate Change

The range of allowances in Table 1 are based on percentiles. A percentile describes the proportion of possible scenarios that fall below an allowance level. The higher central allowance is based on the 70th percentile with the upper end allowance based on the 95th percentile.

Table 1 – Sea level allowance for (south-east River Basin District) in mm per year based on a 1981 to 2000 baseline

Region England	Allowance	2015 to 2035 mm/yr	2035 to 2055 mm/yr	2055 to 2085 mm/yr	2085 to 2115 mm/yr	Cumulative rise 2015 to 2115 (mm/yr)
	Higher Central	5.7 (200)	8.7 (261)	11.6 (348)	13.1 (393)	1.20
	Upper End	6.9 (242)	11.3 (393)	15.8 (474)	18.2 (546)	1.60

The flood model data discussed in Section 2.1 accounts for sea level rise to the year 2115. Based on the lifetime of the proposed development (100 years to the year 2122), an additional 7 years should also be considered to the year 2122 from 2115. This has been calculated to be 0.09m.

To ensure that the development is designed adequately for its lifetime, Climate Change (sea level rise) is discussed further in context of the design flood (1 in 200 year event) in Sections 2 and 3 of this report.

2 Flood Risk Evaluation

The following sections provide an evaluation of the risk posed by the key flood risk sources in relation to the site location. Consideration is given to the severity of flood risk to the site as a whole, making use of existing flood mapping, high-level local strategic studies and available topographic information.

2.1 Fluvial & Tidal Flood Risk

Fluvial flood risk originates from a watercourse of any size that may affect a site when the channel capacity is exceeded. This type of flooding often occurs following an extreme rainstorm event or a prolonged period of wet weather. Tidal flood risk can affect the coastline as well as estuaries and rivers that are tidally influenced. Flood events often coincide with the tidal regime, high rainfall events or other natural phenomena, which can lead to water levels covering low-lying land or exceeding natural or man-made defences.

As previously mentioned within Section 1.7, the nearest EA designated Main River to the site is the River Arun which is tidally influenced and located approximately 290m to the south-west of the site. This river flows in a southerly direction before discharging into the English Channel approximately 950m to the south.

EA Flood Mapping

The EA Flood Map for Planning (Drawing 03) shows that the site is located within Flood Zone 2, 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. The Flood Zones do not include representation of any flood defences that exist.

The EA Risk of Flooding from Rivers and Sea mapping (which does account for the effects of local flood defences) locates the site within a 'Low' risk area. Low means that each year this area has a chance of flooding of between 0.1% and 1%.

The Product 4 data (Appendix B) comprises information on the flood defences along the northern bank of the River Arun. These defences comprise a flood wall, and a review of the open-source GIS dataset indicates the design standard of protection (SOP) of the defences, defend up to the 1 in 75 year event (1.33%).

EA Flood Risk Data

To inform this report, Product 6 data was also requested from the EA with this derived from the Arun to Adur Flood Modelling Study undertaken by JBA Consulting in August 2012. The data comprises modelled flood outlines (shapefiles) and output grids, including flood levels (to mAOD) and flood depths (m) for a range of return periods.

Present Day

The present day flood outlines have been extracted for all modelled return periods in the present day scenario which can be seen on Drawing 04 for reference. A review of this data indicates that the site is shown to be located outside of all present-day return periods up to and including the 1 in 1000 year event. The nearest area at risk (1 in 1000 year event) is located approximately 57m south-east of the site at its nearest location.

Climate Change

The climate change (CC) return periods have been stated below for reference.

- * 1 in 200 year event (2070 scenario)
- * 1 in 200 year event (2115 scenario)
- * 1 in 1000 year event (2115 scenario)

Table 2 below provides analysis of potential flood levels and flood depths at the building. The flood depths are based on underlying LiDAR data within the flood model and have been identified through interrogation of the flood depth ASCII grids in a GIS viewer, taking the maximum depth.

Table 2 – Climate Change Flood Level & Depths at Site.

	Return Periods (yr)		
	1 in 200 year (2070)	1 in 200 year (2115)	1 in 1000 year (2115)
Flood Level (mAOD)	4.09	4.88	5.09
Flood Depth (m)	0.30	1.09	1.29

When considering CC to the year 2115 at the design flood event (1 in 200 year event), the maximum modelled flood depth at the site is 1.09m, equating to a flood level of 4.88mAOD. The maximum modelled flood depths are illustrated on Drawings 07, 08 & 09, derived from the aforementioned flood model data. The maximum modelled flood velocity at the site in the 1 in 200 year + CC (to 2115) event is 0.02m/s and the maximum hazard rating is 1.59 (danger for most).

The flood model data seen within Table 1 above has incorporated sea level rise to the year 2115. As discussed in Section 1.10, an additional 7 years also needs to be considered between 2115 and 2122 (100 year development lifetime).

The total sea level rise as per the data seen in Table 1 in Section 1.10 for the 7 year period between 2115 and 2122 is calculated to be 0.09m to two decimal places. Therefore, the 1 in 200 year design flood level at the site is a combined total of 4.88mAOD from Table 2 and the additional 0.09m quoted above, which equals 4.97mAOD. When comparing this to the lowest LiDAR derived ground level around the vicinity of the dwelling (3.88mAOD), this equates to a maximum calculated flood depth of 1.09m. As the proposals comprise a first floor change of use, this risk is therefore only applicable to the ground floor and access to the self-contained flat.

Based upon the analysis within Section 2.1, the overall risk of fluvial flooding at the site is considered **low**. Further considerations are made within Section 3, to ensure the risk is kept at a very low designation for the site's lifetime.

The risk from tidal flooding at the flat is considered to be **low**, although residual risk to the access/egress is discussed further within Section 3 to help mitigate against this identified risk in the long-term.

2.2 Surface Water Flooding

Surface water flooding occurs when local drainage networks are overwhelmed during an extreme rainfall event, causing water to flow over the surface and follow gravity to the lowest point where it often pools. This flood source is increasingly becoming one of the major contributors of flood risk, due to changing weather patterns and increased extreme rainfall events occurring across the UK. This places more pressure than ever on drainage systems, which are often overwhelmed during flash flood events, normally only designed to take between a 1 in 20 and a 1 in 30 return period event.

When interpreting the surface water flood map information, it needs to be taken into account that surface water mapping is generated from information that is largely high-level. The flood mapping must be correctly interpreted in order to give a fair representation of the site's surface water flood risk and used only as a guide.

The EA Surface Water Flood Map (Drawing 10) indicates that the whole site boundary is located within an area of 'Very Low' risk from surface water flooding. Very low means that each year, the area has a chance of flooding of less than 1 in 1000 (0.1%).

Both High Street to the south and Duke Street to the west are shown to be located within an area of 'Low' Risk from surface water flooding. Low means that each year, the area has a chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%).

There are no reportable instances of surface water flooding located at or within the vicinity of the site within the PFRA, SFRA, LFRMS or SWMP.

The overall risk of surface water flooding affecting the site is considered to be **low**. Further considerations are made within Section 3, to ensure the risk is kept at a very low designation for the site's lifetime.

2.3 Reservoir Failure

Assessment of risk of a reservoir failure may be interpreted as the extent of flooding that would occur, should any reservoir that has a capacity larger than 25,000m³, suffer a catastrophic failure. Mapping of this nature is described by the Environment Agency as a very worst case scenario, with a flood event of this type being extremely unlikely to occur.

The EA Risk of Flooding from Reservoir Failure mapping (Drawing 11) is based on two extents:

- * Wet Day (National) - This data shows the individual flood extents for all large, raised reservoirs in the event that they were to fail and release the water held on a "wet day" when local rivers had already overflowed their banks.
- * Dry Day (National) - This data shows the individual flood extents for all large, raised reservoirs in the event that they were to fail and release the water held on a "dry day" when local rivers are at normal levels.

The EA Risk of Flooding from Reservoir Failure mapping shows that the nearest extent to the site (wet day) is located approximately 1.8km to the north at its nearest location. Furthermore, the dry day extent has been identified approximately 4.6km to the north of the site.

The site is located outside of an area predicted to be at risk of both the wet and dry reservoir extent.. Due to current legislation all reservoirs are inspected regularly and the likelihood of failure occurring is considered to be low and the resultant risk is also considered to be **negligible**. No further consideration of this source is deemed necessary as part of this FRA.

2.4 Groundwater

Flooding from a groundwater source often occurs during or following a period of prolonged wet weather within areas that are low lying underlain by permeable rocks (aquifers). When aquifers are at their maximum holding potential, flooding at surface level can occur from beneath the ground.

Groundwater as a sole flooding mechanism is often regarded as low risk as it often relies on a coinciding rainfall, or flood event from an additional source to become a flood risk. The main contributory factor that will enhance the risk of groundwater flooding, is prolonged periods of high rainfall, which result in the groundwater saturation level rising to the point where it reaches the surface.

Online BGS mapping shows the bedrock geology beneath the site to comprise Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation And Portsdown Chalk Formation (undifferentiated) - Chalk. This is designated by the EA as a 'Principal' aquifer. These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.

The bedrock is overlain by Raised Beach Deposits, 1 - Sand And Gravel. This is designated by the EA as a 'Secondary A' aquifer. This is defined as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

The nearest available borehole to the site is located approximately 67m to the east (BGS Ref: TQ00SW65), which has a depth of approximately 95.4m below ground level (bgl), where groundwater was struck at 3.66m. The geology of this borehole is shown to be the same of that at the site location.

A borehole located approximately 84m to the north-east (BGS Ref: TQ00SW66), which has a depth of approximately 30.48m below ground level (bgl), where groundwater was struck at 2.74m. The geology of this borehole is shown to be the same of that at the site location.

The SFRA states that significant groundwater flooding has been observed across Sussex in 1993/94, 2000/01 and 2002/03; however, the exact location of these events cannot be confirmed. Furthermore, there are no reportable instances of groundwater flooding located at or within the vicinity of the site.

As seen within Appendix F of the SFRA, the site is located within an area >75% susceptible to ground water flooding. This indicates the susceptibility of groundwater flooding occurring and not the likelihood.

The risk of flooding from groundwater flooding is considered to be **low** due to the proposals comprising a first floor change of use. No further consideration of this source is deemed necessary as part of this FRA.

2.5 Artificial Flood Sources

Flood risk from artificial sources would include the failure of man-made drainage or water supply network. Although the likelihood of such an occurrence is highly unpredictable, it is recommended that any proposed designs for the site take into account the location of any existing below ground services, in order to avoid any inadvertent flooding taking place during the construction phase and in the future.

The SFRA states that data from the sewer incident report form supplied by Southern Water confirms a total of 315 recorded flood incidents in the district, with a total of 22 located within the postcode area (BN17 5). There is no further information on these sewer related flooding incidents within the document.

The risk of flooding from artificial sources is therefore considered to be **low**. Further considerations are made within Section 3, to ensure the risk is kept at a low designation for the site's lifetime.

2.6 Summary

Table 3 provides a summary of the classification of risk to the site from all flood sources and indicates where further considerations are required in the context of the proposed change of use.

Table 3 - Flood Risk Summary

Flood Risk Source	Overall Risk Classification	Additional Considerations
Fluvial	Low	See Section 3.
Tidal	Low to Moderate	See Section 3.
Surface Water	Low	See Section 3.
Reservoir Failure	Negligible	None.
Groundwater	Low	See Section 3.
Artificial Sources	Low	See Section 3.

3 Flood Risk in Planning Context

This report has so far evaluated all potential flood risk sources that may affect the site. The following sections describe the identified flood risks in the context of the proposed development and provide recommendations, where required, for the mitigation or reduction of those risks to enable safe development.

3.1 Flood Risk Status

The site is located close to the coast and is considered to be at low to moderate risk of tidal flooding (in the CC change scenario) at the access to the flat, when considering likelihood of flooding, development type and use. As the proposals comprise a change of use from offices to self-contained flat at first floor level, the flat itself is not considered to be at risk.

In the present-day scenario, based on the presence of flood defences in the locality, tidal flood risk is considered to be low (no flooding up to and including the 1 in 1000 year event). The site is located in tidal Flood Zone 2 and analysis of flood model data indicates a flood depth at the design event (1 in 200 year event to the year 2122) to be 1.09m at the ground floor level (access to the flat).

All other flood sources are considered to pose either a low, or negligible risk to the proposed change of use.

3.2 Development Viability

The EA classifies different types of development according to their perceived vulnerability to flood risk. The proposed development is understood to comprise the erection of two replacement dwellings.

In accordance with Table 2 of the NPPG: Flood Risk and Coastal Change, residential development is considered to be 'more vulnerable'. More vulnerable developments are considered appropriate in Flood Zone 2.

A Sequential Test is not considered to be required based upon the proposals comprising a change of use application, rather than a new development.

3.3 Impacts on Flooding Elsewhere

The development does not remove/reduce flood storage as a result of the existing building footprint remaining the same, following the change of use proposals. The development will therefore not increase flood risk elsewhere.

3.4 Design Principles for Development

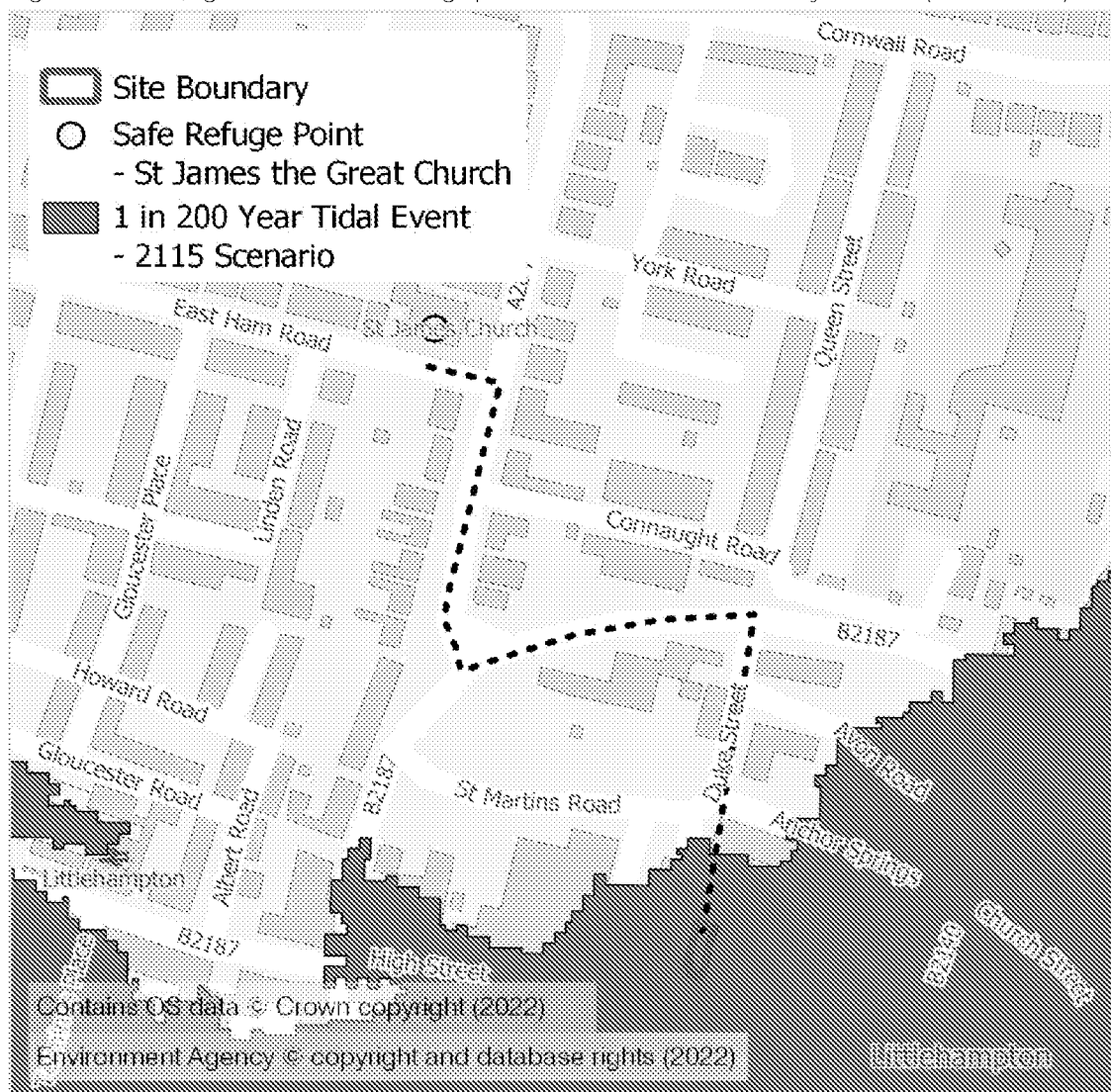
It is recommended that, based on the current design proposals, the following design principles should be incorporated to demonstrate its long term resilience and resistance to flood risk as a whole.

Flood Awareness

It is recommended that the residents/occupants of the building register to the EA Flood Alerts & Warnings service as a precaution.

A Flood Management Plan is considered necessary based upon the flood depths at the access to the self-contained flat at ground level at the design event. As seen on Figure 1 below, an access/egress route has been provided away to the north along Duke Street, before turning left along Franciscan Way and then turning northerly along Arundel Road. St James the Great Church is then on the left along East Ham Road. Figure 1 outlines the access/egress route to the safe refuge point.

Figure 1 – Access/egress route to safe refuge point located outside of 1 in 200 year event (2115 scenario).



4 Conclusion

The site has been assessed for a variety of flood sources and based upon detailed analysis of anecdotal and modelled flood risk information, this FRA has identified that tidal flooding is considered low-moderate (at the access to the flat) in future from sea level rise, with fluvial, groundwater and artificial sources all considered to pose a low risk, surface water considered to pose a very low risk and reservoir flooding considered to pose a negligible risk to the site.

The proposals comprise a first-floor change of use from offices to self-contained flat. The anticipated flood depth (1.09m) at the design flood event (1 in 200 year event – 2115 scenario) is only applicable to the flat's access and not the first floor flat itself.

It is recommended that a Flood Management Plan is in place prior to occupation of the self-contained flat, and that all occupants are registered to the EA Flood Alerts & Warnings service. This FRA has outlined an appropriate access egress route in context of the design flood event. This FRA has also outlined how flood risk, namely tidal, can be mitigated/managed for the lifetime of the development.

Therefore, this FRA demonstrates that the proposed development at the site:

- ✧ Is suitable in the location proposed and will be adequately flood resistant and resilient;
- ✧ Is unlikely to place additional persons at risk of flooding, and will offer a safe means of access and egress through provision of a Flood Management Plan prior to occupation; and
- ✧ Is unlikely to increase flood risk elsewhere as a result of the proposed development through the loss of floodplain storage, impedance of flood flows or increase in surface water runoff.

Limitations of this report

This report has been prepared by Ashfield Flood Risk Solutions Limited (Ashfield) for the sole benefit of the client.

This report has been prepared solely for the benefit of Hardwick Hartley Partnership (the “Client”) and has not been assigned to any other third parties. If reliance on this report was required by a third party, this could be arranged for an agreed fee. This report should not be used by the client in relation to any other matters not covered specifically by the scope of the report. If this report does not contain a signature in the Document Control window, then this is an uncontrolled electronic copy and should not be relied upon by the client or any other recipient, as Ashfield cannot give assurances on the source or content of the document. Ashfield has used all reasonable skill, care and diligence in the preparation of this report.

The Flood Risk Assessment report has been designed to satisfy planning requirements, as outlined in Section 1. It is a desktop review of information provided by the client and from selected private and public databases. It only includes a site investigation where specifically referenced. This report does not make a detailed site-specific assessment of the suitability of the existing drainage on the Site. If this is required, then a site survey should be considered. Ashfield accepts no responsibility for the accuracy or completeness of third party data reviewed within this assessment.

This report is provided under Ashfield Solutions Limited Standard Terms and Conditions.

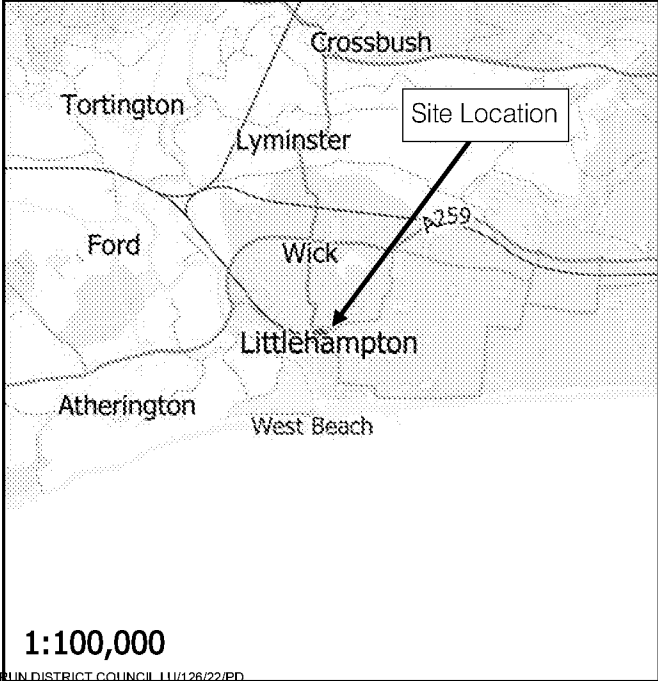
Drawings

Drawings

Drawings



- Legend
- Site Boundary
 - Site Location



Client		
Hardwick Hartley Partnership		
Project		
43 High Street, Littlehampton, BN17 5EJ		
Title		
Site Location Plan		
Report No.	Drawing No.	Revision
144122-F01	01	-
Scale	Date	Frame Size
As Shown	07/03/2022	A3
Produced By	Drawn By	Approved By
LC	LC	JR
ASHFIELD SOLUTIONS GROUP		



Legend

 Site Boundary

LiDAR Derived Ground Levels (mAOD)

 = < 2

 3

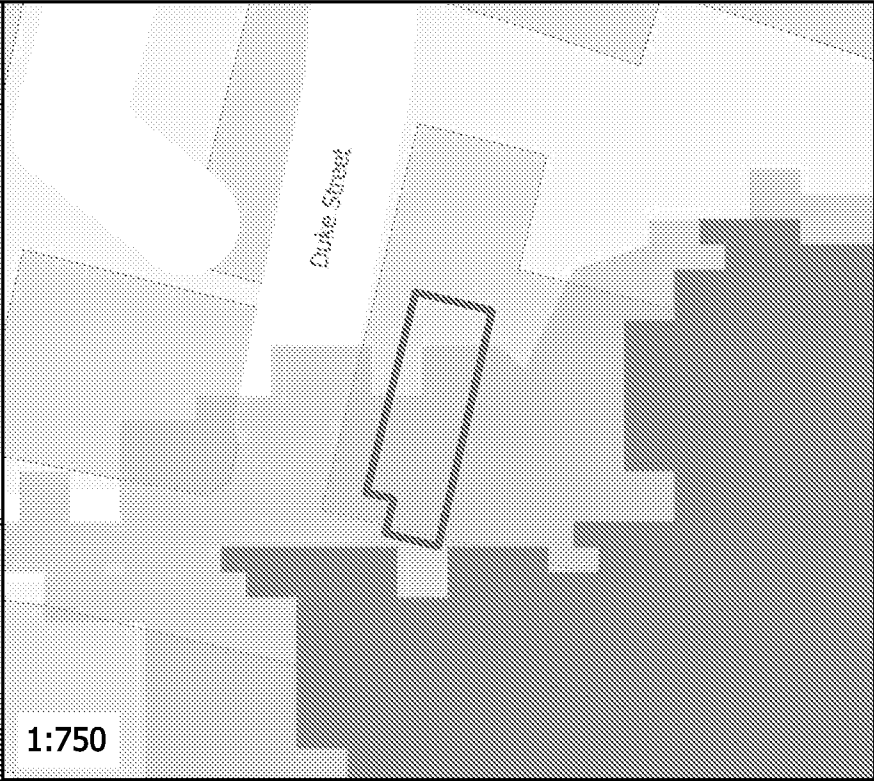
 4

 5

 = > 6

Client		
Hardwick Hartley Partnership		
Project		
43 High Street, Littlehampton, BN17 5EJ		
Title		
LiDAR Derived Ground Levels Plan		
Report No.	Drawing No.	Revision
144122-F01	02	-
Scale	Date	Frame Size
As Shown	07/03/2022	A3
Produced By	Drawn By	Approved By
LC	LC	JR





- Legend
- Site Boundary
 - Main River
 - OS Ordinary Watercourses
 - Flood Defences
 - Areas Benefiting from Flood Defences
 - Flood Zone 3
 - Flood Zone 2

Client
Hardwick Hartley Partnership

Project
43 High Street, Littlehampton, BN17 5EJ

Title
EA Flood Map for Planning

Report No. 144122-F01	Drawing No. 03	Revision -
Scale As Shown	Date 07/03/2022	Frame Size A3
Produced By LC	Drawn By LC	Approved By JR

Contains OS data © Crown copyright (2022)
Environment Agency © copyright and database rights (2022)





Legend

 Site Boundary

 Recorded Flood Outlines - February 1983 Event

Client		
Hardwick Hartley Partnership		
Project		
43 High Street, Littlehampton, BN17 5EJ		
Title		
EA Recorded Flood Outlines		
Report No.	Drawing No.	Revision
144122-F01	04	-
Scale	Date	Frame Size
As Shown	07/03/2022	A3
Produced By	Drawn By	Approved By
LC	LC	JR



Legend

Site Boundary

1 in 5 Year Event

1 in 20 Year Event

1 in 75 Year Event

1 in 100 Year Event

1 in 200 Year Event

1 in 1000 Year Event

Client

Hardwick Hartley Partnership

Project

43 High Street, Littlehampton, BN17 5EJ

Title

Tidal Defended Present Day Flood Outlines -
Arun to Adur Flood Modelling, JBA
Consulting, August 2012

Report No.

144122-F01

Drawing No.

05

Revision

-

Scale

As Shown

Date

07/03/2022

Frame Size

A3

Produced By

JM

Drawn By

JM

Approved By

JR

1:1,000

Contains OS data © Crown copyright (2022)

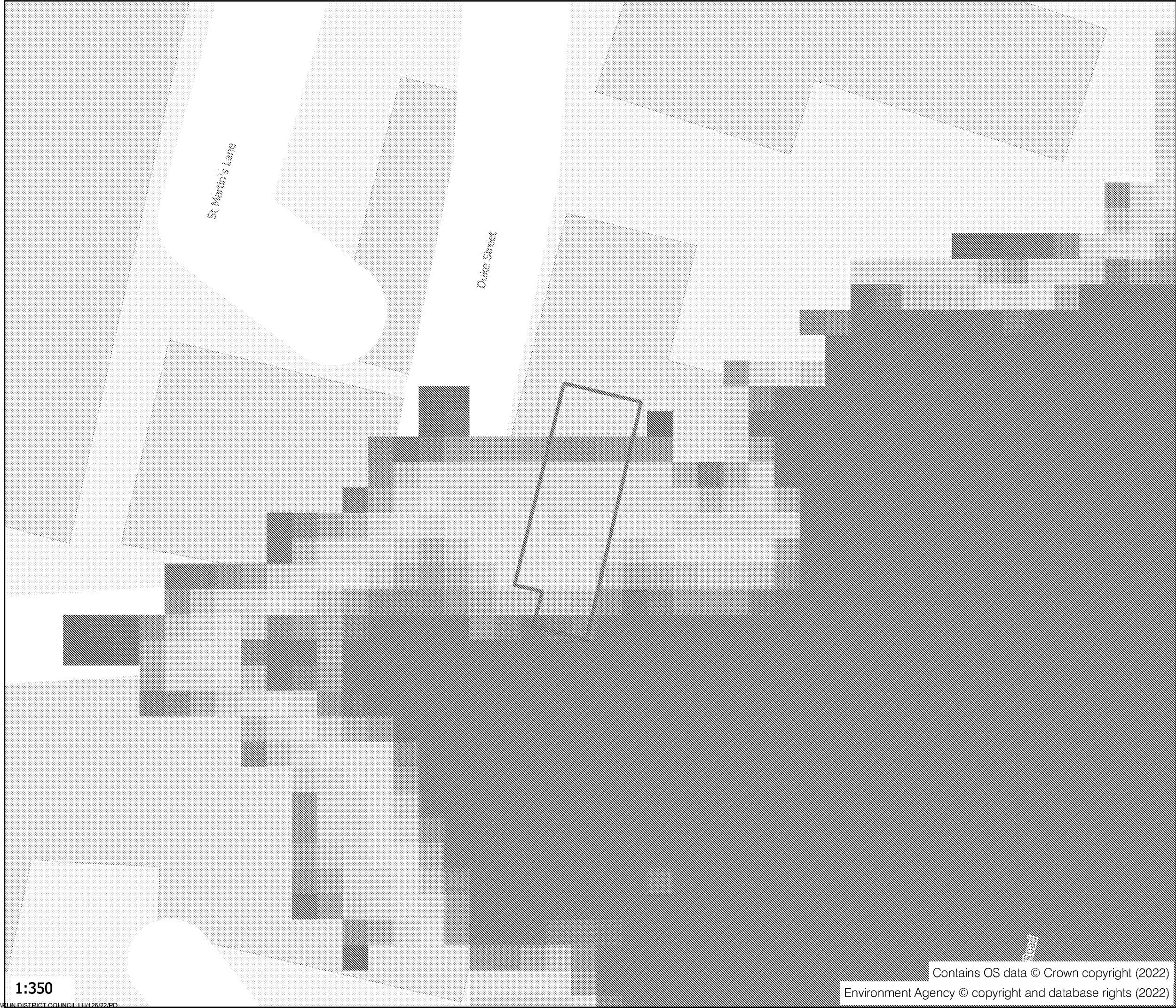
Environment Agency © copyright and database rights (2022)

ASHFIELD
— SOLUTIONS GROUP —



- Legend
- Site Boundary
 - 1 in 200 Year Event (2070 Scenario)
 - 1 in 200 Year Event (2115 Scenario)
 - 1 in 1000 Year Event (2115 Scenario)

Client		
Hardwick Hartley Partnership		
Project		
43 High Street, Littlehampton, BN17 5EJ		
Title		
Tidal Defended Climate Change Flood Outlines - Arun to Adur Flood Modelling, JBA Consulting, August 2012		
Report No.	Drawing No.	Revision
144122-F01	06	-
Scale	Date	Frame Size
As Shown	07/03/2022	A3
Produced By	Drawn By	Approved By
JM	JM	JR
ASHFIELD — SOLUTIONS GROUP —		



Legend

 Site Boundary

1 in 200 Year Event - 2070 Scenario (m)

 0.00

 0.10

 0.20

 >=0.30

Client

Hardwick Hartley Partnership

Project

43 High Street, Littlehampton, BN17 5EJ

Title

1 in 200 Year Event (2070 Scenario) - Arun to
Adur Flood Modelling, JBA Consulting,
August 2012

Report No.

144122-F01

Drawing No.

07

Revision

-

Scale

As Shown

Date

07/03/2022

Frame Size

A3

Produced By

JM

Drawn By

JM

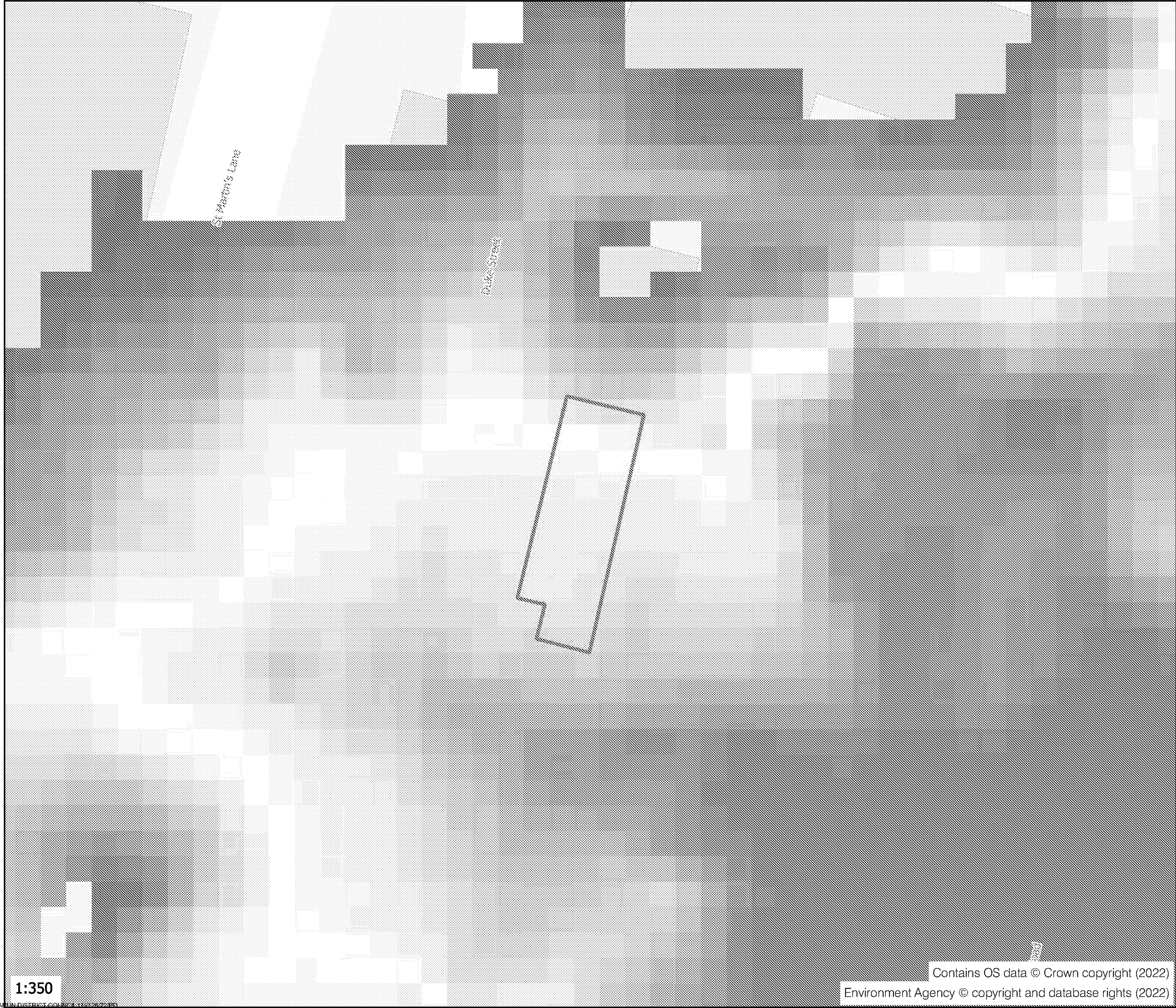
Approved By

JR

Contains OS data © Crown copyright (2022)

Environment Agency © copyright and database rights (2022)

ASHFIELD
— SOLUTIONS GROUP —



Legend

 Site Boundary

1 in 200 Year Event - 2115 Scenario (m)

 0.00

 0.25

 0.50

 0.75

 1.00

 1.25

 => 1.50

Client

Hardwick Hartley Partnership

Project

43 High Street, Littlehampton, BN17 5EJ

Title

1 in 200 Year Event (2115 Scenario) - Arun to
Adur Flood Modelling, JBA Consulting,
August 2012

Report No.

144122-F01

Drawing No.

08

Revision

-

Scale

As Shown

Date

07/03/2022

Frame Size

A3

Produced By

JM

Drawn By

JM

Approved By

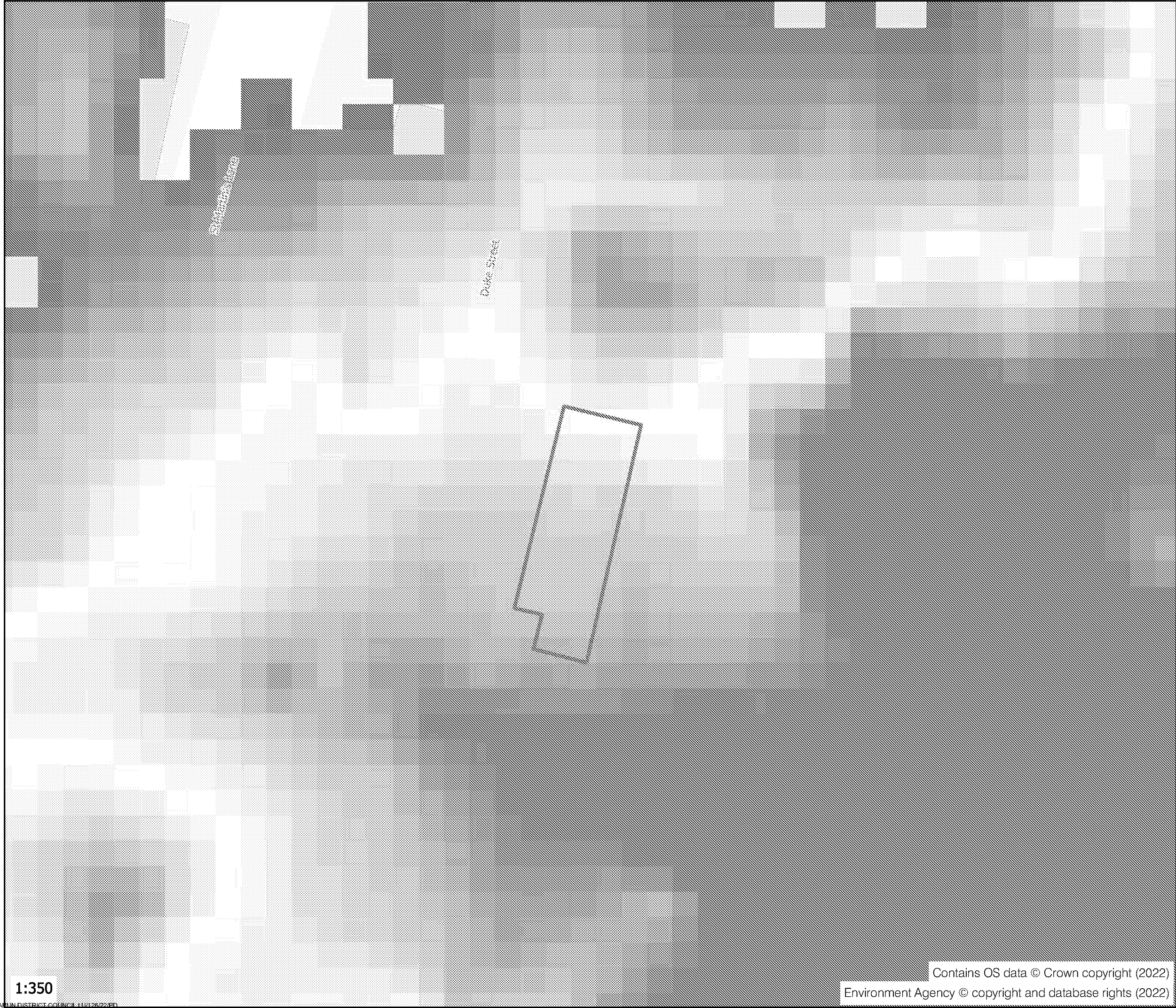
JR

1:350

Contains OS data © Crown copyright (2022)

Environment Agency © copyright and database rights (2022)

ASHFIELD
— SOLUTIONS GROUP —



Legend

 Site Boundary

1 in 1000 Year Event - 2115 Scenario (m)

 0.00

 0.25

 0.50

 0.75

 1.00

 1.25

 1.50

Client

Hardwick Hartley Partnership

Project

43 High Street, Littlehampton, BN17 5EJ

Title

1 in 1000 Year Event (2115 Scenario) - Arun
to Adur Flood Modelling, JBA Consulting,
August 2012

Report No.

144122-F01

Drawing No.

09

Revision

-

Scale

As Shown

Date

07/03/2022

Frame Size

A3

Produced By

JM

Drawn By

JM

Approved By

JR



Legend

- Site Boundary
- High Risk - 1 in 30 Year Extent
- Medium Risk - 1 in 100 year extent
- Low Risk - 1 in 1000 Year Extent

Client		
Hardwick Hartley Partnership		
Project		
43 High Street, Littlehampton, BN17 5EJ		
Title		
Risk of Flooding from Surface Water		
Report No.	Drawing No.	Revision
144122-F01	10	-
Scale	Date	Frame Size
As Shown	07/03/2022	A3
Produced By	Drawn By	Approved By
LC	LC	JR
ASHFIELD SOLUTIONS GROUP		



- Legend
- Site Location
 - Dry Day Reservoir Extent
 - ▨ Wet Day Reservoir Extent

Client		
Hardwick Hartley Partnership		
Project		
43 High Street, Littlehampton, BN17 5EJ		
Title		
Risk of Flooding from Reservoir Failure		
Report No.	Drawing No.	Revision
144122-F01	11	-
Scale	Date	Frame Size
As Shown	07/03/2022	A3
Produced By	Drawn By	Approved By
LC	LC	JR
ASHFIELD SOLUTIONS GROUP		

1:50,000

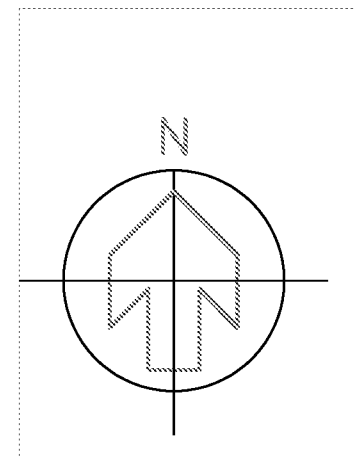
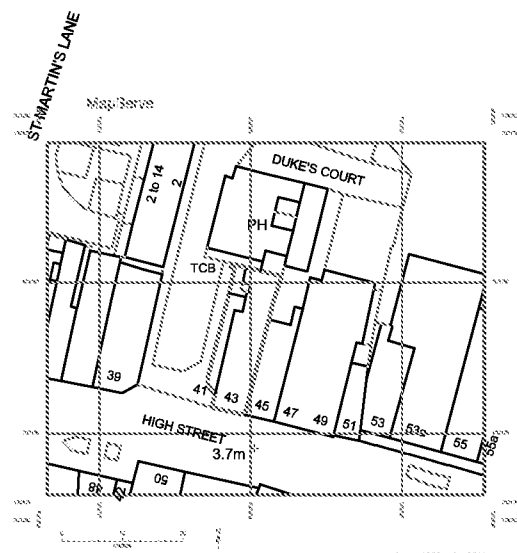
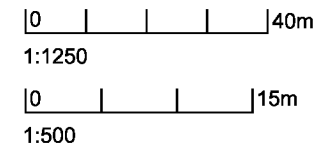
Contains OS data © Crown copyright (2022)
Environment Agency © copyright and database rights (2022)

Appendices

Appendix A

Existing & Proposed Site Plans

Appendix A



Revision

Client
Brighton & Hove Properties

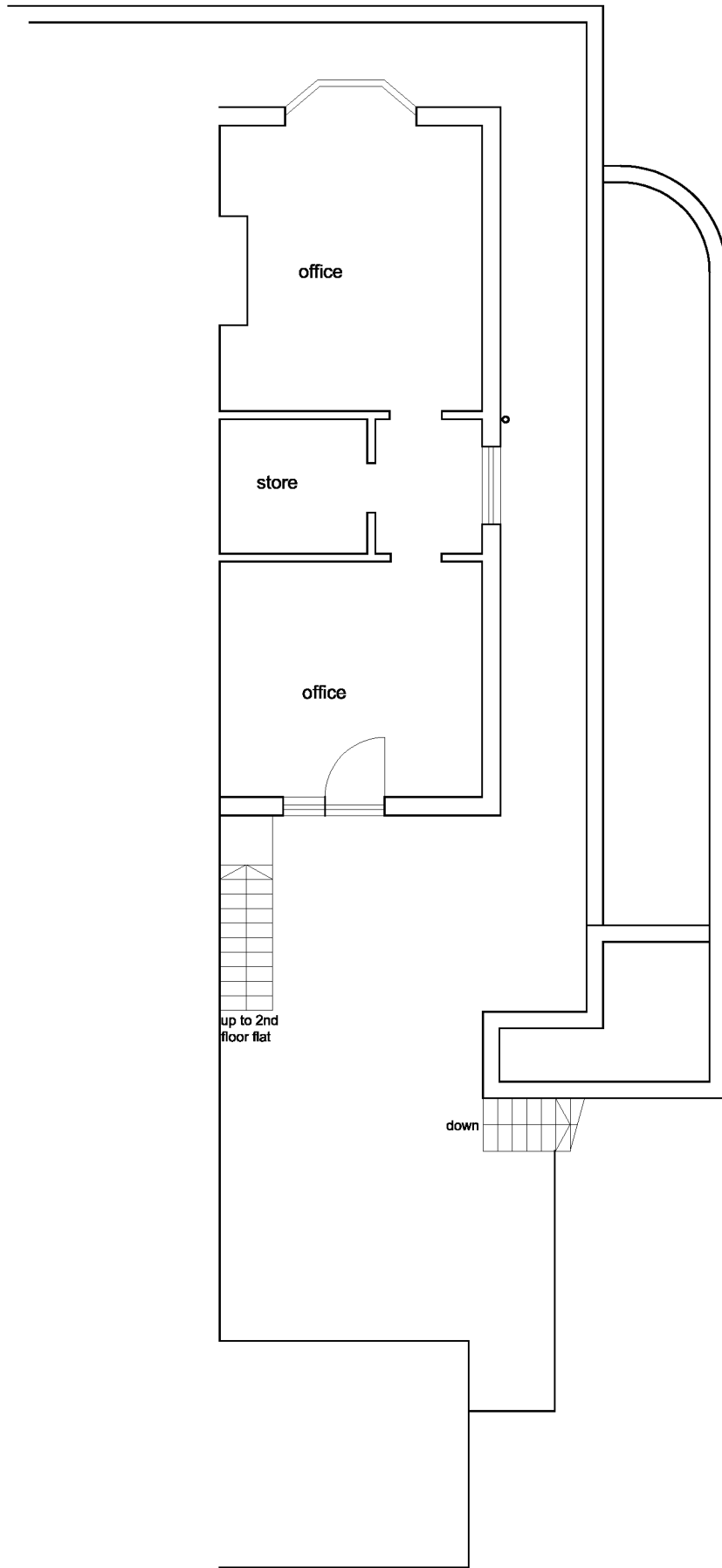
Project
Proposed conversion of first floor to provide
Self-contained flat
43 High Street
Littlehampton BN17 5EJ

Drawing
Site location plan

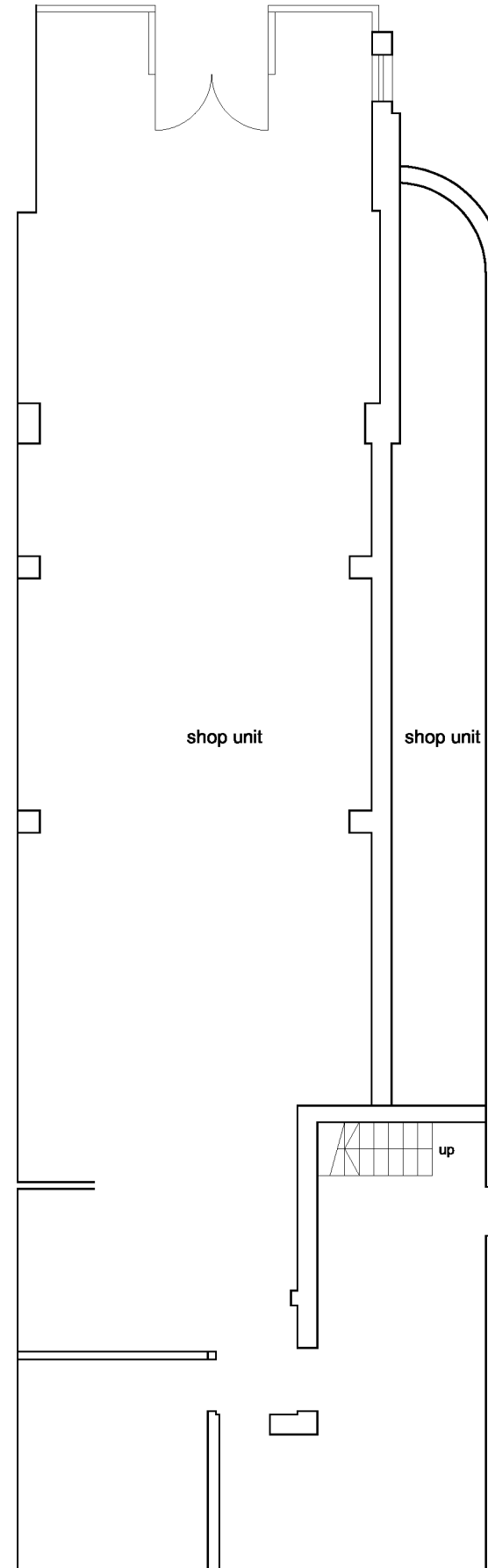
Issue Date
03.01.2022

Scale
1:1250 @A4

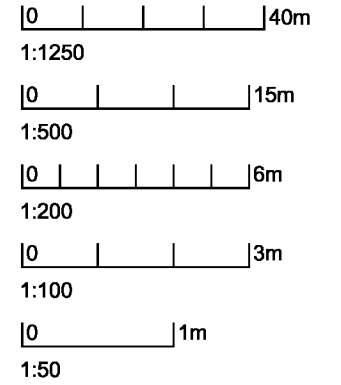
CHL drawing ref.
2021-29-05



Existing First Floor Plan



Existing Ground Floor Plan



DVD Building Design
24 Old Shoreham Road
Hove
BN3 6ET

07976 410454

Revision

Client
Brighton & Hove Properties

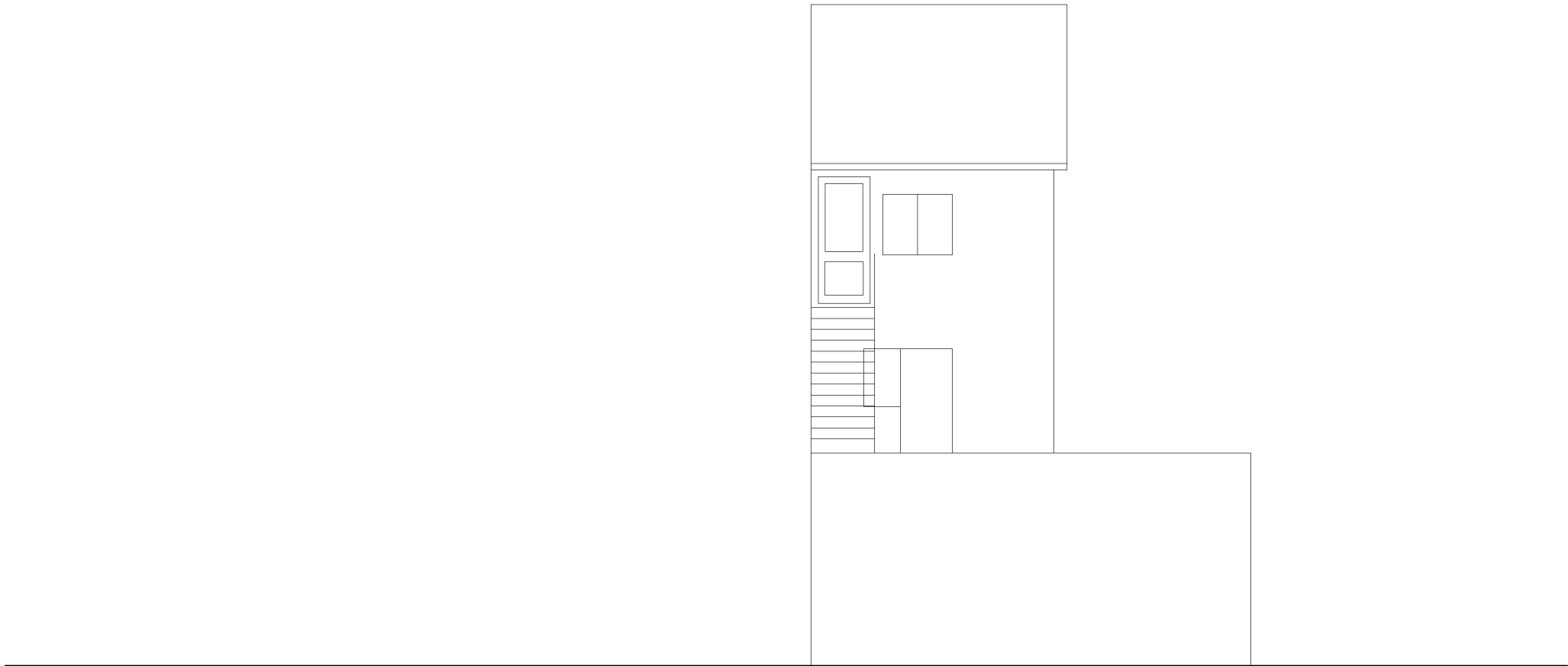
Project
Proposed conversion of first floor
to provide
Self-contained flat
43 High Street
Littlehampton BN17 5EJ

Drawing
Existing ground & first floor plans

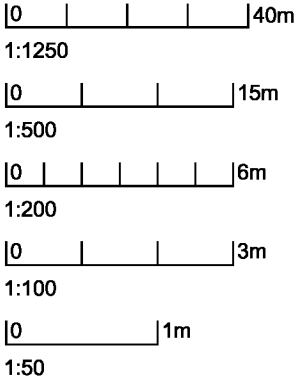
Issue Date 03.01.2022	CHL drawing ref. 2021-29-01
Scale 1:100@A3	



Existing side elevation



Existing rear elevation



DVD Building Design
24 Old Shoreham Road
Hove
BN3 6ET

07976 410454

Revision

Client
Brighton & Hove Properties

Project
Proposed conversion of first floor
to provide
Self-contained flat
43 High Street
Littlehampton BN17 5EJ

Drawing
Existing elevations

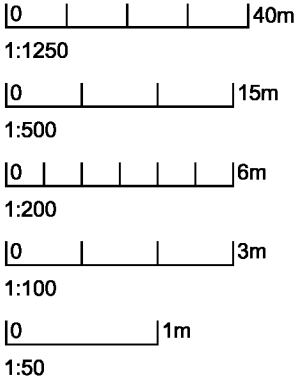
Issue Date 03.01.2022	CHL drawing ref. 2021-29-03
Scale 1:100@A3	



Proposed side elevation



Proposed rear elevation



DVD Building Design
24 Old Shoreham Road
Hove
BN3 6ET

07976 410454

Revision

Client
Brighton & Hove Properties

Project
Proposed conversion of first floor
to provide
Self-contained flat
43 High Street
Littlehampton BN17 5EJ

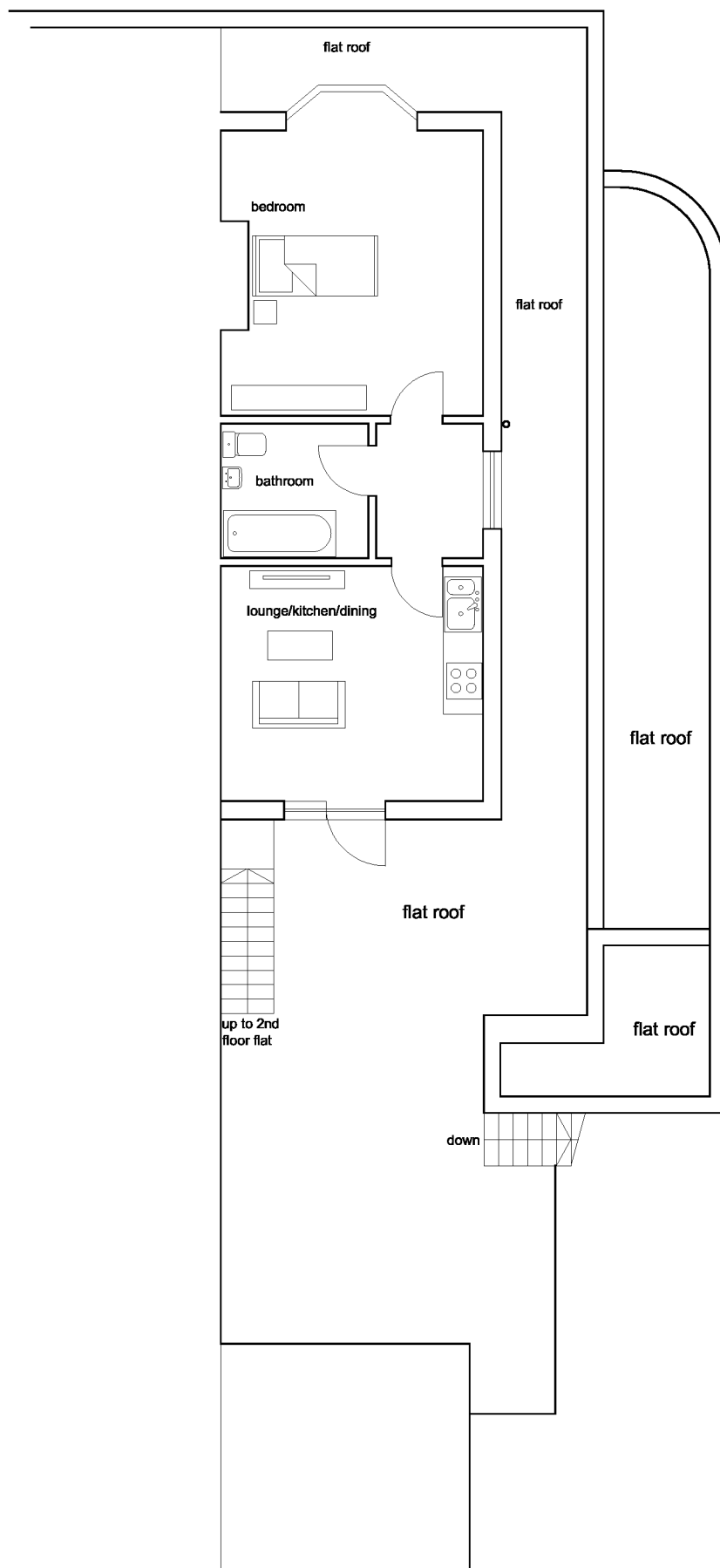
Drawing
Proposed elevations

Issue Date
03.01.2022

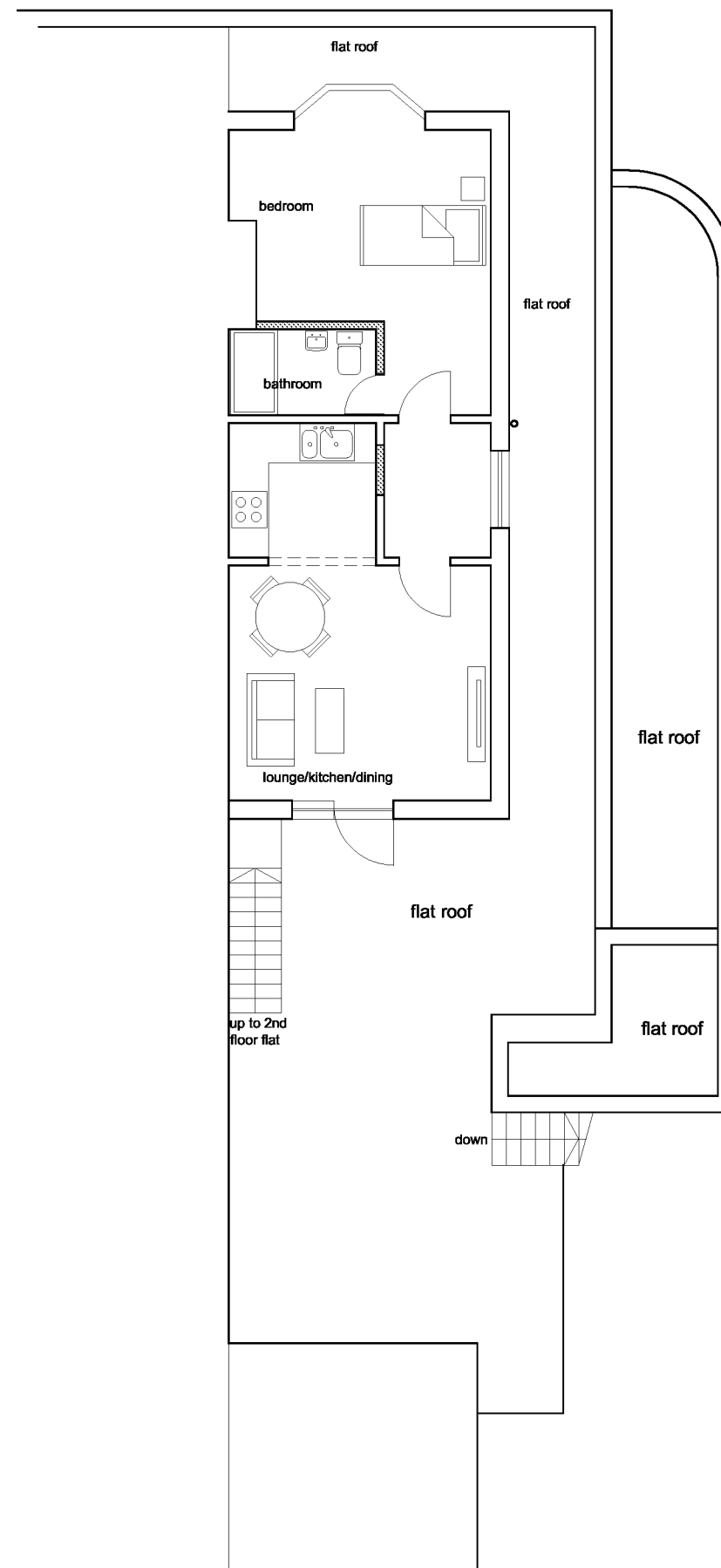
Scale
1:100@A3

CHL drawing ref.

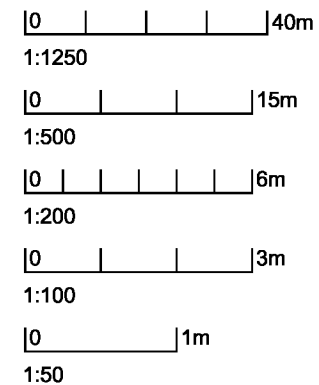
2021-29-04



Proposed First Floor Plan 2



Proposed First Floor Plan 3



DVD Building Design
24 Old Shoreham Road
Hove
BN3 6ET

07976 410454

Revision

Client
Brighton & Hove Properties

Project
Proposed conversion of first floor
to provide
Self-contained flat
43 High Street
Littlehampton BN17 5EJ

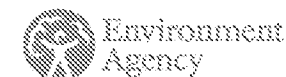
Drawing
Alternative floor plans

Issue Date 03.01.2022	CHL drawing ref. 2021-29-06
Scale 1:100@A3	

Appendix B

EA Product 4 Data

Flood Map for Planning (Rivers and Sea). Centred BN17 5EJ. Created 03/03/2022.



1: 10,000

0 Metres 250



Flood Map for Planning (Rivers & Sea)

- Defences
- Flood Storage Areas
- Areas benefiting from flood defences
- Flood Zone 3
- Flood Zone 2

Flood Map Areas (assuming no defences)

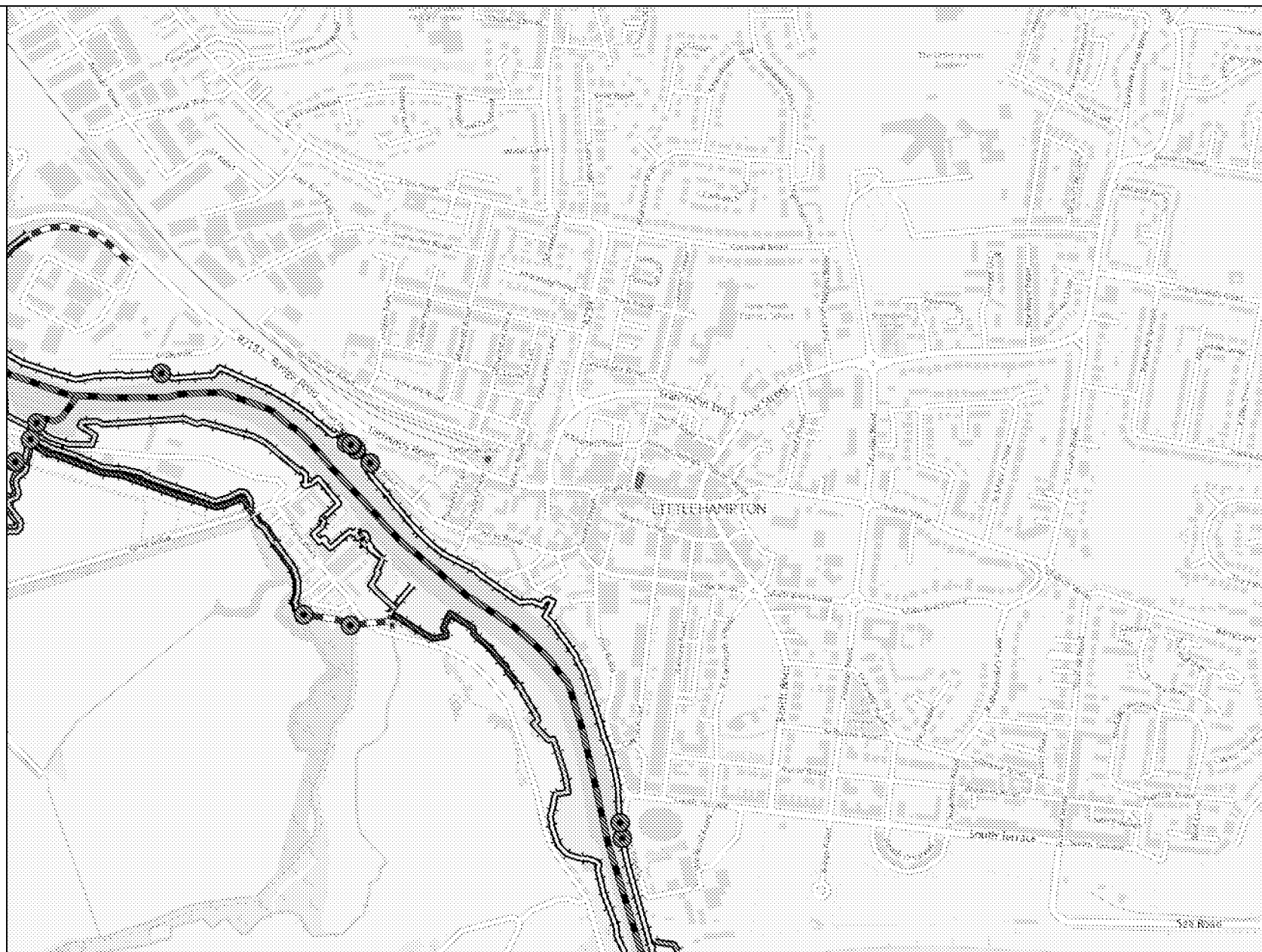
Flood Zone 3 shows the area that could be affected by flooding:

- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

Legend

Please see page 2 for asset
symbology



© Crown Copyright and database rights 2022 . Ordnance Survey 100024198.

Point Structures

-   Borehole
-   Central Pier
-   Control Gate
-   Debris Screen
-   Draw Off Tower
-   Fish or Eel Barrier
-   Fish Pass
-   Inspection Chamber
-   Outfall
-   Ramp
-   Security Screen
-   Slipway
-   Steps
-   Stilling Basin
-   Vortex Flow Control

Linear Structures

-   Debris Boom
-   In Channel Stoplogs
-   Pier
-   Weir
-   Other type or not defined

Defences

-   Embankment
-   Wall
-   Flood Gate
-   Demountable Defence
-   Bridge Abutment
-   Engineered High Ground
-   Natural High Ground
-   Cliff
-   Promenade
-   Quay
-   Beach
-   Barrier Beach
-   Dunes
-   Spillway

Channels

-   Open Channel
-   Complex Culvert
-   Simple Culvert

Instruments

-   CCTV Camera System
-   Flood Warning System
-   Gauge Board
-   Instrumentation
-   Piezometer
-   Rain Gauge
-   Telemetry System
-   Other type or not defined

Buildings and Compounds

-   Control Building
-   Gauging Station Building
-   Pump House
-   Storage Location
-   Other type or not defined

Channel Crossings

-   Bridge
-   Utility Services Crossing
-   Other type or not defined

Beach Structures

-   Breakwater
-   Groyne

Land

-   Water Storage Area
-   Other type or not defined

Point Aids to Navigation

-   Beacon
-   Buoy
-   Dolphin
-   Navigation Signage
-   Other type or not defined

Linear Aids to Navigation

-   Navigation Boom
-   Other type or not defined

Recorded Flood Outlines. Centred BN17 5EJ. Created 03/03/2022.

Legend

 All recorded flood outlines



1: 10,000

0 250

Metres

