

Prepared for:

Giuseppe Molica-Franco

January 2018

Our reference:

87637-Smith-OldMeadRd

Location:

Land to south Old Mead Road

Wick

Littlehampton

BN17 7PU



Document Issue Record

Project: Flood Risk Assessment for Planning

Client: Giuseppe Molica-Franco

Location: Land to south Old Mead Road, Wick, Littlehampton BN17 7PU

Application: Proposed siting of 14 no. 2 Bedroom Mobile Homes, each with standard 1.8 Metrex 2.4 Metre timber storage Shed

Our reference: 87637-Smith-OldMeadRd

Version: Draft v2 040118

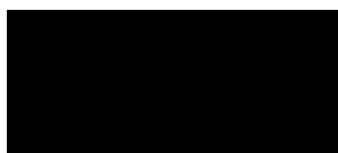
Lead Consultant: Miss Jackie Stone

Document Check: Mr Edward Bouët

Authorisation: Mrs Emma Jeffery

This report (including any enclosures and attachments) has been prepared for the exclusive use and benefit of the commissioning party and solely for the purpose for which it is provided. Unless we provide express prior written consent, no part of this report should be reproduced, distributed or communicated to any third party. We do not accept any liability if this report is used for an alternative purpose from which it is intended, nor to any third party in respect of this report. Any data and information provided by third parties and referred to herein has not been checked or verified by us unless otherwise expressly stated within this report. This report was checked and approved on the date it was issued and is therefore valid on this date. Understanding, circumstances, regulations and professional standards do change, which could subsequently affect the validity of this report.

Southpoint, Old Brighton Road, Gatwick, West Sussex, RH11 0PR



1. Key Facts

Flood Risk Posed:

- Site within Flood Zone 3a.
- Fluvial Risk from the River Arun 1.23km to the west, and Eel Spring Ditch which borders the site.
- The modelled flood extent maps provided show the site to be defended to the 1:100 year plus climate change fluvial standard, and the 1:200 year tidal standard.
- The site is situated within all of the undefended modelled flood extents.
- Risk of pluvial flooding would appear to be "Very Low" to "Low".
- No historic records of flooding at the site.

Flood Risk Management:

- Finished Floor Levels will be set at 600mm above ground level.
- Flood proofing will be incorporated as appropriate.
- A flood warning and evacuation plan which will be prepared in liaison with the Council's Emergency Planners and tied in with the local emergency plans for the area.
- The applicant will register with the Environment Agency Floodline Warnings/Alert Direct service.

Assuming accordance with these flood risk management measures, Unda Consulting Limited consider the proposed application to be suitable in flood risk terms.

2. Introduction

Unda Consulting Limited have been appointed by Giuseppe Molica-Franco (hereinafter referred to as “the applicant”) to undertake a Site Specific Flood Risk Assessment (FRA) for Planning at Land to south Old Mead Road, Wick, Littlehampton BN17 7PU (hereinafter referred to as “the site”). The FRA has been undertaken in accordance with the National Planning Policy Framework (NPPF) March 2012 and the associated technical guidance.

The site appears to be located within Flood Zone 3 as defined by the Environment Agency (EA) on their Flood Map for Planning. Under the National Planning Policy Framework (NPPF). A FRA is required if a proposed development:

- includes building or engineering works in Flood Zone 2 or 3;
- includes building or engineering works on land classified by the Environment Agency as having critical drainage problem;
- changes the use of land or buildings in a location at risk of flooding from rivers or the sea, or with critical drainage problems;
- changes the use of land or buildings in a way that increases the flood vulnerability of the development where it may be subject to other sources of flooding;
- is larger than 1 hectare.

Given that the proposed application site is located within Flood Zone 3 (High Risk of flooding from rivers or the sea), and includes building works, the applicant is required to submit a FRA under the NPPF. The assessment should demonstrate to the Local Planning Authority (LPA) and EA how flood risk will be managed now and over the development’s lifetime, taking climate change into account, and with regard to the vulnerability of its potential users.

The objectives of a FRA to support a planning application are to establish:

- whether the proposed development is likely to be affected by current or future flooding from any source;
- whether it will increase flood risk elsewhere;
- whether the measures proposed to deal with these effects and risks are appropriate.

3. Existing Situation

3.1. Site Usage:

The site is currently vacant. The total area of the plot is approximately 2,467.83 m².

3.2. Topography:

Environment Agency LiDAR has been used to assess the topography across the site and wider area. Light Detection and Ranging (LiDAR) is an airborne mapping technique, which uses a laser to measure the distance between the aircraft and the ground surface. Up to 100,000 measurements per second are made of the ground, allowing highly detailed terrain models to be generated at high spatial resolutions. The EA's LiDAR data archive contains digital elevation data derived from surveys carried out by the EA's specialist remote sensing team. Accurate elevation data is available for over 70% of England. The LiDAR technique records an elevation accurate to +/-5cm to 15cm with spatial resolutions ranging from 25cm to 2 metres. This dataset is derived from a combination of the EA's full dataset which has been merged and re-sampled to give the best possible coverage. The dataset can be supplied as a Digital Surface Model (DSM) produced from the signal returned to the LiDAR (which includes heights of objects, such as vehicles, buildings and vegetation, as well as the terrain surface) or as a Digital Terrain Model (DTM) produced by removing objects from the Digital Surface Model. 2.0m horizontal resolution DTM LiDAR data has been used for the purposes of this study. 2.0m LiDAR remotely sensed digital elevation data suggests that the ground topography on site is approximately 2.15 mAOD.



Figure 1: Aerial view of the site and immediate surrounding area (Source: Google Earth)

3.3. Geology and Soil:

The British Geological Survey (BGS) Map indicates that the bedrock underlying the site is Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk.

Formation (undifferentiated) - Chalk. Sedimentary Bedrock formed approximately 72 to 94 million years ago in the Cretaceous Period. The soil type in the area taken from the UKSO data is deep Marine/Estuarine Sand and Silt to clay to sandy loam texture with a neutral pH.

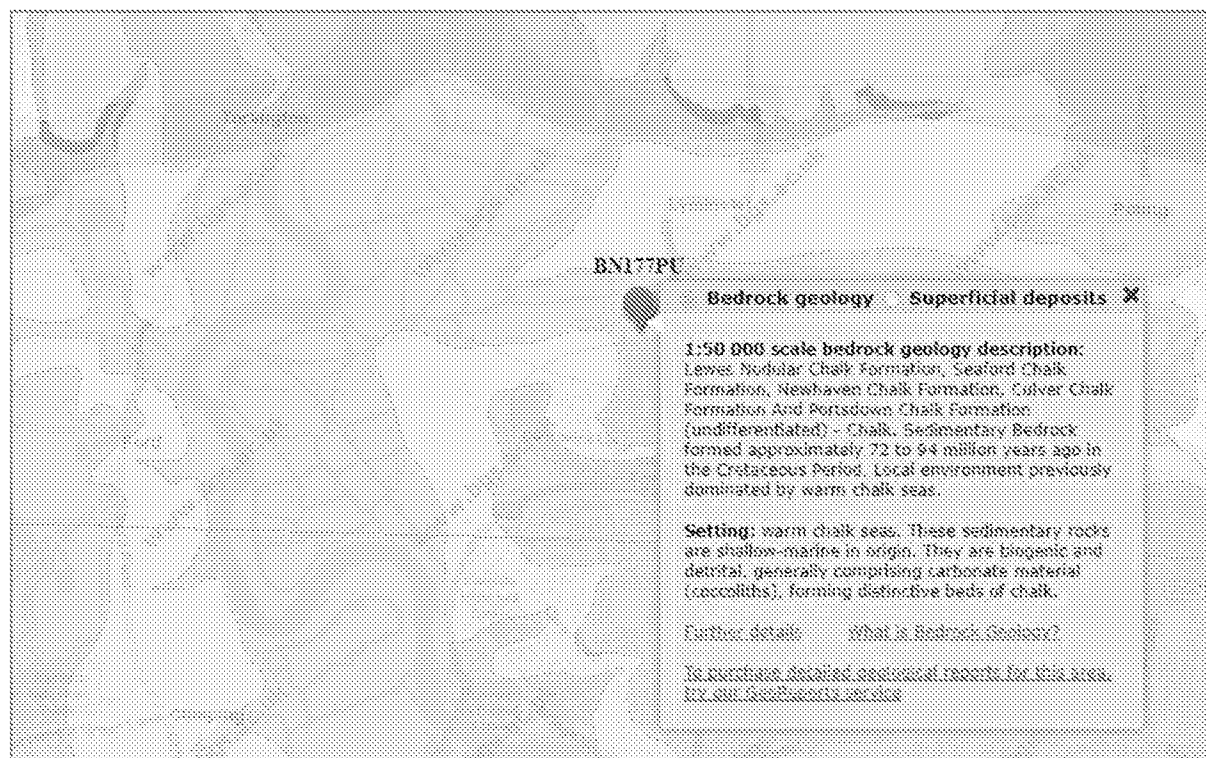


Figure 2: Local geology (Source: BGS)

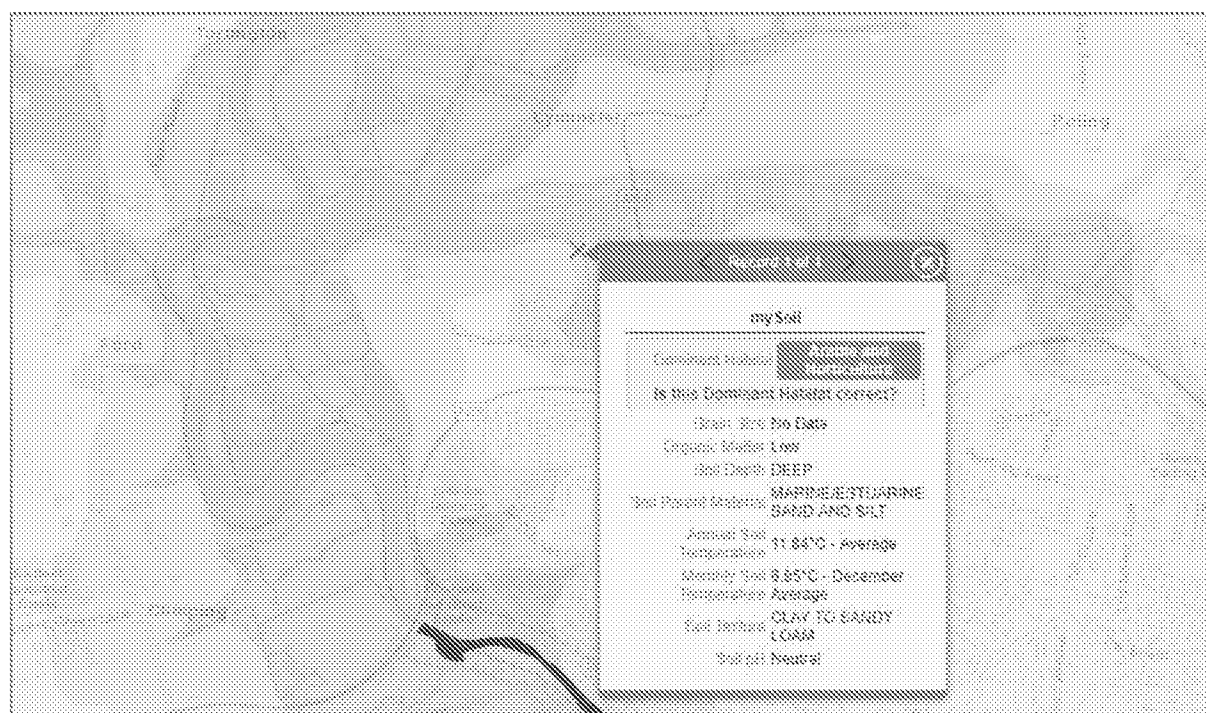


Figure 3: Local soil types (Source: UKSO)

3.4 Riparian Owners:

A riparian owner is someone who owns land or property alongside a river or other watercourses. A watercourse is any natural or artificial channel through which water flows including flow through a culvert, ditch, drain, cut, dyke, sluice or private sewer.

Riparian owners have statutory responsibilities, including:

- Maintaining watercourses;
- Allowing the flow of water to pass without obstruction;
- Controlling invasive alien species

Further guidance for riverside property owners can be found in the EA's helpful booklet 'Living on the Edge'.

3.5 Flood Risk Activity Permit:

Under the Environmental Permitting (England and Wales) Regulations 2010 any activity within 8m of the bank of a main river, or 16m if it is a tidal main river, or any activity within 8m of any flood defence structure or culvert on a main river, or 16m on a tidal river or any activity within 16m of a sea defence structure may require a permit. Some activities may be excluded or exempt. Further details and guidance are available on the GOV.UK website:

<https://www.gov.uk/guidance/flood-risk-activities-environmental-permits>

For more information and to apply please contact the Partnerships and Strategic Overview team at:



Please be aware that Environment Agency permits, consents and licences are separate from the planning process and are not guaranteed.

The applicant has confirmed that no development is proposed within 8m of the top of bank of the Main River. Flood Defence Consent will therefore not be required.

3.6 Internal Drainage Boards:

The Environment Agency is the Internal Drainage Board (IDB) for the River Arun Internal Drainage District. An IDB is a public body that has been established under statute in areas of special drainage need. The EA has permissive powers to undertake work to deal with matters affecting water levels, land drainage and flood risk in specified areas.

4. Proposed Development

The proposed planning application is for the siting of 14 no. 2 Bedroom Mobile Homes, each with standard 1.8 Metrex 2.4 Metre timber storage Shed.

Proposed plans are provided within the report Appendix.



Figure 4: View of the site (Source: Google Streetview)

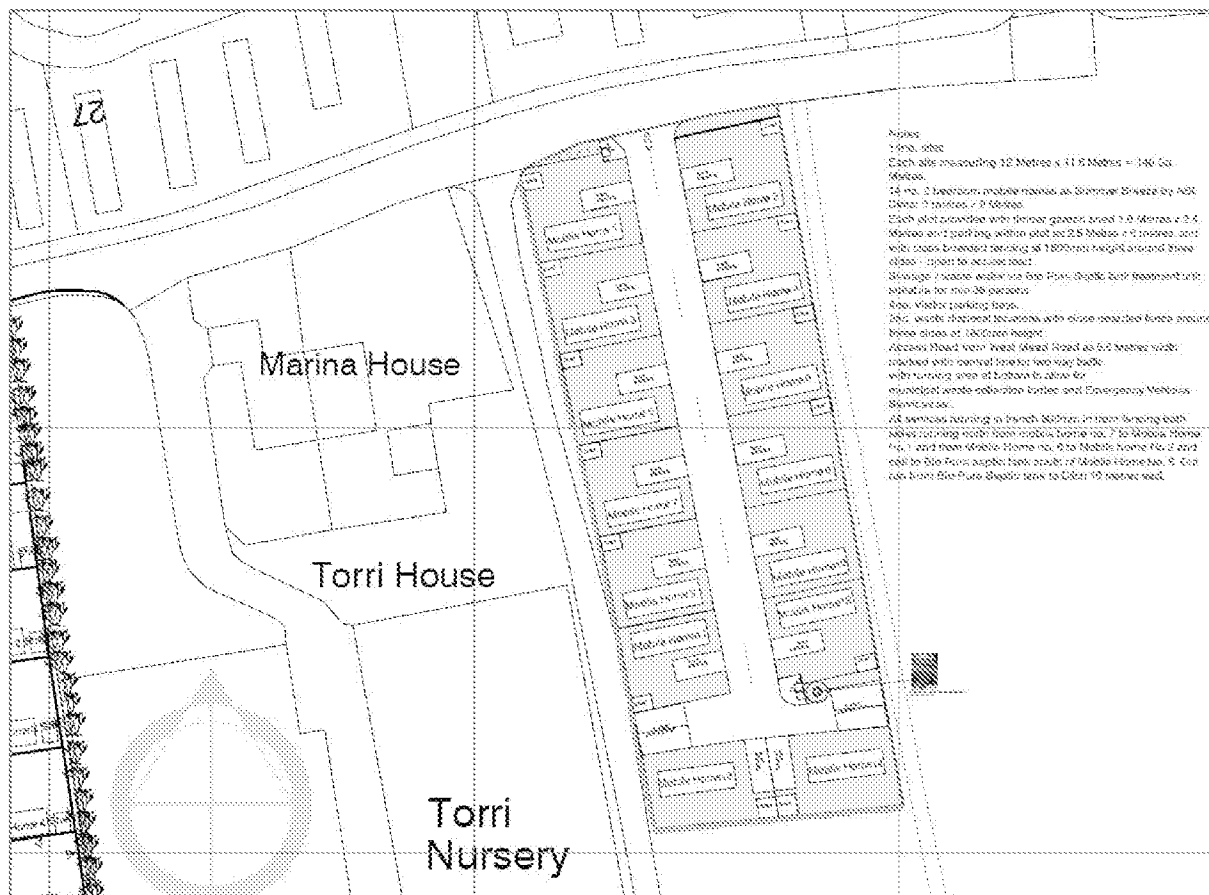


Figure 5: Site plan (Source: Michael Smith Designers in Architecture)

5. Assessment of Flood Risk

5.1. Flood Zones:

Within planning, Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences. They are shown on the Environment Agency's Flood Map for Planning (Rivers and Sea), available on the Environment Agency's web site.

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

Table 1: Flood Zones

The Flood Zones shown on the Environment Agency's Flood Map for Planning (Rivers and Sea) do not take account of the possible impacts of climate change and consequent changes in the future probability of flooding.



Figure 6: Environment Agency Flood Map for Planning (Rivers and Sea) (Source: EA)

The site is located within Flood Zone 3 (High Probability), which means it is defined as land having at least a 1:100 year fluvial / 1:200 year tidal annual probability of fluvial flooding.

The risk would appear to be fluvial/tidal from the River Arun 1.23km to the west, and Eel Spring Ditch which runs along the eastern boundary of the site in a south – north direction.

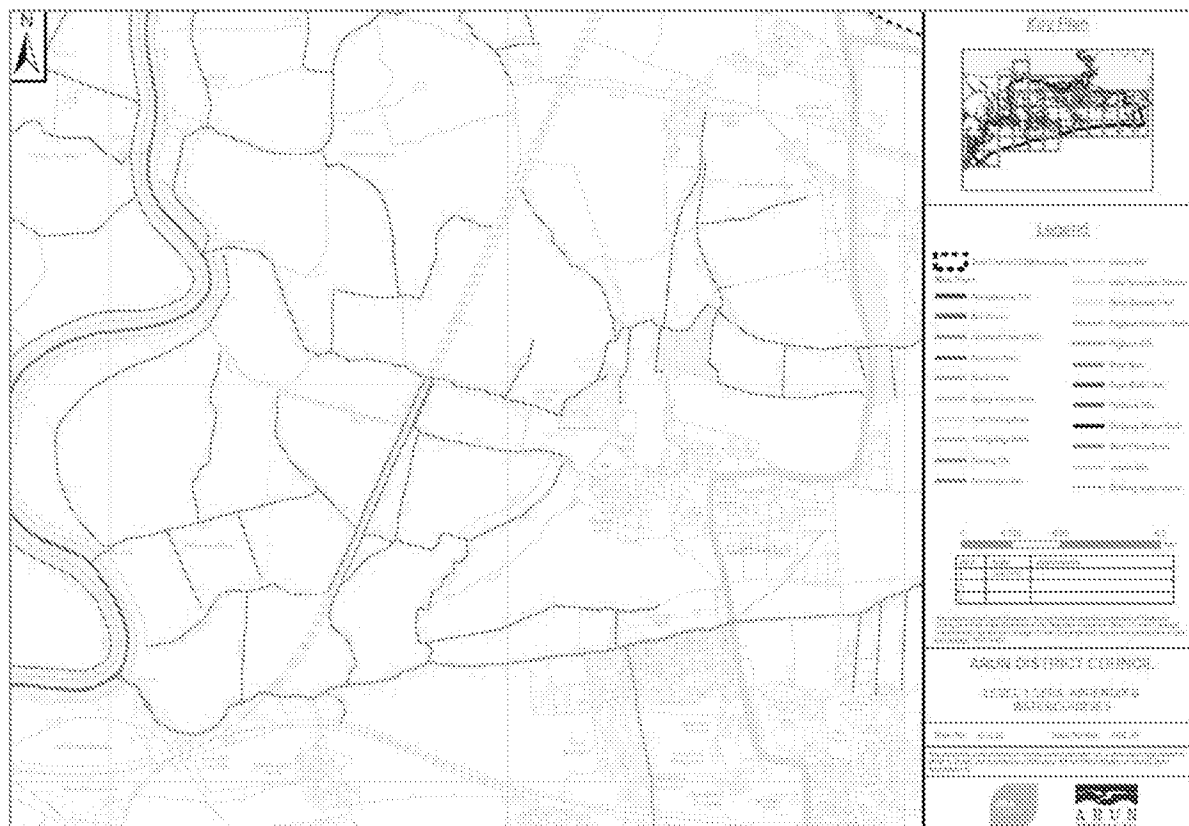


Figure 7: Watercourses (Source: Level 1 SFRA Arun District Council)

5.2. Fluvial/Tidal (River Arun, Eel Spring Ditch):

The Eel Spring Ditch is designated as a Main River by the Environment Agency. It is a tributary of the Black Ditch (Lower Arun) which runs in an east – west direction 140m north of the site.

The River Arun is a river in the English county of West Sussex. At 37 miles (60 km) long, it is the longest river entirely in Sussex and one of the longest in Sussex after the River Medway, River Wey and River Mole. From the series of small streams that form its source in the area of St Leonard's Forest in the Weald, the Arun flows westwards through Horsham to Nowhurst where it is joined by the North River. Turning to the south, it is joined by its main tributary, the western River Rother, and continues through a gap in the South Downs to Arundel to join the English Channel at Littlehampton. It is one of the faster flowing rivers in England, and is tidal as far inland as Pallingham Quay, 25.5 miles (41.0 km) upstream from the sea at Littlehampton.

5.2.1. Modelled flood levels and extents:

Modelled flood levels for use within this report have been provided by the EA as part of a Product 4 data request (EA reference SSD70349, provided in the report Appendix). All levels, depths and flood outlines are taken from the Lower Tidal River Arun Strategy Study Model which was completed in 2010 by Atkins.

Fluvial and tidal levels and depths have been provided for both defended and undefended modelled scenarios. For the purpose of this study, Node 6 is deemed the most appropriate as it's the closest Node to the site, however none of the nodes provided are on the proposed development site itself.



Figure 7: Site Boundary and Node Points Map (Source: EA Product 4 ref: SSD70349)

Modelled Fluvial Flood Levels in Metres

Node Ref	NGR		Undefended Annual Exceedance Probability					
	Eastings	Northings	20%	5%	1.3%	1%	0.1%	1%+CC
6	502246	104147	-	2.55	-	2.55	2.55	2.90
Node Ref	NGR		Defended Annual Exceedance Probability					
	Eastings	Northings	20%	5%	1.3%	1%	0.1%	1%+CC
6	502246	104147	2.52	2.52	2.52	2.40	2.40	2.40

Table 2: Modelled Fluvial Flood Levels in Metres (Source: EA Product 4 ref: SSD70349)

Modelled Tidal Flood Levels in Metres

Node Ref	NGR		Undefended Annual Exceedance Probability					
	Eastings	Northings	20%	5%	1.3%	1%	0.1%	1%+CC
6	502246	104147	-	2.55	-	2.55	2.55	2.99
Node Ref	NGR		Defended Annual Exceedance Probability					
	Eastings	Northings	20%	5%	1.3%	1%	0.1%	1%+CC
6	502246	104147	2.55	2.55	2.55	2.55	2.55	3.13

Table 3: Modelled Tidal Flood Levels in Metres (Source: EA Product 4 ref: SSD70349)

Comparison of these modelled flood levels with topographic site levels (of approximately 2.15mAOD) indicates that the site is situated below all the modelled flood levels provided, Node 6 however is not located on the site itself.

It should be noted however that modelled defended and undefended flood outline maps have also been provided. These maps show the site to be entirely outside of all the defended fluvial modelled flood extents including the 1:100 year extent with allowance for climate change (apart from the defended fluvial 1:1000 year extent), and outside of all of the present day defended tidal extents – but within the tidal extent for the 1:200 year event in 2110.

The modelled flood extent maps however do show the site to be within the undefended fluvial and tidal flood extents.

Based on the modelled flood extent maps provided it would therefore appear that the site is defended from fluvial flooding to the 1:100 year standard including an allowance for climate change, and to the 1:200 year tidal standard.

5.2.2. Flood Storage Areas:

There are no known Flood Storage Areas within close proximity to this site.

5.2.3. Functional Floodplain:

The functional floodplain is vital for the conveyance and storage of floodwater in fluvial systems. Development within this zone will potentially impede the flow of floodwater as well as result in a loss of flood storage, increasing flood risk both within the area and further downstream.

According to the Arun District Council Level 1 and Level 2 SFRA – Final Report (v5 November 2016), the defended case 1 in 20-year annual probability (5% Annual Exceedance Probability) event informs the Functional Floodplain within Arun District. However, where flood outlines of Flood Zone 3b are not available, Flood Zone 3a should be considered as Flood Zone 3b unless, following further work as part of a site-specific FRA, and in consultation with the Environment Agency, it can be proven as Flood Zone 3a.

Where flood risk is dominated by tidal and coastal mechanisms, the flood mechanisms may differ from that of fluvial flooding. In tidal and/or coastal flooding, flood volumes are typically less critical compared with fluvial flooding. Given this influence, the functional nature of a floodplain in a tidal/coastal situation may be less evident or not applicable at all.

Data provided by the Arun District Council Level 1 and Level 2 SFRA – Final Report (v5 November 2016) indicates that the site is located within Flood Zone 3a (and outside of Flood Zone 3b) and in close proximity to Flood Zone 3b.

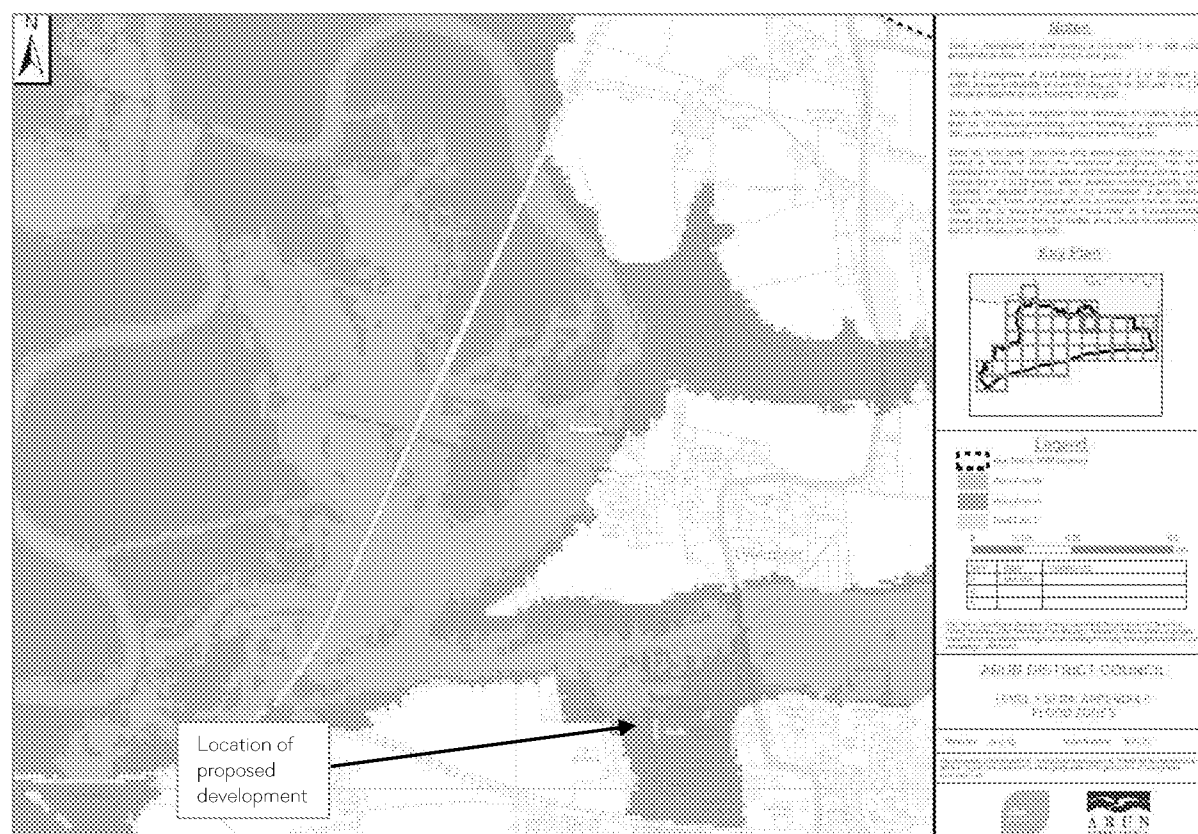


Figure 8: Flood Zones (Source: Arun District Council Level 1 and Level 2 SFRA - Final Report (v5 November 2016)).

5.2.4. Flood defences:

According to EA data, raised earth embankments run along the western and eastern banks of the Eel Spring Ditch. While the Black Ditch defences consist of a mixture of earth banks with timber revetments and natural earth banks which flank either side of the watercourse. It is unclear when these defences were constructed and to what level of protection.

The River Arun is defended to the 1:200 year standard.

In addition, according to the EA there are no formal raised flood defences in the vicinity of the site.

5.2.5. Residual risk (breach or overtopping of flood defences):

Breaching of flood defences can cause rapid inundation of areas behind flood defences as flow in the river channel discharges through the breach. A breach can occur with little or no warning, although they are much more likely to concur with extreme river levels or tides when the stresses on flood defences are highest. Flood water flowing through a breach will normally discharge at a high velocity, rapidly filling up the areas behind the defences, resulting in significant damage to buildings and a high risk of loss of life. Breaches are most likely to occur in soft defences such as earth embankments although poorly maintained hard defences can also be a potential source of breach.

Overtopping of flood defences occurs when water levels exceed the protection level of raised flood defences. The worst case occurs when the fluvial or tidal levels exceed the defence level as this can lead to prolonged flooding. Less severe overtopping can occur when flood levels are below defence levels, but wave action causes cyclic overtopping, with intermittent discharge over the crest level of the defence. Flood defences are commonly designed with a freeboard to provide protection against overtopping from waves. The risk from overtopping due to exceedance of the flood defence level is much more significant than the risk posed by wave overtopping. Exceedance of the

flood defence level can lead to prolonged and rapid flooding with properties immediately behind the defences at highest risk.

5.2.6. Historical flood events:

The EA have no records of historical flooding having affected the site or surrounding area. This has been confirmed from the Historic Flooding Records map taken from the Arun District Council Level 1 and Level 2 SFRA - Final Report (v5 November 2016).

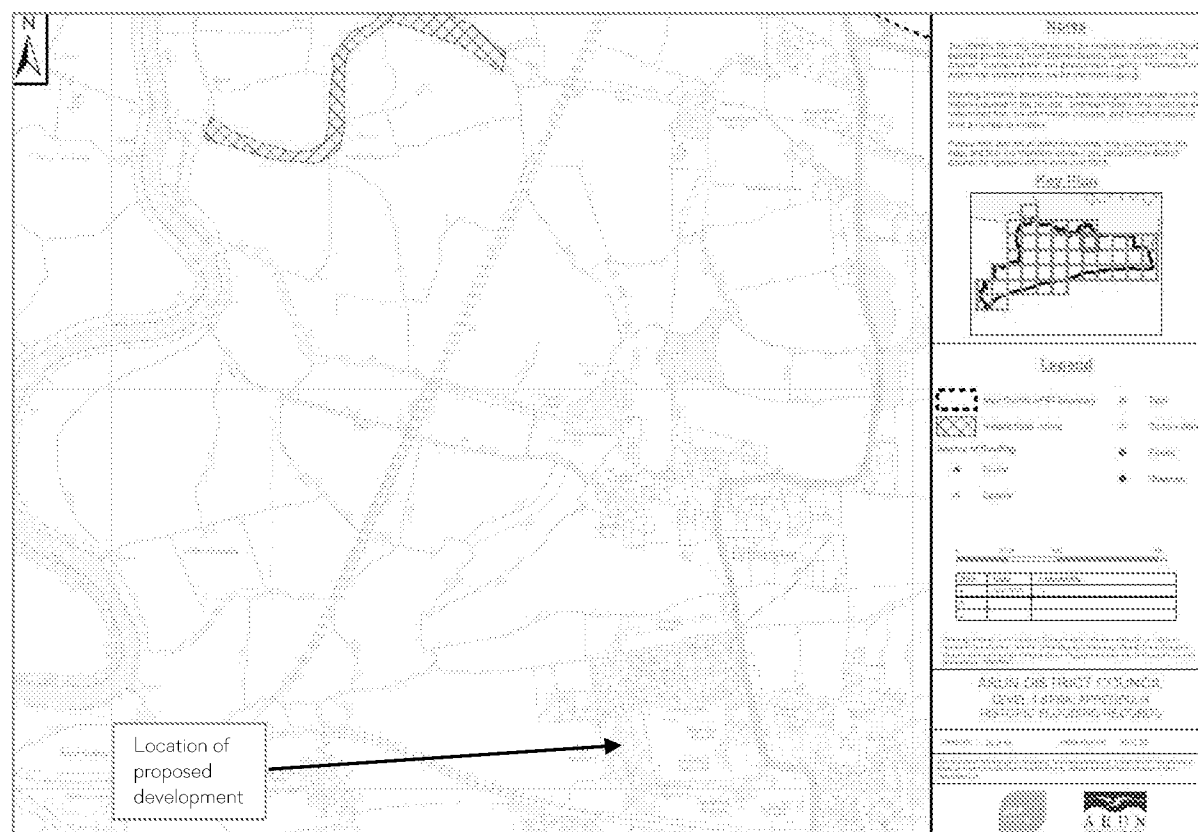


Figure 9: Historic Flooding Records (Source: Arun District Council Level 1 and Level 2 SFRA - Final Report (v5 Nov 2016).

5.3 Pluvial (Surface Water):

Pluvial (surface water) flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead.

In 2013 the EA, working with Lead Local Flood Authorities (LLFAs), produced an updated Flood Map for Surface Water. It is considered to represent a significant improvement on the previous surface water flood maps available, both in terms of method and representation of the risk of flooding. The modelling techniques and data used and considerably improved, and also incorporated locally produced mapping where this is available to represent features best modelled at a local scale.

The Flood Map for Surface Water assesses flooding scenarios as a result of rainfall with the following chance of occurring in any given year (annual probability of flooding is shown in brackets):

- 1:30 (3.3%)
- 1:100 (1%)
- 1:1000 (0.1%)

The mapping below shows the Risk of Flooding from Surface Water centred on the site. Please note that the EA do not consider this information suitable to be used to identify the risk to individual properties or sites. It is useful to raise awareness in areas which may be at risk and may require additional investigation.

The EA Risk of Flooding from Surface Water Map suggests that the site lies within an area of "Very Low" to "Low" risk of flooding from surface water.



Figure 10: Extract from EA Risk of Flooding from Surface Water Map centred on postcode (Source: EA)

5.4 Groundwater:

Groundwater flooding occurs as a result of water rising up from the underlying rocks or from water flowing from abnormal springs. This tends to occur after much longer periods of sustained high rainfall. Higher rainfall means more water will infiltrate into the ground and cause the water table to rise above normal levels. Groundwater tends to flow from areas where the ground level is high, to areas where the ground level is low. In low-lying areas the water table is usually at shallower depths anyway, but during very wet periods, with all the additional groundwater flowing towards these areas, the water table can rise up to the surface causing groundwater flooding.

Groundwater flooding is most likely to occur in low-lying areas underlain by permeable rocks (aquifers). These may be extensive, regional aquifers, such as chalk or sandstone, or may be localised sands or river gravels in valley bottoms underlain by less permeable rocks. Groundwater flooding takes longer to dissipate because groundwater moves much more slowly than surface water and will take time to flow away underground.

According to the Historic Flooding Records map taken from the Arun District Council Level 1 and Level 2 SFRA - Final Report (v5 November 2016) no records have been provided to suggest that the site has flooded from groundwater flooding previously.

The Environment Agency has defined Source Protection Zones for groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones show the risk of contamination from any activities that might cause pollution in the area. The zones are used in conjunction with the EA Groundwater Protection Policy to set up pollution prevention measures in areas that are at a higher risk, and to monitor the activities of potential polluters nearby. The published Environment Agency Groundwater Vulnerability map shows the site to be located outside any area classified as a Groundwater source protection zone.

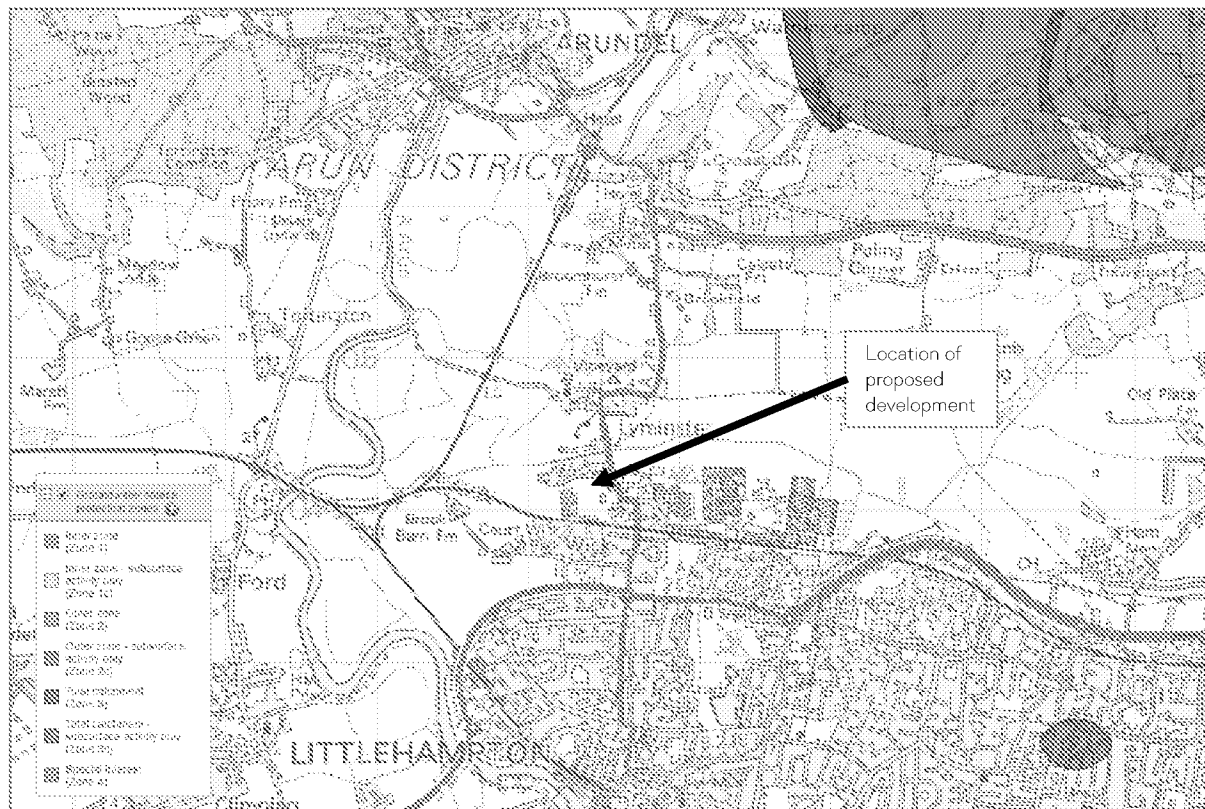


Figure 11: Environment Agency Groundwater Vulnerability Map (Source: EA)

5.5 Sewer Surcharge:

Sewer flooding occurs when the sewer network cannot cope with the volume of water that is entering it. It is often experienced during times of heavy rainfall when large amounts of surface water overwhelm the sewer network causing flooding. Temporary problems such as blockages, siltation, collapses and equipment or operational failures can also result in sewer flooding.

All Water Companies have a statutory obligation to maintain a register of properties/areas which have reported records of flooding from the public sewerage system, and this is shown on the DG5 Flood Register. This includes records of flooding from foul sewers, combined sewers and surface water sewers which are deemed to be public and therefore maintained by the Water Company. The DG5 register records of flood incidents resulting in both internal property flooding and external flooding incidents. Once a property is identified on the DG5 register, water companies can typically put funding in place to address the issues and hence enable the property to be removed from the register. It should be noted that flooding from land drainage, highway drainage, rivers/watercourses and private sewers is not recorded within the register.

According to the Historic Flooding Records map taken from the Arun District Council Level 1 and Level 2 SFRA - Final Report (v5 November 2016) no records have been provided to suggest that the site is susceptible to sewer surcharge flooding.

No further information has been provided to suggest that the site is susceptible to sewer surcharge flooding.

5.6 Other Sources:

Reservoirs with an impounded volume in excess of 25,000 cubic metres (measured above natural ground level) are governed by the Reservoirs Act and are listed on a register held by the Environment Agency. The site is outside the maximum inundation extent on the EA Reservoir Inundation Map. The EA also advise on their website that reservoir flooding is extremely unlikely. There has been no loss of life in the UK from reservoir flooding since 1925. All major reservoirs have to be inspected by specialist dam and reservoir Engineers. In accordance with the Reservoirs Act 1975 in England, these inspections are monitored and enforced by the EA themselves. The risk to the site from reservoir flooding is therefore minimal and is far lower than that relating to the potential for fluvial / tidal flooding to occur. The Environment Agency Reservoir Flood Map illustrated below, illustrates the largest area that might be flooded if the storage area were to fail and release the water it is designed to hold during a flood event.

Records of flooding from reservoirs and canals are erratic as there is no requirement for the Environment Agency to provide information on historic flooding from canals and raised reservoirs on plans. In particular, the NPPF does not require flood risk from canals and raised reservoirs to be shown on the Environment Agency flood zones.

Overflows from canals can be common as they are often fed by land drainage, and often do not have controlled overflow spillways. Occasionally, major bank breaches also occur, leading to rapid and deep flooding of adjacent land.

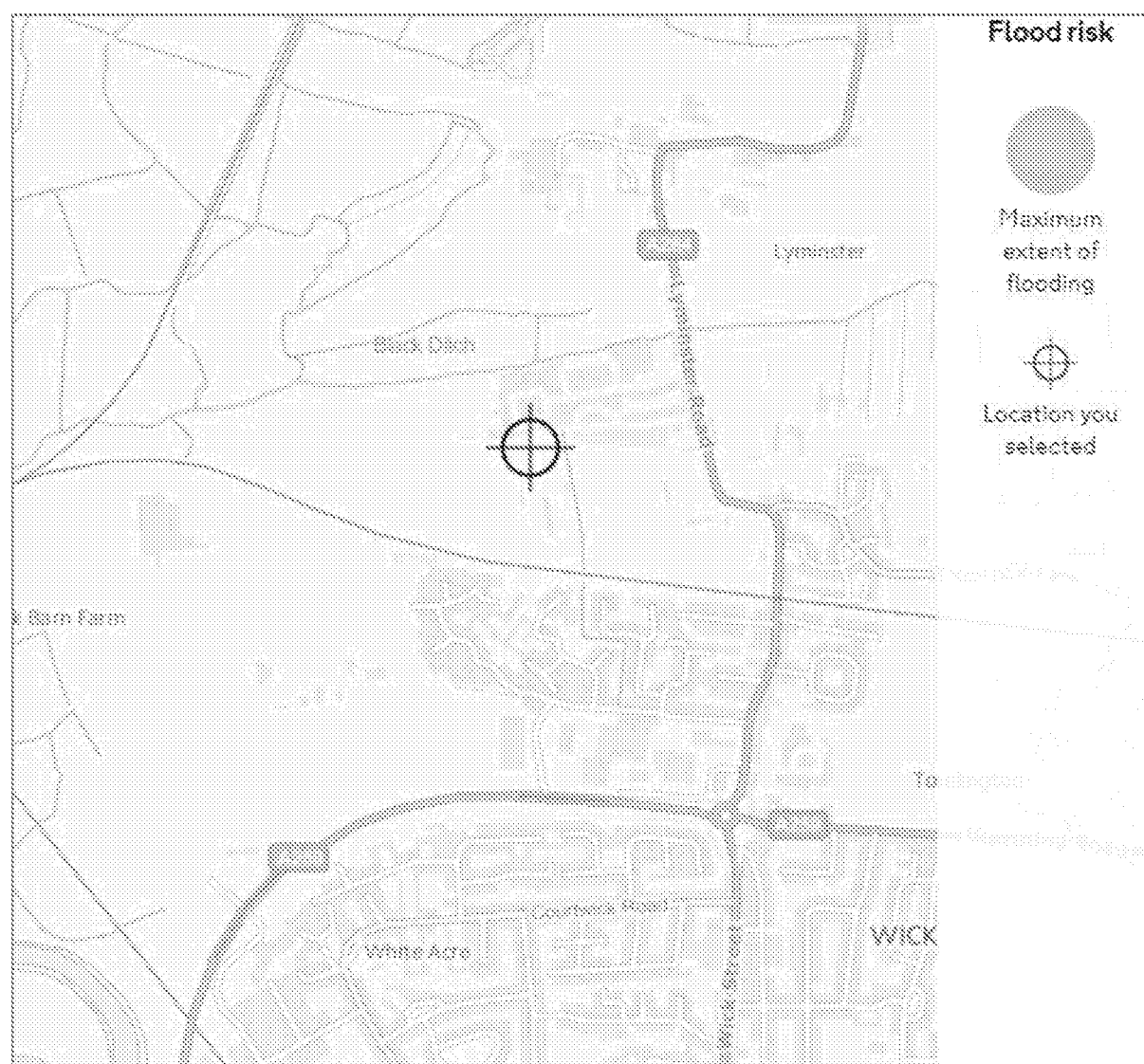


Figure 12: Maximum extent of flooding from reservoirs (Source: EA)

6 Flood Risk Management Measures

6.1 Vulnerability to flooding:

The NPPF classifies property usage by vulnerability to flooding.

The existing site is currently vacant.

Post development, the site will become “highly vulnerable”, as the application is for the proposed siting of 14 no. 2 Bedroom Mobile Homes. Accordingly, it is considered that the vulnerability of the site as a whole will increase post development.

6.2 EA Standing Advice:

The EA Standing Advice guidance is for domestic extensions and non-domestic extensions where the additional footprint created by the development does not exceed 250m². It should not be applied if an additional dwelling is being created, e.g. a self-contained annex or additional commercial unit.

6.3 Physical Design Measures:

The NPPF requires new residential floor levels to be set at least 300mm above suitable modelled 1:100 fluvial / 1:200 year tidal (plus allowance for climate change) flood levels. Due to the nature of the development (the siting of 14 no. 2 Bedroom Mobile Homes) it is not possible to raise the finished floor levels above the undefended design flood levels. It should be noted however that the modelled flood extent maps show that the site is defended from fluvial flooding to the 1:100 year standard including an allowance for climate change, and to the 1:200 year tidal standard

Therefore the finished floor levels of the mobile homes will be set at 600mm above ground level.

To stop the caravans from potentially floating away and becoming a debris hazard during an extreme flood event, the caravans will be secured to their concrete hardstanding by a number of mounting points. Each Site will be provided with a shingle space for hard standing parking and a 150mm thick concrete slab enforced with 142mm m/s reinforcement at 30mm and at 90mm for the mobile homes and similarly for the timber garden shed.

To help protect against flooding during extreme events, the applicant has agreed to implement flood resistant design measures, in consultation with the Local Authority building control department. These measures can include the following where possible:

- Closed-cell foam used in wall cavities;
- Waterproof ground floor internally;
- Exterior ventilation outlets, utility points and air bricks fitted with removable waterproof covers;
- Plumbing insulation of closed-cell design;
- Non-return valves fitted to all drain and sewer outlets;
- Manhole covers secured;
- Anti-syphon fitted to all toilets;
- Kitchen units of solid, water resistant material;
- Use of MDF carpentry (i.e. skirting, architrave, built-in storage) avoided.

The applicant should also consider the use of demountable flood defence barriers to defend ground level doorways and low windows.

6.4 Safe Escape:

The NPPF requires a route of safe escape for all residents and users to be provided from new residential properties in Flood Zone 3. Safe escape is usually defined as being through slow moving flood water no deeper than 25cm during the 1:100 year plus allowance for climate change flood event.

The site is situated within Flood Zone 3 when using the Environment Agency Flood Map for Planning (Rivers and Sea) but is defended from fluvial flooding to the 1:100 year plus climate change standard, and from tidal flooding to the 1:200 year standard. The modelled flood extent maps show the access routes to the site are within the defended fluvial flood extents, and the site and access routes are within the defended 1:200 year flood extent including an allowance for climate change. As such, safe escape cannot be provided in line with the definitions within the NPPF. Therefore, safe escape will be provided by a formal flood warning and evacuation plan which will be prepared in liaison with the Council's Emergency Planners and tied in with the local emergency plans for the area.

6.5 Flood Warning:

The EA is responsible for issuing flood warnings. Flood warnings are issued to the emergency services and local authorities. Both private individuals and organisations can sign-up to receive warnings via phone, text or email. This system of receiving warnings is currently voluntary.

Advice regarding severe flood warnings will generally be given during weather forecasts on local radio and TV. In the case of extreme events, warnings can also be disseminated via door to door visits by the police or locally appointed flood wardens.

The site lies within Flood Zones 2 and 3. The EA issue flood warnings/alerts to specific areas when flooding is expected. It is recommended that the applicant registers online with the free Environment Agency Floodline Warnings/Alert Direct service at <https://fwd.environment-agency.gov.uk/app/oir/register> to receive flood warnings by phone, text or email.

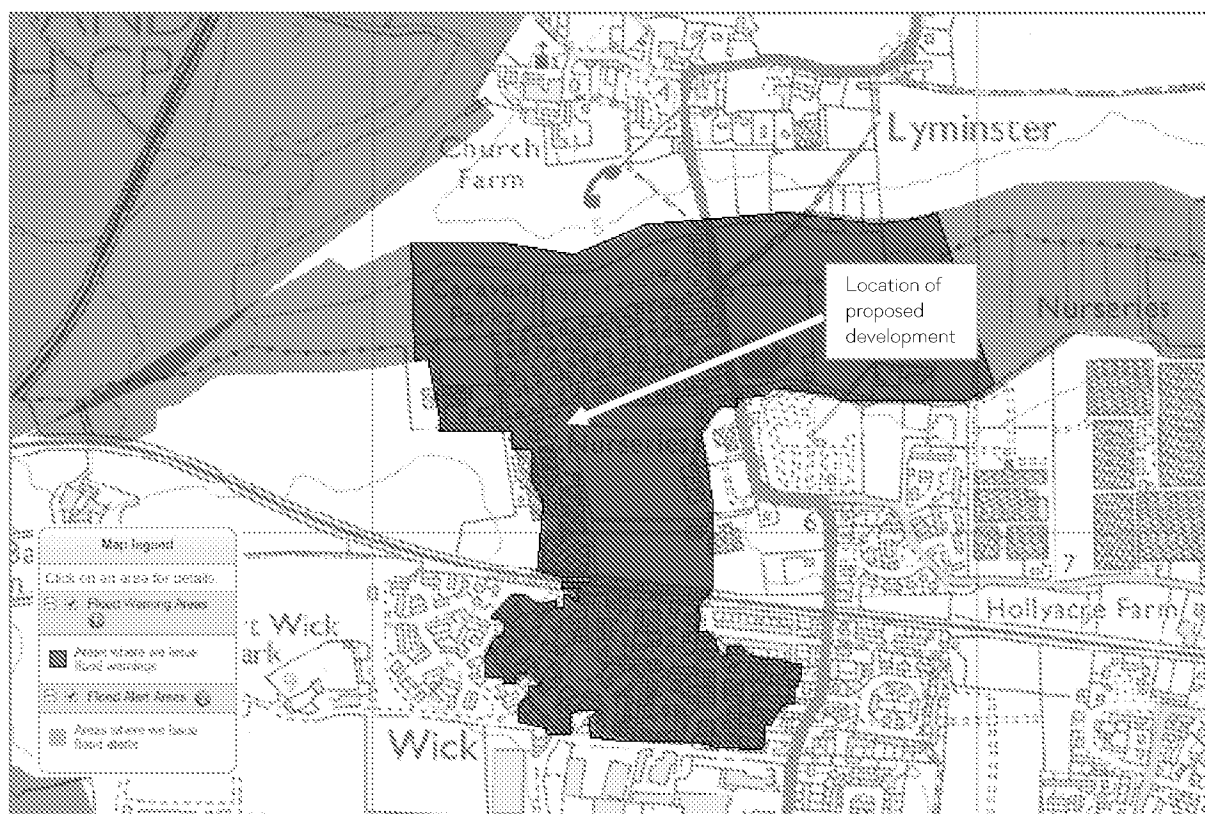


Figure 13: Extract from Environment Agency Flood Warning Area Map (Source: EA)

The flood warning service has three types of warnings that will help you prepare for flooding and take action:

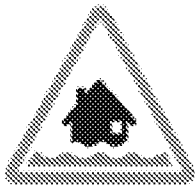
Flood Warning	Flood Alert	Flood Warning	Severe Flood Warning
			
What it means?	Flooding is possible. Be prepared.	Flooding is expected. Immediate action required.	Severe flooding. Danger to life.
When it's used?	Two hours to two days in advance of flooding.	Half an hour to one day in advance of flooding.	When flooding poses a significant threat to life.
What to do?	Be prepared to act on your flood plan. Prepare a flood kit of essential items. Monitor local water levels and the flood forecast on our website.	Move family, pets and valuables to a safe place. Turn off gas, electricity and water supplies if safe to do so. Put flood protection equipment in place.	Stay in a safe place with a means of escape. Be ready should you need to evacuate from your home. Co-operate with the emergency services. Call 999 if you are in immediate danger.

Table 6: Flood Warnings

Flood Plan:

It is recommended that the applicant and future owners, occupiers and Landlords of the property prepare a flood plan to protect life and property during a flood event:

Before a flood:

- Find out if you are at risk of flooding.
- Find out if you can receive flood warnings.
- Prepare and keep a list of all your important contacts to hand or save them on your mobile phone.
- Think about what items you can move now and what you would want to move to safety during a flood such as pets, cars, furniture, and electrical equipment.
- Know how to turn off gas, electricity and water supplies.
- Prepare a flood kit of essential items and keep it handy. It can include copies of important documents, a torch, a battery-powered or wind-up radio, blankets and warm clothing, waterproofs, rubber gloves and a first aid kit including all essential medication.
- Consider buying flood protection products such as flood boards and airbrick covers to help reduce flood water getting into your property.

During a flood:

- Tune into your local radio station on a battery or wind-up radio.
- Fill jugs and saucepans with water.
- Grab your flood kit – if you have prepared one.
- Collect blankets, torch, first aid kit, medication and food.

- Move important documents, personal items, valuables, and lightweight belongings upstairs or to high shelves.
- Raise large items of furniture, or put them in large bags if you have them.
- Move people, outdoor belongings, cars and pets to higher ground.
- Switch off water, gas and electricity at mains when water is about to enter your home. Do not touch sources of electricity when standing in water.
- Fit flood protection products, if you have them, for example flood boards, airbrick covers, sandbags.
- Put plugs in sinks and baths. Weigh them down with a pillowcase or plastic bag filled with soil.
- If you do not have non-return valves fitted, plug water inlet pipes with towels or cloths.
- Move your family and pets upstairs or to a high place with a means of escape.
- Listen to the advice of the emergency service and evacuate if told to do so.
- Avoid walking or driving through flood water. Six inches of fast-flowing water can knock over an adult and two feet of water can move a car.

After a flood:

- If you have flooded, contact your insurance company as soon as possible.
- Take photographs and videos of your damaged property as a record for your insurance company.
- If you don't have insurance, contact your local authority for information on grants and charities that may help you.
- Flood water can contain sewage, chemicals and animal waste. Always wear waterproof outerwear, including gloves, wellington boots and a face mask.
- Have your electrics, central heating and water checked by qualified engineers before switching them back on.

6.6 Off-Site Impacts

6.6.1 Fluvial floodplain storage:

The NPPF requires that where development is proposed in undefended areas of floodplain, which lie outside of the functional floodplain, the implications of ground raising operations for flood risk elsewhere needs to be considered. Raising existing ground levels may reduce the capacity of the floodplain to accommodate floodwater and increase the risk of flooding by either increasing the depth of flooding to existing properties at risk or by extending the floodplain to cover properties normally outside of the floodplain. Flood storage capacity can be maintained by lowering ground levels either within the curtilage of the development or elsewhere in the floodplain, in order to maintain at least the same volume of flood storage capacity within the floodplain.

In undefended tidal areas, raising ground levels is unlikely to impact on maximum tidal levels so the provision of compensatory storage should not be necessary.

For development in a defended flood risk area, the impact on residual flood risk to other properties needs to be considered. New development behind flood defences can increase the residual risk of flooding if the flood defences are breached or overtopped by changing the conveyance of the flow paths or by displacing flood water elsewhere. If the potential impact on residual risk is unacceptable then mitigation should be provided.

According to the Arun District Council Level 1 and Level 2 SFRA - Final Report (v5 November 2016) the site is located within Flood Zones 3a which is both fluvial and tidal in nature. No development will take place in Flood Zone 3b.

There will be no built construction or land raising within Flood Zone 3, and as such no loss in fluvial flood storage post development.

6.6.2 Surface Water Drainage Strategy:

The development will utilise Sustainable Urban Drainage (SuDs) design in accordance with the NPPF for Planning Applications and the London Plan drainage hierarchy as follows:

1. Store rainwater for later use;
2. Infiltration techniques;
3. Attenuate rainwater by storing in tanks for gradual release;
4. Discharge rainwater direct into watercourse;
5. Discharge rainwater into surface water sewer;
6. Discharge rainwater into a combined sewer;
7. Attenuation of rainwater in ponds or open water features with controlled discharge into the local watercourse.

All surface water runoff generated by the proposed development up to 1:100 year rainfall event (plus climate change) will be stored on site, prior to being discharged. All surface drainage will be directed to existing open drainage ditch (Eel Spring Ditch) which runs along the eastern boundary of the site and laid to falls of 1:30. Soil runs to proposed Bio-Pure septic tank to be run at falls of 1:30 laid in trench on supporting pea shingle and covered to suitable safety depths.

7 Sequential and Exception Test

The Sequential Test aims to ensure that development does not take place in areas at high risk of flooding when appropriate areas of lower risk are reasonably available.

This approach is designed to manage flood risk whilst allowing necessary development to occur. This is appropriate only for use when there are large areas in Flood Zones 2 and 3, where the Sequential Test alone cannot deliver acceptable sites, but where some continuing development is necessary for wider sustainable development reasons and the development is demonstrated to be safe for its lifetime without increasing flood risk elsewhere and/or possibly reducing flood risk overall, taking into account the need to avoid social or economic blight and the need for essential civil infrastructure to remain operational during floods.

The site is situated within Flood Zone 3a when using the Environment Agency Flood Map for Planning (Rivers and Sea). Post development, the site will become “highly vulnerable”, as the application is for the proposed siting of 14 no. 2 Bedroom Mobile Homes. Accordingly, it is considered that the vulnerability of the site as a whole will increase post development.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a	Exception Test required	X	Exception Test required	✓	✓
Zone 3b	Exception Test required	X	X	X	✓

Table 3: Flood risk vulnerability and flood zone ‘compatibility’

8 Conclusion

Unda Consulting Limited have been appointed Giuseppe Molica-Franco (hereinafter referred to as "the applicant") to undertake a Site Specific Flood Risk Assessment (FRA) for Planning at Land to south Old Mead Road, Wick, Littlehampton BN17 7PU (hereinafter referred to as "the site"). The FRA has been undertaken in accordance with the National Planning Policy Framework (NPPF) March 2012 and the associated technical guidance.

The site is currently vacant. The total area of the plot is approximately 2,467.83 m². The proposed planning application is for the siting of 14 no. 2 Bedroom Mobile Homes, each with standard 1.8 Metrex 2.4 Metre timber storage Shed. Post development, the site will become "highly vulnerable", as the application is for the proposed siting of 14 no. 2 Bedroom Mobile Homes. Accordingly, it is considered that the vulnerability of the site as a whole will increase post development.

The site would appear to be located within Flood Zone 3 (High Probability) as defined by the Environment Agency (EA) on their Flood Map for Planning. The risk would appear to be fluvial/tidal from the River Arun, and the Eel Spring Ditch which runs along the eastern boundary of the site.

There are no known Flood Storage Areas within close proximity to this site.

Data provided by the Arun District Council Level 1 and Level 2 SFRA - Final Report (v5 November 2016) indicates that the site is located within Flood Zone 3a and in close proximity to Flood Zone 3b.

Modelled flood levels for use within this report have been provided by the EA as part of a Product 4 data request (EA reference SSD70349, provided in the report Appendix). All levels, depths and flood outlines are taken from the Lower Tidal River Arun Strategy Study Model which was completed in 2010 by Atkins.

Fluvial and tidal levels and depths have been provided for both defended and undefended modelled scenarios have been provided.

Comparison of these modelled flood levels with topographic site levels (of approximately 2.15mAOD) indicates that the site is situated below all the modelled flood levels provided, Node 6 however is not located on the site itself.

It should be noted however that modelled defended and undefended flood outline maps have also been provided. These maps show the site to be entirely outside of all the defended fluvial modelled flood extents including the 1:100 year extent with allowance for climate change (apart from the defended fluvial 1:1000 year extent), and outside of all of the present day defended tidal extents – but within the tidal extent for the 1:200 year event in 2110.

The modelled flood extent maps however do show the site to be within the undefended fluvial and tidal flood extents.

Based on the modelled flood extent maps provided it would therefore appear that the site is defended from fluvial flooding to the 1:100 year standard including an allowance for climate change, and to the 1:200 year tidal standard.

The EA and Arun District Council have no records of flooding having affected the site previously.

The EA Risk of Flooding from Surface Water Map suggests that the site lies within an area of "Very Low" to "Low" risk of flooding from surface water.

Safe escape will be provided by a flood warning and evacuation plan which will be prepared in liaison with the Council's Emergency Planners and tied in with the local emergency plans for the area.

In summary:

- Site within Flood Zone 3a.
- Fluvial Risk from the River Arun 1.23km to the west, and Eel Spring Ditch which borders the site.
- The modelled flood extent maps provided show the site to be defended to the 1:100 year plus climate change fluvial standard, and the 1:200 year tidal standard.
- The site is situated within all of the undefended modelled flood extents.

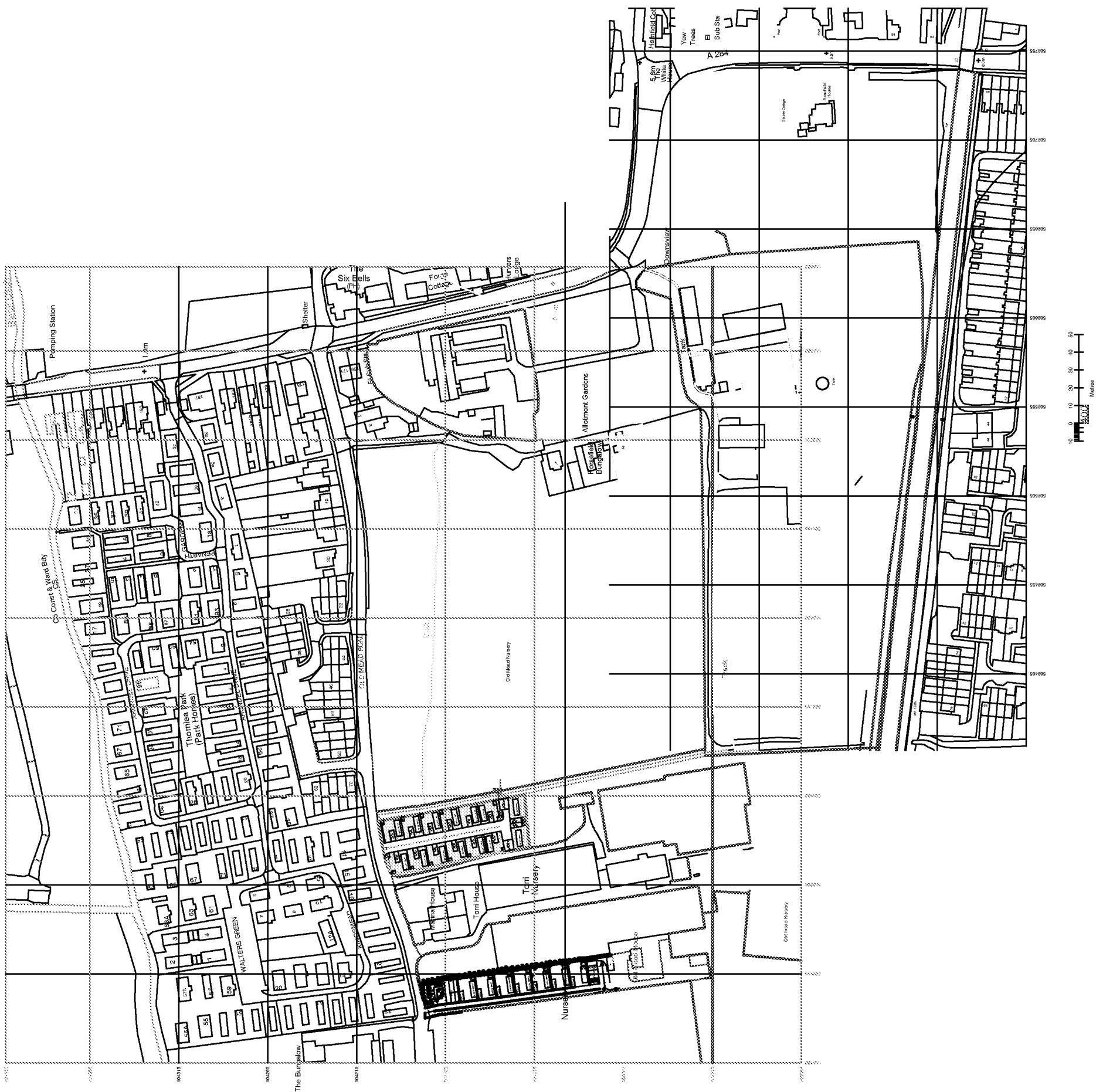
- Risk of pluvial flooding would appear to be "Very Low" to "Low".
- No historic records of flooding at the site.
- Finished Floor Levels will be set at 600mm above ground level.
- Flood proofing will be incorporated as appropriate.
- A flood warning and evacuation plan which will be prepared in liaison with the Council's Emergency Planners and tied in with the local emergency plans for the area.
- The applicant will register with the Environment Agency Floodline Warnings/Alert Direct service.

Assuming accordance with these flood risk management measures, Unda Consulting Limited consider the proposed application to be suitable in flood risk terms.

Appendix

Pages 26 – 28: Site Location, Proposed Site Plan & photos of the mobile homes (3 pages);

Pages 29 – 39: Product 4 data request (11 pages);



A. Area amended to show in blue outline of other property owned or controlled by Guiseppe Molle-Franco. The site is outlined in red.

	No.	Revision / Issue	Date



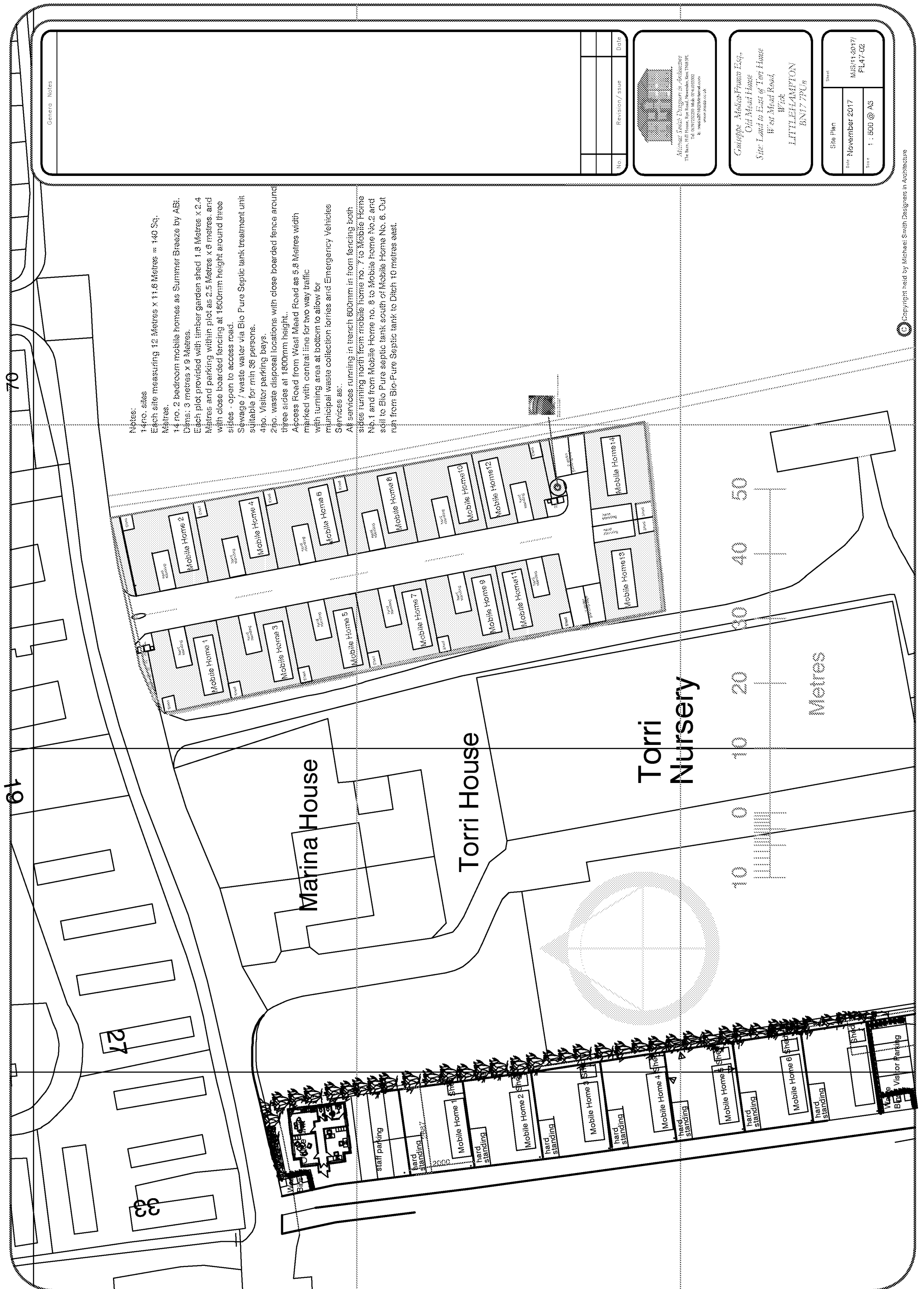
Advanced Speech Designers in Architecture
The Barn, Hill House, Rye Road, Newenden, Kent TN18 5PL
Tel: 01797252250 Mob: 0741035592
E: ms@speechdesigners.co.uk
www.speechdesigners.co.uk

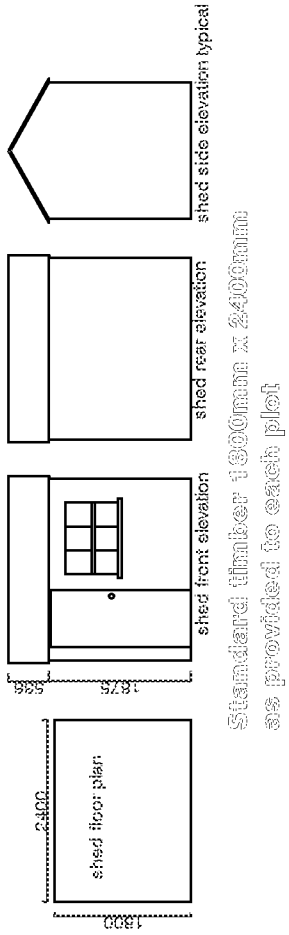
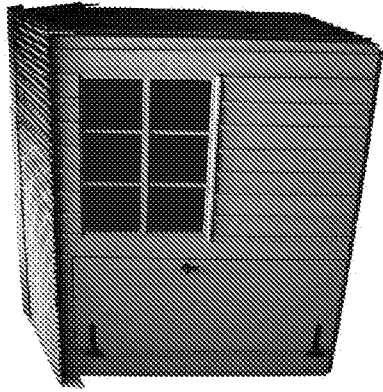
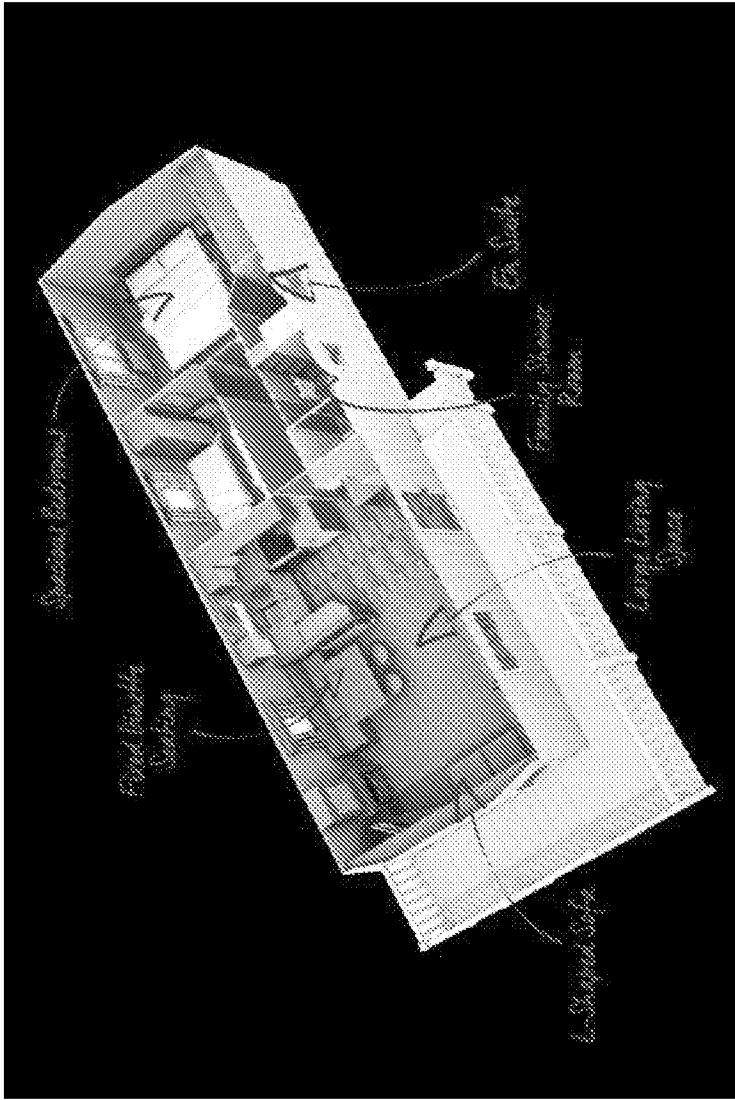
*Crispette Moha-Franco Esq.,
Old Mead Horse
Site: Land to East of Tori House
West Mead Road.*

Wick
LITTLEHAMPTON

87-1117-11A

Location: Plan	Sheet
Date: November 2017	MUS/11-2017/ FL47-01A
Scale: 1 : 2500 @ A3	





General Notes	

No.	Revision / Issue	Date

Michael Smith Designers in Architecture
The Barn, Hill House, 1st Floor, Newenden, Kent TN26 3PL
Tel: 01892 510000
www.msd.co.uk

Crispelle Morris-Penna Esq.,
Old Mead House,
Old Mead Road,
Wick
LITTLEHAMPTON
BN17 7PU

Typical plan and photograph sheet
2 bedroom Mobile Home Summer Escape
Date: November 2017
Scale: NTS @ A3

MS/11-2017/
PL17-03

Jackie Stone
Unda Consulting Limited
Southpoint
Old Brighton Road
Gatwick
West Sussex
RH11 0PR

Our ref: SSD70349
Your ref: 87637
Date: 27/12/2017

Dear Jackie Stone,

Enquiry regarding Product 4 for: Land to south Old Mead Road, Wick, BN17 7PU

Thank you for your enquiry which was received on 14/12/17.

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

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

The site is partially in an area located within Flood Zone 3 shown on our Flood Map for Planning (Rivers and Sea).

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

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

Flood Defences

There are no formal raised flood defences in the vicinity of the site.

Model Information

The model used was the Lower Tidal River Arun Strategy Study Model which was completed in 2010 by Atkins.

Flood History

We hold no record of previous flooding events affecting this site.

Please note our records are not comprehensive and may not include all events. I recommend contacting the Lead Local Flooding Authority, West Sussex County

Council or the Local Authority, Arun District Council for a more comprehensive flood history check.

FRA advisory text

Name	Product 4
Description	Detailed Flood Risk Assessment Map for Land to south Old Mead Road, Wick, BN17 7PU
Licence	<u>Open Government Licence</u>
Information Warnings	There are no additional information or health warnings for these levels/depths or the model from which they have been produced.
Information Warning - OS background mapping	<i>The mapping of features provided as a background in this product is © Ordnance Survey. It is provided to give context to this product. The Open Government Licence does not apply to this background mapping. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial purposes for the period during which the Environment Agency makes it available. You are not permitted to copy, sub-license, distribute, sell or otherwise make available the Licensed Data to third parties in any form. Third party rights to enforce the terms of this licence shall be reserved to OS.</i>
Attribution	Contains Environment Agency information © Environment Agency and/or database rights. Contains Ordnance Survey data © Crown copyright 2017 Ordnance Survey 100024198.

Data Available Online

Many of our flood datasets are available online:

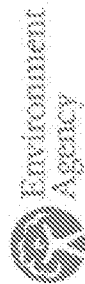
- [Flood Map For Planning \(Flood Zone 2, Flood Zone 3 ,Flood Storage Areas, Flood Defences, Areas Benefiting from Defences\)](#)
- [Risk of Flooding from Rivers and Sea](#)
- [Historic Flood Map](#)
- [Current Flood Warnings](#)

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

Yours sincerely,

Leanne Prentice

FCRM Officer, PSO West Sussex



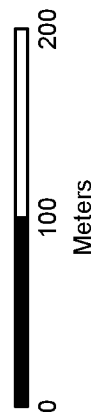
A



Legend

-  Site Nodes
 Site Boundary

Scale: 1:4,000



Product 4 Flood Risk Data Requested by: Unda Consulting Limited

Site: Land to south Old Mead Road, Wick, BN17 7PU

Table 1: Water Levels: Fluvial Undefended

Node Ref	NGR		Modelled Flood Levels in Metres			
	Eastings	Northings	Undefended Annual Exceedance Probability			
			5%	1%	0.1%	1% +CC
1	502566	104196	3.55	3.55	3.55	3.55
2	502732	104009	6.51	6.51	6.51	6.51
3	502727	103911	2.31	2.31	2.31	2.31
4	502383	103942	2.16	2.21	2.47	2.90
5	502250	104016	3.31	3.31	3.31	3.31
6	502246	104147	2.55	2.55	2.55	2.90
7	502442	104163	2.16	2.21	2.47	2.90
8	502496	104051	2.16	2.21	2.47	2.90
9	502568	103947	2.58	2.58	2.58	2.90

Table 2: Water Levels: Fluvial Defended

Node Ref	NGR		Modelled Flood Levels in Metres					
	Eastings	Northings	Defended Annual Exceedance Probability					
			20%	5%	1.3%	1%	0.1%	1% + CC
1	502566	104196	3.34	3.34	3.34	3.34	3.34	3.34
2	502732	104009	6.41	6.41	6.41	6.41	6.41	6.41
3	502727	103911	2.36	2.36	2.36	2.36	2.36	2.36
4	502383	103942	1.96	1.96	1.96	1.96	1.96	1.96
5	502250	104016	3.25	3.25	3.25	3.25	3.25	3.25
6	502246	104147	2.52	2.52	2.52	2.40	2.40	2.40
7	502442	104163	1.50	1.50	1.50	1.50	2.38	1.67
8	502496	104051	1.58	1.58	1.58	1.58	2.38	1.66
9	502568	103947	2.58	2.58	2.58	2.58	2.58	2.58

Table 3: Water Levels: Tidal Undefended

Node Ref	NGR		Modelled Flood Levels in Metres			
			Undefended Annual Exceedance Probability			
	Eastings	Northings	5%	0.5%	0.1%	0.5% +CC
1	502566	104196	4.12	4.12	4.12	4.12
2	502732	104009	6.15	6.15	6.15	6.15
3	502727	103911	2.31	2.31	2.31	2.31
4	502383	103942	2.34	2.48	2.51	2.99
5	502250	104016	3.31	3.31	3.31	3.31
6	502246	104147	2.55	2.55	2.55	2.99
7	502442	104163	2.34	2.48	2.51	2.99
8	502496	104051	2.34	2.48	2.51	2.99
9	502568	103947	2.55	2.55	2.55	2.99

Table 4: Water Levels: Tidal Defended

Node Ref	NGR		Modelled Flood Levels in Metres					
			Undefended Annual Exceedance Probability					
	Eastings	Northings	20%	5%	1.3%	0.5%	0.1%	0.5% + CC
1	502566	104196	4.12	4.12	4.12	4.12	4.12	4.12
2	502732	104009	6.51	6.51	6.51	6.51	6.51	6.51
3	502727	103911	2.31	2.31	2.31	2.31	2.31	2.31
4	502383	103942	1.71	1.71	1.71	1.71	1.71	3.13
5	502250	104016	3.31	3.31	3.31	3.31	3.31	3.31
6	502246	104147	2.55	2.55	2.55	2.55	2.55	3.13
7	502442	104163	1.59	1.59	1.59	1.59	1.59	3.13
8	502496	104051	1.62	1.62	1.62	1.62	1.62	3.13
9	502568	103947	2.55	2.55	2.55	2.55	2.55	3.13

Table 5: Water Depth: Fluvial Undefended

Node Ref	NGR		Modelled Flood Depths in Metres			
			Undefended Annual Exceedance Probability			
	Eastings	Northings	5%	1%	0.1%	1% +CC
1	502566	104196	N/A	N/A	N/A	N/A
2	502732	104009	N/A	N/A	N/A	N/A
3	502727	103911	N/A	N/A	N/A	N/A
4	502383	103942	0.46	0.51	0.77	1.20
5	502250	104016	N/A	N/A	N/A	N/A
6	502246	104147	N/A	N/A	N/A	0.35
7	502442	104163	0.57	0.62	0.88	1.31
8	502496	104051	0.55	0.60	0.85	1.28
9	502568	103947	N/A	N/A	N/A	0.33

Table 6: Water Depth: Fluvial Defended

Node Ref	NGR		Modelled Flood Depths in Metres					
	Eastings	Northings	Defended Annual Exceedance Probability					
			20%	5%	1.3%	1%	0.1%	1% + CC
1	502566	104196	N/A	N/A	N/A	N/A	N/A	N/A
2	502732	104009	N/A	N/A	N/A	N/A	N/A	N/A
3	502727	103911	N/A	N/A	N/A	N/A	N/A	N/A
4	502383	103942	N/A	N/A	N/A	N/A	0.42	N/A
5	502250	104016	N/A	N/A	N/A	N/A	N/A	N/A
6	502246	104147	N/A	N/A	N/A	N/A	0.42	N/A
7	502442	104163	N/A	N/A	N/A	N/A	0.89	0.17
8	502496	104051	N/A	N/A	N/A	N/A	0.80	0.08
9	502568	103947	N/A	N/A	N/A	N/A	N/A	N/A

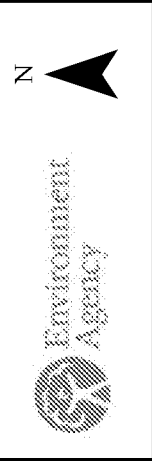
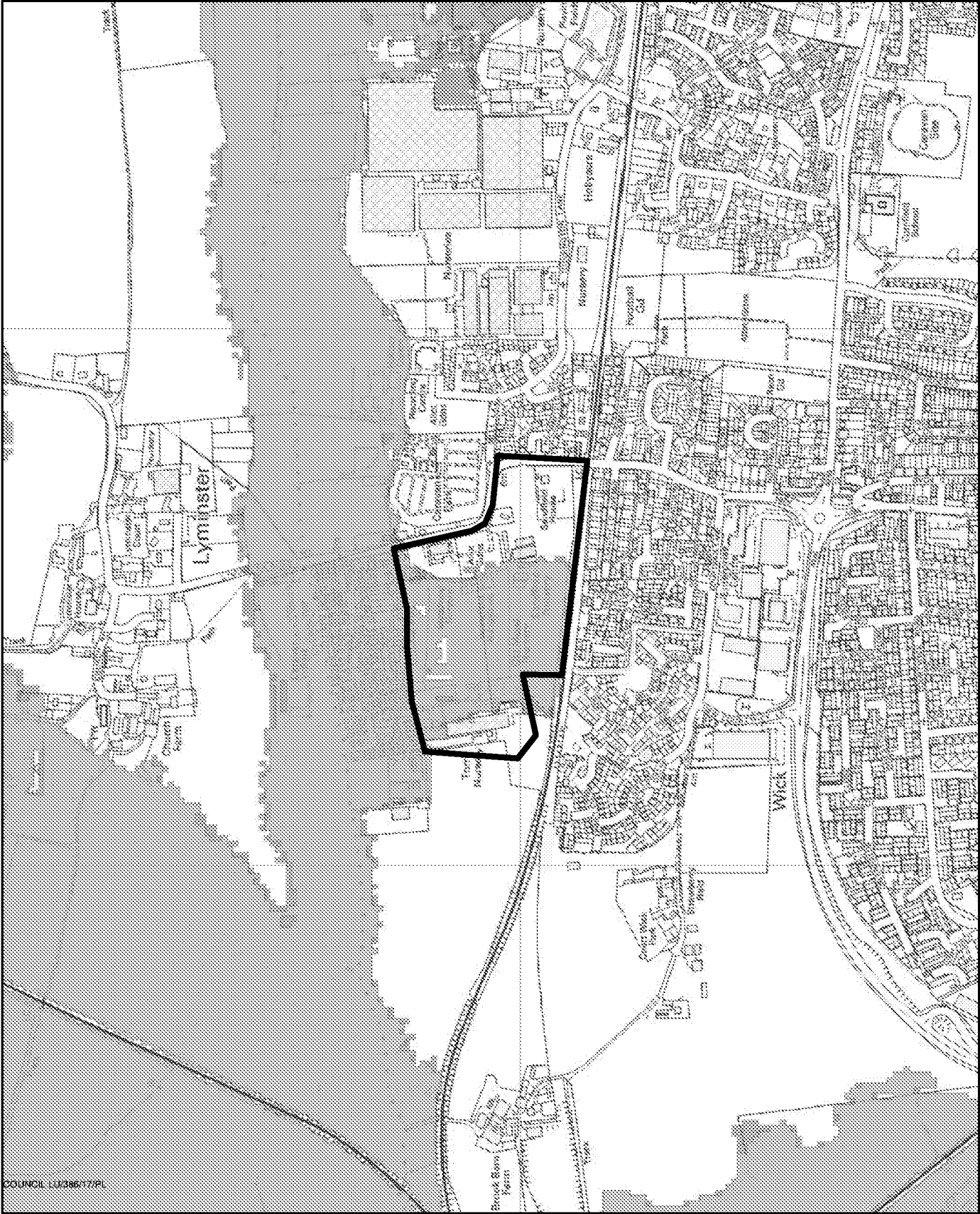
Table 7: Water Depth: Tidal Undefended

Node Ref	NGR		Modelled Flood Depths in Metres			
	Eastings	Northings	Undefended Annual Exceedance Probability			
			5%	0.5%	0.1%	0.5% +CC
1	502566	104196	N/A	N/A	N/A	N/A
2	502732	104009	N/A	N/A	N/A	N/A
3	502727	103911	N/A	N/A	N/A	N/A
4	502383	103942	0.64	0.78	0.81	1.29
5	502250	104016	N/A	N/A	N/A	N/A
6	502246	104147	N/A	N/A	N/A	0.44
7	502442	104163	0.75	0.89	0.92	1.40
8	502496	104051	0.72	0.87	0.89	1.37
9	502568	103947	N/A	N/A	N/A	0.44

Table 8: Water Depth: Tidal Defended

Node Ref	NGR		Modelled Flood Depths in Metres					
	Eastings	Northings	Undefended Annual Exceedance Probability					
			20%	5%	1.3%	0.5%	0.1%	0.5% + CC
1	502566	104196	N/A	N/A	N/A	N/A	N/A	N/A
2	502732	104009	N/A	N/A	N/A	N/A	N/A	N/A
3	502727	103911	N/A	N/A	N/A	N/A	N/A	N/A
4	502383	103942	N/A	N/A	N/A	N/A	N/A	1.43
5	502250	104016	N/A	N/A	N/A	N/A	N/A	N/A
6	502246	104147	N/A	N/A	N/A	N/A	N/A	0.57
7	502442	104163	N/A	N/A	N/A	N/A	N/A	1.54
8	502496	104051	N/A	N/A	N/A	N/A	N/A	1.51
9	502568	103947	N/A	N/A	N/A	N/A	N/A	0.57

All levels taken from: Lower Tidal River Arun Strategy Model (2010) Produced on: 27/12/17

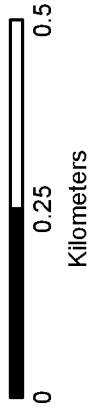


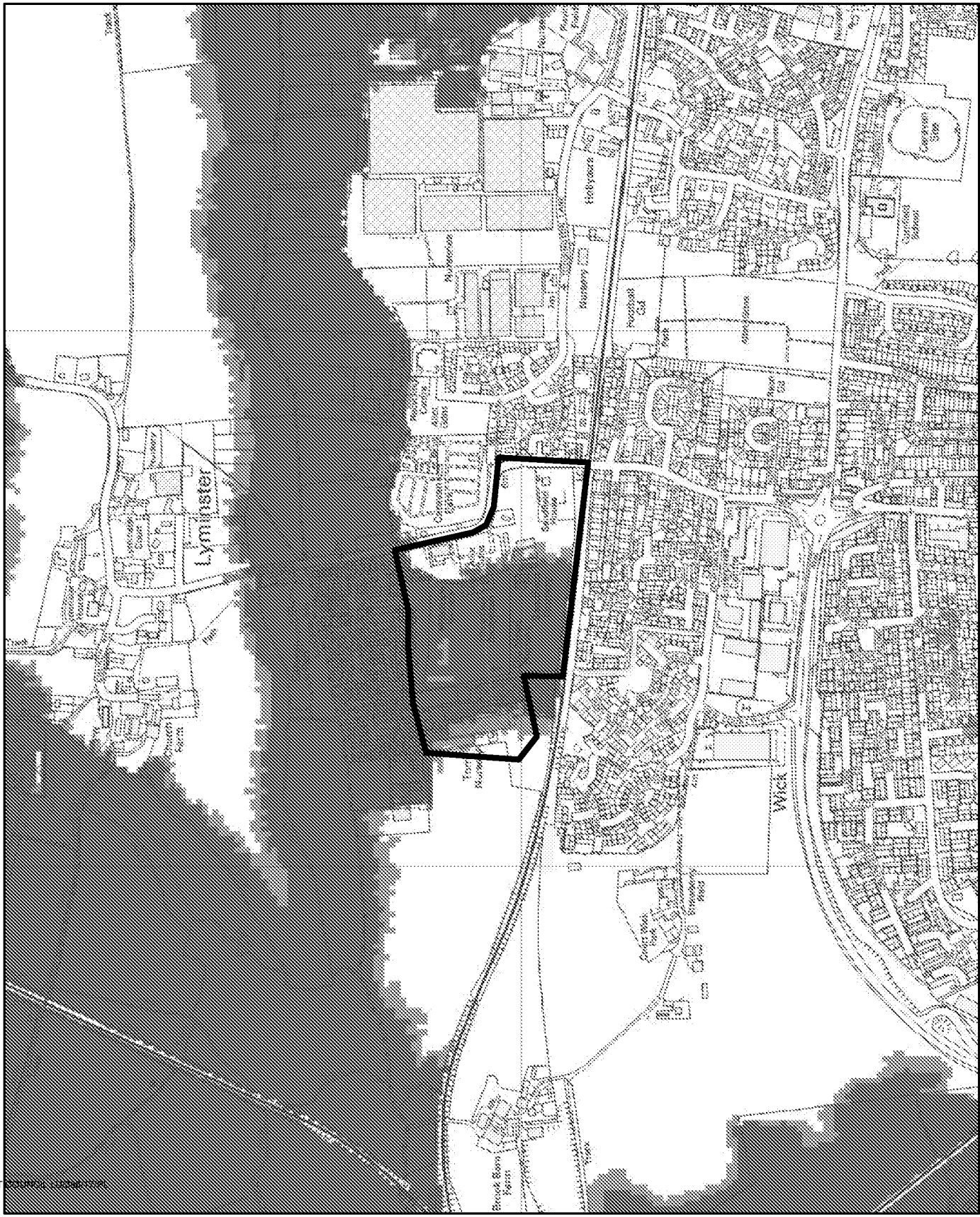
Legend

- Site Boundary
- 5% AEP (Undefended Tidal)
- 0.5% AEP (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





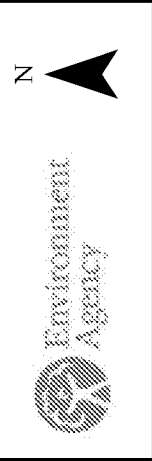
Legend

- Site Boundary
- 0.5% AEP (2110) (Undefended Tidal)
- 0.1% AEP (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





Legend

- Site Boundary
- 5% AEP (Undefended Fluvial)
- 1% AEP (Undefended Fluvial)
- 1% AEP + CC (Undefended Fluvial)
- 0.1% AEP (Undefended Fluvial)

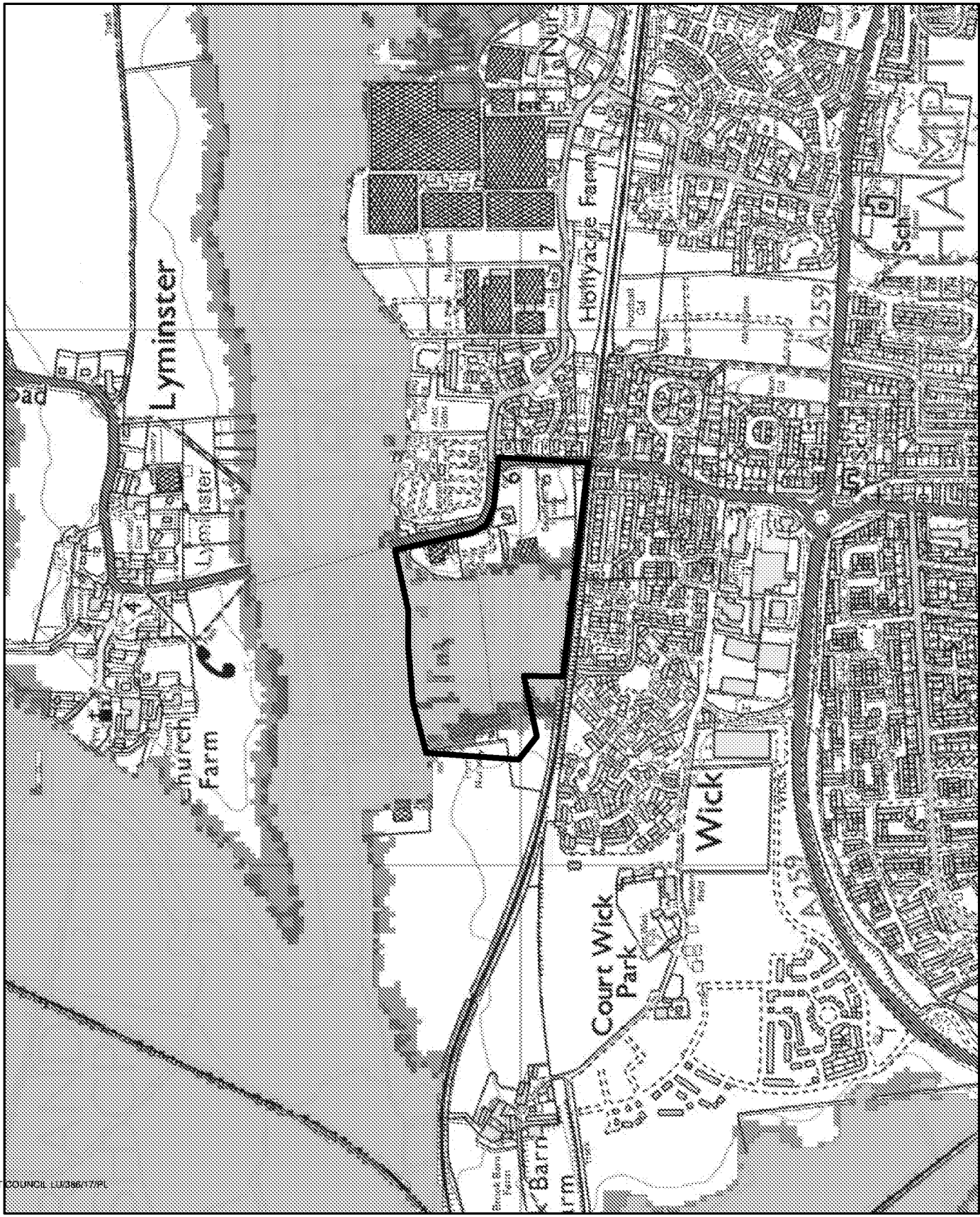
Climate Change (CC) extent based on an increase of 20% in river flows.

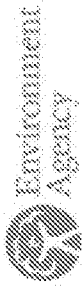
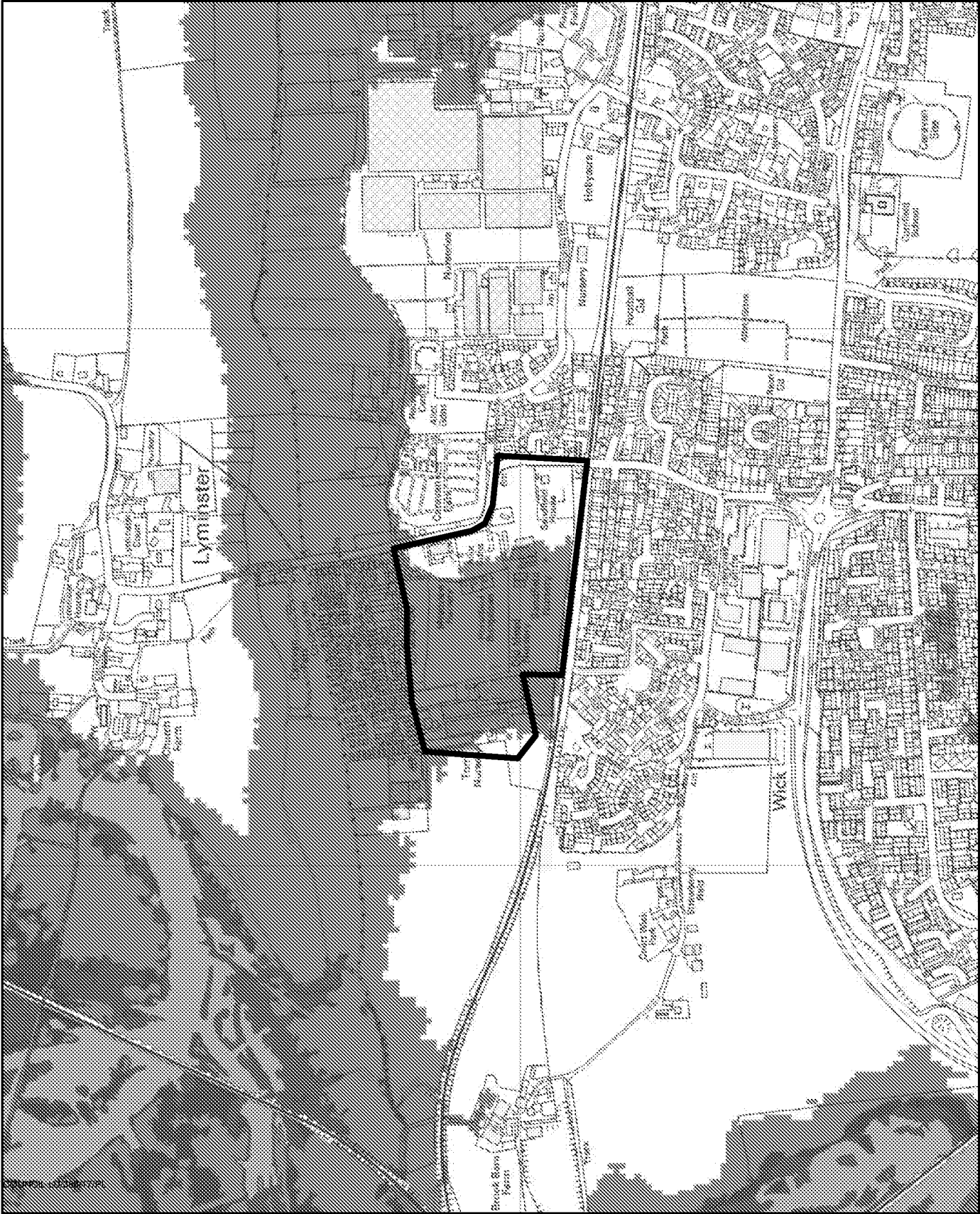
Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000

00.250.5

Kilometers





N

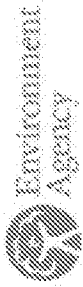
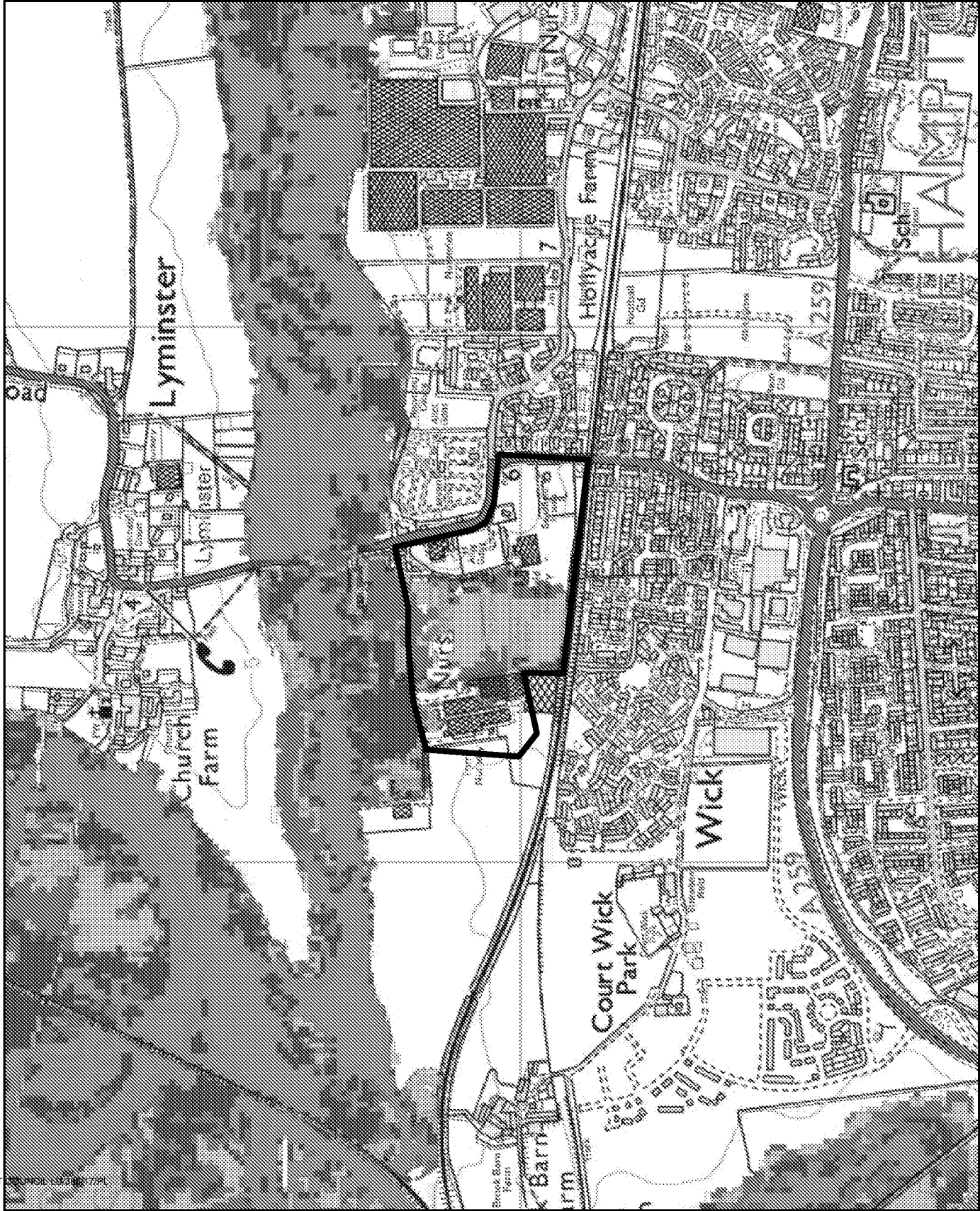
Legend

- Site Boundary
- 20% AEP (Defended Tidal)
- 5% AEP (Defended Tidal)
- 1.3% AEP (Defended Tidal)
- 0.5% AEP (Defended Tidal)
- 0.5% AEP (2110) (Defended Tidal)
- 0.1% AEP (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





Legend

Site Boundary

20% AEP (Defended Fluvial)

5% AEP (Defended Fluvial)

1.3% AEP (Defended Fluvial)

1% AEP (Defended Fluvial)

1% AEP + CC (Defended Fluvial)

0.1% AEP (Defended Fluvial)

Climate Change (CC) extent based on an increase of 20% in river flows.

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

Scale: 1:10,000



Kilometers