



██████████  
Southbourne Parish Council

9 January 2019  
██████████

By Email Only

Dear ████████,

## **Nutbourne Flood Study Interim Update**

Further to your meeting with Steven Brown on 1 November 2018 we are writing to provide you with an update regarding the flood risk study related to flooding at Nutbourne, West Sussex. Annex A provides a detailed review of the findings.

We have undertaken a review of the likely causes of flooding within the, a location plan is included in the enclosed Flood Map Pack in Annex B for reference.

The key findings of the data review are as follows:


- The Environment Agency flood maps show that the Site is at risk of flooding from fluvial and tidal sources.
- Ground levels within Nutbourne vary from 6 to 2 m AOD, with the 1 in 200 annual probability tidal flood level being around 3.4 m AOD (i.e. higher than some of the village)
- A high-level assessment of the predicted flood flows within the Ham Brook indicates that the difference in flood volume between the 1 in 10 and the 1 in 100 year flood flows is around 43,500 m<sup>3</sup>. It is considered very unlikely that this volume of attenuation could be achieved, without significant investment and availability of land. To contain the flood water at a depth of 1 meter would require storage areas of 4.35 Hectares. A number of smaller attenuation basins could be considered.
- Due to the layout of the village and the size of the existing channel it is considered unlikely that it could be widened sufficiently to accommodate the full flood flow; raising the existing banks adjacent to the road would be difficult to achieve due to the number of private accesses within the area.
- The potential impacts of groundwater flooding should be further investigated and determined.
- Potential flood storage reservoirs in the upstream catchment in the form of natural flood management solutions could be considered, to reduce the volume of water needing to pass through Nutbourne.




- Strategies to reduce flood risk within the area will need to be informed by public and stakeholder engagement.

We would be happy to discuss these findings with you, and look forward to agreeing the next steps with you.

Yours faithfully

  
Assistant Engineer

  
Associate

ES/SB

Encl.: Annex A – Flood Study  
Annex B – Reference Mapping

## ANNEX A – FLOOD STUDY

### Location and Tidal levels

Nutbourne is located approximately 300m to the north of the Nutbourne Channel, West Thorney estuary, part of Chichester Harbour.

The Extreme Sea-Levels for Southern Estuaries and Harbours report was updated in 2015 by JBA Consulting. From this study, the Extreme Sea Levels (ESL) in Chichester Harbour have been derived, and are presented in Table 1.

The latest Environment Agency's Climate Change allowance guidance<sup>1</sup> specifies an annual sea level increase of 4mm to 15mm per year, for the 1990 to 2115 period. Table 1 summarises the predicted flood levels for the 1 in 1, 1 in 20 and 1 in 200 year return periods for both the 2011 baseline year and the estimated climate change effect in 2115.

**Table 1 Predicted tidal flood levels at Chichester Harbour**

Return Period	Baseline year 2011	Climate change year 2115
1 in 1	2.91m AOD	4.04m AOD
1 in 20	3.23m AOD	4.38m AOD
1 in 200	3.44m AOD	4.40m AOD
Ground Elevation at Nutbourne	2 to 4 m AOD	

Sources: JBA (2015) *The Extreme Sea-Levels for Southern Estuaries and Harbours*, and the Environment Agency's *climate change allowances guidance*.

Light Detection and Ranging (LiDAR) data has been obtained from the Environment Agency as shown in Drawing 35128-TOP-001 in Appendix A. The LiDAR data shows that existing ground levels at the site generally fall from north to south, from approximately 6 mAOD at the A259 and 2 mAOD to the south of Nutbourne. Therefore the study area is at risk of tidal flooding, especially when the predicted impacts of climate change on sea levels are considered.

The Environment Agency Flood Defence data indicates that Nutbourne benefits from coastal defences which are mainly raised embankment sections with standard protection levels of 1 in 20 years. The location of the Environment Agency's defences is included in Figure 35128-EA-001 for reference.

<sup>1</sup> Environment Agency (2017) *Flood risk assessments: climate change allowances*  
<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

## Existing Watercourses

Two Environment Agency Main Rivers<sup>2</sup>, branches of the Ham Brook flow through the site. The river channels are mainly open channels with some sections having been culverted, for instance under the A259, the railway line, and the A27.

The area between the two channels of the Ham Brook, is designated as being Flood Zones 2 and 3, by the Environment Agency's flood map for planning, which is likely to represent a combination of tidal and fluvial risk of flooding. The Environment Agency has been consulted regarding flood risk data for the study area however their response is not available at the time of writing.

The Environment Agency Flood Defence data indicates that there are fluvial defences in the form of high ground along Ham Brook river branches. The location of the defences is shown in Figure 35128-EA-001.

A Flooding Study undertaken in 2017 by Opus indicates that several channel segments of the Ham Brook branches have low flow capacity and therefore fluvial flooding at the area is likely for return periods greater than 1 in 5 years.

## Surface Water Run-off and Catchments

The Environment Agency's surface water flood maps indicate that an overland flow route crosses the site associated with the existing watercourses.

LiDAR data has been used to estimate the surface water catchment which contributes surface water run-off towards the area of study. The catchment is approximately 479 Ha in size and is represented in Figure 35128-CAT-001 for reference, it should be noted that this catchment area is likely to drain towards the watercourses within the catchment, and not all of it would occur as overland flows.

Past experience of the Environment Agency's surface water flood mapping, makes it likely that the surface water flood maps presented do not take account culverts especially under main roads and railway lines. The A27 highways culverts, and culverts under the railway line are likely to restrict the maximum run-off from the land upstream of Nutbourne.

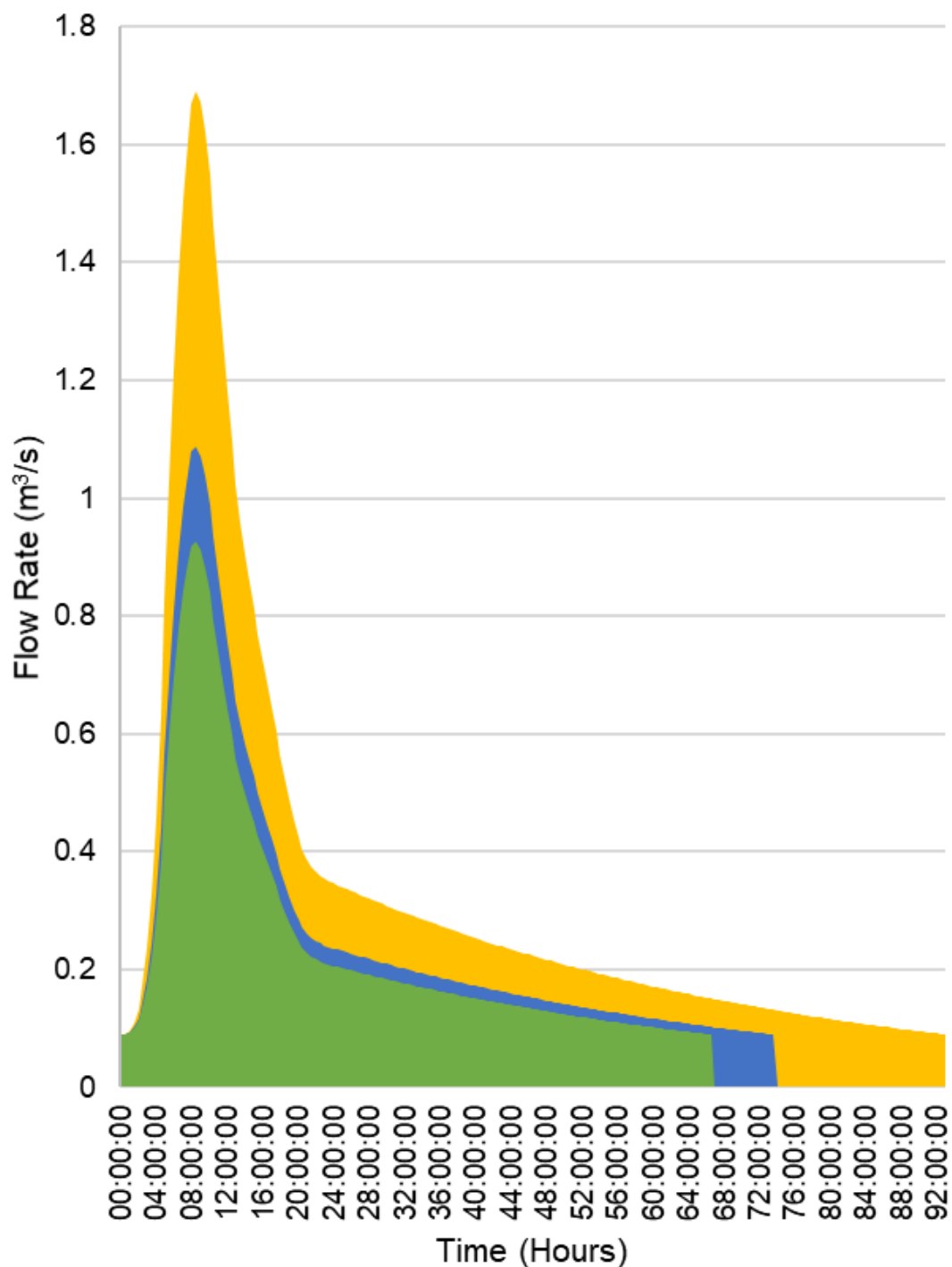
An initial estimation of the flow within the catchment based on the Flood Estimation Handbook ReFH method, and a summary graph for some of the flood events is presented in the Graph overleaf. The graph shows that for the 1 in 5, and 1 in 10 annual flood events the predicted flow rate is around  $1 \text{ m}^3.\text{s}^{-1}$ ; this almost doubles for the 1 in 100 annual flood event ( $1.7 \text{ m}^3.\text{s}^{-1}$ ). Based on the sizing of the culverts under the railway provided by Network Rail (two 900 mm diameter, and one 450 mm diameter pipes) would have capacity to convey around  $1.4 \text{ m}^3.\text{s}^{-1}$ . Consequently, the Railway Line is unlikely to provide any meaningful attenuation for the lower order events, and therefore the full catchment flow is likely to impact at Nutbourne. Assuming that the culverts are free of blockage and functioning efficiently.

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<sup>2</sup> Main Rivers in England are designated by the Department for Environment, Food and Rural Affairs (DEFRA) with responsibility for management and maintenance assigned to the Environment Agency



## Estimated Catchment Flows



- Total flow  $\text{m}^3/\text{s}$  (100 year)- urbanised model
- Total flow  $\text{m}^3/\text{s}$  (10 year)- urbanised model
- Total flow  $\text{m}^3/\text{s}$  (5 year)- urbanised model

## Existing Drainage Infrastructure

Southern Water sewer records indicate that surface water sewers are not present in Nutbourne. Refer to attached Southern Water Sewer Records for reference.

There are several foul sewers which ultimately discharge into the Nutbourne Pumping Station located at the southern end of Farm Land. It receives sewage from local properties and pumps it to the Waste Water Treatment Works at Thornham for treatment. An overflow outfall from the Pumping Station discharges into the Ham Brook which is likely to be used when the pumping station is at capacity.

The asset records plan also shows a 225mm diameter foul sewer to run along the Main Road. This sewer is connected to combined sewers at two locations which will convey the excess of flows to a northern outfall into the Ham Brook when the foul sewer under the Main road is overwhelmed.

It is understood that new developments are being proposed at Nutbourne and that it is likely to connect to the existing Pumping Station. This could provide an opportunity to enhance the pumping station and/or to install a new sewer to divert overflows from the combined drainage to the north. This will reduce the risk of foul drainage to be discharged into the Ham Brook as the river flows through gardens and when it floods, through homes.

## Geology and Hydrogeology

### BEDROCK GEOLOGY

British Geological Survey (BGS) 1:50,000 scale on-shore Digital Mapping (British Geological Survey, 2018) shows the Site to be underlain mainly by the Lambeth Group which is classified as Clay, Silt and Sand. The Lambeth Group is underlain by the Lewes Nodular Chalk Formation of the White Chalk Subgroup which is a Principal Aquifer. Bedrock geology is appended in Figure 53218-BGS-001.

The hydrogeological map of the South Downs and Adjacent Parts of the Weald (BGS, 1978) includes contours for the Chalk aquifer water table or potentiometric pressure surface where the aquifer is confined, e.g. below the Lambeth Group. The contours indicate an autumn (low) elevation of the water table of 5 to 10 mAOD, which is greater than the surface elevation of 2 to 6 mAOD, meaning that the Chalk aquifer is locally confined.

The closest historic BGS borehole scan in Chalk is SU70NE83 located in 1km to the west of the School Lane and Farm Lane junction at a surface elevation of approximately 6.5mAOD. The scan indicates a Rest Water Level (RWL) of 8ft (approximately 2.4m) below ground level equivalent to approximately 4.1 mAOD.

The Lambeth Group and the London Clay Formation overlay the Chalk and confine it at the site. Therefore, an additional groundwater contribution caused by the decompression of the confined Chalk aquifer may occur at the geological boundaries, i.e. in the southern end of the site.

### SUPERFICIAL DEPOSITS

The bedrock geology is overlain by superficial deposits which are shown on Figure 53218-BGS-002. The superficial deposits include Raised Marine Deposits (sand and gravel), Head (clay and

gravel), River Terrace Deposits (clay, silt, sand and gravel), Raised Beach Deposits (sand and gravel) and Alluvium (clay, silt, sand and gravel). The sands and gravels have potential to store and transmit large volumes of water. The extent of connectivity between the various superficial deposits and the underlying bedrock aquifers is not known.

BGS borehole scans along the Main Road (SU70NE1 and SU70NE2) indicate that shallow groundwater was present in the superficial deposits. The recorded rest water in December 1970 was of 0.84 m bgl in SU70NE1 and 0.99 m bgl in SU70NE2 with ground levels of 7.35 mAOD and 8.10m AOD respectively.

Groundwater levels are likely to be tidally influenced due to the proximity to the estuary. The groundwater response to the tide will be mainly in the superficial deposits as the Chalk aquifer is mostly confined at the site of interest. Groundwater tidal response will be greater near the estuary and will gradually decrease inland. Small groundwater fluctuations in the Chalk, however, are also possible.

The Environment Agency's coastal defences (embankments) are unlikely to prevent groundwater rising in response to tidal fluctuations. The superficial aquifers may in fact transmit the tidal fluctuations in inland.

## Flooding History

The Southbourne Neighbourhood Plan provided a record of the historic flooding at Nutbourne (south of the A259) and summarised below:

- 1974 Farm Lane, School Lane, Easter Cottage and other houses flooded reported by the occupiers of Easter Cottage, School Lane.
- 1980's uncertain date reported by hearsay.
- Several houses were flooded in 1992, reported by the occupiers of Easter Cottage in School Lane.
- September/November 2000 Farm Lane, School Lane, Easter Cottage and other houses flooded reported by the occupiers of Easter Cottage, School Lane and Off Shore Cottage.
- 11<sup>th</sup> June 2012 major flooding of Farm Lane, School Lane, Easter Cottage, Old School House, Nutbourne House (Catholic Bible School), Waterside and Sunnybank and others.
- 19/20<sup>th</sup> December 2012 flooding of several gardens reported by the occupiers of Easter Cottage.
- 23<sup>rd</sup> December 2013 flooding of Farm Lane, School Lane, houses including Easter Cottage.

The flooding from 11 June 2012 record contains the most complete and detailed evidence, including an indication of flood depths and flood duration. The flooding in 2012 was severe but water dissipated quickly, in a matter of hours, which confirms that it is unlikely to be caused by a rise in the groundwater levels. Groundwater flooding typically occurs in the late winter and the duration of flooding could last weeks because of the complete saturation of the soil capacity.

The flooding events have been associated with the Ham Brook, overflowing its banks, and fluvial as the main flooding mechanism of flooding at Nutbourne.

## Consultations

As part of this study, WSP has consulted the relevant flood authorities to request available flood risk data, including hydraulic modelling, details on existing flood defences, groundwater data,

survey data, historic flood records, drainage information, existing sewer network and required easements. A summary of the responses is listed below:

- Environment Agency – data and comments are currently awaited.
- West Sussex County Council (WSSCC) as a Lead Local Flood Authority - data and comments are currently awaited.
- Southern Water – informed that they do not hold any flood risk data and are unable to answer the raised flood risk queries.

In addition, Highways England and Network Rail have been contacted for information regarding drainage and culvert data upstream of the site, and a summary of the data is listed below:

- Highways England – four number culverts under the A27 have been identified upstream of the site. The diameter of the culverts varies from 225mm to 750mm. The A27 highways drainage is a combination of pipe network connected to highways ditches at both sides of the road. Approximately 1.63km of the A27 drains towards the site.
- Network Rail – three No. of culverts under the railway line north of the site have been identified: one 3' diameter arch culvert and two 18" culverts.

## Conclusions

Based on the findings of this desk study it is concluded that the main form of flooding is from the Ham Brook, with the potential for this flooding to be exacerbated by high groundwater and a tidal influence at the downstream end of Nutbourne.

- A high-level assessment of the predicted flow hydrographs within the Ham Brook, indicates that the difference in flood volume between the 1 in 10 and the 1 in 100 year flows is around 43,500 m<sup>3</sup>. It is considered very unlikely that this volume of attenuation could be achieved, without significant investment and availability of land. To contain the flood water at a depth of 1 meter would require storage areas of 4.35 Hectares. A number of smaller attenuation basins could be considered instead.
- Due to the layout of the village and the size of the existing channel, it is considered unlikely that it could be widened sufficiently to accommodate the full flood flows, raising the existing banks, where adjacent to the road, would be difficult to achieve due to the number of private accesses within the area.
- The potential impacts of groundwater flooding should be further investigated and determined.
- Potential flood storage reservoirs in the upstream catchment in the form of natural flood management solutions could be considered, to reduce the volume of water needing to pass through Nutbourne.
- Individuals should consider the use of property level protection measures, but these require retro-fitting to existing properties, which due to construction methods, may not be practicable to implement.
- Strategies to reduce flood risk within the area will need to be informed by public and stakeholder engagement.



# FLOOD RISK PACK



**Client:**  
**Southbourne Parish Council**

**Project Reference:**  
**70053128 - NUTBOURNE FLOOD  
ALLEVIATION SCHEME**

**Site Reference:**  
**Nutbourne**

**Site Location**  
**477743, 105430**

**Site Area:**  
**13.47 hectares**

**Map Scale:**  
**1:10000**

## **CONTENTS:**

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and the Sea**

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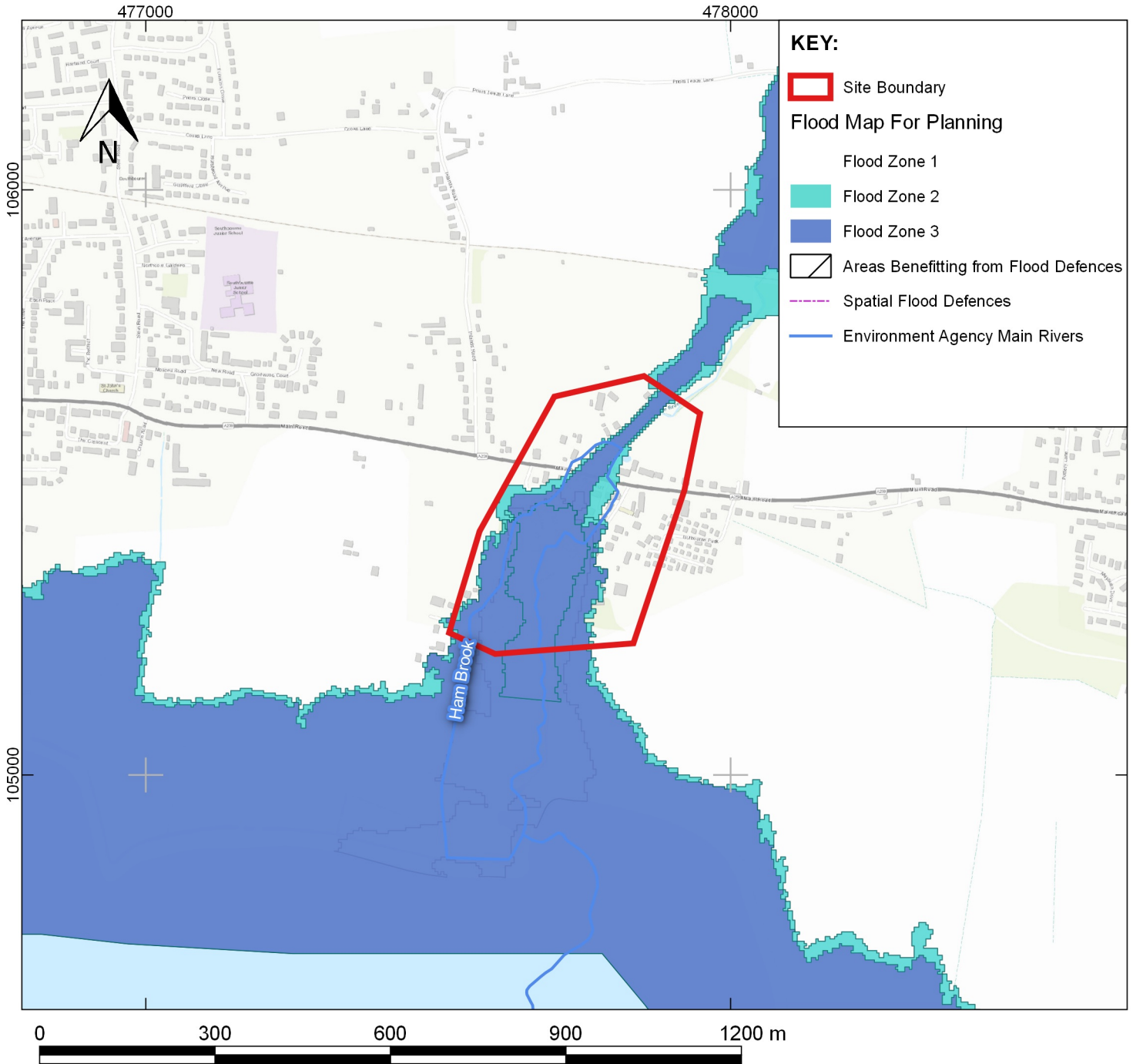
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\\uk.wspgroup.com\Central Data\Projects\70053128 - Nutbourne Flood Alleviation Scheme\02 WIP\EIA and flood risk\02 Drawing\Flood Map Pack - NUTBOURNE\70053128 - NUTBOURNE FLOOD ALLEVIATION SCHEME.qgs





# ENVIRONMENT AGENCY FLOOD MAP FOR PLANNING



Flood zone maps are modelled using local and national river and sea data. This information provides an indication of the likelihood of flooding and is intended for planning use only.

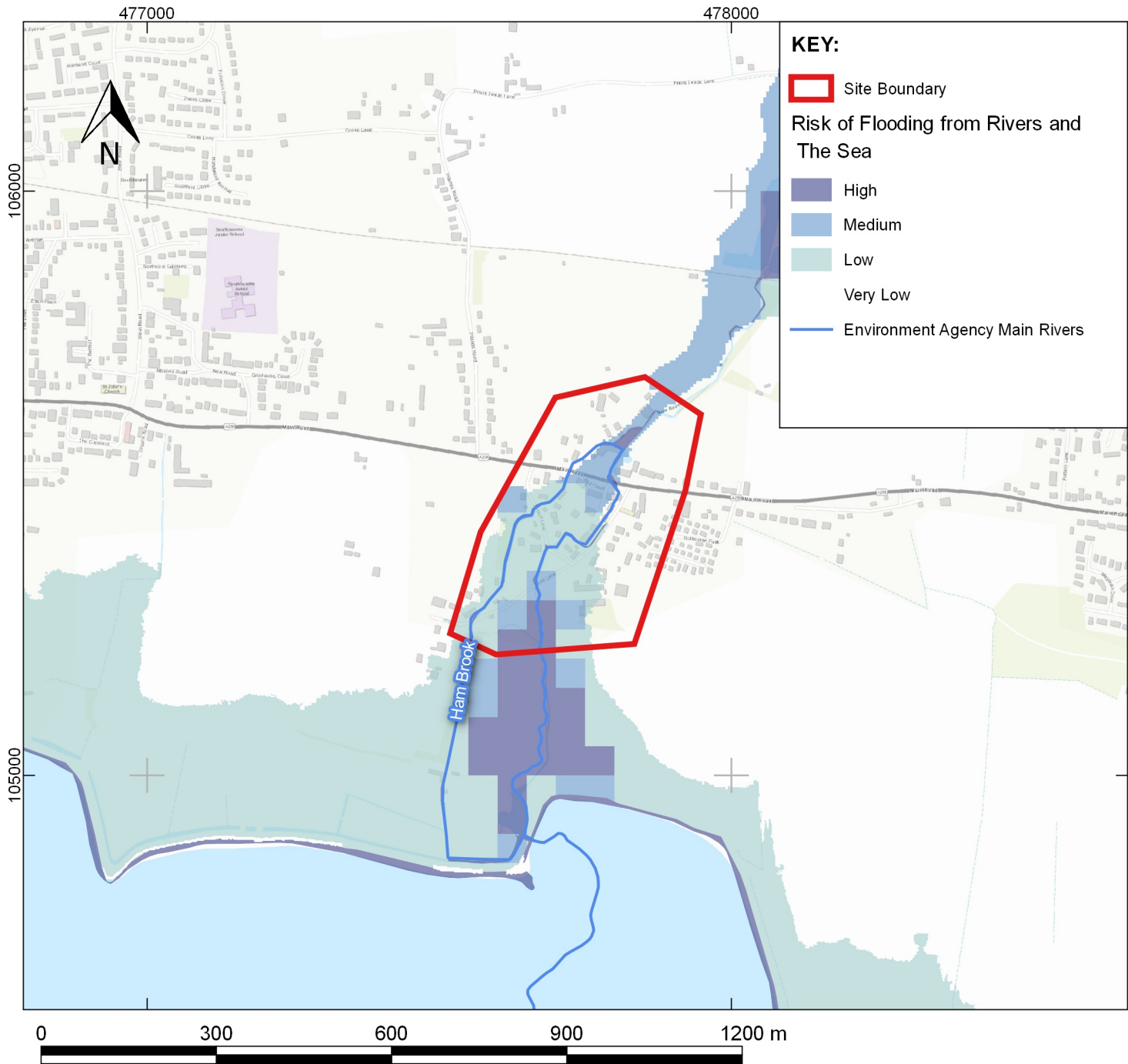
Flood Zone 1 - Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3).

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. (Land shown in light blue on the Flood Map)

Flood Zone 3 - 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)



# ENVIRONMENT AGENCY RISK OF FLOODING FROM RIVERS AND THE SEA



High risk means that each year this area has a chance of flooding of greater than 3.3%.

Medium risk means that each year this area has a chance of flooding of between 1% and 3.3%.

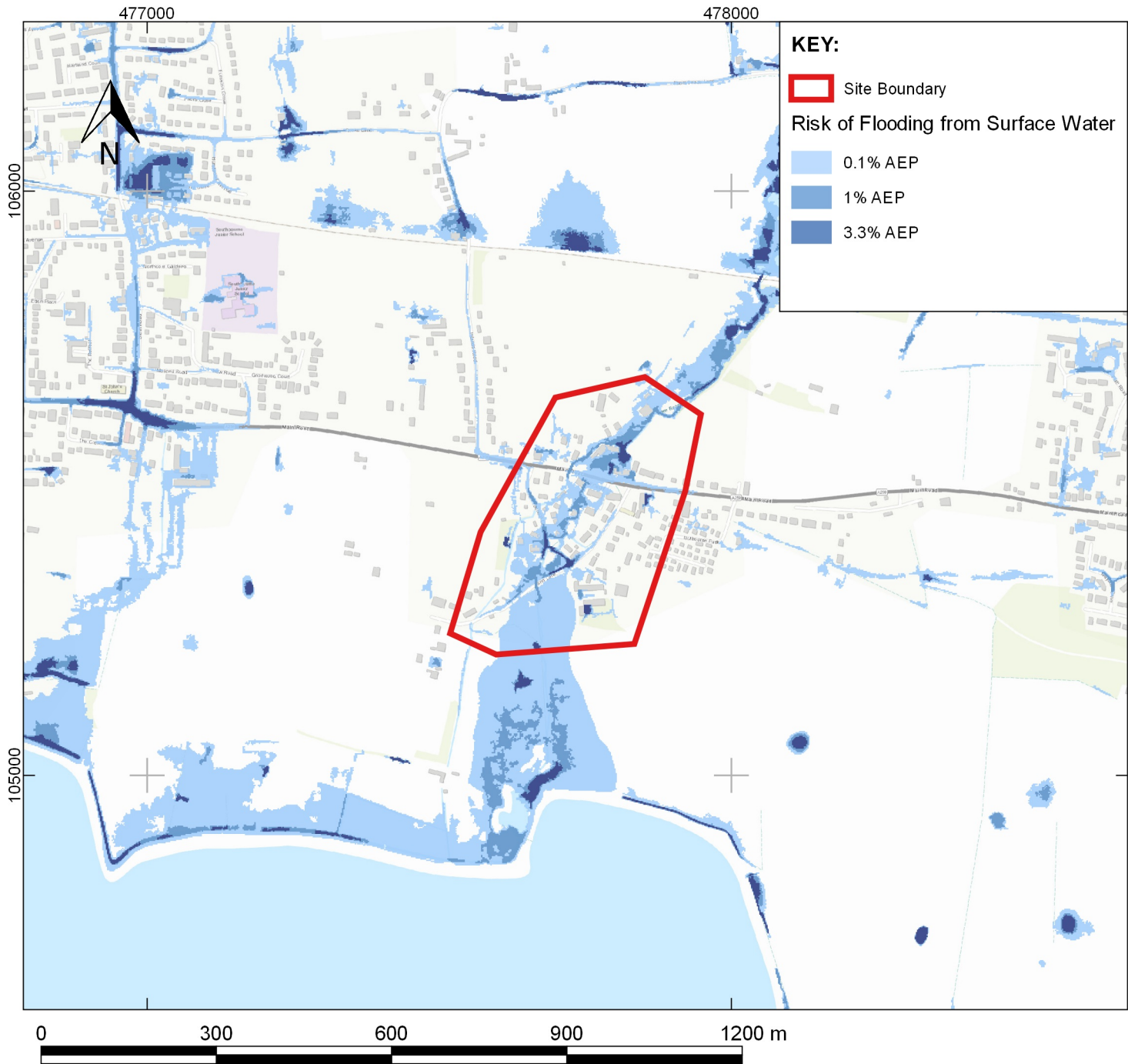
Low risk means that each year this area has a chance of flooding of between 0.1% and 1%.

Very low risk means that each year this area has a chance of flooding of less than 0.1%.

This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.



# ENVIRONMENT AGENCY RISK OF FLOODING FROM SURFACE WATER



High risk means that each year this area has a chance of flooding of greater than 3.3%.

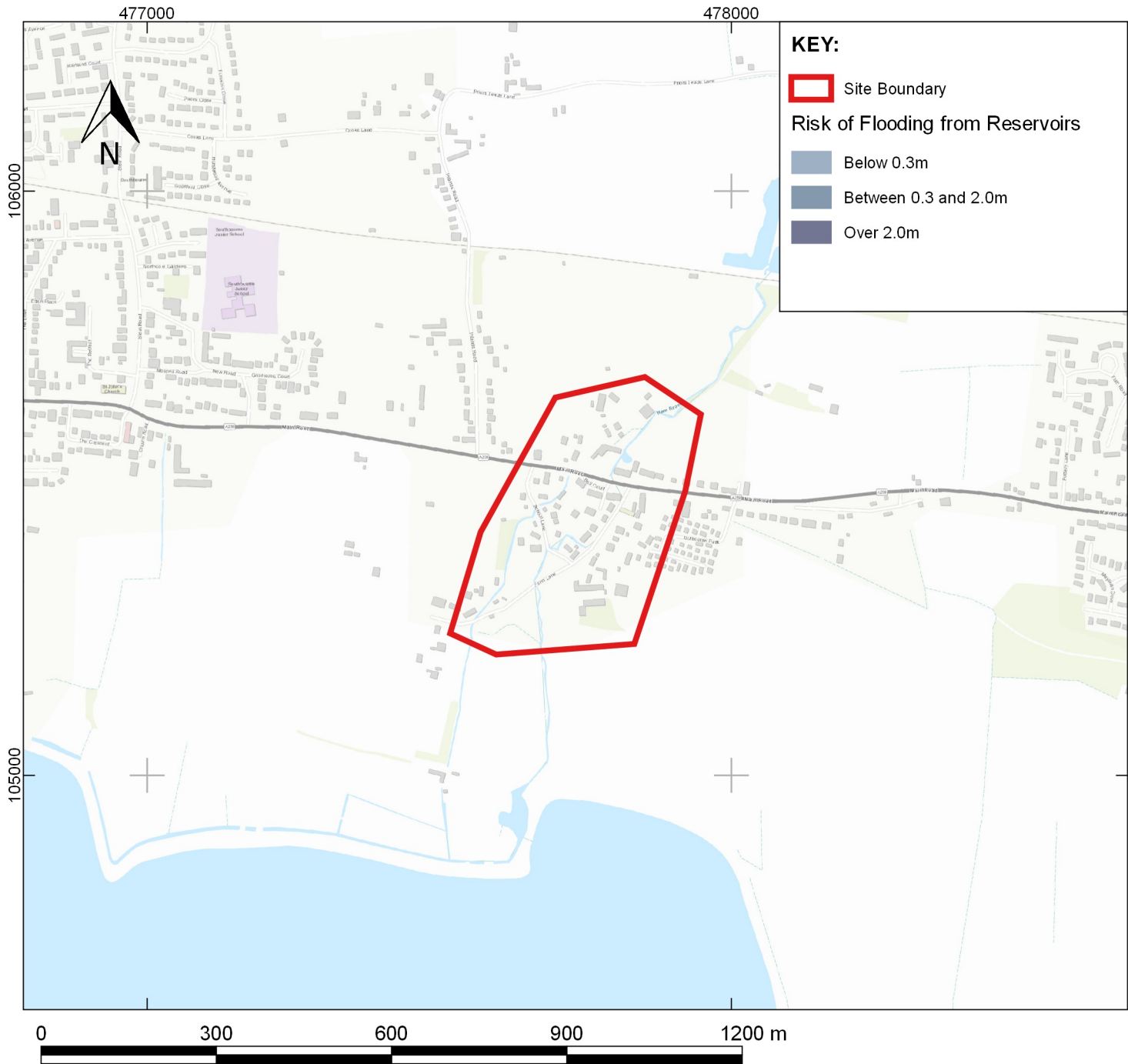
Medium risk means that each year this area has a chance of flooding of between 1% and 3.3%.

Low risk means that each year this area has a chance of flooding of between 0.1% and 1%.

Very low risk means that each year this area has a chance of flooding of less than 0.1%.

Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding.

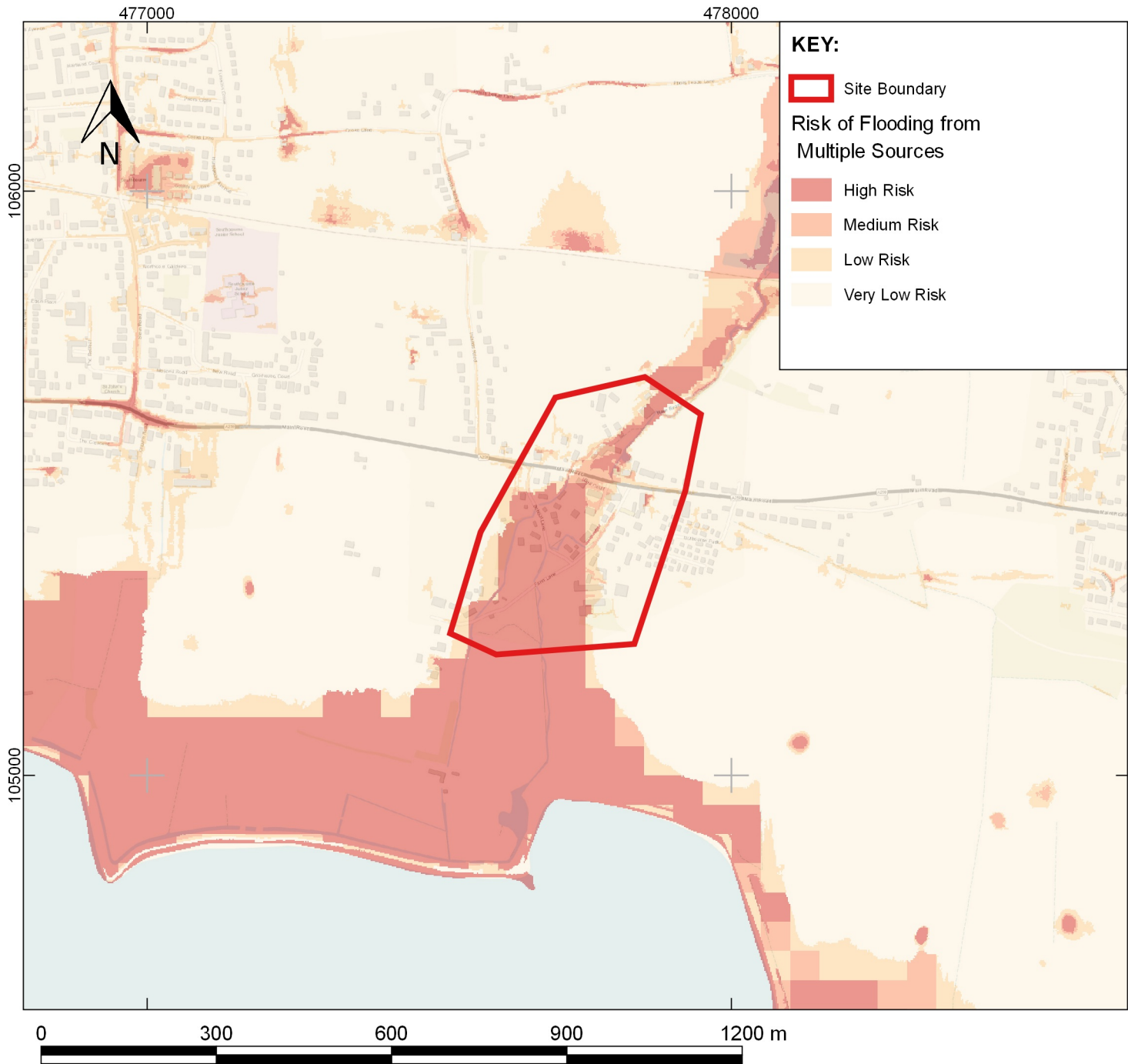
# ENVIRONMENT AGENCY RISK OF FLOODING FROM RESERVOIRS



If a location is at risk, flooding from reservoirs is extremely unlikely. There has been no loss of life in the UK from reservoir flooding since 1925.

An area is considered at risk if peoples' lives could be threatened by an uncontrolled release of water from a reservoir.

# ENVIRONMENT AGENCY RISK OF FLOODING FROM MULTIPLE SOURCES



High risk means that each year this area has a chance of flooding of greater than 3.3%.

Medium risk means that each year this area has a chance of flooding of between 1% and 3.3%.

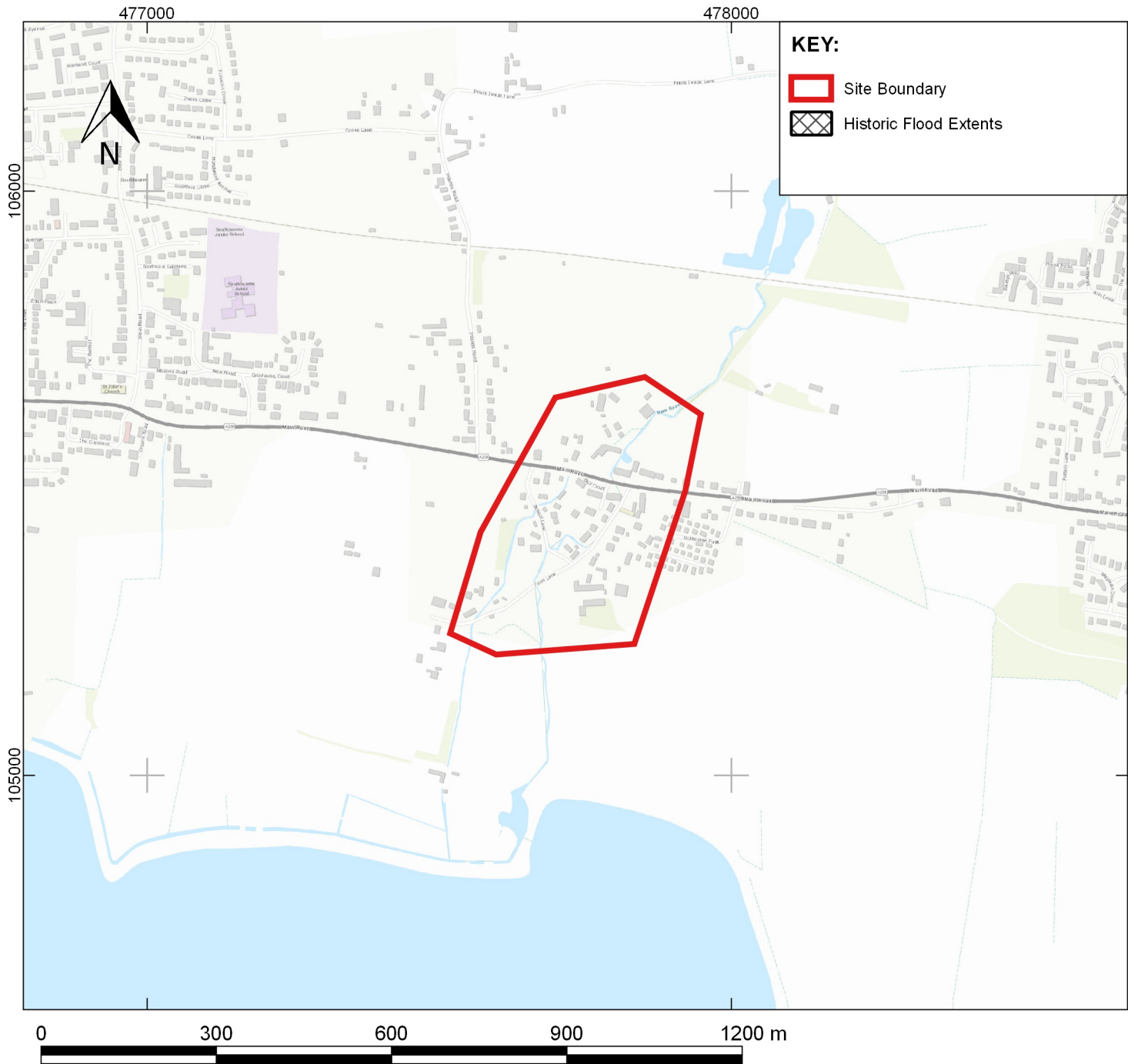
Low risk means that each year this area has a chance of flooding of between 0.1% and 1%.

Very low risk means that each year this area has a chance of flooding of less than 0.1%.

This dataset is not suitable for identifying whether an individual property will flood. The Risk of Flooding from Multiple Sources (RoFMS) information is a national scale assessment. It gives an indication of what areas of land may be at risk of flooding from more than one source. This first version of the assessment considers flooding from rivers, the sea and surface water.



# ENVIRONMENT AGENCY HISTORIC FLOOD MAP



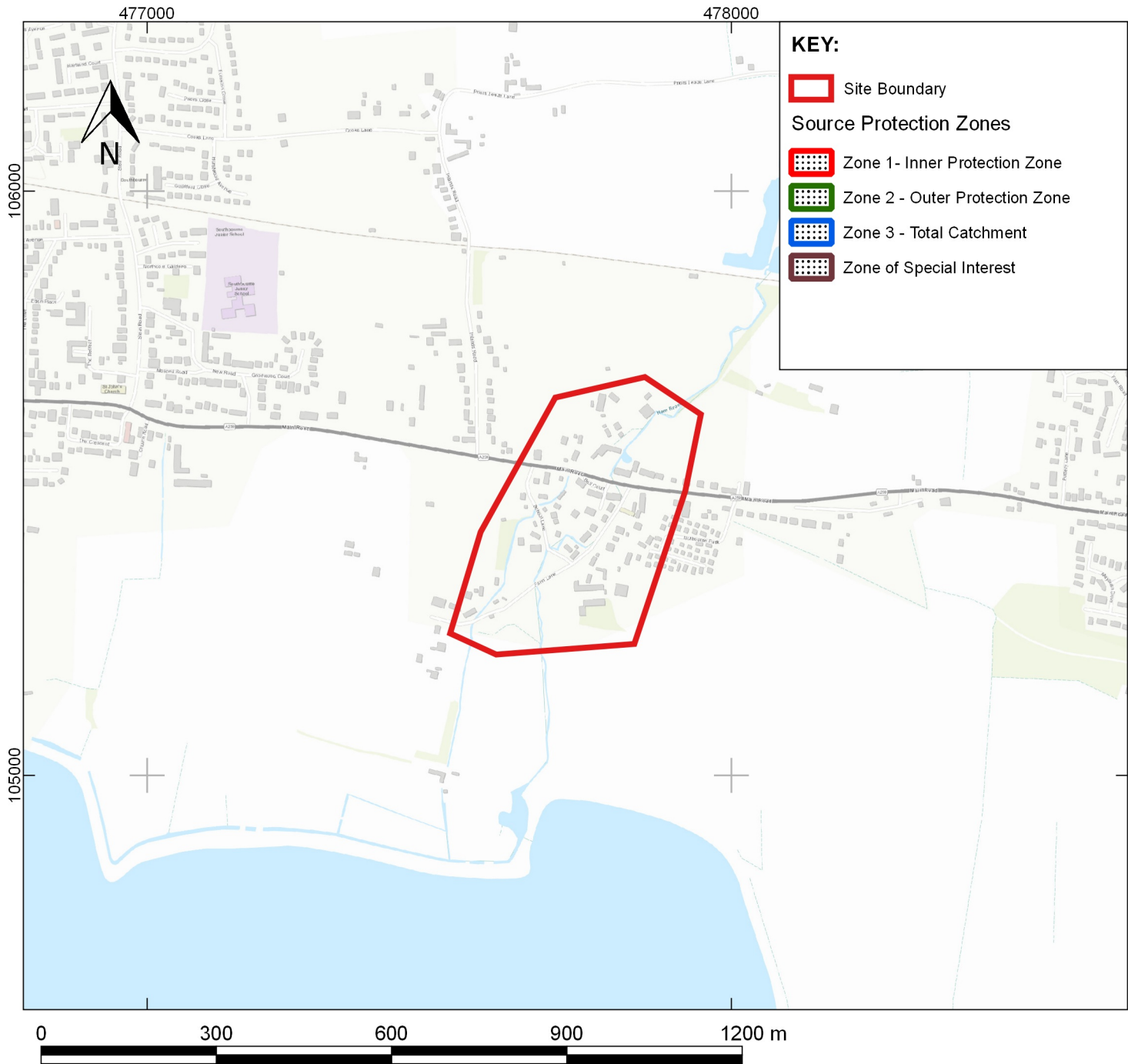
The Historic Flood Map is a GIS layer showing the maximum extent of all individual Recorded Flood Outlines from river, the sea and groundwater springs and shows areas of land that have previously been subject to flooding in England. Records began in 1946 when predecessor bodies to the Environment Agency started collecting detailed information about flooding incidents, although limited details may be held about flooding incidents prior to this date.

The absence of coverage by the Historic Flood Map for an area does not mean that the area has never flooded, only that we do not currently have records of flooding in this area. It is also possible that the pattern of flooding in this area has changed and that this area would now flood under different circumstances. The Historic Flood Map will take into account of the presence of defences, structures, and other infrastructure where they existed at the time of flooding. It will include flood extents that may have been affected by overtopping, breaches or blockages. Flooding shown to the land and does not necessarily indicate that properties were flooded internally.





# ENVIRONMENT AGENCY SOURCE PROTECTION ZONES



Inner zone (Zone 1) - Defined as the 50 day travel time from any point below the water table to the source. This zone has a minimum radius of 50 metres;

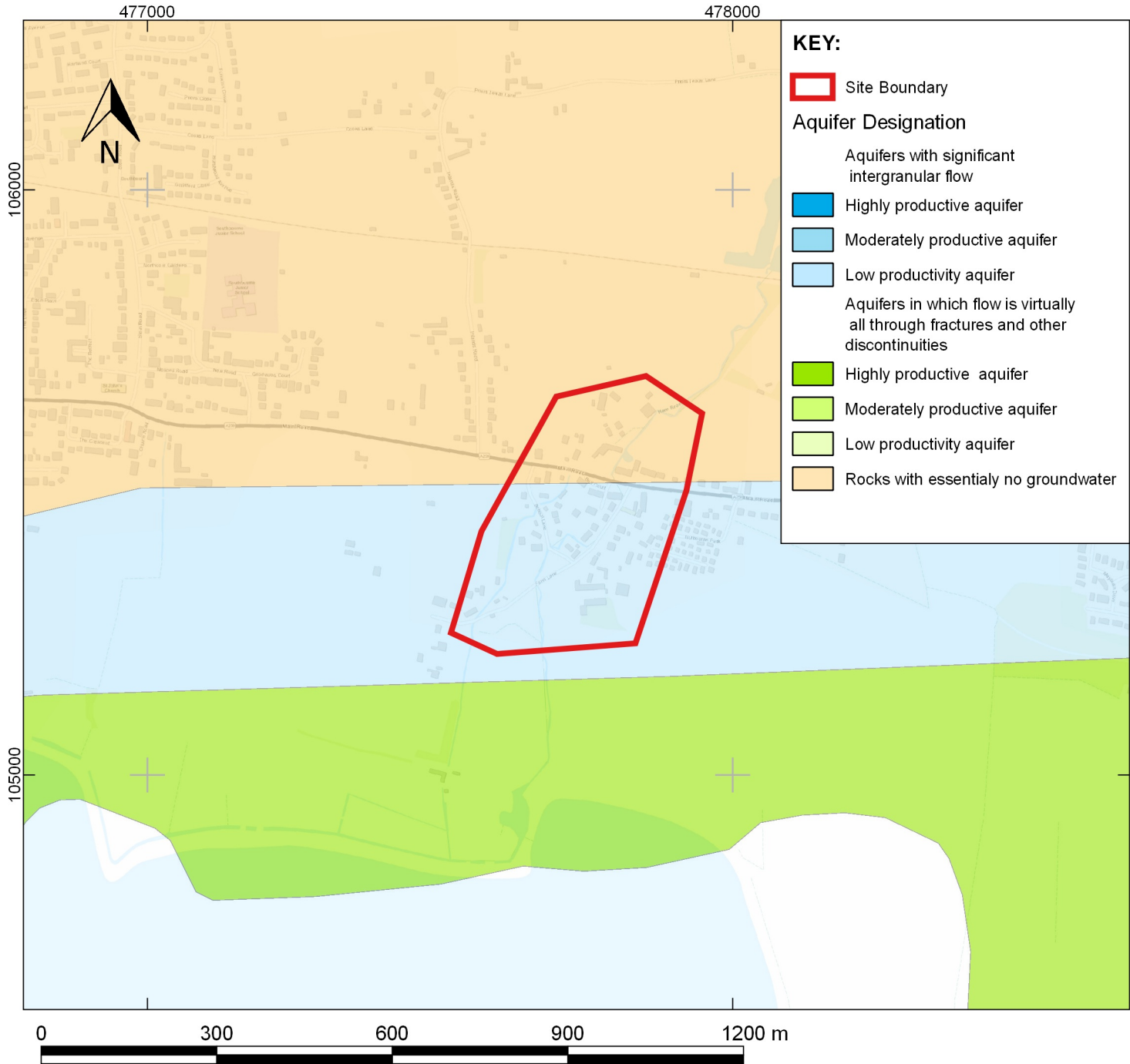
Outer zone (Zone 2) - Defined by a 400 day travel time from a point below the water table. The previous methodology gave an option to define SPZ2 as the minimum recharge area required to support 25 per cent of the protected yield. This option is no longer available in defining new SPZs and instead this zone has a minimum radius of 250 or 500 metres around the source, depending on the size of the abstraction;

Total catchment (Zone 3) - Defined as the area around a source within which all groundwater recharge is presumed to be discharged at the source.

Special interest (Zone 4) - A fourth zone SPZ4 or 'Zone of Special Interest' was previously defined for some sources. SPZ4 usually represented a surface water catchment which drains into the aquifer feeding the groundwater supply (i.e. catchment draining to a disappearing stream).



# ENVIRONMENT AGENCY 1:625,000 SCALE AQUIFER DESIGNATION



The hydrogeological map indicates aquifer potential in generalised terms using a threefold division of geological formations:

1. those in which intergranular flow in the saturated zone is dominant
2. those in which flow is controlled by fissures or discontinuities
3. less permeable formations including aquifers concealed at depth beneath covering layers

Highly productive aquifers are distinguished from those that are only of local importance or have no significant groundwater. Within each of these classes the strata are grouped together according to age or lithology.

The 1:625 000 scale data may be used as a guide to the aquifers at a regional or national level, but should not be relied on for local information.









KEY:

Area of Study

A	06/11/18	ES	FIRST ISSUE	SB	
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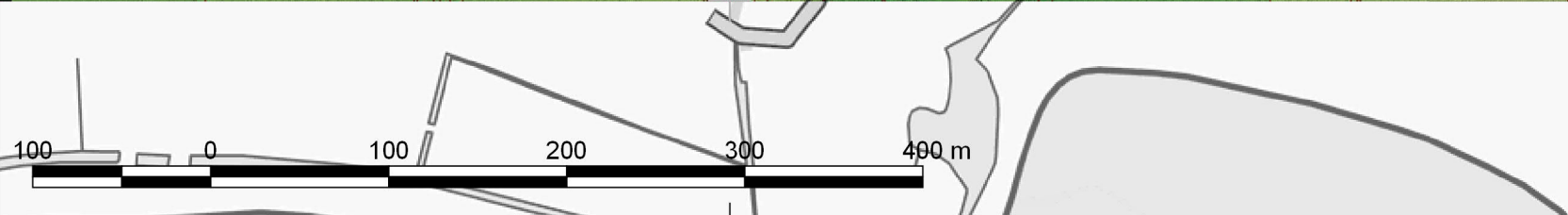
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PROJECT:  
**NUTBOURNE  
FLOOD ALLEVIATION SCHEME**

TITLE:  
**LOCATION PLAN**

DRAWN:	CHECKED:	APPROVED:
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PROJECT No: 70053128	DRAWING No: 53128-LOC-001	REV: A



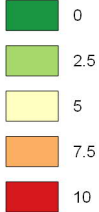


KEY:

Area of Study

Environment Agency

Ground Elevation (mAOD)



Contours 1m

Contours 5m

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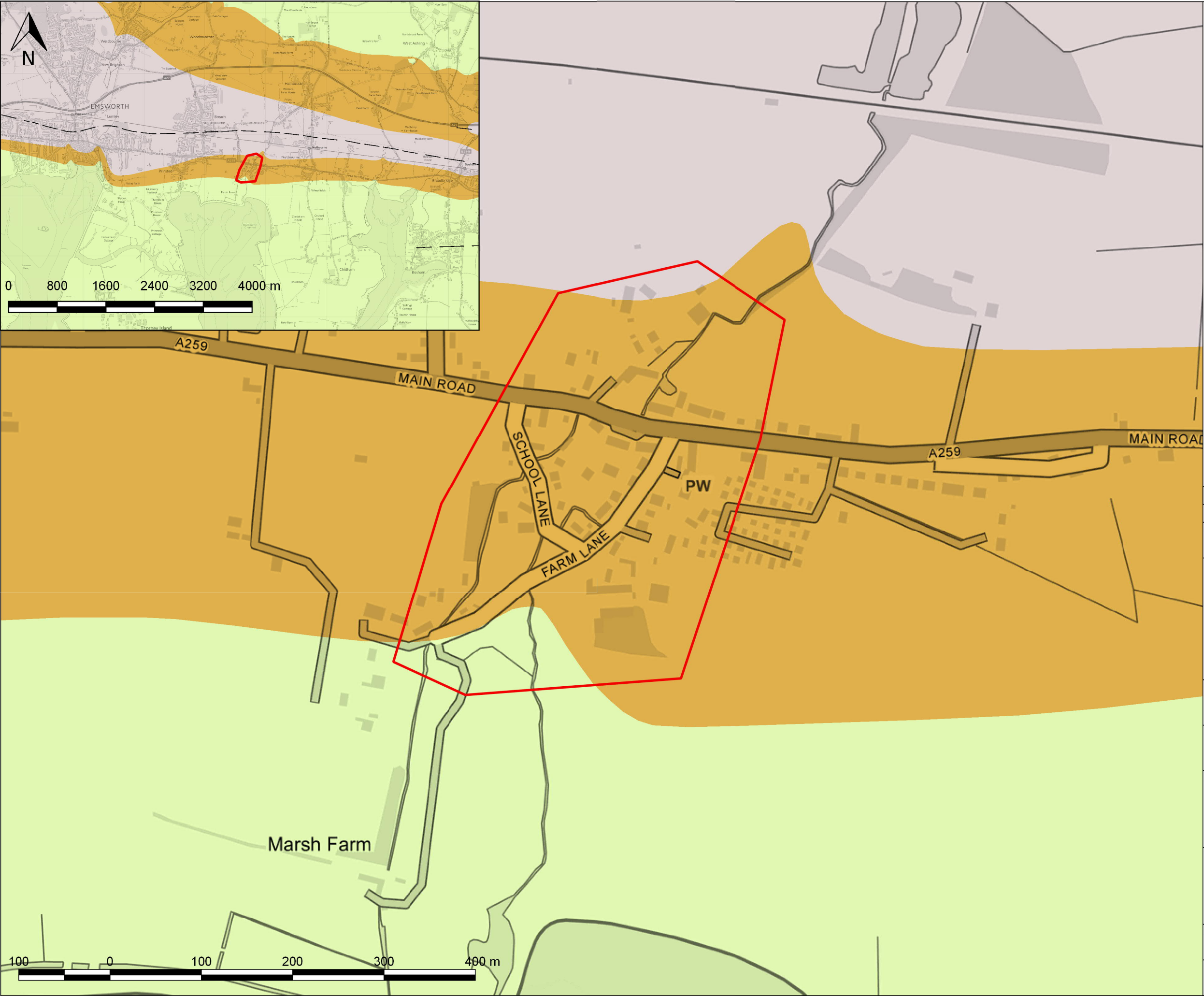
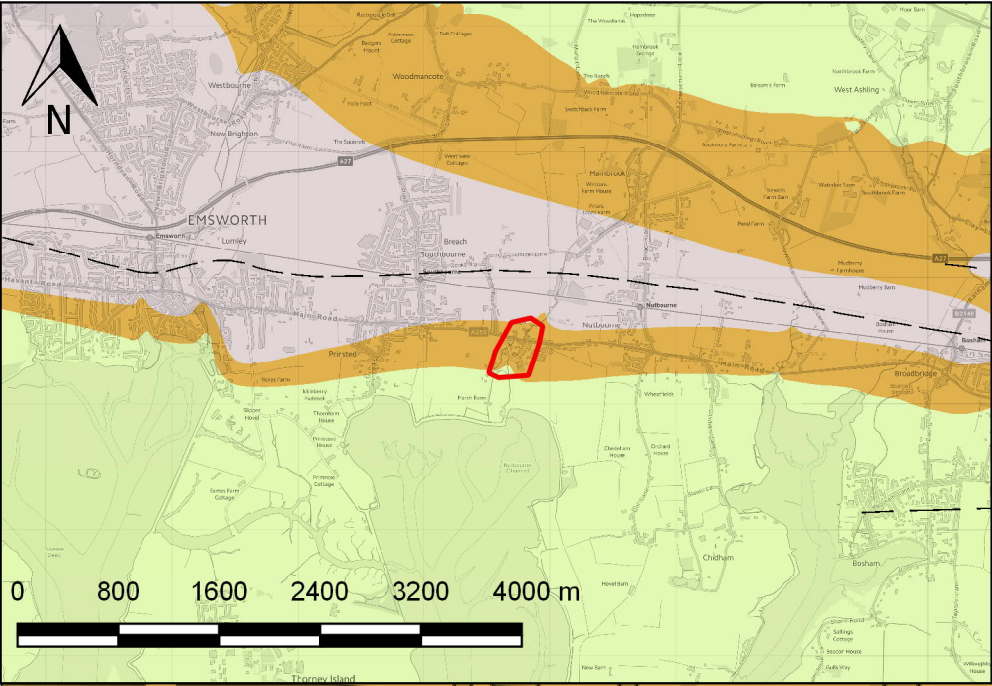
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PROJECT:  
**NUTBOURNE  
FLOOD ALLEVIATION SCHEME**

TITLE:  
**LIDAR DERIVED TOPOGRAPHY**

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PROJECT No: 70053128	DRAWING No: 53128-TOP-001	REV: A





KEY:

Area of Study

BGS data

Linear feature

----- Linear feature

Bedrock geology

- LONDON CLAY FORMATION - CLAY, SILT AND SAND
- LAMBETH GROUP - CLAY, SILT AND SAND
- LEWES NODULAR CHALK FORMATION, SEAFORD CHALK FORMATION, NEWHAVEN CHALK FORMATION, CULVER CHALK FORMATION AND PORTSDOWN CHALK FORMATION (UNDIFFERENTIATED) - CHALK

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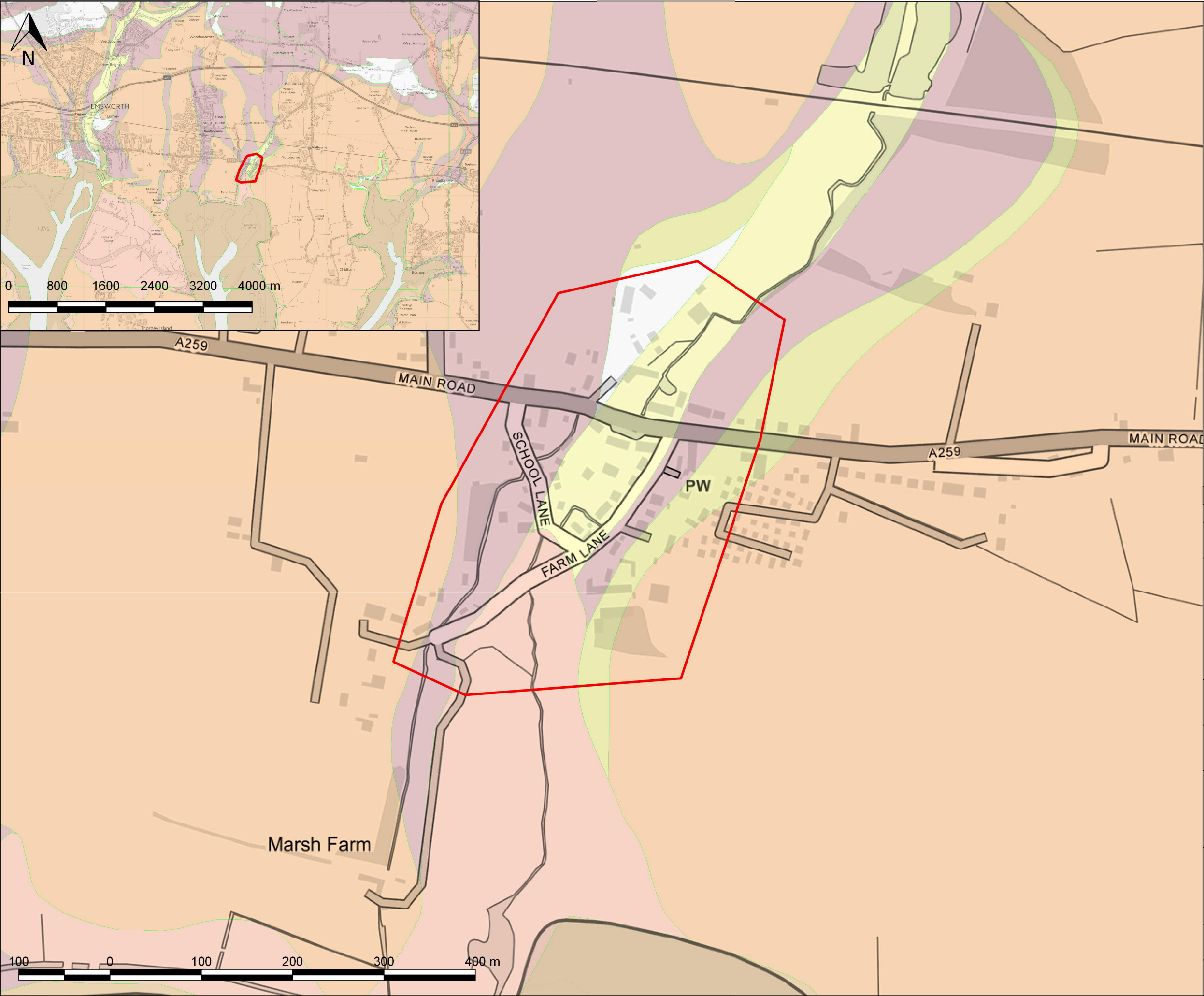
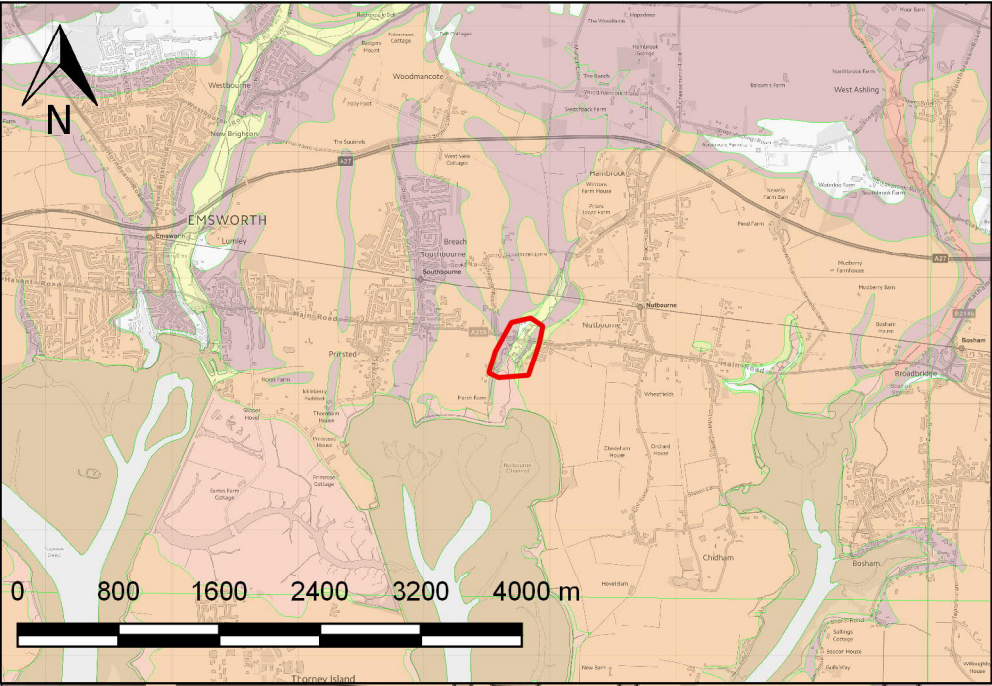
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PROJECT:  
**NUTBOURNE  
FLOOD ALLEVIATION SCHEME**

TITLE:  
**BRITISH GEOLOGICAL SURVEY  
BEDROCK GEOLOGY**

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KEY:

Area of Study

BGS data

Superficial Deposits

- ALLUVIUM - CLAY, SILT, SAND AND GRAVE
- RAISED BEACH DEPOSITS, 1 - SAND AND GRAVEL
- RIVER TERRACE DEPOSITS (UNDIFFERENTIATED) SAND, SILT AND CLAY
- HEAD - CLAY AND GRAVEL
- RAISED MARINE DEPOSITS - SAND AND GRAVEL
- BEACH AND TIDAL FLAT DEPOSITS (UNDIFFERENTIATED) CLAY, SILT, SAND AND GRAVEL

A	21/11/18	ES	FIRST ISSUE	SB	
REV	DATE	DRW	DESCRIPTION	CHK	APP

STATUS:  
**FOR INFORMATION ONLY**



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CLIENT:  
**SOUTHBOURNE PARISH COUNCIL**

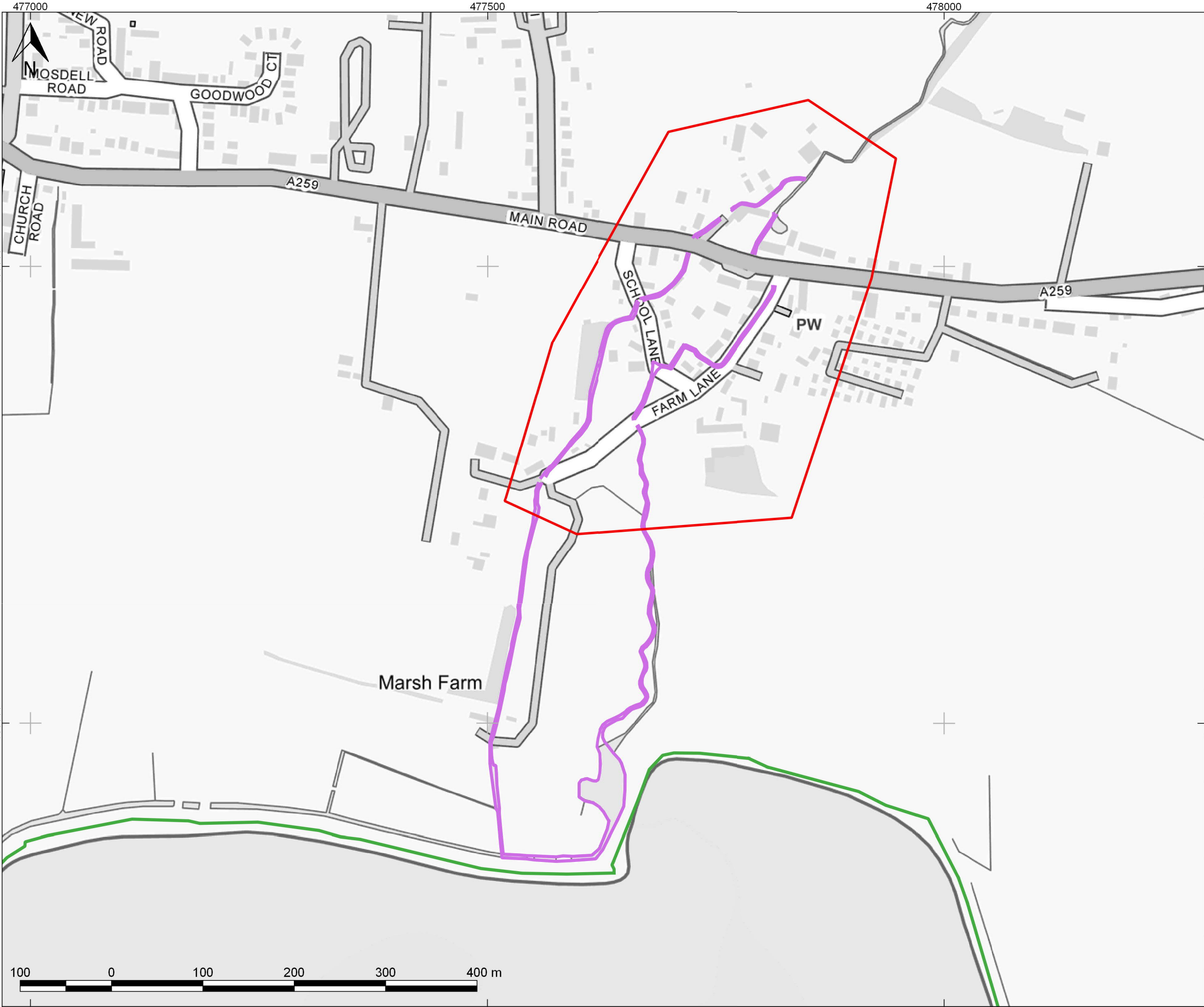
ARCHITECT:  
-

PROJECT:  
**NUTBOURNE  
FLOOD ALLEVIATION SCHEME**

TITLE:  
**BRITISH GEOLOGICAL SURVEY  
SUPERFICIAL DEPOSITS**

DRAWN:	CHECKED:	APPROVED:
QGIS FILE: 53128-Layout.qgs	SCALE @A3: 1:4,000	DATE: 21/11/18
PROJECT No: 70053128	DRAWING No: 53128-BGS-002	REV: A





KEY:

- Area of Study
- Spatial Flood Defences
  - Coastal
  - Fluvial

A	22/11/18	ES	FIRST ISSUE	SB	
REV	DATE	DRW	DESCRIPTION	CHK	APP

STATUS:  
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CLIENT:  
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ARCHITECT:  
-

PROJECT:  
NUTBOURNE  
FLOOD ALLEVIATION SCHEME

TITLE:  
ENVIRONMENT AGENCY  
FLOOD DEFENCES

DRAWN:	CHECKED:	APPROVED:
QGIS FILE: 53128-Layout.qgs	SCALE @A3: 1:4,000	DATE: 22/11/18
PROJECT No: 70053128	DRAWING No: 53128-EA-001	REV: A



Opus International Consultants (UK) Ltd  
Fareham Office, Modulus House  
Salterns Lane  
Fareham  
Hampshire  
PO16 0QS

Your ref OICL  
Our ref 240914  
Date 12 April 2017  
Contact [searches@southernwater.co.uk](mailto:searches@southernwater.co.uk)  
Tel 0845 272 0845  
0330 303 0276  
Fax 01634 844514

Attention: Jonathan Simmonds

Dear Customer

**Re: Provision of public sewer record extract**

**Location: Main Road Nutbourne, West Sussex, Flood Studies PO18 8RL**

Thank you for your order regarding the provision of extracts of our sewer and/or water main records. Please find enclosed the extracts from Southern Water's records for the above location.

We confirm payment of your fee in the sum of £49.92 and enclose a VAT receipt for your records.

Customers should be aware that there are areas within our region in which there are neither sewers nor water mains. Similarly, whilst the enclosed extract may indicate the approximate location of our apparatus in the area of interest, it should not be relied upon as showing that further infrastructure does not exist and may subsequently be found following site investigation. Actual positions of the disclosed (and any undisclosed) infrastructure should therefore be determined on site, because Southern Water does not accept any responsibility for inaccuracy or omission regarding the enclosed plan. Accordingly it should not be considered to be a definitive document.

Should you require any further assistance regarding this matter, please contact the LandSearch team.

Yours faithfully

LandSearch

# VAT receipt

## Ordered by:

Opus International Consultants (UK) Ltd  
Salterns Lane  
Fareham  
Hampshire  
PO16 0QS

**VAT registration number:** 813 0378 56  
**Order reference:** 240914  
**Your reference:** OICL

Receipt for provision of an extract from the public sewer and/or water main records.

Location	Costs
Main Road Nutbourne West Sussex Flood Studies PO18 8RL	£41.60
<b>Net total</b>	£41.60
<b>VAT</b>	£8.32
<b>Total</b>	£49.92
<b>Paid</b>	<b>Paid in full</b>

## Thank you for your payment:

Received on: 6 April 2017

For enquiries regarding the information provided in this receipt, please contact the LandSearch team:

Tel: 0845 270 0212  
0330 303 0276 (individual consumers)

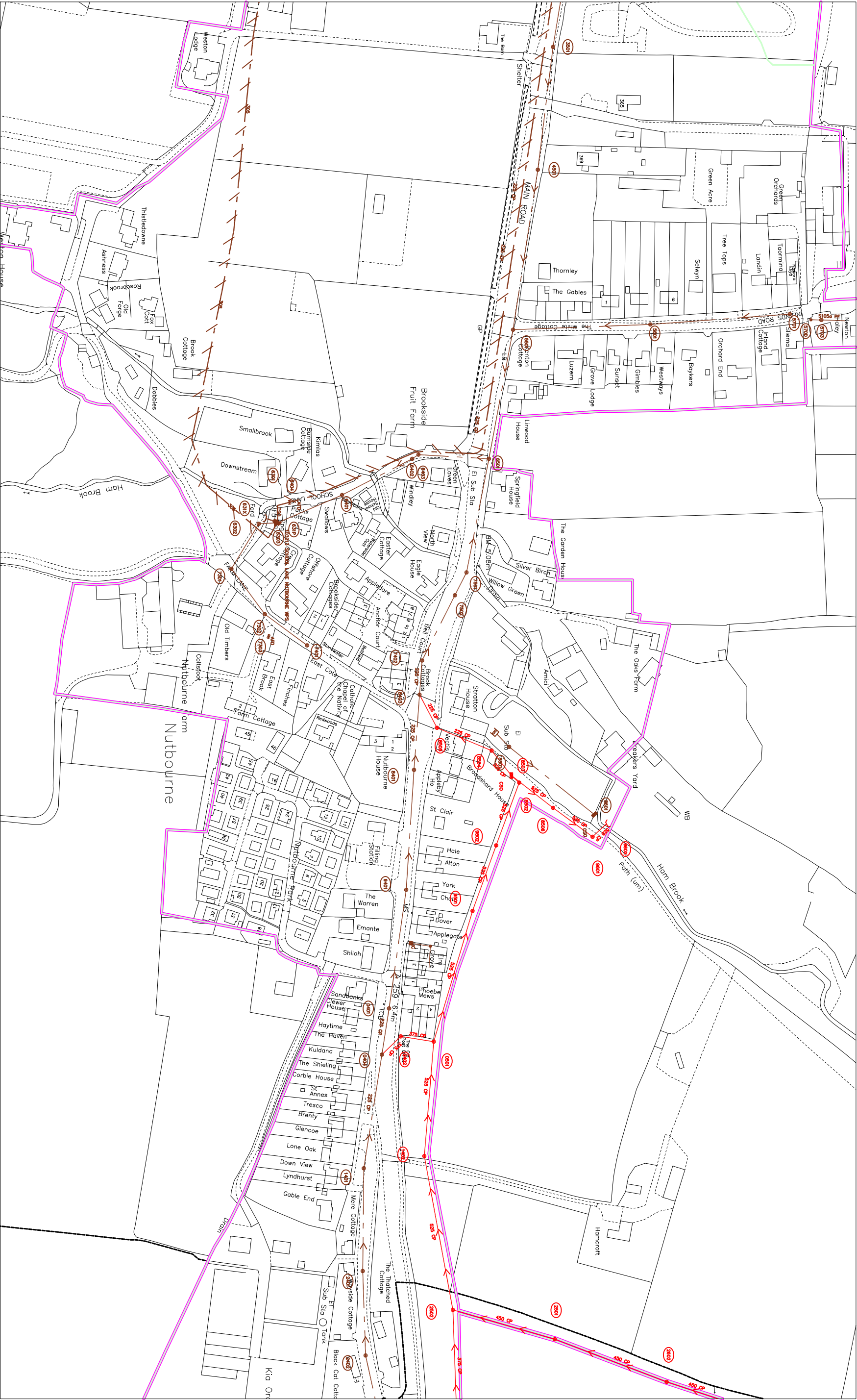
Email: [searches@southernwater.co.uk](mailto:searches@southernwater.co.uk)

Web: [www.southernwater.co.uk](http://www.southernwater.co.uk)

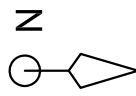

LandSearch  
Southern Water Services  
Southern House  
Capstone Road  
Chatham  
Kent  
ME5 7QA



105788



105210

O.S. REF. <b>SU7705SE</b>		Drawn by: <b>kumaria</b>		The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. <b>WARNING: BAC pipes are constructed of Bonded Asbestos Cement</b> <b>WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement</b>
		Scale: <b>1:2500</b>		
Title: 240914_Main Road Nutbourne, We		Date: 12/04/2017		Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved Licence No. WU 298530.
				

477347

478287



SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape
0401X	6.46	3.85	225	CP	CIRC												
0402X	6.98	4.234	375	CP	CIRC												
0404Y	6.94	4.2	375	CP	CIRC												
0404X	6.94	4.2	225	CP	CIRC												
0501X	7.29	4.129	525	CP	CIRC												
1401Y	7.09		225	CP	CIRC												
1402X	7.71	4.369	525	CP	CIRC												
2401X	7.48	4.22	225	CP	CIRC												
2402X	7.88	4.33	225	CP	CIRC												
2501X	8.61	4.785	450	CP	CIRC												
2502X	8.17	4.6	525	CP	CIRC												
2602X	8.47	4.915	450	CP	CIRC												
3501X	6.79	4.93	150	VC	CIRC												
4501X	5.72	4.17	150	VC	CIRC												
5501X	4.68	3.11	225	CP	CIRC												
5601X	5.59	4.06	150	VC	CIRC												
5701X	6.31	4.92	150	VC	CIRC												
5703X			UNK	PF	CIRC												
6301X	3.6	2.21	300	CP	CIRC												
6302X	2	1.3	300	VC	CIRC												
6303X			300	PVC	CIRC												
631PX	3.56	3.56	300	CP	CIRC												
6401X	2.78	2.38	225	CP	CIRC												
6402X	3.68	1.69	300	CP	CIRC												
6403X	3.71	1.84	300	CP	CIRC												
6501X	4.7	1.88	300	CP	CIRC												
7301X	2.18	2.18	300	CP	CIRC												
7302X	1.63	1.36	150	VC	CIRC												
7401X	2.83	1.50	VC	CIRC													
7402Y	3.03	1.72	150	VC	CIRC												
7501X	4.5	2.4	225	CP	CIRC												
7502X	4.68	2.37	225	CP	CIRC												
8401Y	5.08		225	CP	CIRC												
8403X	4.813	2.573	225	CP	CIRC												
8501X			UNK	UNK	CIRC												
8502X	5.99	3.581	225	CP	CIRC												
8503X	5.83	3.56	225	CP	CIRC												
8503Y	5.83	4.38	525	CP	CIRC												
8504X	5.03	3.35	225	CP	CIRC												
8505X	4.72	2.757	225	CP	CIRC												
8506X	5.28	4.327	525	CP	CIRC												
9401X	5.55	3.69	225	CP	CIRC												
9501X	6.96	3.772	525	CP	CIRC												
9502X	6.76	3.68	525	CP	CIRC												
950DX			UNK	UNK	CIRC												
9601X	5.86	4.248	525	CP	CIRC												

LINE STYLES / COLOURS

Brown

Full

Full Siphon Sewer

Full Vacuum Main

Full Rising Main

Combined Siphon Sewer

Combined Rising Main

Building Over Agreement Area

Treated Effluent

Sewer Catchment

Section 104 Area

Surface Water

Surface Water Rising Main

Private

Access Shaft

Discommissioned

MATERIALS

AK Asphaltene

BAC Black Adhesive Cement

BAC Black (Common)

BAC Black (Sewer)

CC Concrete Box Culvert

CI Cast Iron

CO Concrete (H-SU)

CS Concrete (Common)

CSB Concrete Segments (boxed)

CSU Concrete Segments (unboxed)

DI Ductile Iron

GC Glass Reinforced Concrete

GP Glass Reinforced Plastic

MAC Masonry in regular Courses

MAC Masonry in random Courses

PF Pitch Fibre

PP Polypropylene

PP Polypropylene Bedded

PP Polypropylene Random Matrix

SI Spun Iron

ST Steel

XXX Other

ZZZ Unknown

LEGEND - SEWERS

Manhole (SW)

Manhole (FKC)

Lamp Hole (SW)

Lamp Hole (FKC)

Pumping Station (SW)

Pumping Station (FKC)

Site entry manhole (SW)

Site entry Manhole (FKC)

Blind shaft (SW)

Blind shaft (FKC)

Ejector station (SW)

Ejector station (FKC)

Waterlight door (SW)

Waterlight door (FKC)

Flushing on, Man- (SW)

Flushing on, Man- (FKC)

Flushing on, Man- (SW)

Flushing on, Man- (FKC)

Demarcation Chamber

Waistout (SW)

Waistout (FKC)

Rodding Eye (SW)

Rodding Eye (FKC)

Gauging point (SW)

Gauging point (FKC)

Intercept chamber (SW)

Intercept chamber (FKC)

Intercept chamber (FKC)

Storm Trunk (SW)

Storm Trunk (FKC)

Vortex chamber (SW)

Vortex chamber (FKC)

Label ellipse

Dummy S&A manhole

Cutbill

Peristock chamber

Damboards

Storm Overflow

Backdrop manhole

Other (S)

Other

Change to sewer (S)

Change to sewer

Refill valve

Flap valve

Catchcave

Arise

Valve

Closed Valve

Air Valve

Hatch box (SW)

Hatch box (FKC)

Decision arrow

Emptying valve

Catchpit

Scaleway

Islet

Balancing Pond

Wastewater treatment works

Mains treatment works

Cutbill headworks

Vent

Wall column

Total storage tank

Blank end

Head of Public Sewer

Micro Pumping Station

SHAPE (S)

A Arcuate

R Rectangular

C Circular

E Ellipse

H Headwork

T Triangular

U U Shape

X X Shape

NODE REFERENCING SYSTEM

1st digit: hundred metre easting identifier

2nd digit: hundred metre northing identifier

3rd digit: sewer type identifier

4th digit: next sequential node

5th = Surface Water

Drawn by: kumaria

Title: 240914\_ Main Road Nutbourne, We

Date: 12/04/2017

Southern Water