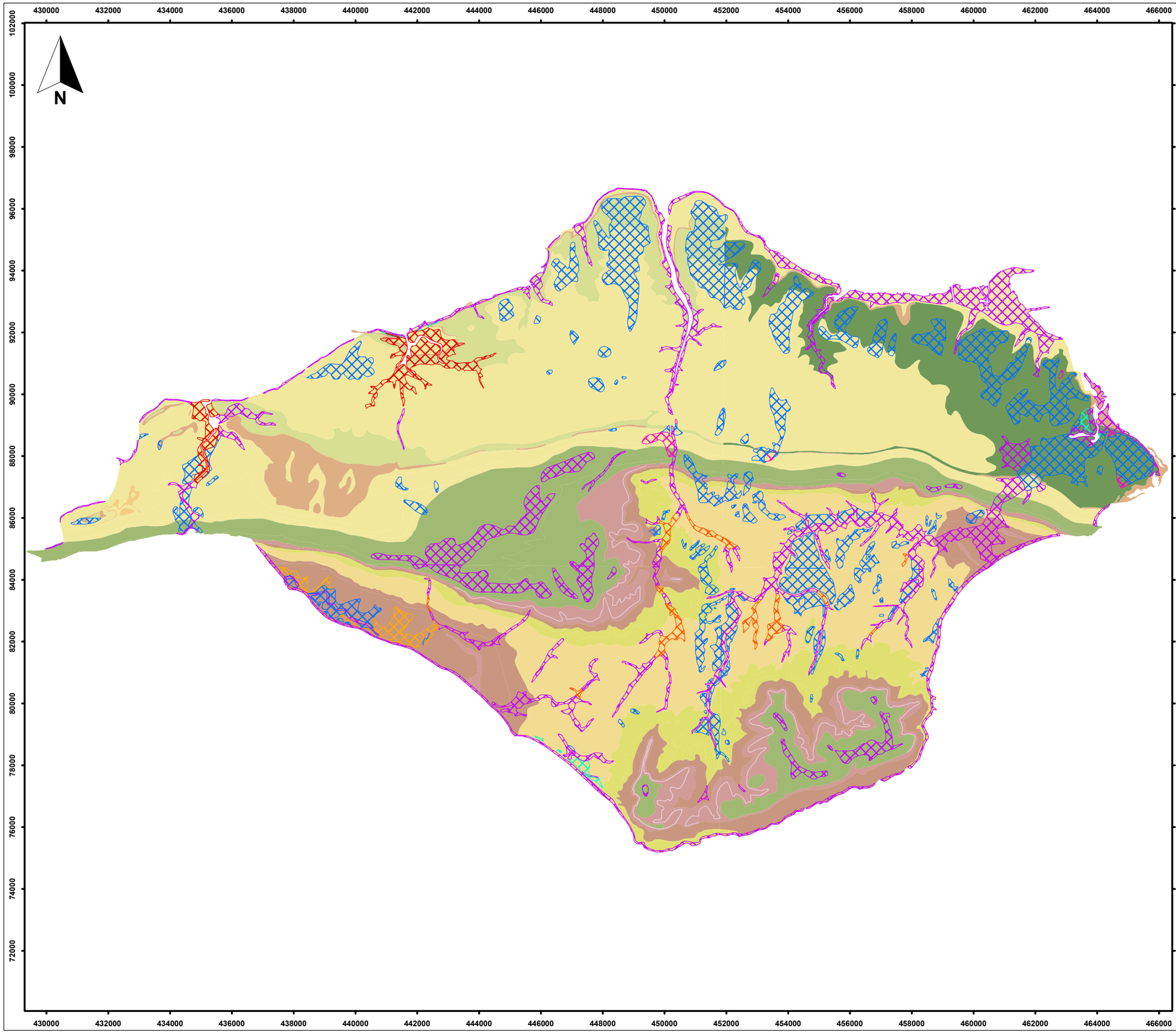
Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix A
Island Wide Mapping

June 2010

ISLE of WIGHT COUNCIL



Key:

Drift Geology

- Clay and Silt
- Clay, Silt and Sand
- Clay, Silt, Sand and Gravel
- Peat
- Sand
- Sand and Gravel
- Sand, Silt and Clay

Solid Geology

- Calcareous Mud
- Chalk
- Clay
- Clay, Silt and Sand
- Ferruginous Sandstone
- Limestone
- Limestone and Argillaceous Rocks, Interbedded
- Mudstone
- Sandstone
- Sandstone and Chert
- Sandstone, Siltstone and Mudstone

BGS Complementary Licence 2006/109A

0 1 2 3 4 5 6 Kilometers

Scale: 1:120,000 @ A3

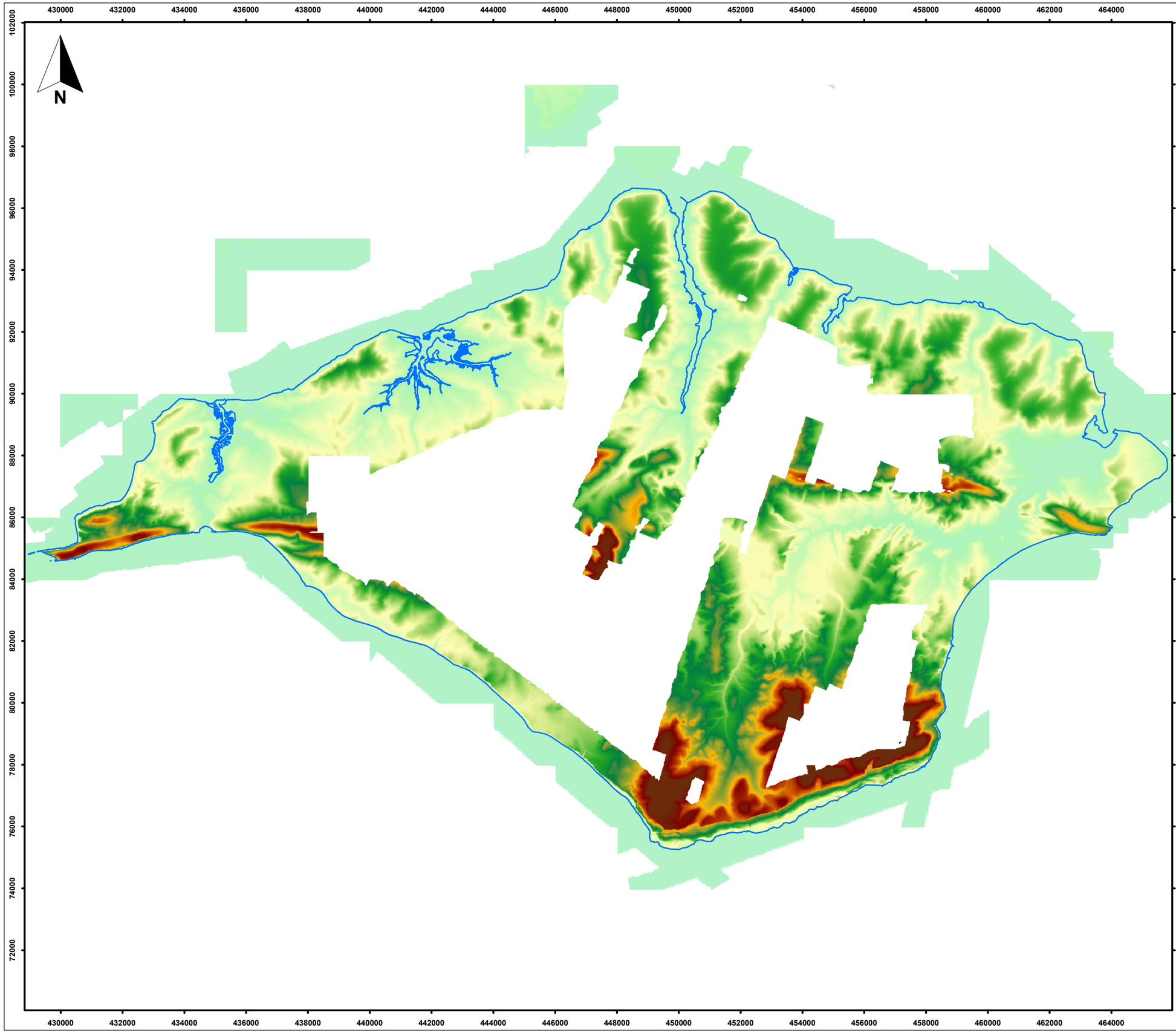
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 1
Solid and Drift Geology

November 2009
25793-A04.mxd squij

Entec



Key:

IoW Outline

Elevation

High : 240 mAOD

Low : 0 mAOD

0 1 2 3 4 5 6 Kilometers

Scale: 1:120,000 @ A3

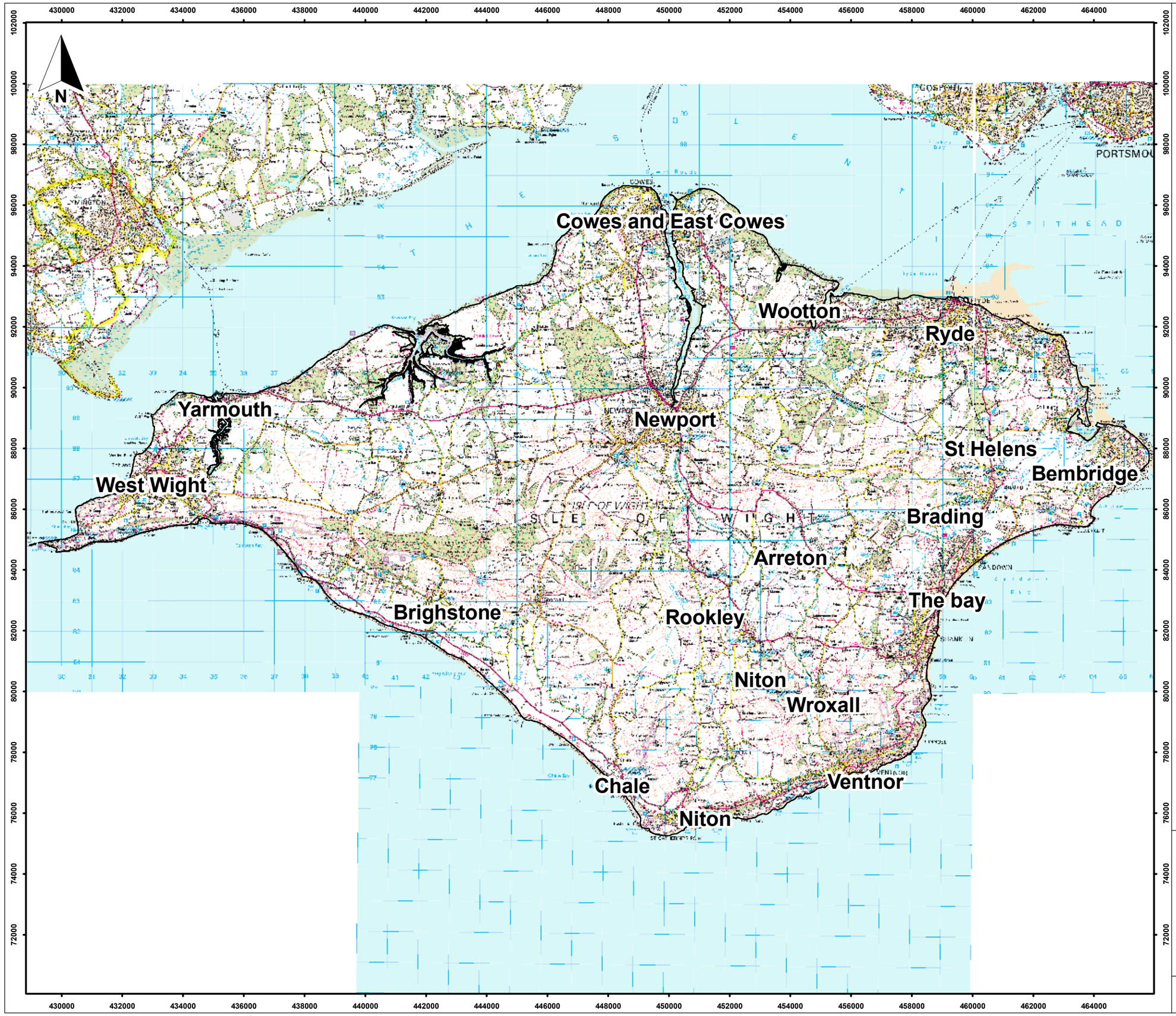
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 2
IoW LiDAR Coverage

November 2009
25793-A05.mxd squij

Entec



0 1 2 3 4 5 Kilometers

Scale: 1:120,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

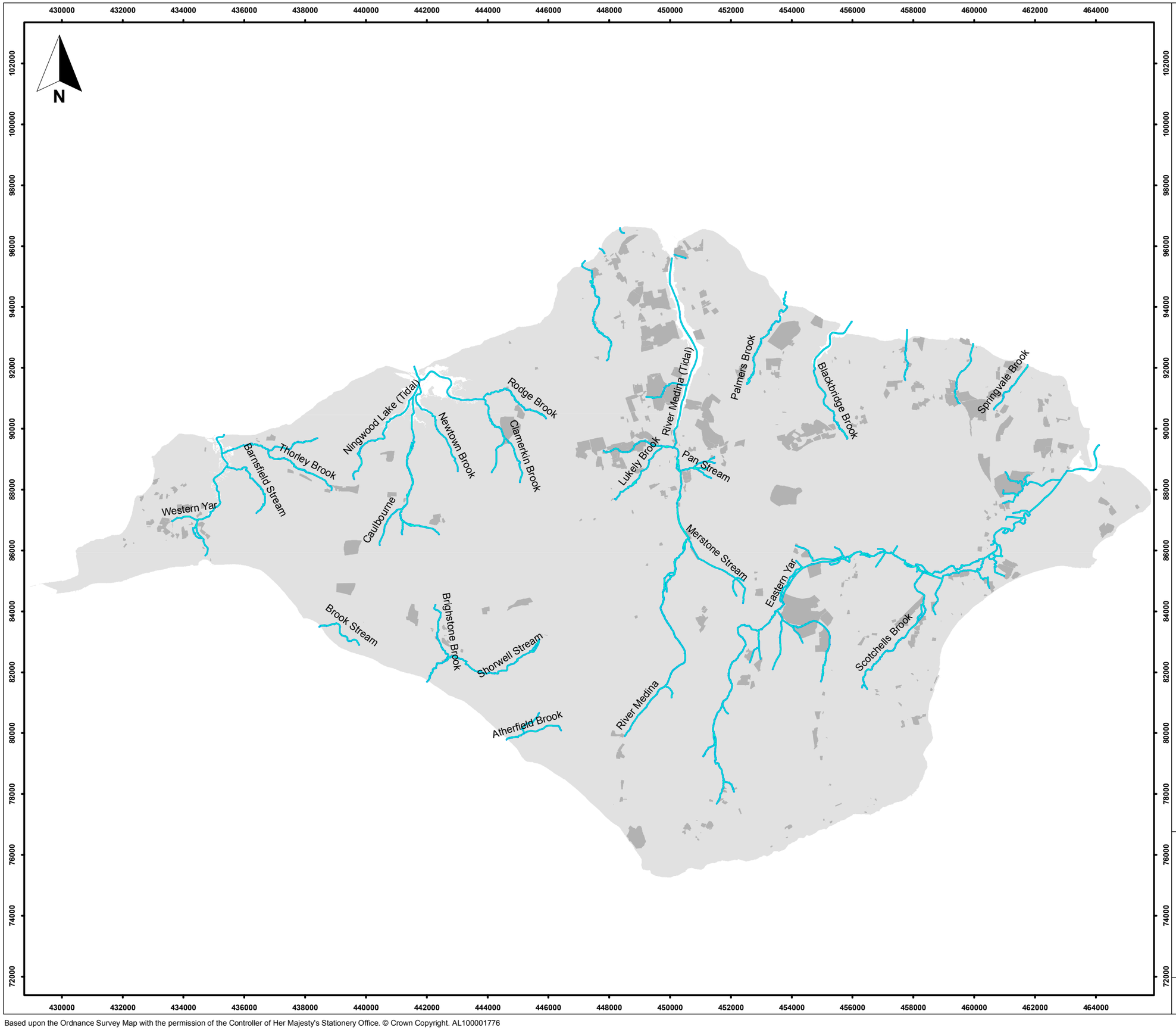
Isle of Wight SFRA MK2

Figure 3

Regeneration and Development Areas

November 2009
25793-A06.mxd squij

Entec



Key:

- Main Rivers - 20m Buffer
- IoW Outline
- Potential Development Sites

0 1 2 3 4 5 6 Kilometers

Scale: 1:120,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 4
Buffered Main Rivers (20m)

November 2009
25793-A07a.mxd squij

Entec

Key:

- Main Rivers
- Potential Development Sites
- Isle of Wight Outline
- Flood Zone 3
- Flood Zone 2

0 1 2 3 4 5 6 Kilometers

Scale: 1:120,000 @ A3

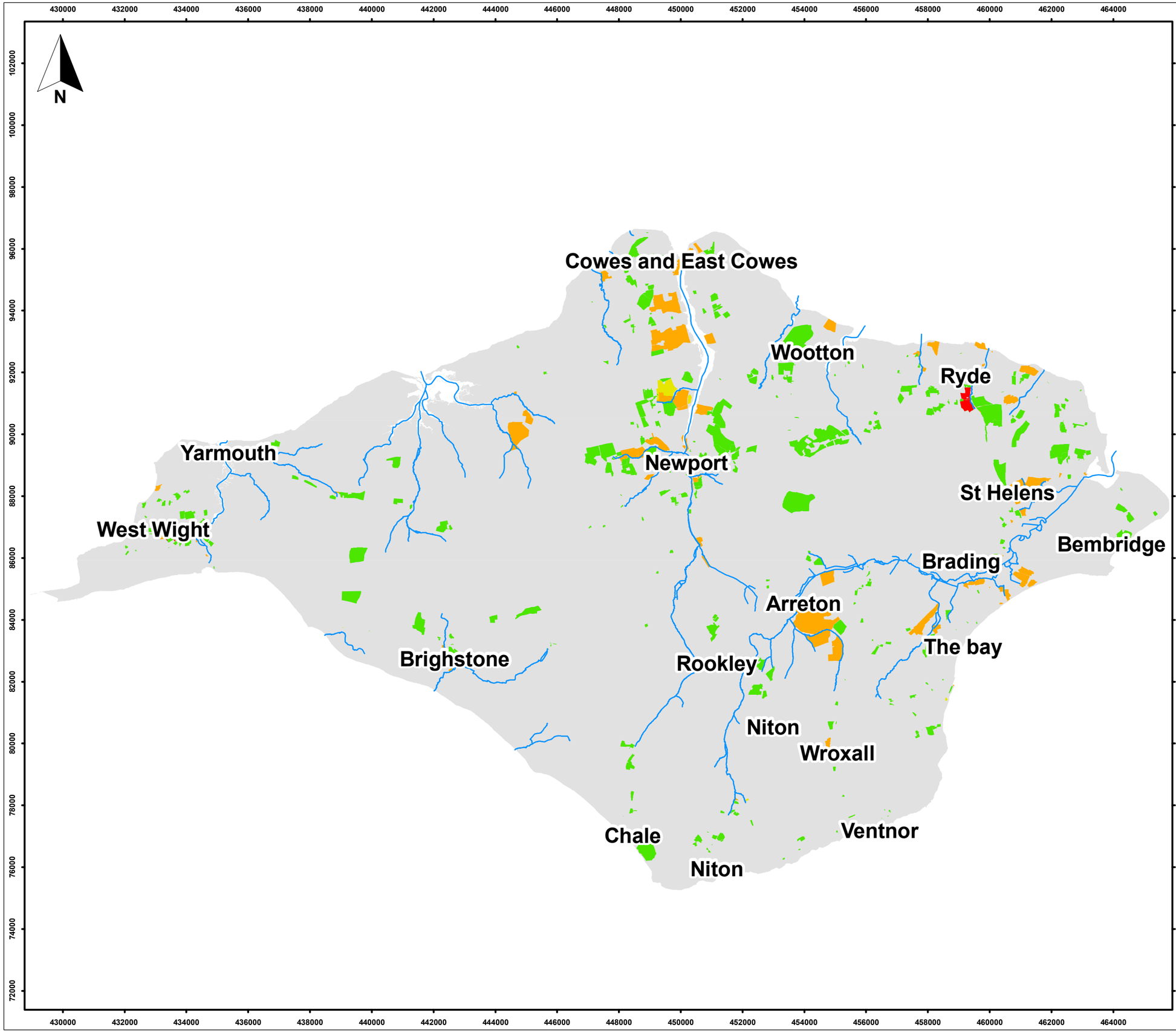
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 5
Potential Development Sites and Flood Risk

November 2009
25793-A08a.mxd squij

Entec



Key:

- Main Rivers
- Potential Development Sites
- IoW Outline

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

Notes:
Site is attributed with the flood probability associated with the highest probability flood zone the site intersects

The mapped extent of Flood Zone 3b has been used to identify Functional Floodplain
The 1 in 100 year fluvial flood zone for the present day and the 1 in 200 year tidal extent predicted for the year 2115 has been used to identify sites at a High Probability. The 1 in 1000 year fluvial flood zone for the present day and the 1 in 1000 year tidal extent predicted for the year 2115 has been used to identify sites at a Medium Probability. Sites only in Flood Zone 1 have been assigned a Low Probability

0 1 2 3 4 5 6 Kilometers

Scale: 1:120,000 @ A3

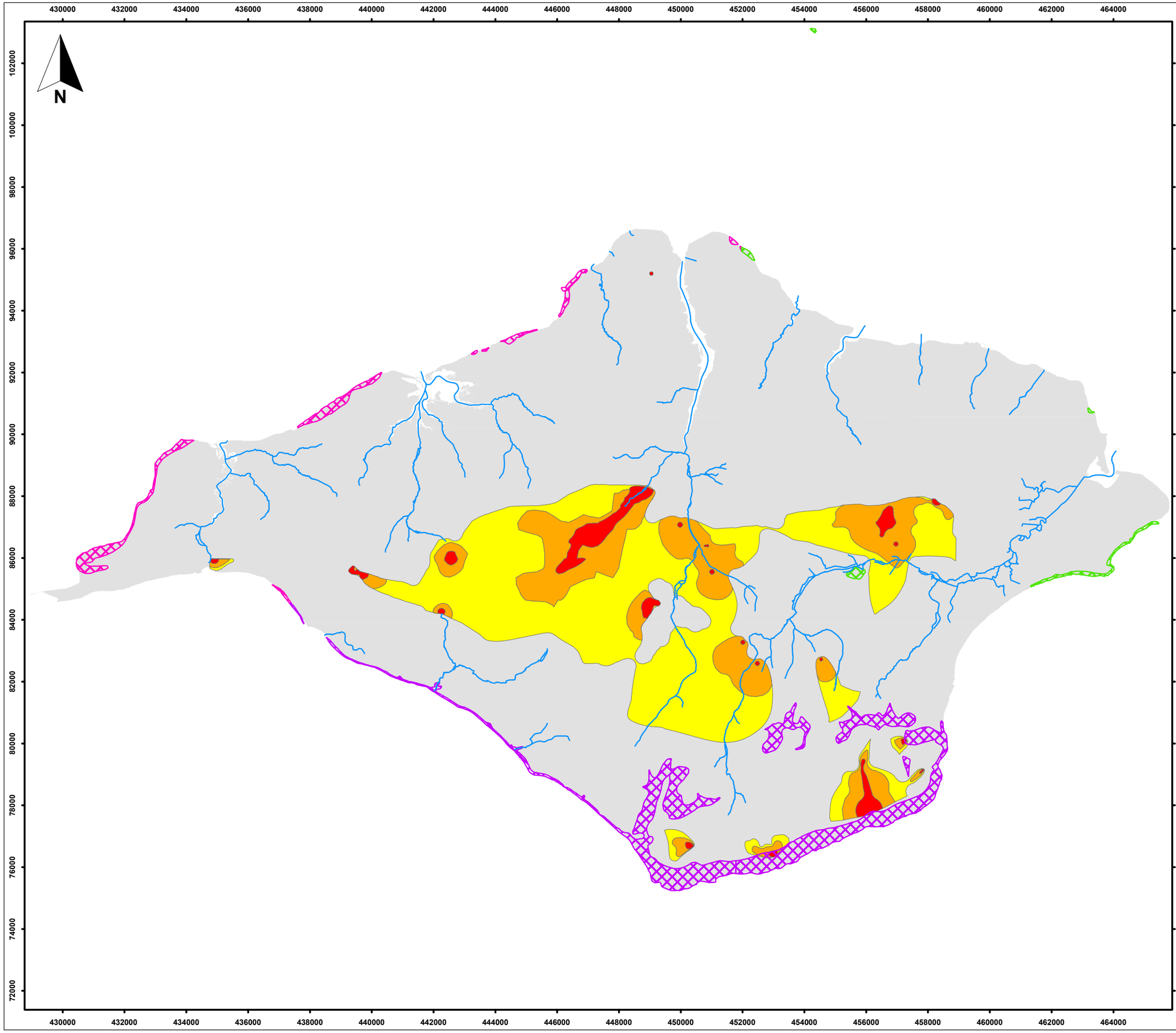
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 6
Potential Development Sites
Qualitative Flood Risk

November 2009
25793-A09a.mxd squij

Entec



Key:

Main Rivers

IoW Outline

Mass Movement - Rock Description

Clay (Undifferentiated)

Rock (Undifferentiated)

Sandstone (Undifferentiated) and Mudstone

Source Protection Zone

Inner Zone (1)

Outer Zone (2)

Total Catchment (3)

0 1 2 3 4 5 6 Kilometers

Scale: 1:120,000 @ A3

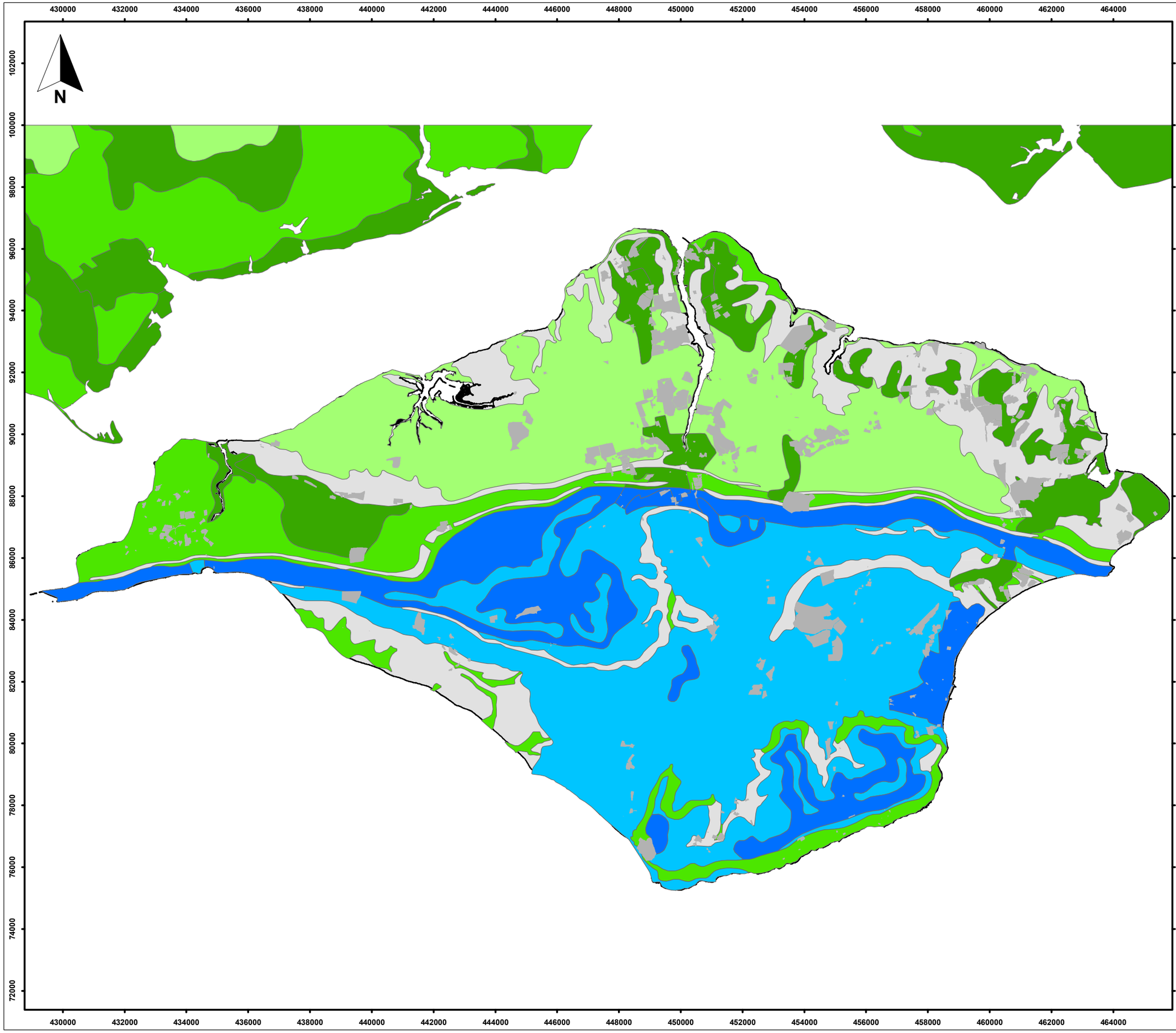
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 7
Source Protection Zones (SPZs) and areas of Mass Movement

November 2009
25793-A10.mxd squij

Entec



Key:

Potential Development Sites

Groundwater Vulnerability Classification (Aquifer Type/ Leaching Potential)

- Major / High
- Major / Intermediate
- Minor / High
- Minor / Intermediate
- Minor / Low
- Non-Aquifer

0 1 2 3 4 5 Kilometers

Scale: 1:120,000 @ A3

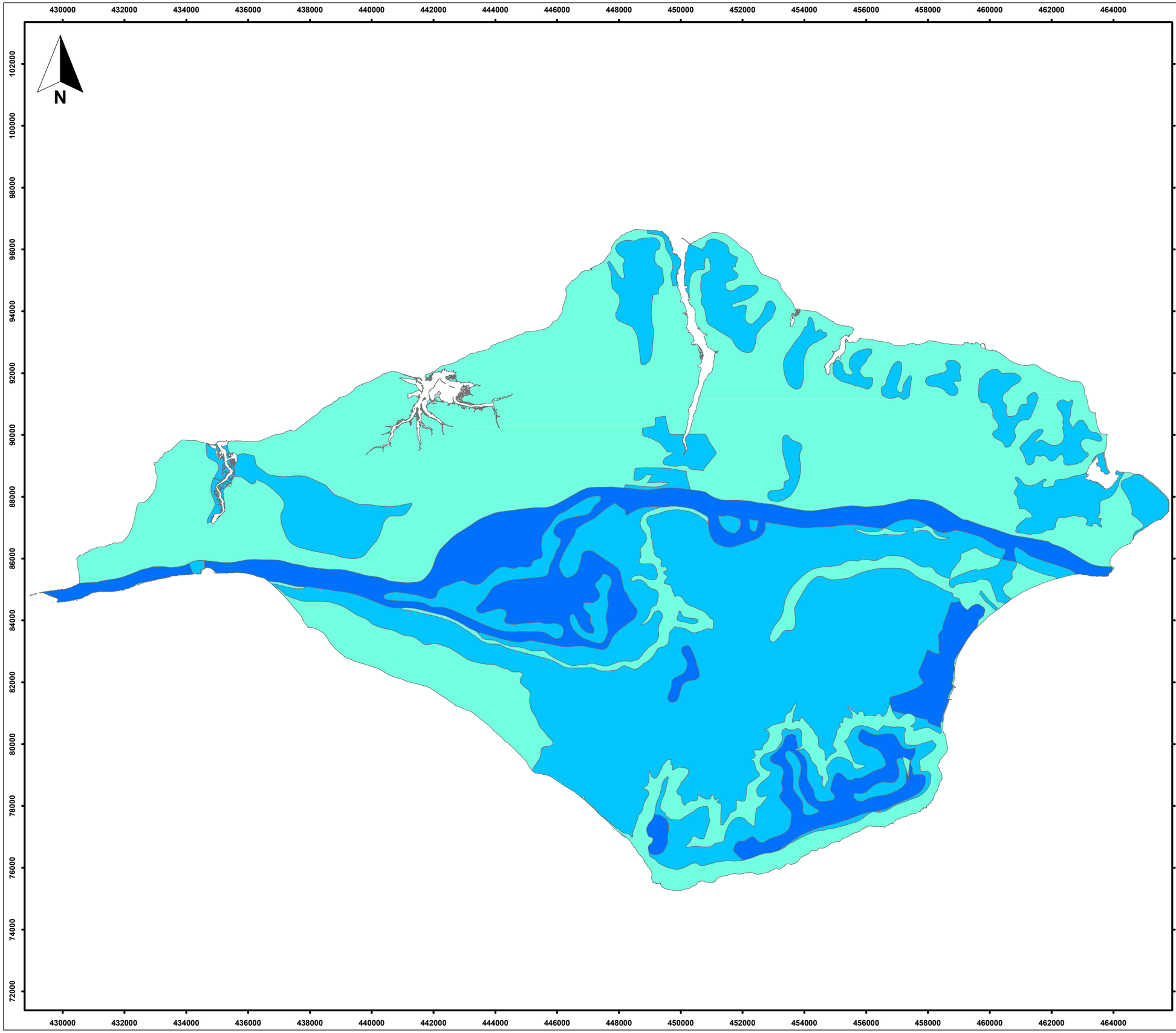
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 8
Groundwater Vulnerability Classification

November 2009
25793-A11a.mxd squij

Entec



Key:

SuDS
Infiltration Potential

- High
- Medium
- Low
- Unknown

0 1 2 3 4 5 6 Kilometers

Scale: 1:120,000 @ A3

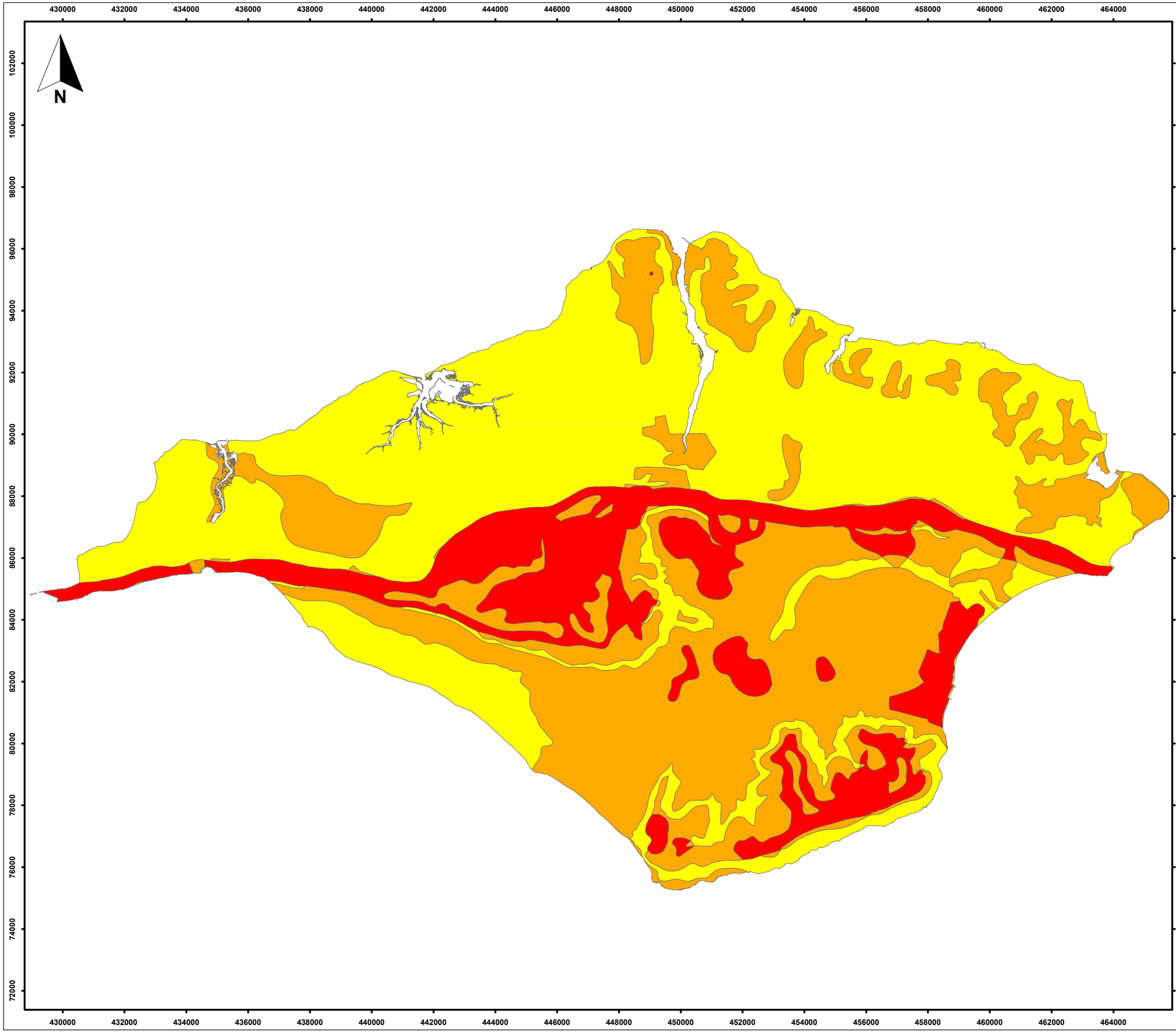
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 9
SuDS
Infiltration Potential

November 2009
25793-A12.mxd squij

Entec



Key:

SuDS
Groundwater Contamination Potential

- High
- Medium
- Low
- Unknown

0 1 2 3 4 5 6 Kilometers

Scale: 1:120,000 @ A3

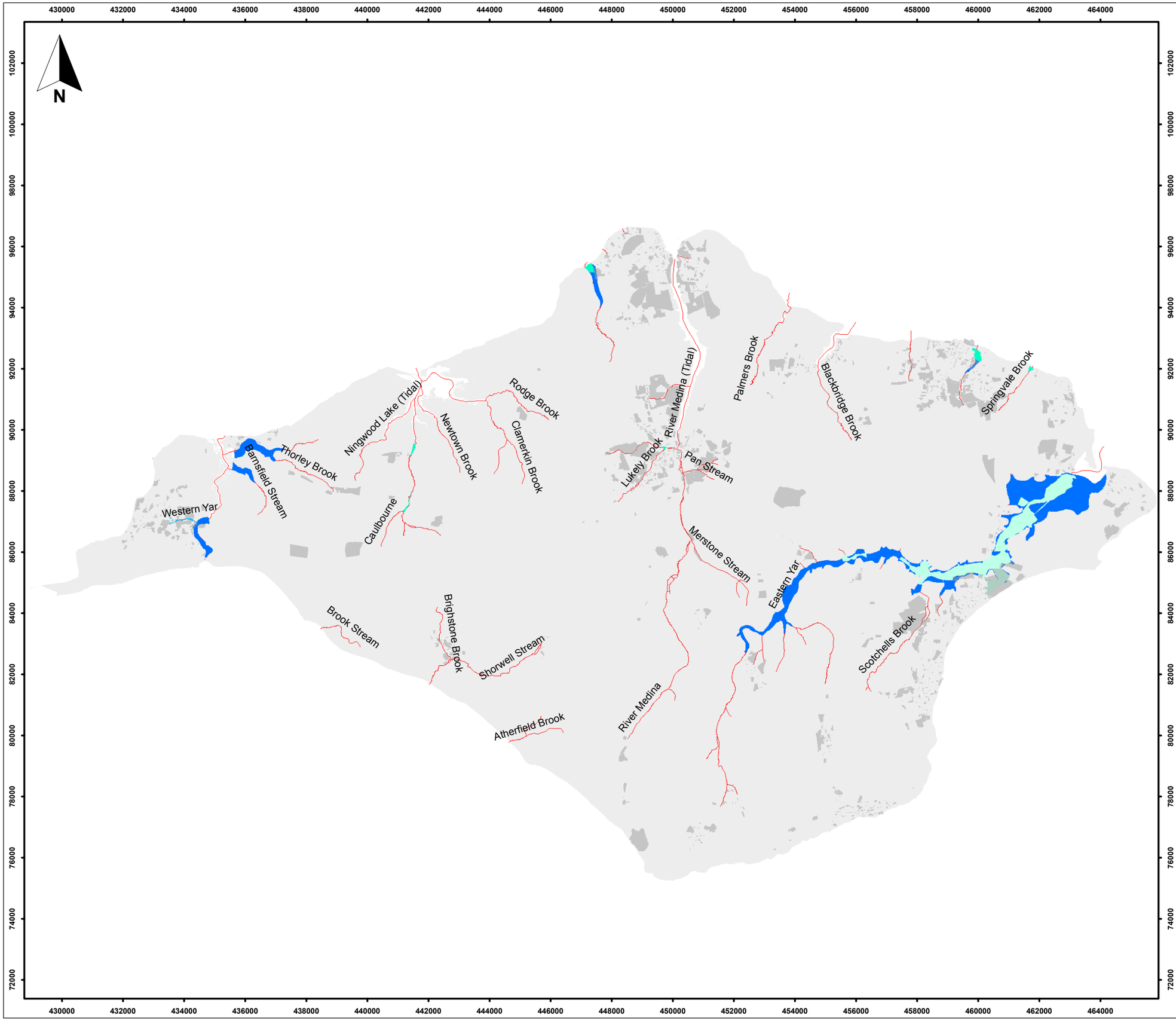
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 10
SuDS
Groundwater Contamination Potential

November 2009
25793-A13.mxd squij

Entec



Key:

Historical Flooding (Flood Year)

- 2000
- 1999
- 1993
- 1974

Potential Development Sites

IoW Outline

Main Rivers

0 1 2 3 4 5 Kilometers

Scale: 1:120,000 @ A3

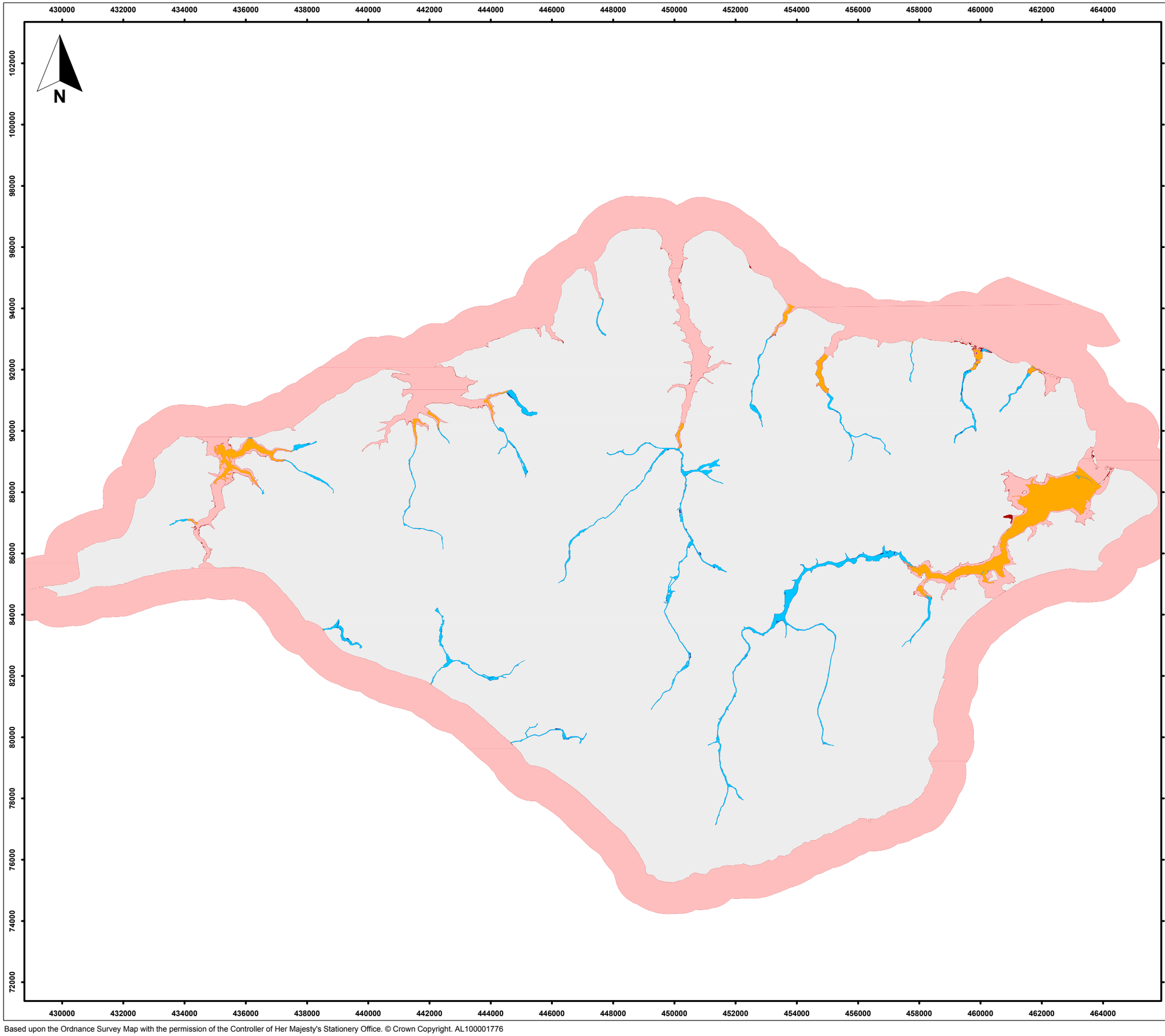
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 11
Historical Flooding

November 2009
25793-A14.mxd squij

Entec



Key:

Environment Agency Flood Zones August 2009

Flood Zone 3b

- Fluvial
- Fluvial/Tidal
- Tidal

Flood Zone 3b

- Fluvial
- Fluvial/Tidal
- Tidal

- IoW Outline

0 1 2 3 4 5 6 Kilometers

Scale: 1:120,000 @ A3

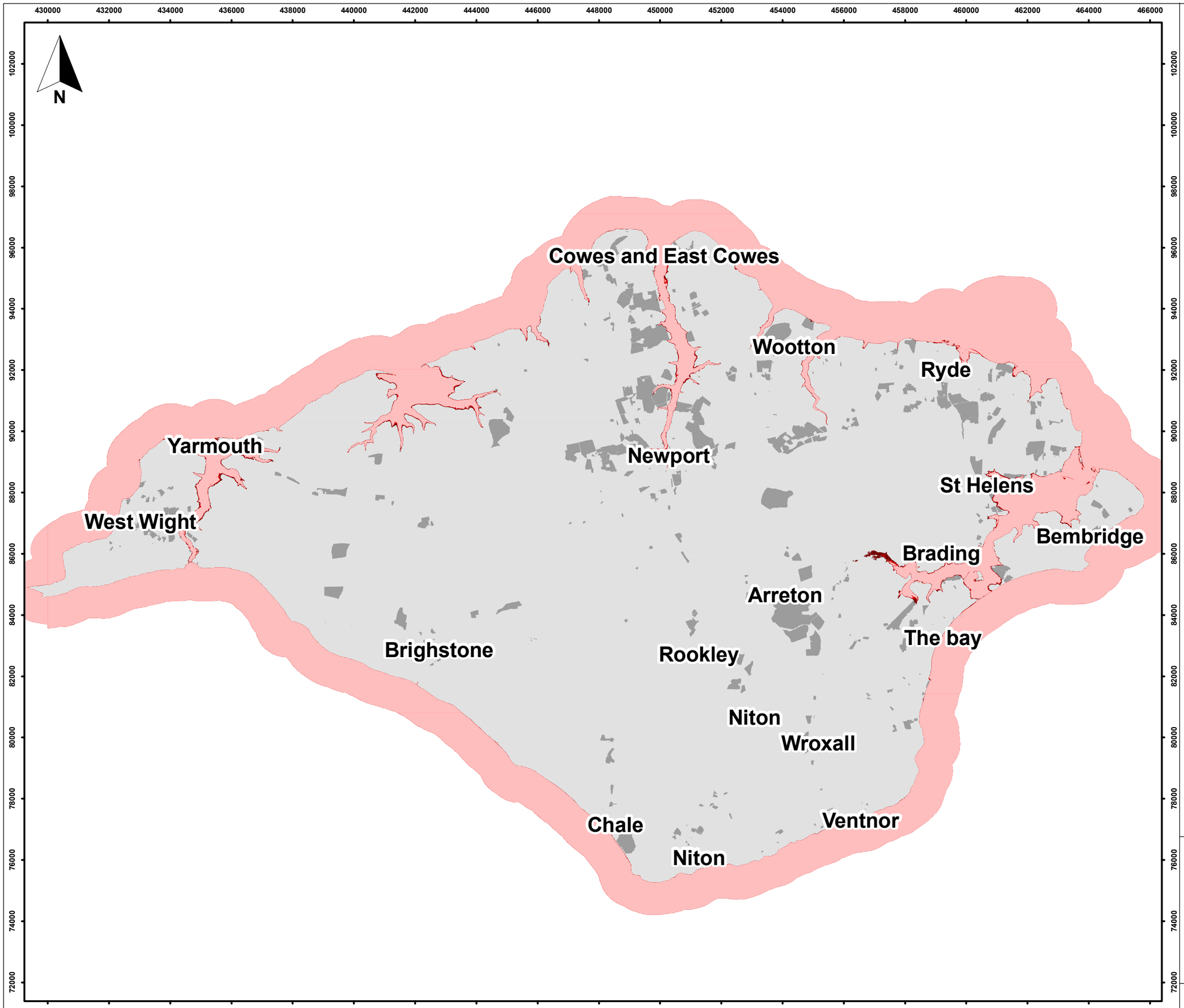
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 12
Flood Zones 2 and 3 (Tidal & Fluvial)

November 2009
25793-A15.mxd squij

Entec



Key:

Predicted 1 in 200 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115
- Potential Development Sites
- IoW Outline

0 1 2 3 4 5 6 Kilometers

Scale: 1:120,000 @ A3

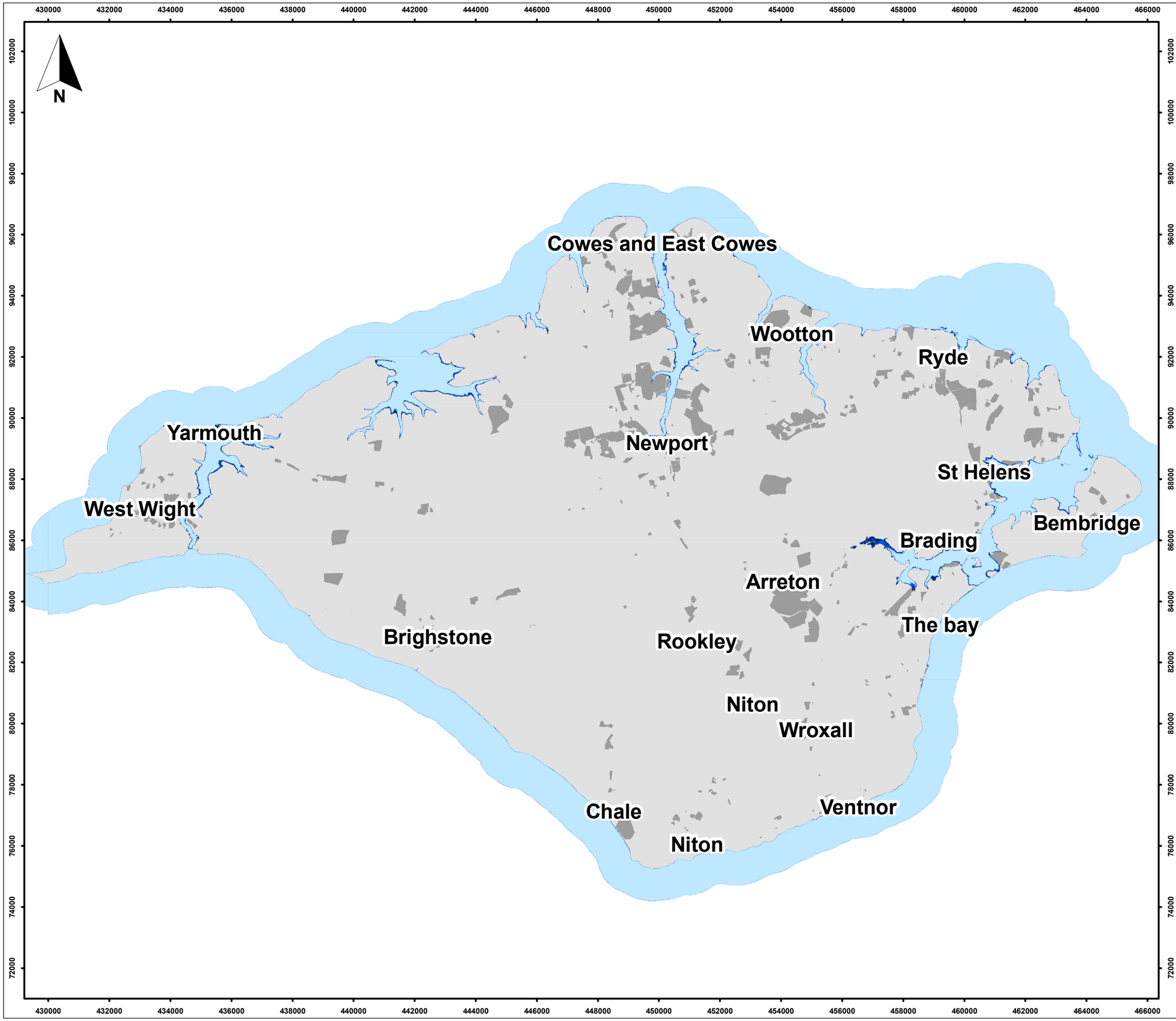
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 13
Tidal Flood Zone 3
Climate Change

November 2009
25793-A16a.mxd squij

Entec



Key:

Predicted 1 in 1000 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115
- Potential Development Sites
- IoW Outline

0 1 2 3 4 5 Kilometers

Scale: 1:120,000 @ A3

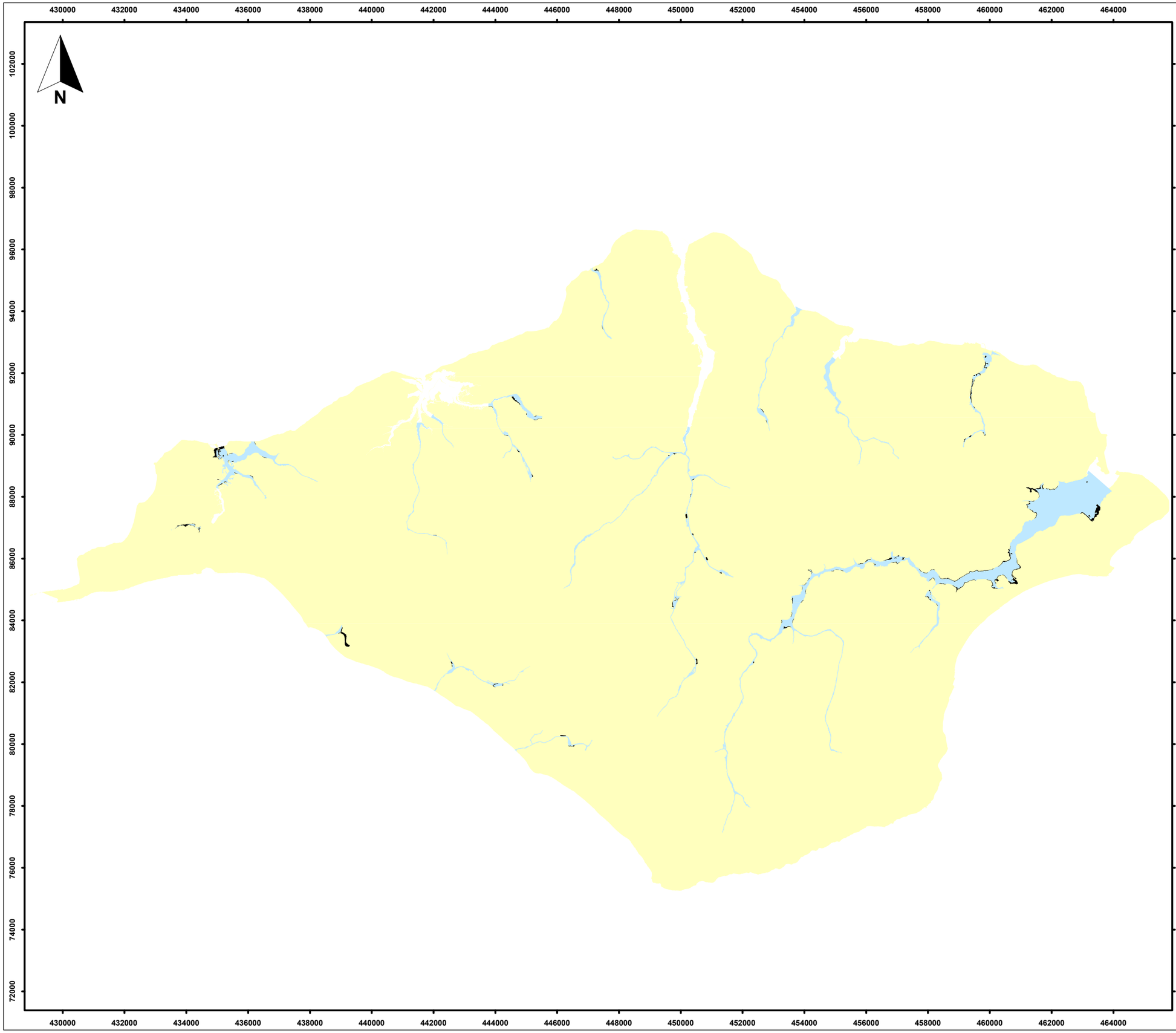
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 14
Tidal Flood Zone 2
Climate Change

November 2009
25793-A17a.mxd squij

Entec



Key:

- Fluvial floodplain areas potentially sensitive to climate change
- IoW Outline
- Fluvial Flood Zone 3

0 1 2 3 4 5 Kilometers

Scale: 1:120,000 @ A3

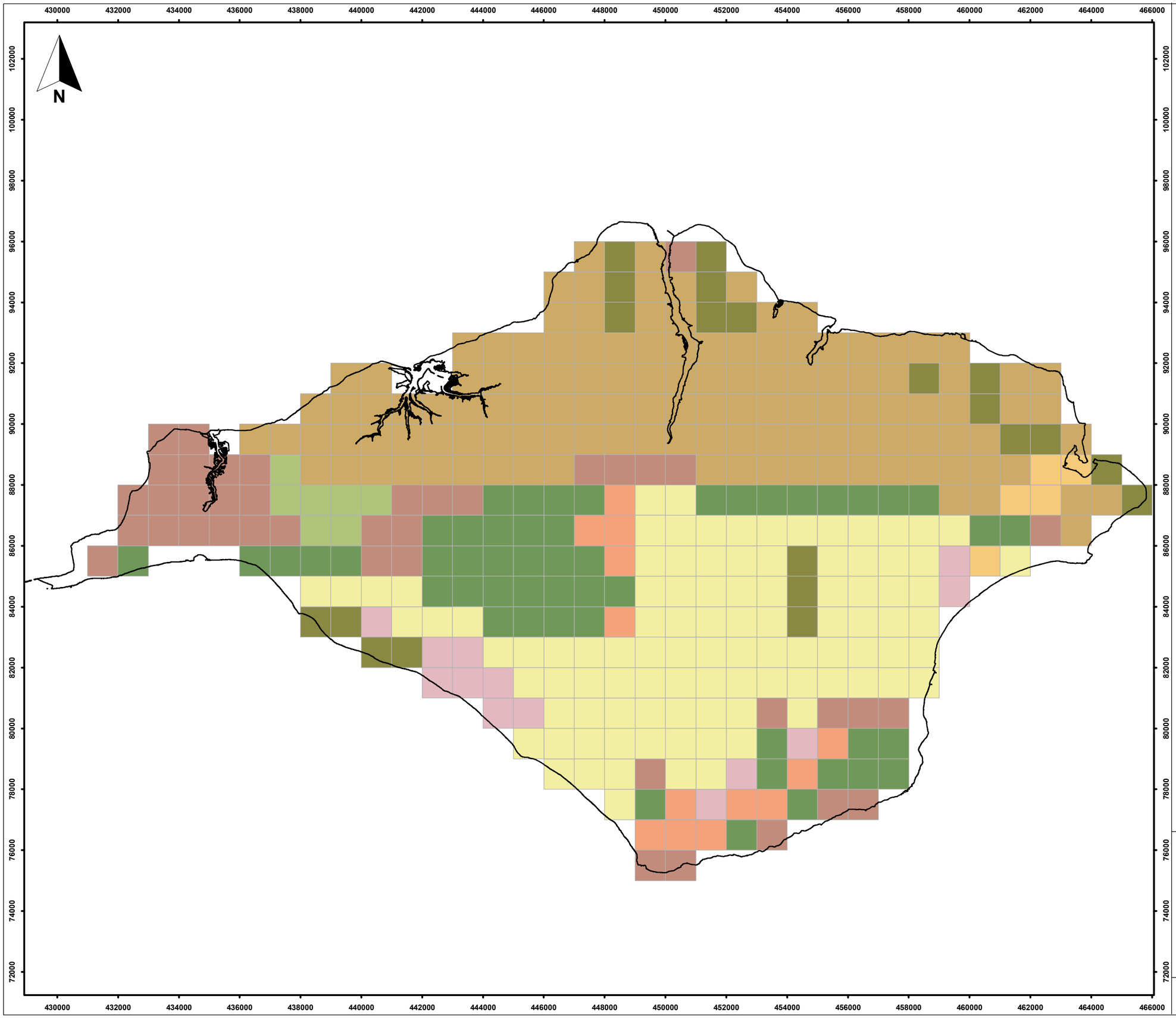
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 15
Areas of floodplain potentialy sensitive to climate change

November 2009
25793-A18.mxd squij

Entec



Key:

Soils
HOST Classes

- 1
- 2
- 3
- 5
- 9
- 16
- 18
- 20
- 25

IoW Outline

0 1 2 3 4 5 6 7 Kilometers

Scale: 1:120,000 @ A3

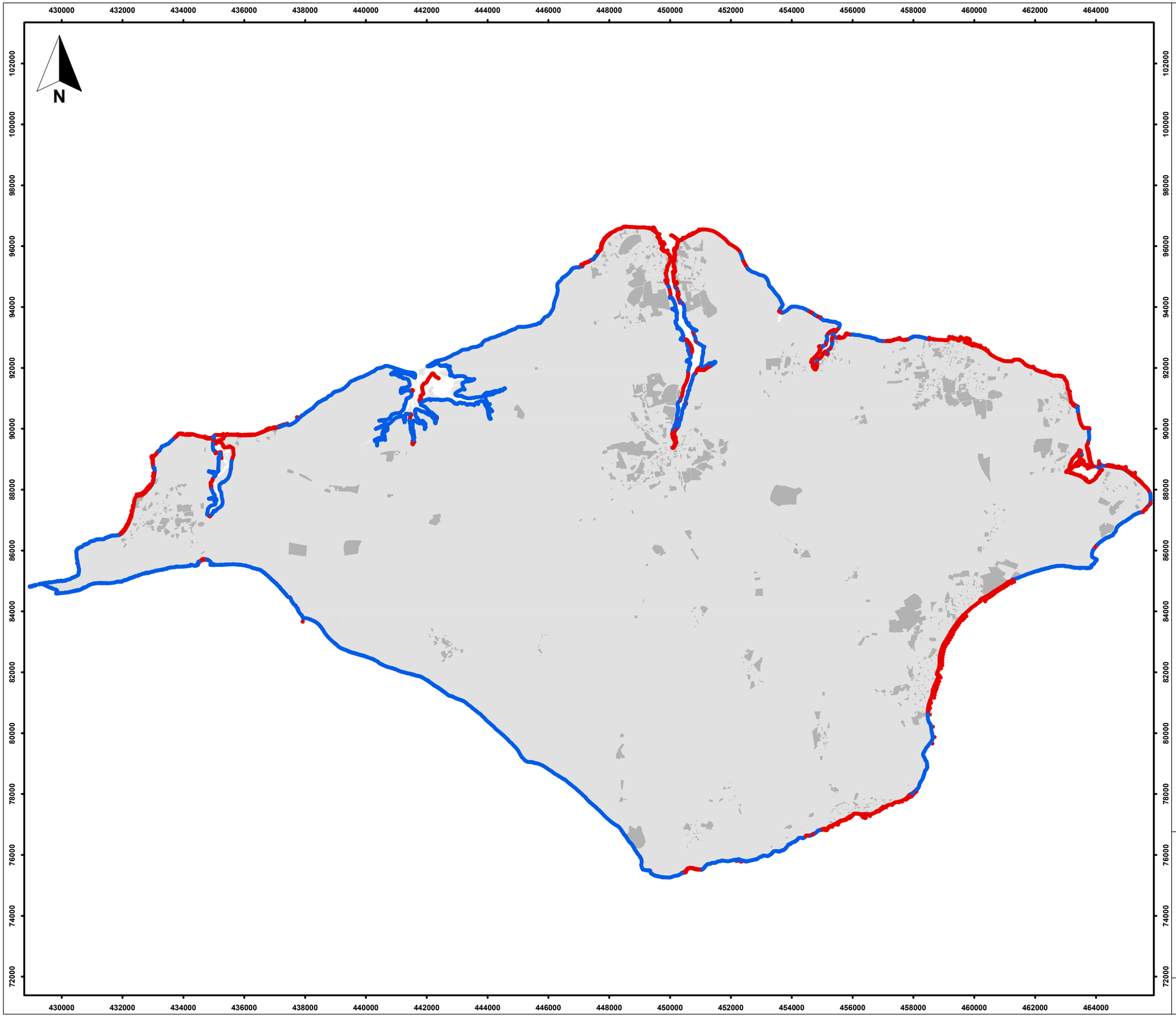
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 16
Soil HOST Classifications

November 2009
25793-A19.mxd squij

Entec



Key:

- Flood Defence Present
- No Flood Defence Identified
- IoW Outline
- Potential Development Sites

0 1 2 3 4 5 6 Kilometers

Scale: 1:120,000 @ A3

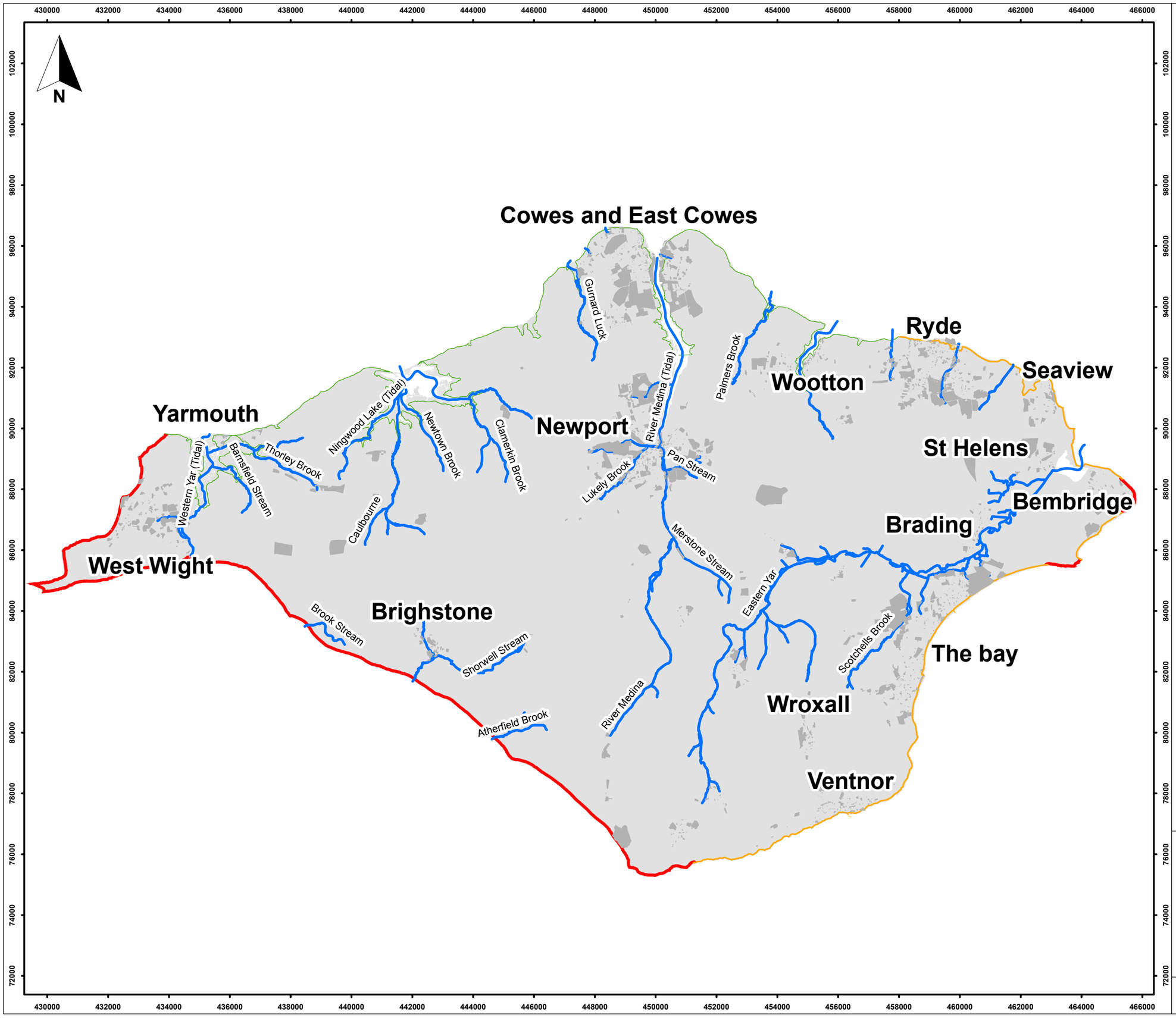
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 17
Flood Defence Condition

November 2009
25793-A20.mxd squij

Entec



Key:

Potential Exposure Risk

- High
- Medium
- Low

- Potential Development Sites
- IoW Outline
- Main Rivers

0 1 2 3 4 5 6 Kilometers

Scale: 1:120,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 18
Qualitative Wind and Wave Exposure Risk

November 2009
25793-A21.mxd squij

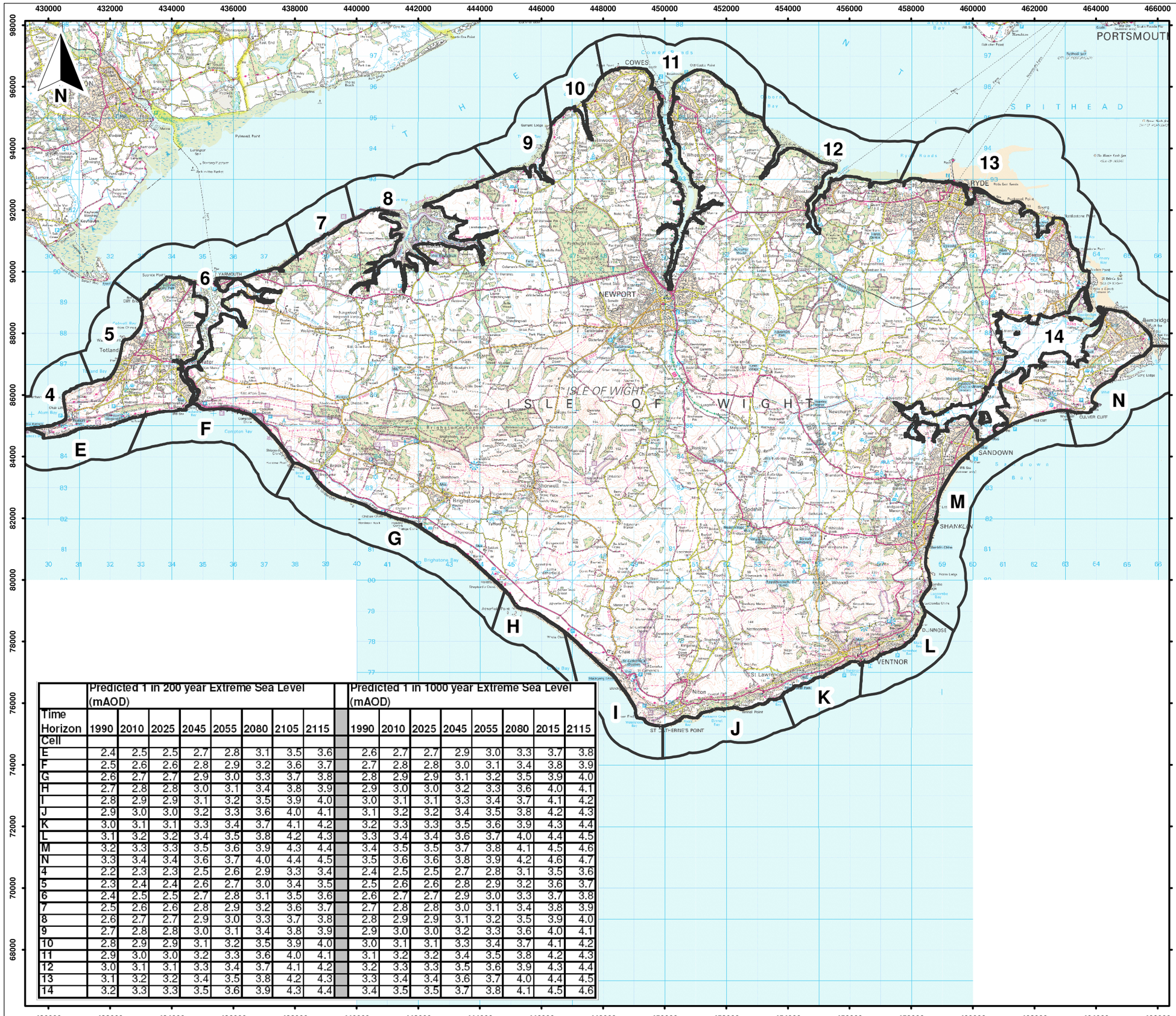
Entec

Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix B
Climate Chancge
Tide Level Predictions

June 2010

ISLE of WIGHT COUNCIL



	Predicted 1 in 200 year Extreme Sea Level (mAOD)								Predicted 1 in 1000 year Extreme Sea Level (mAOD)							
Time Horizon	1990	2010	2025	2045	2055	2080	2105	2115	1990	2010	2025	2045	2055	2080	2015	2115
Cell																
E	2.4	2.5	2.5	2.7	2.8	3.1	3.5	3.6	2.6	2.7	2.7	2.9	3.0	3.3	3.7	3.8
F	2.5	2.6	2.6	2.8	2.9	3.2	3.6	3.7	2.7	2.8	2.8	3.0	3.1	3.4	3.8	3.9
G	2.6	2.7	2.7	2.9	3.0	3.3	3.7	3.8	2.8	2.9	2.9	3.1	3.2	3.5	3.9	4.0
H	2.7	2.8	2.8	3.0	3.1	3.4	3.8	3.9	2.9	3.0	3.0	3.2	3.3	3.6	4.0	4.1
I	2.8	2.9	2.9	3.1	3.2	3.5	3.9	4.0	3.0	3.1	3.1	3.3	3.4	3.7	4.1	4.2
J	2.9	3.0	3.0	3.2	3.3	3.6	4.0	4.1	3.1	3.2	3.2	3.4	3.5	3.8	4.2	4.3
K	3.0	3.1	3.1	3.3	3.4	3.7	4.1	4.2	3.2	3.3	3.3	3.5	3.6	3.9	4.3	4.4
L	3.1	3.2	3.2	3.4	3.5	3.8	4.2	4.3	3.3	3.4	3.4	3.6	3.7	4.0	4.4	4.5
M	3.2	3.3	3.3	3.5	3.6	3.9	4.3	4.4	3.4	3.5	3.5	3.7	3.8	4.1	4.5	4.6
N	3.3	3.4	3.4	3.6	3.7	4.0	4.4	4.5	3.5	3.6	3.6	3.8	3.9	4.2	4.6	4.7
4	2.2	2.3	2.3	2.5	2.6	2.9	3.3	3.4	2.4	2.5	2.5	2.7	2.8	3.1	3.5	3.6
5	2.3	2.4	2.4	2.6	2.7	3.0	3.4	3.5	2.5	2.6	2.6	2.8	2.9	3.2	3.6	3.7
6	2.4	2.5	2.5	2.7	2.8	3.1	3.5	3.6	2.6	2.7	2.7	2.9	3.0	3.3	3.7	3.8
7	2.5	2.6	2.6	2.8	2.9	3.2	3.6	3.7	2.7	2.8	2.8	3.0	3.1	3.4	3.8	3.9
8	2.6	2.7	2.7	2.9	3.0	3.3	3.7	3.8	2.8	2.9	2.9	3.1	3.2	3.5	3.9	4.0
9	2.7	2.8	2.8	3.0	3.1	3.4	3.8	3.9	2.9	3.0	3.0	3.2	3.3	3.6	4.0	4.1
10	2.8	2.9	2.9	3.1	3.2	3.5	3.9	4.0	3.0	3.1	3.1	3.3	3.4	3.7	4.1	4.2
11	2.9	3.0	3.0	3.2	3.3	3.6	4.0	4.1	3.1	3.2	3.2	3.4	3.5	3.8	4.2	4.3
12	3.0	3.1	3.1	3.3	3.4	3.7	4.1	4.2	3.2	3.3	3.3	3.5	3.6	3.9	4.3	4.4
13	3.1	3.2	3.2	3.4	3.5	3.8	4.2	4.3	3.3	3.4	3.4	3.6	3.7	4.0	4.4	4.5
14	3.2	3.3	3.3	3.5	3.6	3.9	4.3	4.4	3.4	3.5	3.5	3.7	3.8	4.1	4.5	4.6

Key:

Isle of Wight Coastal Cells

Notes:

The Costal Cells illustrated in FIgure 1 were provided by the Environmnet Agency and the 1990 base sea levels were confirmed by the Environment Agency on the 07/09/09. The climate change predictions are based on the incremantal rates provided in Table B.1. in PPS25 (South East figures)

0 1 2 3 4 5 6 Kilometers

Scale: 1:120,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\MXDS - CC mapping update

IoW SFRA

Figure 1
Coastal Cells and Predicted Extreme Sea Levels

September 2009
25793-A001 RAMPJ

Entec

Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix C
SFRA GIS Data Discussions

June 2010

ISLE of WIGHT COUNCIL

Source Data Discussion

Many datasets were requested for use in this SFRA, and these were primarily received from the Isle of Wight Council and the Environment Agency. These geographic data had various formats by which they were made available and originated from different sources (e.g. digitised paper maps, survey data and satellite data).

The following is a short description of the source data GIS data used during the course of the SFRA. Where available, the reference scale of the map has been included in order to indicate the maximum scale of use for which the map was intended.

Ordnance Survey Basemap

A high level topographic map which provides an overview of the Island and the RDA's was used as a basemap where detailed ordnance information was not required. This map includes data such as the road network, green areas and contours. The data of this map was captured at 1:50,000 reference scale.

Mastermap

Mastermap data was made available by the IoW Council. This dataset is an accurate source of ordnance survey data that informed the SFRA at RDA and site specific scale. The reference scale of the dataset differs depending on the degree of urbanisation, with urban areas having a capture standard of 1:1,250 while for rural areas detail is reduced.

Potential Development Sites

Potential development sites were supplied the IoW Council and included several different datasets of '*Sites*', '*Large Sites*' and '*Employment Sites*'. This dataset identified those areas on the Island that were/might be considered for development. The reference scale of this dataset is unknown. Section 6 provides further details of the potential development sites on the Island.

Geology

Geological maps of the Island were sourced from the British Geological Society (BGS) on behalf of the Council. The datasets included solid (bedrock), drift (superficial), artificial geological maps, as well as linear geological features and areas of mass movement. The reference scale of these maps are 1:63,360. The mass movement dataset is discussed in greater detail in Section 7.3.1.

Soils

Soils data for the Island was sourced from a national gridded dataset of soils. This dataset is comprised of 1km^2 cells with attributed values for the percentage composition of various soils for the cell of interest. The dataset also

contains a HOST value for the soils in the cell. Given that the data originated in a 1km^2 grid, specific detail about the spatial distribution of soils was lacking. Section 7.3.3 provides additional detail.

Groundwater Vulnerability

A digital dataset of groundwater mapping was provided by the Environment Agency. These maps show the vulnerability of groundwater as a combination of aquifer type and soils. The reference scale for this dataset is 1:100,000. Since soils data are included in the dataset, it was possible to supplement the less accurate national soils grid. Sections 7.3.1 and 7.3.2 discuss this dataset in greater detail.

Source Protection Zones

Source Protection Zones were provided by the Agency for the Isle of Wight. The zones show the risk of contamination from activities that might cause pollution to aquifers used for public water supply. The closer the potential contamination activity is to the abstraction point, the greater the risk classification. The reference scale of this dataset is unknown. Section 7.3.1 provides further information.

Environment Agency Main Rivers

The main rivers on the Island were sourced from an Environment Agency dataset of rivers defined as larger streams and rivers, including smaller watercourses of local significance.

Fluvial and Tidal Flood Outlines for Zones 2 and 3

The Environment Agency provided a digital dataset of the Island which outlined those areas affected by flooding. The data was divided according to flood zone 2 and 3, as well as fluvial and tidal. This data is sourced from modelling done for the Agency which used Synthetic Aperture Radar (SAR) elevation data.

Environment Agency Flood Model Outlines

The Environment Agency provided flood model outlines of various return periods for some of the rivers on the Island, including the Medina, Monkton Mead and Western Yar. This data was used where necessary, to update the fluvial flood outlines provided by the Agency. The accuracy of the datasets is dependant on the modelling process and its input data. The application of this data is discussed further in Section 5.

Historic Flood Outlines

Historic flood outlines were also provided by the Agency. The past flooding events included the years 1974, 1993, 1999 and 2000. The annual exceedence probability of the flood outlines is unknown, and as such, they were used to supplement the existing flood outlines. The reference scale of these outlines is unknown and is dependant on the

accuracy of the original data and the scale at which they were digitised. Sections 2 and 6 provide further information about historic flooding on the Island.

Flood Defences

The National Flood and Coastal Defence Database from the Agency was the source for the location, extent and level of protection of flood defences on the Island. The reference scale of this dataset is unknown.

Data Precision

Each data source has an associated level of precision. The groundwater water vulnerability mapping has a reference scale of 1:100,000. Whereas LiDAR data has a 2 metre resolution, which means that each 2m by 2m area of land is assigned a single elevation value. Much of the Island wide data (e.g. Groundwater Vulnerability Mapping, Source Protection Zones and Soils Data) come from national data sets, the spatial precision of which is low, but appropriate for strategic Island wide assessments. The individual potential development sites are attributed with values derived from these low precision national datasets (e.g. the generalised classifications of infiltration SuDS suitability, groundwater vulnerability and runoff potential). It must be noted that the precision of the data does not increase despite the analysis being performed on the smaller site specific scale.

It is important that the site specific detail of the datasets covered in the following section be considered in respect to the level of accuracy of the source data. The reference scale of any of the original source data should be deemed as the maximum scale at which the data is considered accurate.

Datasets Produced by the SFRA

'Sites Database'

The purpose of this section is to detail the method by which the potential site attribution dataset was created. Much of the relevant detail is mentioned in previous sections, and therefore the intention is to provide an overview of how a single attribute was assigned to a site which was covered by multiple attribute values. The attribute fields in this dataset were derived as follows:

PERC_FZ1

This defines the percentage area of the site which falls within Flood Zone 1.

PERC_FZ2

This defines the percentage area of the site which falls within Flood Zone 2.

PERC_FZ3a

This defines the percentage area of the site which falls within Flood Zone 3a.

PERC_FZ3b

This defines the percentage area of the site which falls within Flood Zone 3b.

FRA_REQ

Sites were categorised into those requiring and not requiring a FRA. This was determined by whether or not a site was within any of the flood zones as recorded by the fields (Func_FP, FZ3_T, FZ3_F, FZ2_T and FZ2_F) and whether or not the site was over 1ha. Sections 3 and 4 provide an overview of the flood risk zones as defined by PPS25.

FUNC_FP, Func_FP, FZ3_T, FZ3_F, FZ2_T and FZ2_F

Each site was attributed as to the flood zones into which it either partially or completely fell. This categorisation was independent of scale, such that a site was accordingly attributed even if only fractionally touched by a flood zone. Details about the flood zones as defined by PPS25 are found in Section 3.

PROBABILIT

By assessing whether a site fell within a flood risk area, and the maximum flood risk posed, it was possible to assign a qualitative attribute to each of the affected sites corresponding to the qualitative descriptions used by PPS25. This attribution applied a precautionary approach by identifying the greatest flood risk posed to a site.

APP_USES

The various fields recording flood risk to the sites allowed for an initial assessment of appropriate land uses for each site. Thus a site falling outside the flood zone was attributed as not having any restrictions in terms of suitable uses, while for sites falling within flood risk zone, a precautionary approach was used, identifying the most severe flood risk falling on the site, and specifying appropriate uses accordingly. It is therefore advisable to consult the site specific flood risk definition dataset to determine the site distribution be consulted. Table D.2 of Annex D PPS25, as replicated in Appendix B provides further information.

HISTORIC

Historic flood outlines were provided by the Environment Agency for the Island. These outlines provided supporting information of those areas already identified at risk of flood as defined by the functional floodplain, flood zone 2 and flood zone 3 as well identifying potential flood risk areas not included in the Environment Agency

maps. The sites were therefore attributed with the month and year for each of the historic floods which they intersected. This categorisation was independent of scale, such that a site was accordingly attributed even if it only fractionally passed through a historic flood zone. Section 3 contains further detail about historic flooding on the Island.

M_RIV_BUFF

A generic assessment of the influence of major rivers on flood risk was carried out, since the fluvial flood risk zones as defined by the Agency do not cover all the main rivers on the Island. It was therefore agreed at a meeting between the IoW Council, the Agency and Entec (on the 18 September 2007), that a 20m buffer would be applied to all major rivers on the Island. Sites that intersected the buffered rivers where then attributed accordingly. This advice is in line with current Agency requirements, since as the Environment Agency is a statutory consultee under Town and Country Planning Act, their authority extends past areas within Flood Zone 2 and 3, and includes development within 20 metres of main rivers. The buffer is 20m either side of the main river centreline.

WAVE_RISK

The assessment of potential Wave exposure risk is detailed in Section 5. The objective of the assessment was to identify areas potentially susceptible to wave action and spray. A three tier classification has been applied which is based upon a consideration of the exposure of the coastline, prevailing wind and recorded wave heights. The coastline has either been classified as having a high. Medium or low risk of potential wave exposure. The purpose of which is to indicate to future developers that this potential risk should be assessed and addressed when developing along the coastline, so that development can be appropriately designed.

FLUVIAL_CC

Climate change on fluvial flood risk was also necessary to assess, since rainfall intensities and hence peak river flows are likely to increase on the Island in the future, resulting in the extension of current fluvial flood zones. Section 4 discusses this in more detail, and provides clarity on the assumptions and simplifications made.

Once areas of fluvial climate change were identified, it was then possible to attribute the sites with an attribute as to whether or not they intersected the identified fluvial climate change areas. A site was accordingly attributed even if it only fractionally passed through an area " *of Fluvial Floodplain Potentially Sensitive to Climate Change*. (See Figure 15 in Appendix A for the areas identified as being potentially sensitive)

SUDS_SUIT and SUDS_VUL

The applicability of SuDS on the Island was a component of the work undertaken as part of the SFRA. This was done in order to provide a site by site generalisation of the suitability of SuDS as categorised by attenuation vs. infiltration techniques. Section 7 provides a description of the origin of the datasets used to attribute the sites, and the processing involved to arrive at the two SuDS classifications.

SUDS_SUIT was assigned to each site it describes the suitability of infiltration SuDS techniques. If a site was predominantly in an area of 'high' infiltration suitability, and only a small portion was intersected by a 'low' infiltration suitability area, a worst case scenario was assumed, and the resulting *SUDS_SUIT* attribution for that site was recorded as 'low'. Areas of mass movement were assigned a low suitability

SUDS_VUL this classification describes the potential for the contamination of groundwater. This assessment was based on Groundwater protection Zones and three classifications of were produced, low, medium and high. As with *SUDS_SUIT* a worst case scenario was assumed in that if a site was predominantly in an area of low contamination potential but with a small portion in an area of medium contamination potential – the site was assigned a medium contamination potential.

RUNOFF_POT

A component of all FRA's is the requirement for an assessment of site drainage to be undertaken. This process is site-specific and would be inappropriate for the purposes of a SFRA, as 7.3.3 details. Nonetheless, an initial Island wide assessment of runoff potential was carried out, since it provides a preliminary indication of runoff.

This assigned a qualitative attribute to each site of very low, low, medium, high or very high. This attribution was determined through the *SPR_HOST* for each site, which in turn was assigned according to the *HOST* classification for the site. Unlike much of the previous attribution in the dataset, *RUNOFF_POT* required that the predominant *HOST* class for each site be assigned as the attribute value for that site. Therefore, each site was attributed according to the *HOST* class most prevalent (assuming a site was intersected by more than one class). It should be noted though, that some sites were not covered by the original *HOST* dataset, and were therefore attributed as 'unknown'.

Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix D
Useful Extracts from PPS25

June 2010

ISLE of WIGHT COUNCIL

Table D.1: Flood Zones

(Note: These Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences)

Zone 1 Low Probability

Definition

This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).

Appropriate uses

All uses of land are appropriate in this zone.

FRA requirements

For development proposals on sites comprising one hectare or above the vulnerability to flooding from other sources as well as from river and sea flooding, and the potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off, should be incorporated in a FRA. This need only be brief unless the factors above or other local considerations require particular attention. See Annex E for minimum requirements.

Policy aims

In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of sustainable drainage techniques.

Table D.1: contd.

Zone 2 Medium Probability

Definition

This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% – 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% – 0.1%) in any year.

Appropriate uses

The water-compatible, less vulnerable and more vulnerable uses of land and essential infrastructure in Table D.2 are appropriate in this zone.

Subject to the Sequential Test being applied, the highly vulnerable uses in Table D.2 are only appropriate in this zone if the Exception Test (see para. D.9.) is passed.

FRA requirements

All development proposals in this zone should be accompanied by a FRA. See Annex E for minimum requirements.

Policy aims

In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area through the layout and form of the development, and the appropriate application of sustainable drainage techniques.

Zone 3a High Probability

Definition

This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

Appropriate uses

The water-compatible and less vulnerable uses of land in Table D.2 are appropriate in this zone.

The highly vulnerable uses in Table D.2 should not be permitted in this zone.

The more vulnerable and essential infrastructure uses in Table D.2 should only be permitted in this zone if the Exception Test (see para. D.9) is passed. Essential infrastructure permitted in this zone should be designed and constructed to remain operational and safe for users in times of flood.

FRA requirements

All development proposals in this zone should be accompanied by a FRA. See Annex E for minimum requirements.

Table D.1: contd.

Zone 3a High Probability *(continued)*

Policy aims

In this zone, developers and local authorities should seek opportunities to:

i. reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage techniques;

ii. relocate existing development to land in zones with a lower probability of flooding; and

iii. create space for flooding to occur by restoring functional floodplain and flood flow pathways and by identifying, allocating and safeguarding open space for flood storage.

Zone 3b The Functional Floodplain

Definition

This zone comprises land where water has to flow or be stored in times of flood. SFRAs should identify this Flood Zone (land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1%) flood, or at another probability to be agreed between the LPA and the Environment Agency, including water conveyance routes).

Appropriate uses

Only the water-compatible uses and the essential infrastructure listed in Table D.2 that has to be there should be permitted in this zone. It should be designed and constructed to:

– remain operational and safe for users in times of flood;

– result in no net loss of floodplain storage;

– not impede water flows; and

– not increase flood risk elsewhere.

Essential infrastructure in this zone should pass the Exception Test.

FRA requirements

All development proposals in this zone should be accompanied by a FRA. See Annex E for minimum requirements.

Policy aims

In this zone, developers and local authorities should seek opportunities to:

i. reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage techniques; and

ii. relocate existing development to land with a lower probability of flooding.

Table D.2: Flood Risk Vulnerability Classification

Essential Infrastructure	• Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk, and strategic utility infrastructure, including electricity generating power stations and grid and primary substations.
Highly Vulnerable	• Police stations, Ambulance stations and Fire stations and Command Centres and telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring hazardous substances consent.[19]
More Vulnerable	• Hospitals. • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. • Buildings used for: dwelling houses; student halls of residence; drinking establishments; nightclubs; and hotels. • Non–residential uses for health services, nurseries and educational establishments. • Landfill and sites used for waste management facilities for hazardous waste.[20] • Sites used for holiday or short-let caravans and camping, **subject to a specific warning and evacuation plan**.
Less Vulnerable	• Buildings used for: shops; financial, professional and other services; restaurants and cafes; hot food takeaways; offices; general industry; storage and distribution; non–residential institutions not included in 'more vulnerable'; and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment plants. • Sewage treatment plants (if adequate pollution control measures are in place).

[19] DETR Circular 04/00 – para. 18: *Planning controls for hazardous substances.* www.communities.gov.uk/index.asp?id=1144377

[20] See *Planning for Sustainable Waste Management: Companion Guide to Planning Policy Statement 10* for definition. www.communities.gov.uk/index.asp?id=1500757

Table D.2: contd.

Water-compatible Development	• Flood control infrastructure. • Water transmission infrastructure and pumping stations. • Sewage transmission infrastructure and pumping stations. • Sand and gravel workings. • Docks, marinas and wharves. • Navigation facilities. • MOD defence installations. • Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water-based recreation (excluding sleeping accommodation). • Lifeguard and coastguard stations. • Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. • Essential ancillary sleeping or residential accommodation for staff required by uses in this category, **subject to a specific warning and evacuation plan**.

Notes:

1) This classification is based partly on Defra/Environment Agency research on Flood Risks to People (FD2321/TR2)[21] and also on the need of some uses to keep functioning during flooding.

2) Buildings that combine a mixture of uses should be placed into the higher of the relevant classes of flood risk sensitivity. Developments that allow uses to be distributed over the site may fall within several classes of flood risk sensitivity.

3) The impact of a flood on the particular uses identified within this flood risk vulnerability classification will vary within each vulnerability class. Therefore, the flood risk management infrastructure and other risk mitigation measures needed to ensure the development is safe may differ between uses within a particular vulnerability classification.

Table D.3[22]: Flood Risk Vulnerability and Flood Zone 'Compatibility'

Flood Risk Vulnerability classification (see Table D2)		Essential Infrastructure	Water compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone (see Table D.1)	Zone 1	✔	✔	✔	✔	✔
	Zone 2	✔	✔	Exception Test required	✔	✔
	Zone 3a	Exception Test required	✔	✗	Exception Test required	✔
	Zone 3b 'Functional Floodplain'	Exception Test required	✔	✗	✗	✗

Key:

✔ Development is appropriate

✗ Development should not be permitted

Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix E
West Wight

June 2010

ISLE of WIGHT COUNCIL

Overview

The West Wight RDA is comprised of the towns of Totland and Freshwater and is classified as a Smaller Regeneration Area. Totland lies on a raised area of land adjacent the coast, while Freshwater is built at a lower level, with a significant area of the town under 10 mAOD. Flood risk in the two centres is contrasting with minimal flood risk posed to sites in Totland, yet both tidal and fluvial flooding present a flood risk in Freshwater. The town of Freshwater has a history of flooding relating to the Western Yar. The Western Yar presents a fluvial risk and a tidal risk by acting as a conduit for tidal flood waters. A few of the potential development sites in Freshwater are consequently at high risk of flooding.

Please review this discussion in conjunction with the mapping provided in this Appendix.

Sustainability and Regeneration Objectives

Both settlements of Totland and Freshwater are areas of need in terms of regeneration and therefore the Isle of Wight Council will be receptive to development proposals. The West Wight SRA has been identified as having the potential to accommodate further development to meet the regeneration aims and needs of the local community, through improving local services and strengthening public transport. Development will be encouraged on brownfield sites in the first instance and tourism will be promoted.

Sites at Risk

West Wight has both fluvial and tidal flood risk. Freshwater has the most severe flood risk of the two towns, with historical flooding recorded in 1974 along the headwaters of the Western Yar towards Freshwater Bay. The Agency has also issued two flood reports for the town of Freshwater, both for fluvial flood events from the Western Yar as a result of high rainfall events prior to flooding which saturated the soil and consequently flooding occurred. The two flood events occurred on the 2 June 1999 and on the 9th of October 2000. The Isle of Wight Autumn 2000 Flood Investigation Study – (*Freshwater Parish Council Flood Report*) identified one site specific example of flooding. West Wight Printers, located on the small industrial estate adjacent to Afton Marsh was flooded by surface water and not from the Western Yar.

Fluvial flooding is therefore of concern in Freshwater due to the close proximity of properties to the main river. The sites identified in Figure 19 as being 'Highly Likely' are the product of a functional floodplain (Zone 3b) being defined for the Western Yar. This designation only permits water compatible land uses and essential infrastructure to be developed, providing they do not impede the conveyance of flood waters. Figure 20 illustrates that the functional floodplain is only narrow and it is only the parts of the potential sites nearest the river that are actually within the functional floodplain and Flood Zone 3a. Development should be steered to the areas of lowest risk.

In contrast, very few potential development sites have been identified as being within Flood Zones 2 or 3 in Totland. This is due to the absence of any main rivers running through the town, as well as the land quickly becoming elevated with increasing distance from the shoreline.

Climate Change

The impact of climate change on extreme tidal levels to Totland is not likely to have a significant impact. The predicted extent of future flood zones is close to that of the present zones. Only the two development sites already identified as being at risk of flooding marginally affected by the impact of climate change.

Figures 21 and 22 in Appendix A show the extent of the predicted change in extent of Flood Zones 2 and 3 over four even epochs up to the year 2115. Of the available potential development sites, severity of future tidal flooding is likely to increase particularly for sites about the Western Yar confluence. Fluvial areas potentially susceptible to climate change are predominantly confined to areas along the western reach of the Western Yar. The area south west of the Western Yar confluence is also a potentially susceptible area. Other than currently affected sites, no new sites are identified as being affected by fluvial climate change.

Potential Surface Water Flow Routes and Ponding Areas

Method

The potential surface water flow routes and ponding areas presented in the SFRA, illustrate areas of predicted flooding greater than 25m^2 in spatial extent and only flooding which is more than 0.1m deep. This refinement of the TuFLOW model output is necessary so as to establish the primary areas of predicted flood risk. The modelling approach utilises a 5m resolution ground model grid. The TuFLOW model does not incorporate the Southern Water surface water drains or sewers, which during a storm event would provide storage capacity. Southern Water advised that the modelling should assume that the surface water sewer network could accommodate the 1 in 20 year storm. Therefore, the 1 in 20 year rainfall depths for the critical storm were subtracted from the 1 in 100 year (plus climate change) rain fall depths.

The 1 in 100 year (plus climate change) winter profile storm hyetographs (hyetograph refers to a graph presenting rainfall depth over time) were generated by deriving catchment descriptors from the Flood Estimation Handbook CD-ROM (FEH) and applying the FEH Rain Profile Method. The storm durations were determined by the critical drainage pathway lengths in each of the model areas. The model boundaries were determined by the topography, the local watersheds were traced to ensure that all contributing parts of the catchments were included in the model.

Results

The majority of the predicted flooding areas are either small isolated patches (which are most likely to be a result of small undulations in the LiDAR ground model), flow routes or areas of predicted ponding.

In West Wight there are well defined potential surface water flow routes, it is clear that the model has routed the rainfall along the roads and highways which are represented in the LiDAR ground model as local topographic low points. The roads are either following the bottom of natural depressions or, in places, they appear to be positioned in man-made cuttings.

The areas of predicted ponding are areas where water has accumulated during the simulated storm and due to the form of the topography it has not drained away over the surface. These areas do not however correspond to the reported incidents provided by Southern Water, this discrepancy may be the product of the actual Southern Water surface water drainage system not being represented in the model. It is possible that the piped drainage network has the potential to drain topographic low points, which cannot drain by overland surface flow routes.

The confinement of the flow routes to roads and topographic low points, results in there not being a significant surface water flood risk being predicted for any of the potential development sites in this Regeneration and Development Area.

Surface Drainage and Infiltration SuDS Potential

The Freshwater Flooding Feasibility Report (1999) assesses the surface drainage network of Freshwater, and many of the culverts in the river channel, to suffer from under capacity issues.

The soils map of the town shows consistent distribution of soils with an SPR of about 47%. This means that runoff potential in the area is likely to be high. This assumed consistent soil distribution is mirrored in the map of groundwater vulnerability which shows the site as lying predominantly over Secondary Aquifer with an intermediate leaching potential. Except for the area the south of Freshwater which has a few small areas of Unproductive Strata and Principal Aquifer associated with intermediate and high leaching potential soils. Infiltration potential in the area is therefore mostly low, except of the south part of Freshwater which is divided into areas of medium and high infiltration potential. The area immediately along the coast of Totland is also associated with an area of mass movement and consequently infiltration SuDS are considered to be unsuitable. Groundwater contamination reflects the infiltration potential classifications except for a small area to the far south of Freshwater which overlies a zone 1, 2 and 3 SPZ.

Due to the high runoff and a low soil leaching potentials in much of West Wight, infiltration SuDS techniques are considered to have a low suitability. This excludes a small area to the south of Freshwater which has high infiltration potential but is defined as lying over a SPZ, which makes contamination mitigation of any infiltrated water an important concern. Volumes of surface water can be discharged into the sea without restrictions. The presence of a SSSI to the east of Freshwater and a SAC south of Freshwater Bay require extra precaution be taken to prevent pollutants from entering the environment in these locations. Consideration should be given to the potential for tide locked surface water drainage outfalls. On site attenuation and storage will need to be provided to ensure that high tides do not result in sites flooding.

Wave Exposure Risk

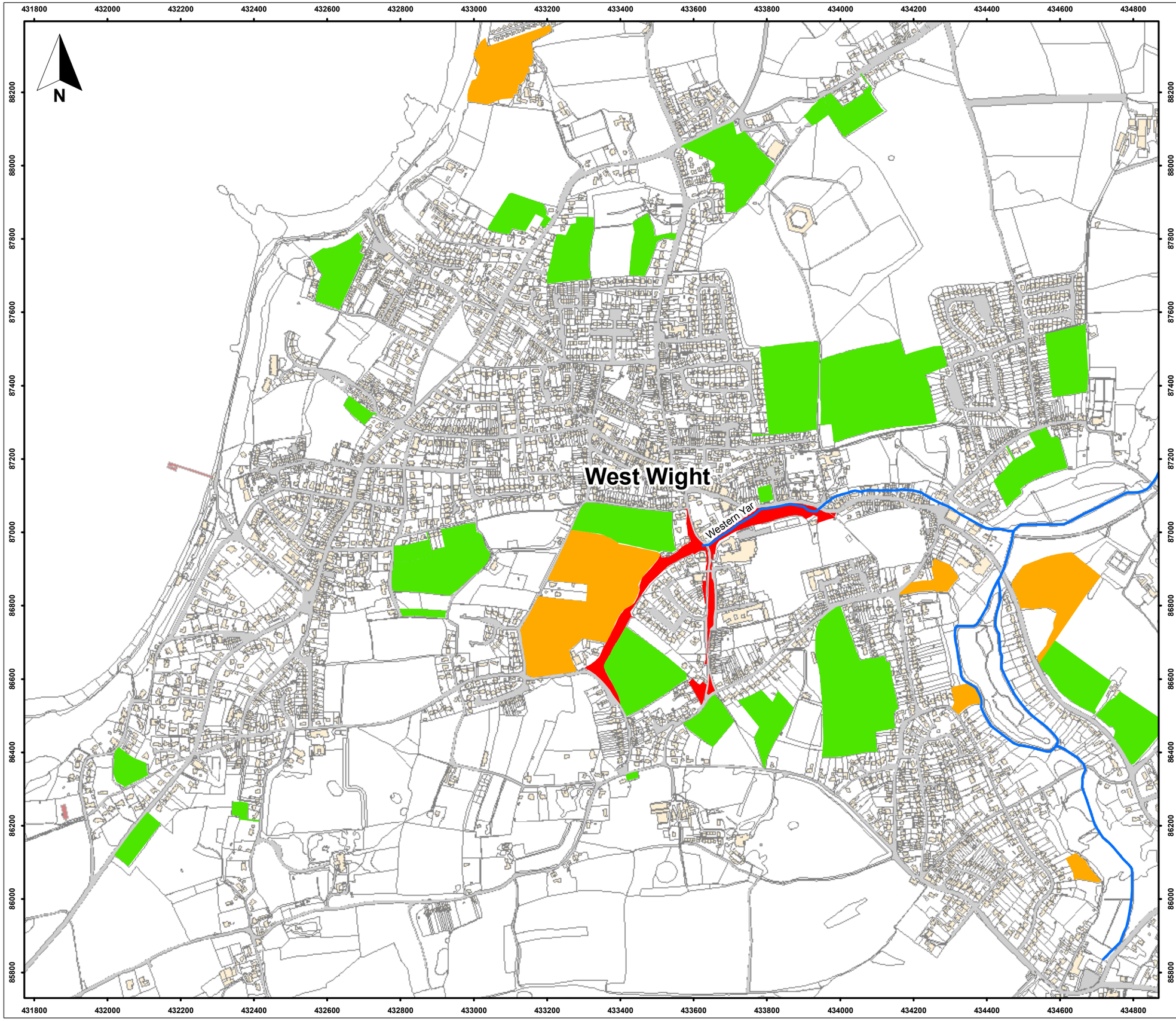
The coastline of West Wight has been classified as being at high risk of wave exposure (see Section 6 of the SFRA Report). It is recommended that for any site within the 100m buffer, where ground levels are less or equal to the predicted peak 1 in 200 year tide in 2115 level plus a 4m allowance for wave height, building design should consider the impact of being potentially exposed to airborne beach material and the corrosive effects of sea spray.

Flood Risk Management Guidance and Site Specific FRAs

The principal of avoidance should be applied when considering sites within Yarmouth. The development of any previously undeveloped site in Flood Zones 2 and 3 is considered by PPS25 as an increase in flood risk and should be avoided. The redevelopment of any previously developed sites within the Flood Zones will require the PPS25 Sequential test to be passed and the Exception Test satisfied where necessary.

Factors to be considered in safe development could include:

- Ensuring that the sequential approach to landuse planning is, where possible, applied on site. This approach would see more and highly vulnerable landuse types being placed in the lower risk zones.
- Finished first floor levels should be set above the predicted 1 in 100 year fluvial flood levels, plus a climate change allowance and above the 1 in 200 year predicted tide levels for the year 2115. The Environment Agency should be consulted for fluvial flood levels and the Environment Agency should be asked to confirm if the predicted tide levels in Figure 1 in Appendix B are still the most recent predictions. A freeboard allowance should be applied, again the Environment Agency should be consulted on this aspect of the design.
- Buildings should be designed so that safe access and egress can be facilitated in the event of the 1 in 100 year (plus climate change) and 1 in 200 year tidal event (plus climate change).
- Development should not increase the risk of flooding elsewhere. As such, the potential for displaced flood water to impact adjacent areas should be considered. This typically applies if an existing building footprint is being increased in fluvial floodplains and defended tidal floodplains. The displacement of water aspect of development along an undefended coastline is not necessarily a concern.
- Building design should account for the potential depths of water that might occur and appropriate flood resilient and or resistant design features should be incorporated.
- Surface water generated by development should be managed using sustainable techniques. The FRA or drainage assessment should explore the Environment Agency and CIRIA SuDS hierarchy. Discharge rates and volumes should not increase post development, in addition to this PPS25 requirement, the Council and the Environment Agency want to see developers seeking to reduce run-off rates and volumes.



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

Notes:
Site is attributed with the flood probability associated with the highest probability flood zone the site intersects

The mapped extent of Flood Zone 3b has been used to identify Functional Floodplain
The 1 in 100 year fluvial flood zone for the present day and the 1 in 200 year tidal extent predicted for the year 2115 has been used to identify sites at a High Probability. The 1 in 1000 year fluvial flood zone for the present day and the 1 in 1000 year tidal extent predicted for the year 2115 has been used to identify sites at a Medium Probability. Sites only in Flood Zone 1 have been assigned a Low Probability

0 200 400 Meters

Scale: 1:10,000 @ A3

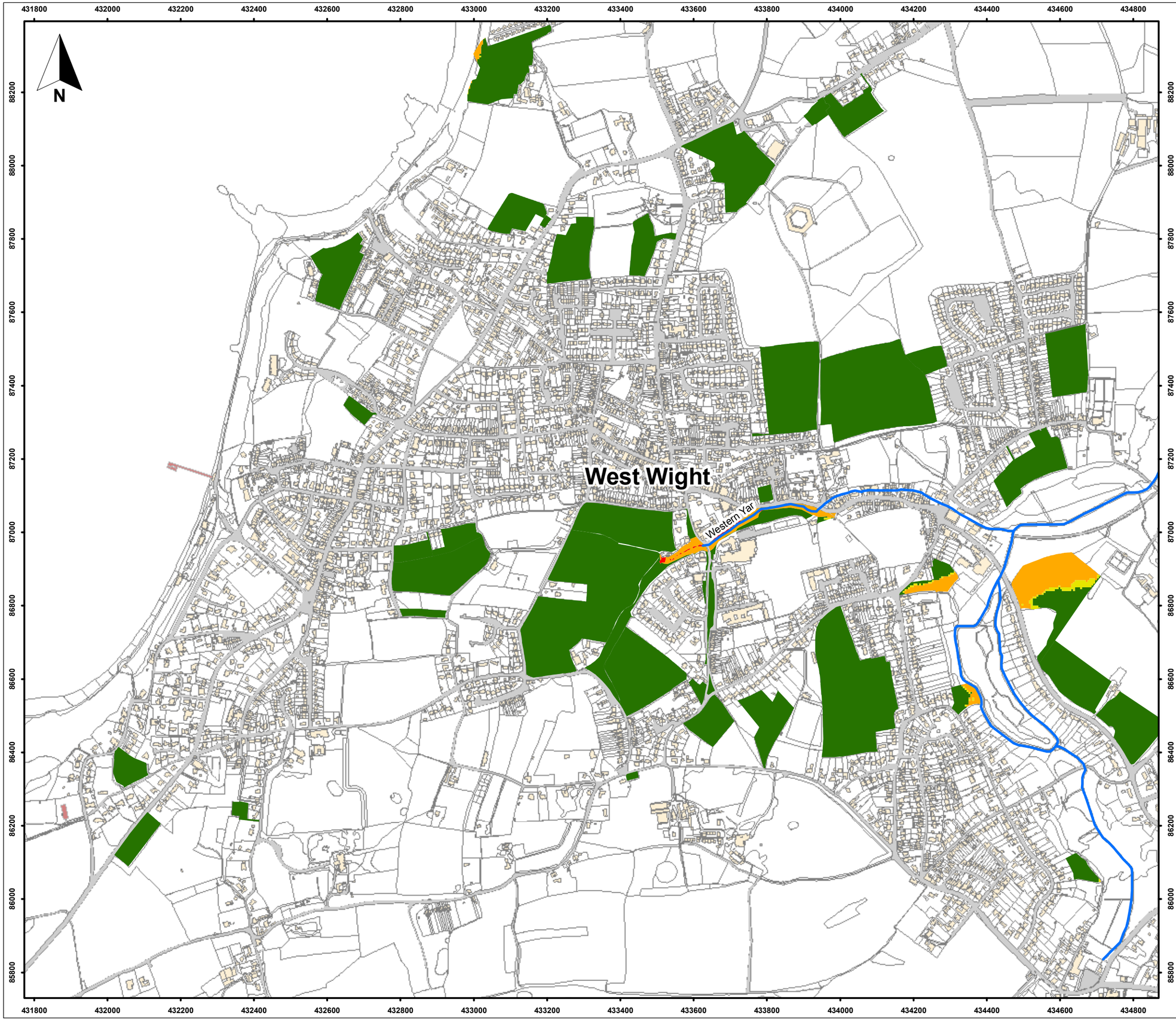
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 19
Potential Development Sites
Qualitative Flood Risk
West Wight

November 2009
25793-A22a.mxd squij

Entec



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

0 200 400 Meters

Scale: 1:10,000 @ A3

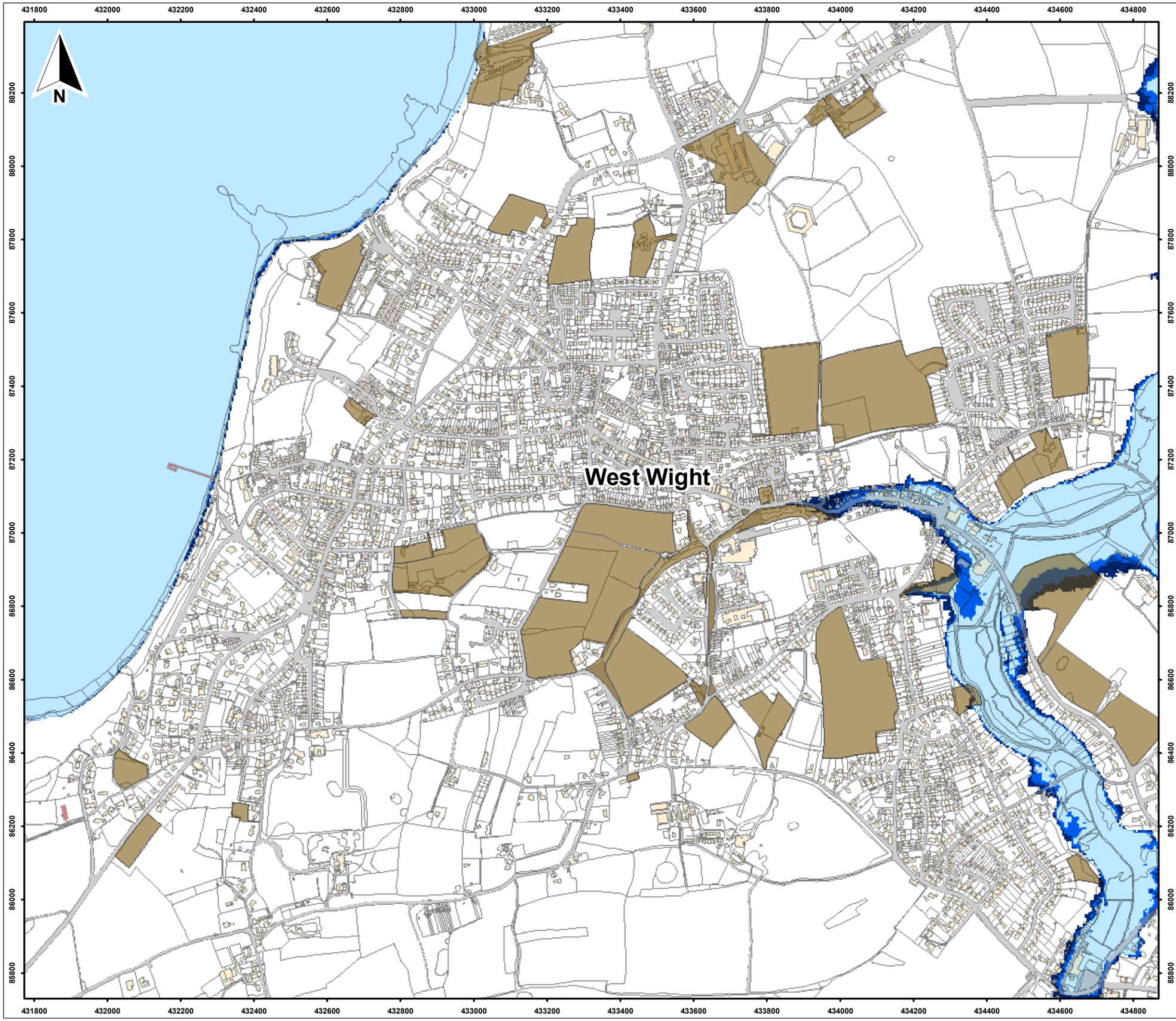
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 20
Potential Development Sites
Site Specific Flood Risk Definition
West Wight

November 2009
25793-A23a.mxd squij

Entec



Key:

Predicted 1 in 1000 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 Meters

Scale: 1:10,000 @ A3

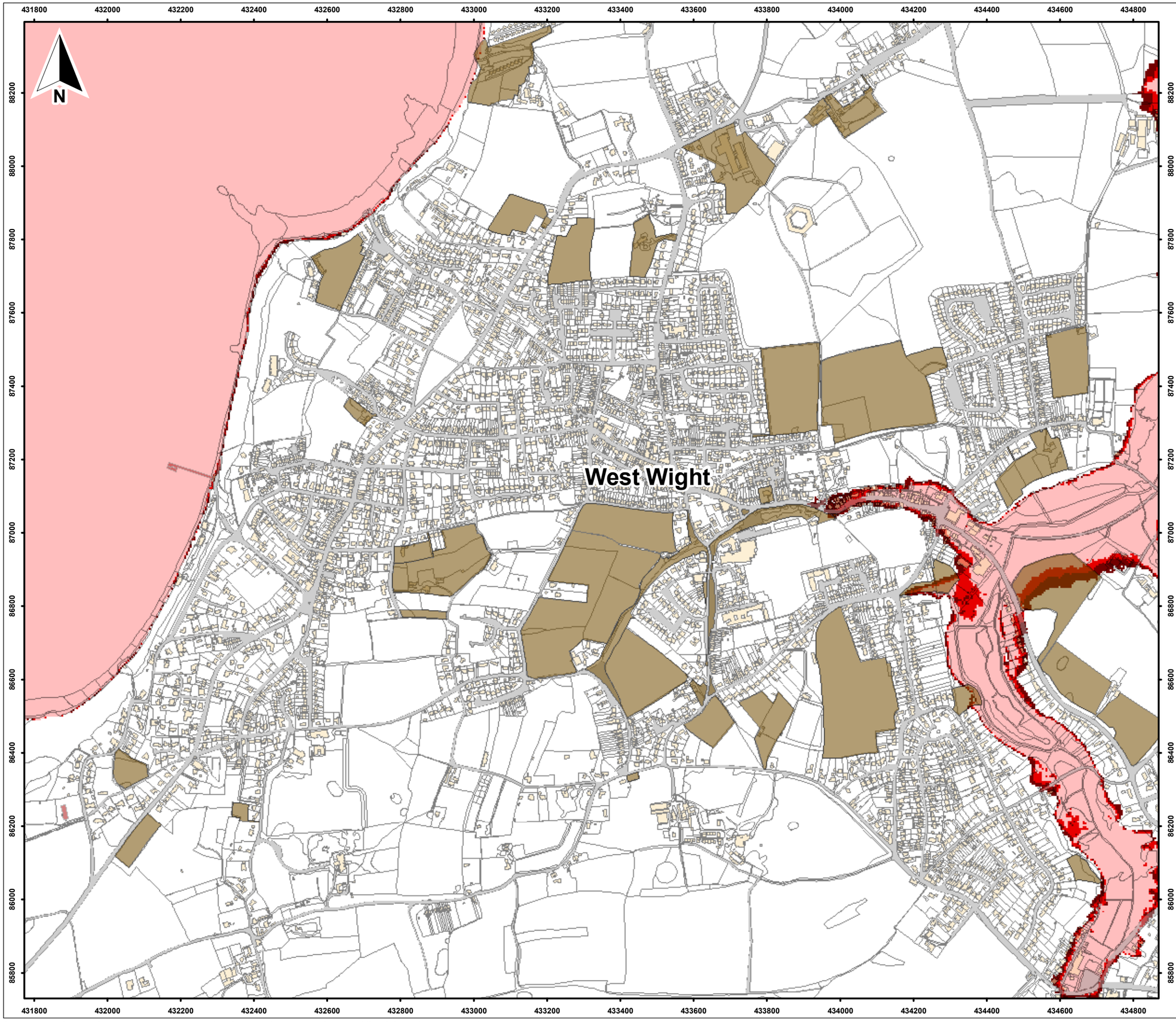
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 21
Potential Development Sites
Flood Zone 2
Climate Change Scenarios
West Wight

November 2009
25793-A24a.mxd squij

Entec



Key:

Predicted 1 in 200 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 Meters

Scale: 1:10,000 @ A3

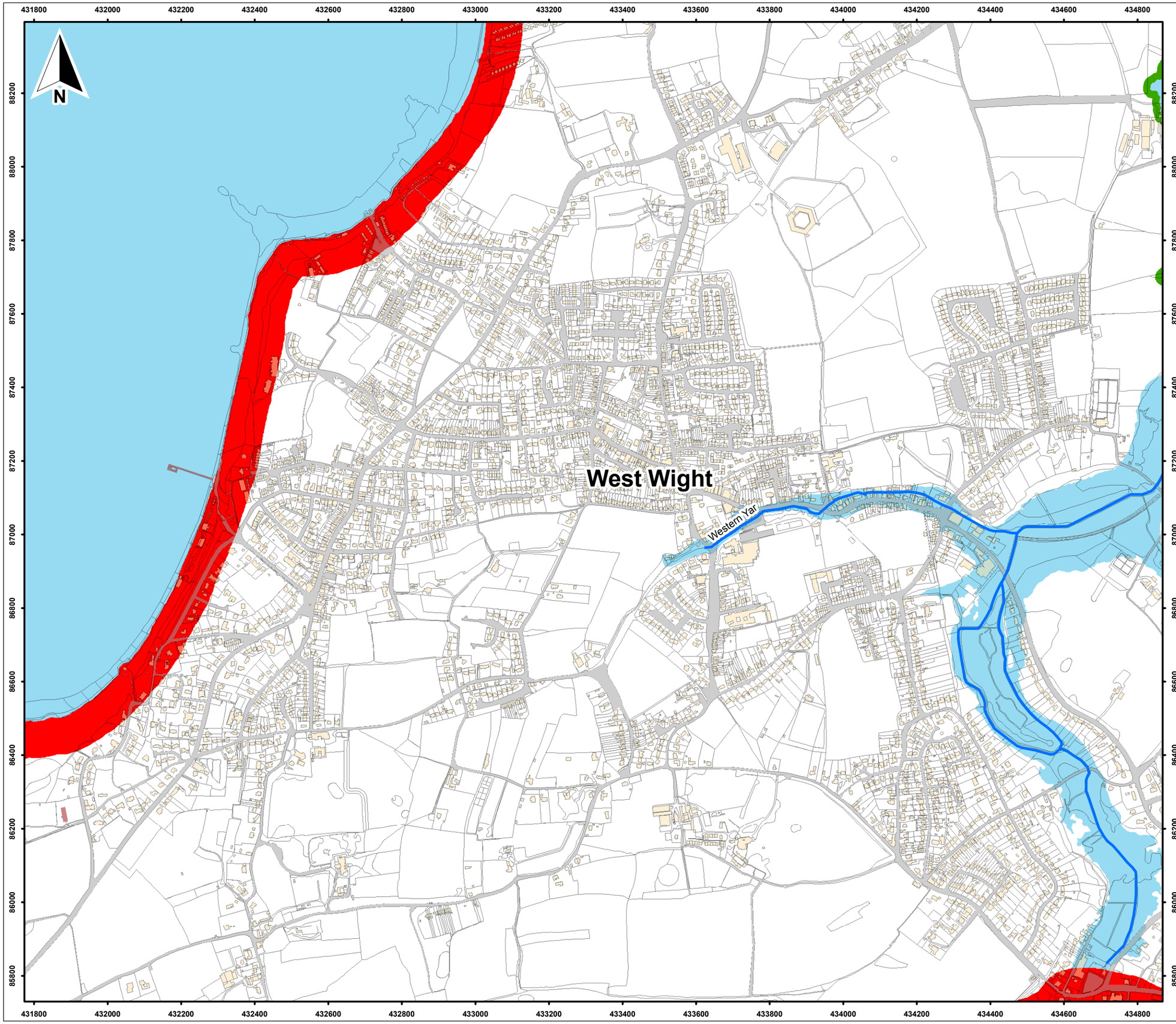
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 22
Potential Development Sites
Flood Zone 3
Climate Change Scenarios
West Wight

November 2009
25793-A25a.mxd squij

Entec



Key:

Main Rivers

Potential Exposure Risk

High

Medium

Low

Environment Agency Flood Zone 2 (November 2009)

0 200 400 Meters

Scale: 1:10,000 @ A3

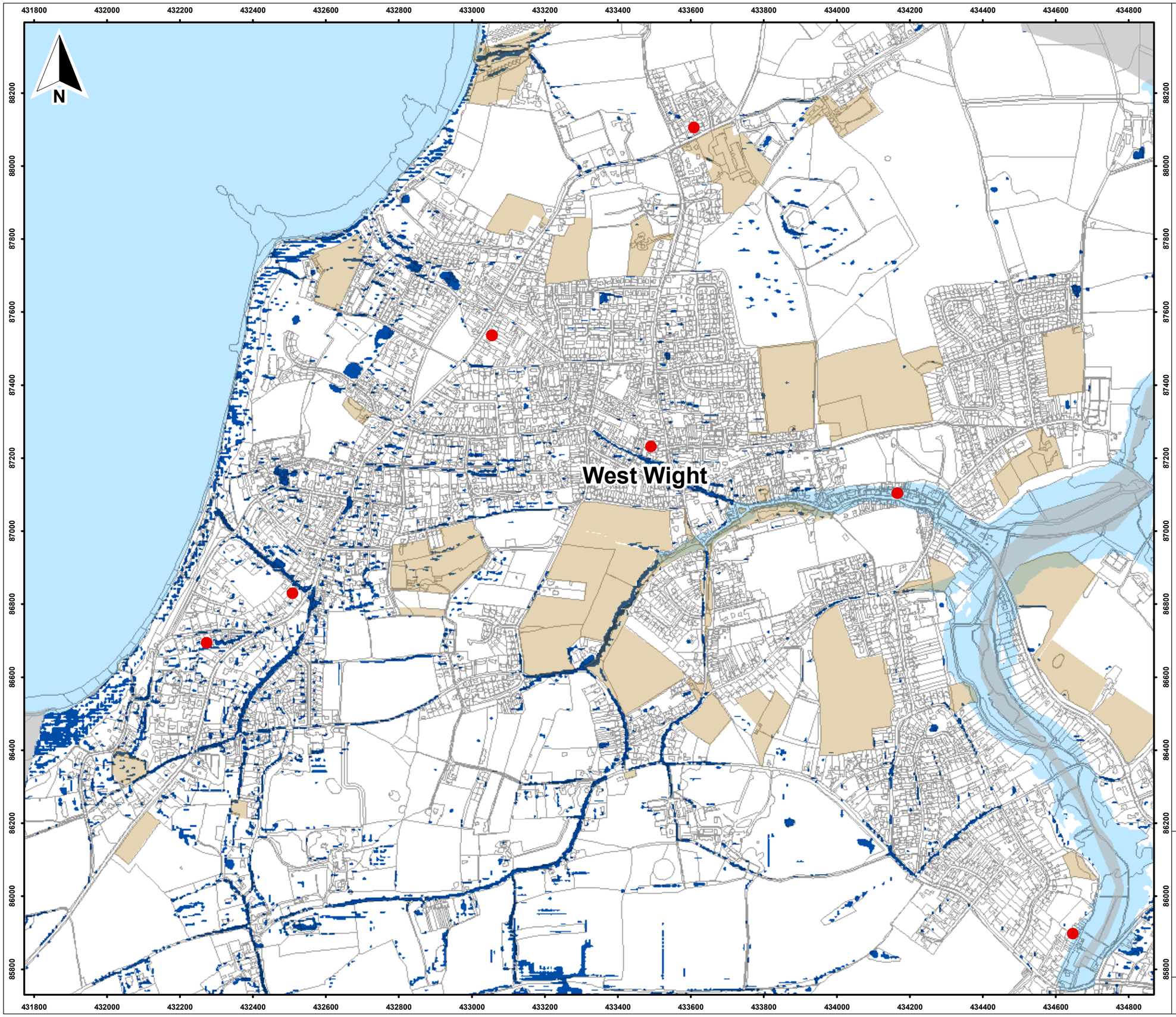
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 23
Qualitative Wind and Wave Exposure Risk West Wight

November 2009
25793-A26.mxd squij

Entec



Key:

- Location of reported surface water flooding issues. Supplied by Southern Water for the period upto and including 2006.
- Environment Agency Flood Zone 2 (November 2009)
- Potential Surface Water Flow Routes and Ponding areas (1:100+cc) Over 0.2m deep
- Potential Development Sites
- Outside the Limits of the Surface Water Model

Notes:
Only predicted surface water flow routes and ponding areas, over 0.1m deep and greater than 25m2 in areas are shown

0 200 400 Meters

Scale: 1:10,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 24
Potential Surface Water Flow Routes and Ponding Areas (1 in 100 year storm + climate change) West Wight

November 2009
25793-A27.mxd squij

Entec

Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix F
Yarmouth

June 2010

Overview

The topography of Yarmouth is relatively flat, with western parts of the town below 3 mAOD, and is classified as a Rural Service Centre. Flood risk in the town is complex with the tidal risk from the sea along the northern edge of the town, and a combination of tidal and fluvial risk from the estuary to the south and west.

Please review this discussion in conjunction with the mapping provided in this Appendix.

Sustainability and Regeneration Objectives

Development within the wider countryside will be focused on the Rural Service Centres such as Yarmouth and should support their role as wider centres for outlying villages, hamlets and surrounding countryside. For the rural service centres development will be expected to ensure their future viability. Within the rural service centres and outlying rural areas, development will be expected, in the first instance, to meet a rural need and maintain or enhance the viability of local communities and will be subject to local considerations.

Yarmouth RSC has been identified as having the potential to accommodate further development to meet the regeneration aims and needs of the local community, through improving local services and strengthening public transport. Development will be encouraged on brownfield sites in the first instance and tourism will be promoted

Sites at Risk

Tidal flood risk in Yarmouth is significant, however one two of the six potential development sites are impacted by the 2115 Flood Zone 3 extent. Tidal Flood Zone extents are more extensive than the fluvial extents on all sides of the town.

Although not exactly related to a particular potential development site, the current Environment Agency Flood Zones appear to completely encircle the town. This potentially presents serious problems relating to access and egress routes for existing and proposed developments and emergency planning. In the event of the 1 in 200 year tidal event, the A3054 is predicted to flood (see figure 24). This situation has the potential to restrict the ability of emergency services to access the settlement and thus becomes an emergency planning consideration for the council.

Climate Change

Increasing sea levels as the result of climate change have the most significant impact in the west of the town, where the topography is the flattest. The extent of the flood zones in 2115 do not include any additional potential sites that are not already included by the current flood zone extents.

Potential Surface Water Flow Routes and Ponding Areas

Method

The potential surface water flow routes and ponding areas presented in the SFRA, illustrate areas of predicted flooding greater than 25m^2 in spatial extent and only flooding which is more than 0.1m deep. This refinement of the TuFLOW model output is necessary so as to establish the primary areas of predicted flood risk. The modelling approach utilises a 5m resolution ground model grid. The TuFLOW model does not incorporate the Southern Water surface water drains or sewers, which during a storm event would provide storage capacity. Southern Water advised that the modelling should assume that the surface water sewer network could accommodate the 1 in 20 year storm. Therefore, the 1 in 20 year rainfall depths for the critical storm were subtracted from the 1 in 100 year (plus climate change) rain fall depths.

The 1 in 100 year (plus climate change) winter profile storm hyetographs (hyetograph refers to a graph presenting rainfall depth over time) were generated by deriving catchment descriptors from the Flood Estimation Handbook CD-ROM (FEH) and applying the FEH Rain Profile Method. The storm durations were determined by the critical drainage pathway lengths in each of the model areas. The model boundaries were determined by the topography, the local watersheds were traced to ensure that all contributing parts of the catchments were included in the model.

Results

The town of Yarmouth is completely surrounded by low land, as such there town does not have an upslope surface water catchment that can deliver surface water run-off to the town. As such the modelling predicts there to be a minimal surface water flood risk in Yarmouth. There are only a small number of areas where the model has predicted accumulations of water over 0.1m deep and greater than 25m^2 in area. These small pockets of flooding do not appear to follow a particular flow route and are more likely to be the product of small variations in the recorded LiDAR ground levels.

Surface Drainage and Infiltration SuDS Potential

The runoff potential of soils in Yarmouth is only available for the east of the town which has a SPR of approximately 50%, thus indicating a high runoff potential. The groundwater vulnerability map of the area also shows much of Yarmouth overlying a Unproductive Strata, expect for the south west edge of the town which is characterised by a Secondary Aquifer with a high leaching potential, and the east of the town which is associated

with a Secondary Aquifer of low leaching potential. Infiltration potential is classified as low for Yarmouth other than for the south western edge of the town which has a medium infiltration potential. The low infiltration potential of the town makes infiltration SuDS techniques unsuitable except of the south west of the town, that is, under the assumption that appropriate precautionary measures are employed to prevent pollution of the underlying aquifer.

The sea north of Yarmouth and the Western Yar estuary, west of the town, are designated as a SAC. Thornley Brook is associated with a SPA and SSSI, which extend towards the coast between The Mount and Thornley Road. The close proximity of a SAC, SAP and SSSI around the town means it is important that measures be considered to mitigate against pollutants entering the estuarine environments through surface water discharges. The estuarine and coastal waters around Yarmouth allow for an unconstrained volume of runoff discharge, assuming water is free of contaminants. Consideration should be given to the potential for tide locked surface water drainage outfalls. On site attenuation and storage will need to be provided to ensure that high tides do not result in sites flooding.

Wave Exposure Risk

The coastline of West Wight has been classified as being at low risk of wave exposure (see Section 6 of the SFRA Report). It is recommended that for any site within the 20m buffer, where ground levels are less or equal to the predicted peak 1 in 200 year tide in 2115 level plus a 4m allowance for wave height, building design should consider the impact of being potentially exposed to airborne beach material and the corrosive effects of sea spray.

Flood Risk Management Guidance and Site Specific FRAs

The principal of avoidance should be applied when considering sites within West Wight. The development of any previously undeveloped site in Flood Zones 2 and 3 is considered by PPS25 as an increase in flood risk and should be avoided. The redevelopment of any previously developed sites within the Flood Zones will require the PPS25 Sequential test to be passed and the Exception Test satisfied where necessary.

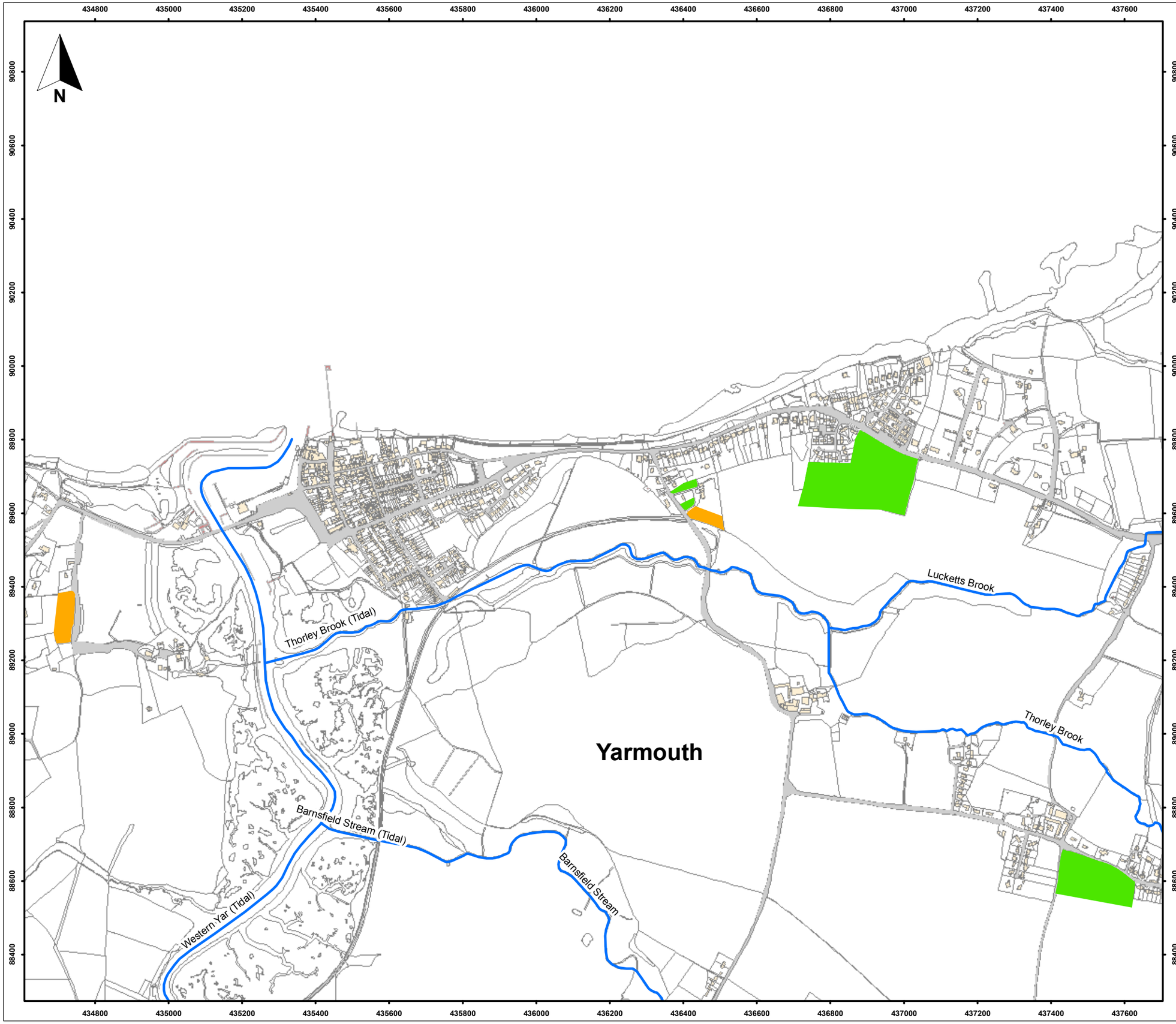
Factors to be considered in safe development could include:

- Ensuring that the sequential approach to landuse planning is, where possible, applied on site. This approach would see more and highly vulnerable landuse types being placed in the lower risk zones.
- Finished first floor levels should be set above the predicted 1 in 100 year fluvial flood levels, plus a climate change allowance and above the 1 in 200 year predicted tide levels for the year 2115. The Environment Agency should be consulted for fluvial flood levels and the Environment Agency should be asked to confirm if the predicted tide levels in Figure 1 in Appendix B are still the most recent predictions. A freeboard allowance should be applied, again the Environment Agency should be consulted on this aspect of the design.
- Buildings should be designed so that safe access and egress can be facilitated in the event of the 1 in 100 year (plus climate change) and 1 in 200 year tidal event (plus climate change).

- Development should not increase the risk of flooding elsewhere. As such, the potential for displaced flood water to impact adjacent areas should be considered. This typically applies if an existing building footprint is being increased in fluvial floodplains and defended tidal floodplains. The displacement of water aspect of development along an undefended coastline is not necessarily a concern.

- Building design should account for the potential depths of water that might occur and appropriate flood resilient and or resistant design features should be incorporated.

- Surface water generated by development should be managed using sustainable techniques. The FRA or drainage assessment should explore the Environment Agency and CIRIA SuDS hierarchy. Discharge rates and volumes should not increase post development, in addition to this PPS25 requirement, the Council and the Environment Agency want to see developers seeking to reduce run-off rates and volumes.



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

Notes:
Site is attributed with the flood probability associated with the highest probability flood zone the site intersects

The mapped extent of Flood Zone 3b has been used to identify Functional Floodplain The 1 in 100 year fluvial flood zone for the present day and the 1 in 200 year tidal extent predicted for the year 2115 has been used to identify sites at a High Probability. The 1 in 1000 year fluvial flood zone for the present day and the 1 in 1000 year tidal extent predicted for the year 2115 has been used to identify sites at a Medium Probability. Sites only in Flood Zone 1 have been assigned a Low Probability

0 200 400 Meters

Scale: 1:10,000 @ A3

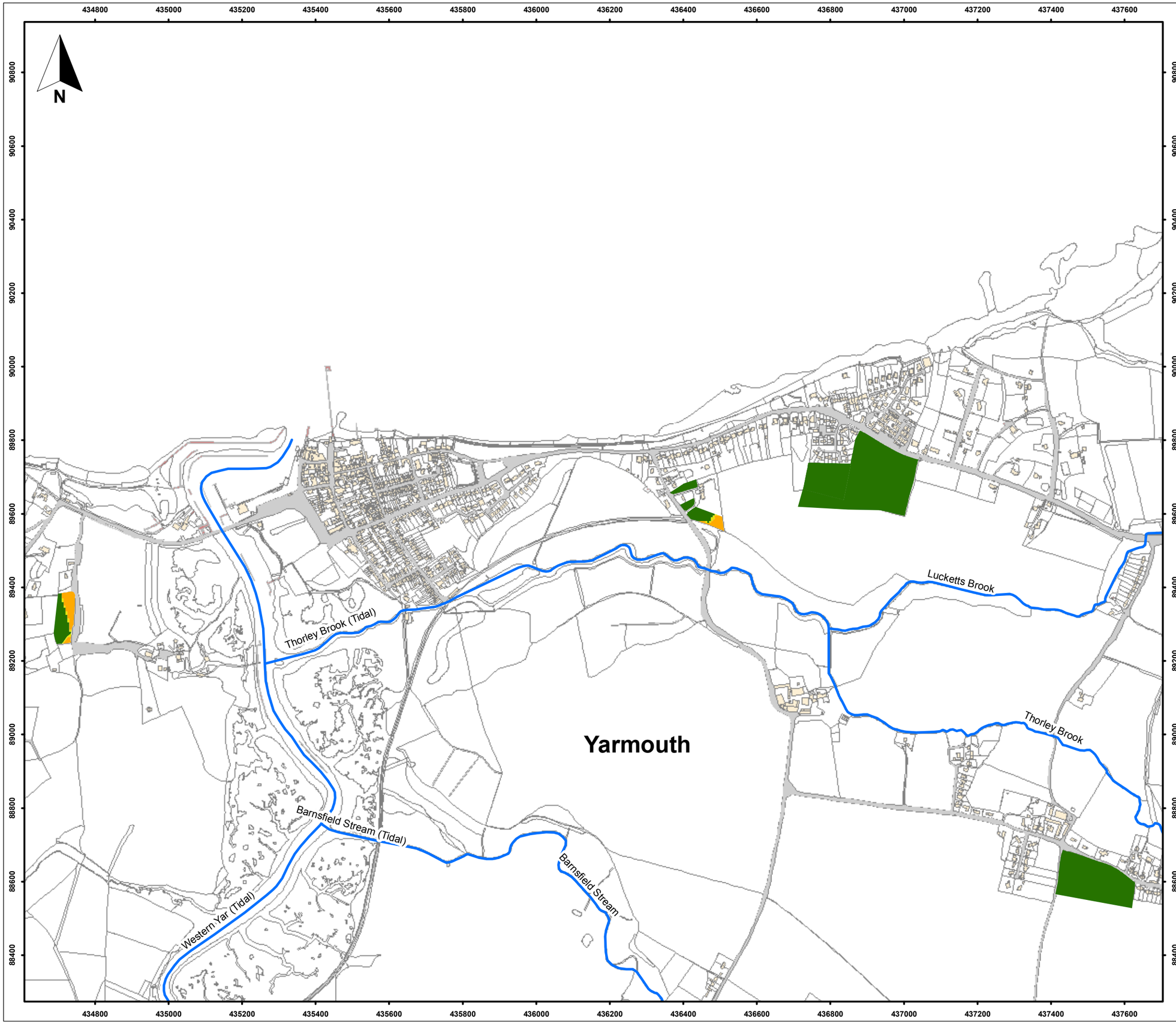
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 25
Potential Development Sites
Qualitative Flood Risk
Yarmouth

November 2009
25793-A28a.mxd squij

Entec



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

0 200 400 Meters

Scale: 1:10,000 @ A3

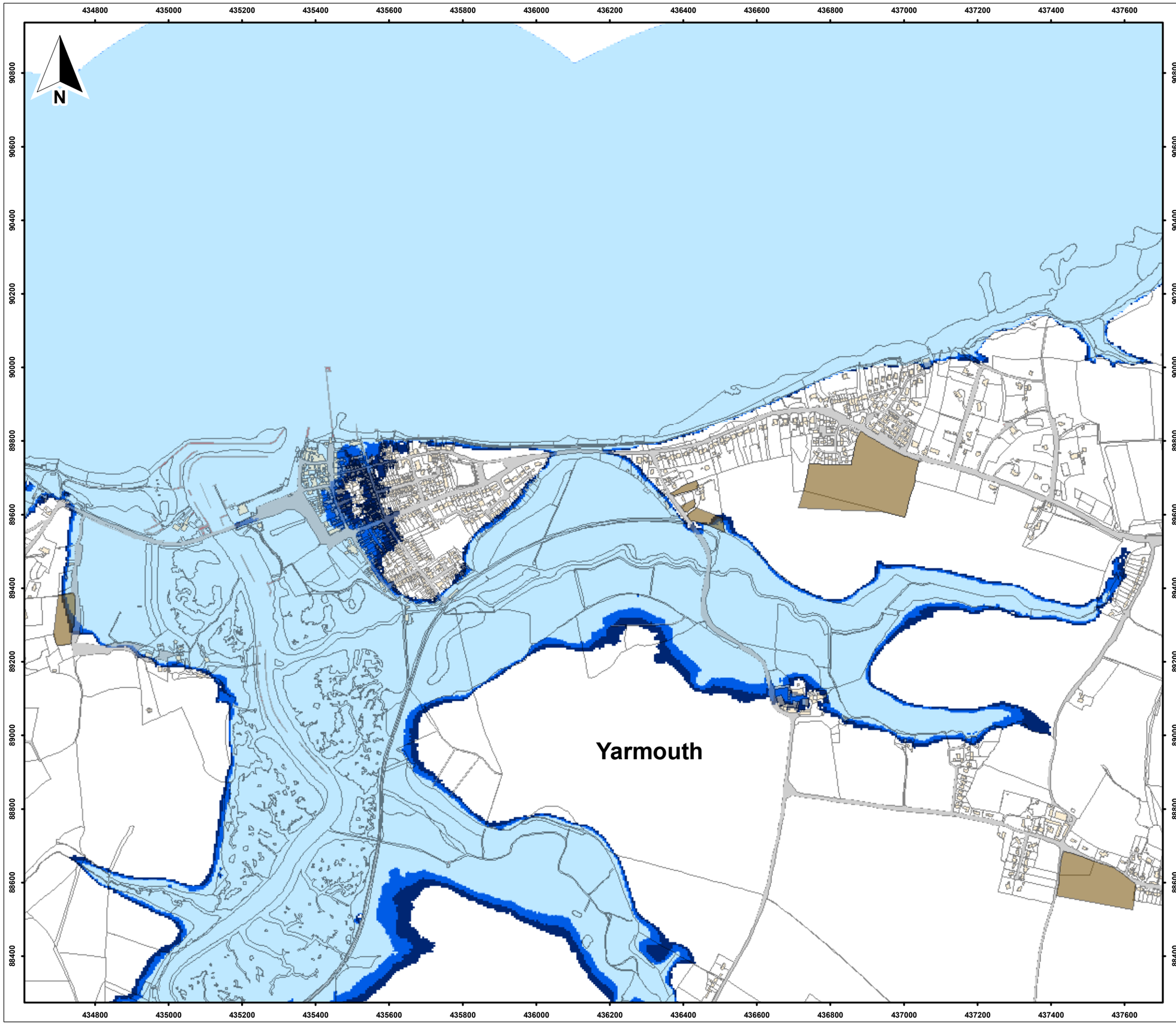
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 26
Potential Development Sites
Site Specific Flood Risk Definition
Yarmouth

November 2009
25793-A29a.mxd squij

Entec



Key:

Predicted 1 in 1000 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 Meters

Scale: 1:10,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 27
Potential Development Sites
Flood Zone 2
Climate Change Scenarios
Yarmouth

November 2009
25793-A30a.mxd squij

Entec

436000

90000

N

Year 2010

Yarmouth

436000

Key:

Predicted 1 in 200 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 Meters

Scale: 1:10,000 @ A3

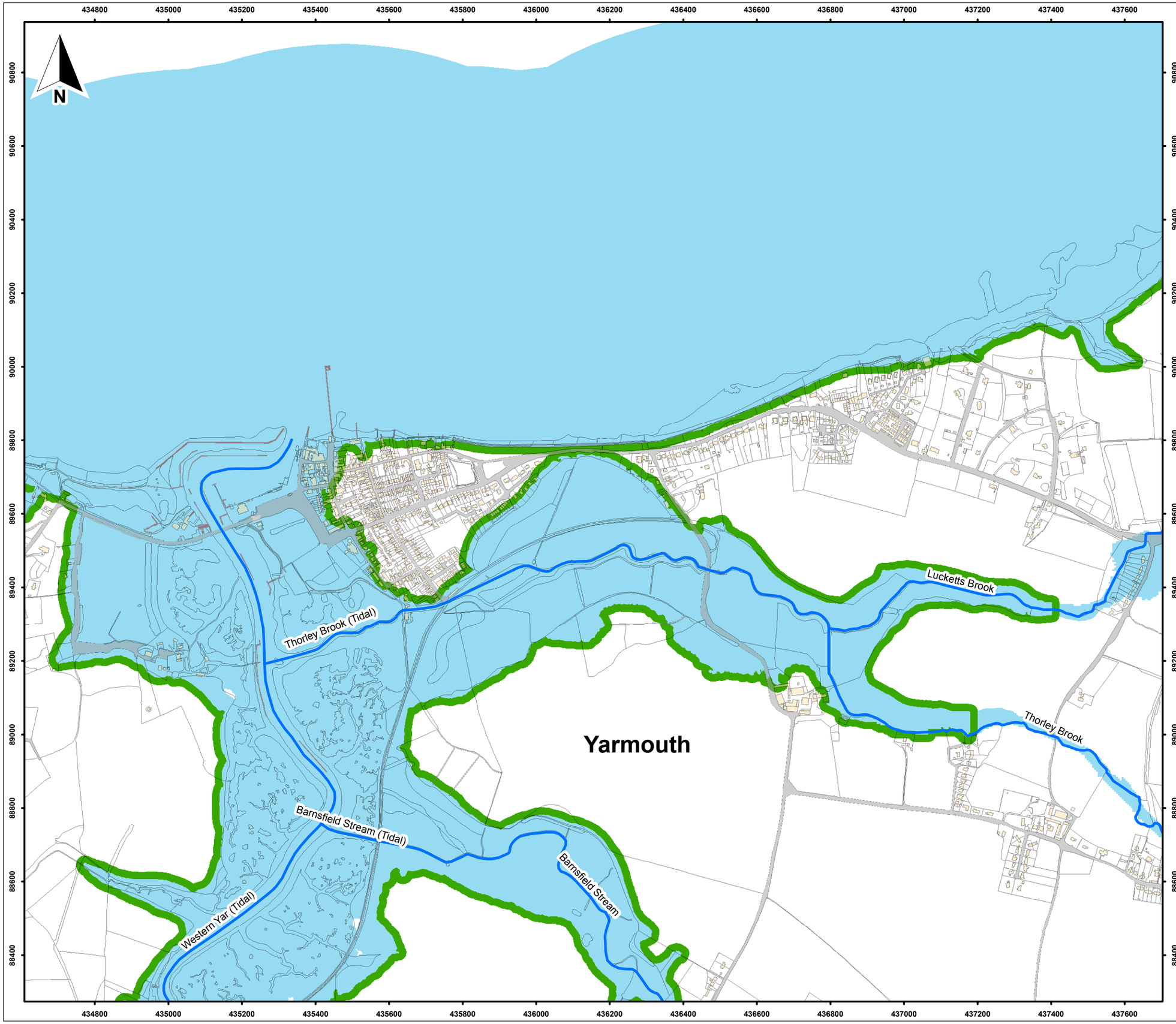
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 28
Potential Development Sites
Flood Zone 3
Climate Change Scenarios
Yarmouth

November 2009
25793-A31a.mxd squij

Entec



Key:

Main Rivers

Potential Exposure Risk

High

Medium

Low

Environment Agency Flood Zone 2 (November 2009)

0 200 400 Meters

Scale: 1:10,000 @ A3

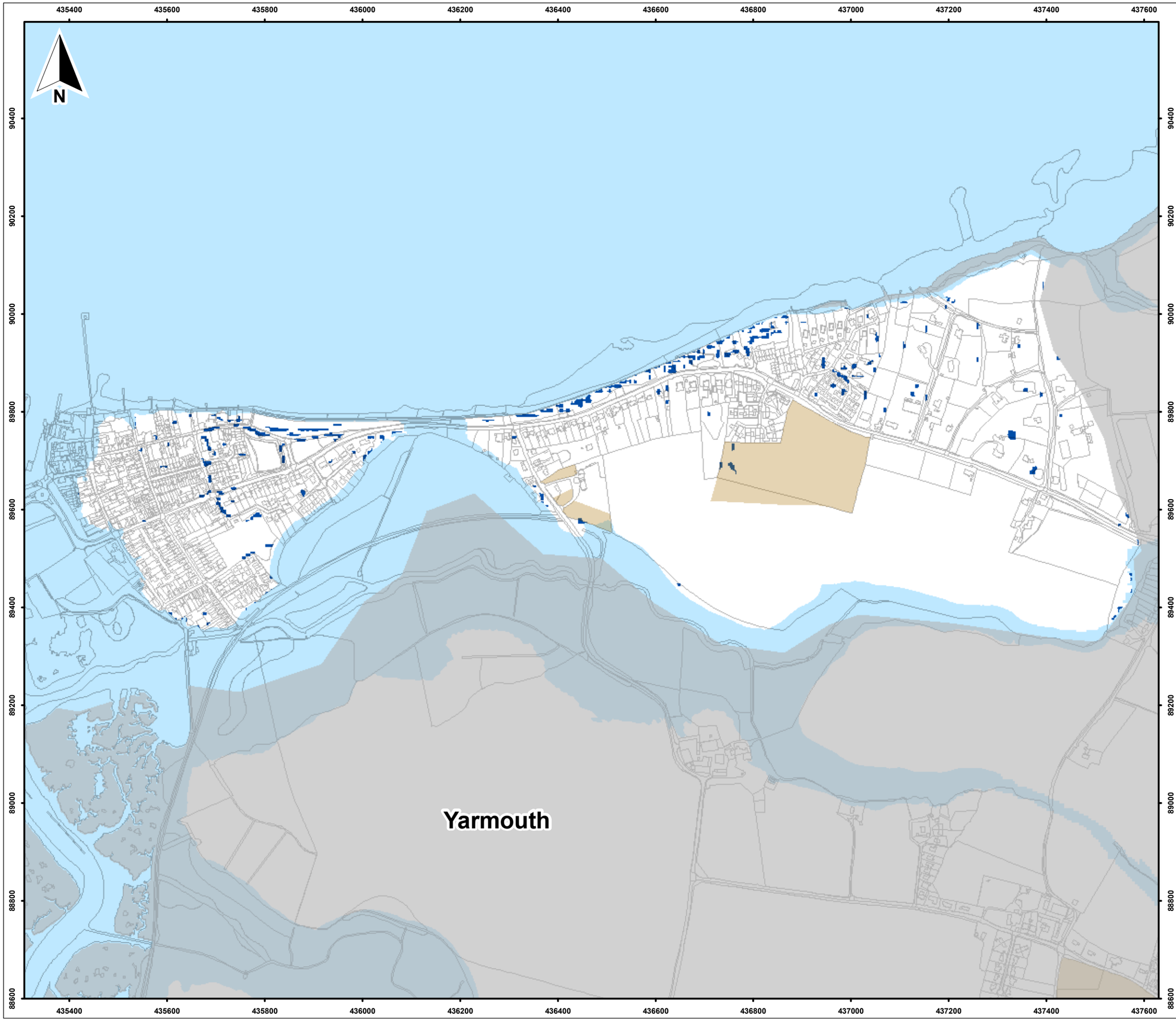
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 29
Qualitative Wind and Wave Exposure Risk - Yarmouth

November 2009
25793-A32.mxd squij

Entec



Key:

- Location of reported surface water flooding issues. Supplied by Southern Water for the period upto and including 2006.
- Environment Agency Flood Zone 2 (November 2009)
- Potential Surface Water Flow Routes and Ponding areas (1:100+cc)
- Potential Development Sites
- Outside the Limits of the Surface Water Model

Notes:
Only predicted surface water flow routes and ponding areas, over 0.1m deep and greater than 25m2 are shown

0 200 400 Meters

Scale: 1:7,500 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 30
Potential Surface Water Flow Routes and Ponding Areas (1 in 100 year storm + climate change) - Yarmouth

November 2009
25793-A33.mxd squij

Entec

Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix G
Brighstone

June 2010

ISLE of WIGHT
COUNCIL

Overview

Brighstone is classified as a Rural Service Centre and is located on the confluence of Brighstone Brook and Shorewell Stream, both of which are Environment Agency Main Rivers. The main issue in this town is that the Flood Zones do not extend the full length of the watercourses. As such potential developments which may be in a flood plain are attributed in the Sites Database as being in Flood Zone 1 and thus appropriate for all development types. Therefore the Main River 20m buffer dataset is very important and it is recommended that this dataset be consulted should any of the potential sites be released for development. If a site is within 20m of a main river then it will be stated in the Sites Database.

Please review this discussion along side the mapping provided in this Appendix.

Sustainability and Regeneration Objectives

Development within the wider countryside will be focused on the Rural Service Centres such as Brighstone and should support their role as wider centres for outlying villages, hamlets and surrounding countryside. For the rural service centres development will be expected to ensure their future viability. Within the rural service centres and outlying rural areas, development will be expected, in the first instance, to meet a rural need and maintain or enhance the viability of local communities and will be subject to local considerations.

Brighstone RSC has been identified as having the potential to accommodate further development to meet the regeneration aims and needs of the local community, through improving local services and strengthening public transport. Development will be encouraged on brownfield sites in the first instance and tourism will be promoted.

Sites at Risk

Fluvial flood zones associated with Brighstone Brook extend through the length of the settlement, which results in at least 50% of the potential development site on the south bank of Brighstone Brook being in flood zone 3a. At the eastern end of the settlement Brighstone Brook has its confluence with Shorewell Stream. The flood zones in the location of the confluence impact on three potential development sites, with two of them being completely within Flood Zone 3a.

Climate Change

The fluvial climate change assessment outlined in Section 5.2 indicates that sites (ID Brighstone1334 and Brighstone1203) are potentially susceptible to the impacts of climate change as there is a significant difference between the extents of Flood Zone 2 and 3. It is therefore recommended that, should either of these sites be put forward for planning, the impact of climate change on the extent of Flood Zone 3 be assessed as part of a site specific FRA.

Potential Surface Water Flow Routes and Ponding Areas

Method

The potential surface water flow routes and ponding areas presented in the SFRA, illustrate areas of predicted flooding greater than 25m^2 in spatial extent and only flooding which is more than 0.1m deep. This refinement of the TuFLOW model output is necessary so as to establish the primary areas of predicted flood risk. The modelling approach utilises a 5m resolution ground model grid. The TuFLOW model does not incorporate the Southern Water surface water drains or sewers, which during a storm event would provide storage capacity. Southern Water advised that the modelling should assume that the surface water sewer network could accommodate the 1 in 20 year storm. Therefore, the 1 in 20 year rainfall depths for the critical storm were subtracted from the 1 in 100 year (plus climate change) rain fall depths.

The 1 in 100 year (plus climate change) winter profile storm hyetographs (hyetograph refers to a graph presenting rainfall depth over time) were generated by deriving catchment descriptors from the Flood Estimation Handbook CD-ROM (FEH) and applying the FEH Rain Profile Method. The storm durations were determined by the critical drainage pathway lengths in each of the model areas. The model boundaries were determined by the topography, the local watersheds were traced to ensure that all contributing parts of the catchments were included in the model.

Results

The topography of Brighstone can be characterised two narrow valleys, one running from the north west and the other from the north east. These two valleys converge in the village to form another valley which leads southwards towards the English Channel. The hillside above the town is a steep south facing slope with no significant defined drainage pathways. This results in the model simulating unconfined broad extents of shallow flooding. Through the village, and where drainage routes are better defined, the predicted flooding becomes confined to drainage pathways. The difference between the northerly parts and southern parts of the model are also a product of the fact that the topography of the northern portion is defined by SAR (Synthetic Aperture Radar) data which is significantly less detailed than the LiDAR data which is present in the southern part of the modelled area.

The model predicts several potential flow routes that are not currently covered by the flood zones; these exist outside the main built area and are not predicted to impact any of the potential development sites. These flow routes should however be considered in the production of any site specific flood risk assessments that may come forward.

Surface Drainage and Infiltration SuDS Potential

Soils on the site have a low to very high runoff potential with SPR values between 15% and 60%. The steeper parts of the Brighstone, in the north east, have been classified as having a low runoff potential, while the flatter areas in the south west is underlain by soils with a very high runoff generation potential. Groundwater

vulnerability in Brighstone is characterised by a Principal Aquifer in the north east and an Unproductive Strata in the south west. An area of Secondary Aquifer is identified in the area around Brighstone Brook and Shorewell Stream. Infiltration potential is classified as medium in the north east and low in the south west.

The application of infiltration SuDS techniques in Brighstone are only constrained by the low infiltration potential classification assigned to the south western part of the settlement.

Wave Exposure Risk

The coastline to the south of Brighstone is classified as being at high risk of wave exposure (see Section 6 of the SFRA Report). It is recommended that for any site within the 100m buffer, where ground levels are less or equal to the predicted peak 1 in 200 year tide in 2115 level plus a 4m allowance for wave height, building design should consider the impact of being potentially exposed to airborne beach material and the corrosive effects of sea spray.

Flood Risk Management Guidance and Site Specific FRAs

The principal of avoidance should be applied when considering sites within Brighstone. The development of any previously undeveloped site in Flood Zones 2 and 3 is considered by PPS25 as an increase in flood risk and should be avoided. The redevelopment of any previously developed sites within the Flood Zones will require the PPS25 Sequential test to be passed and the Exception Test satisfied where necessary.

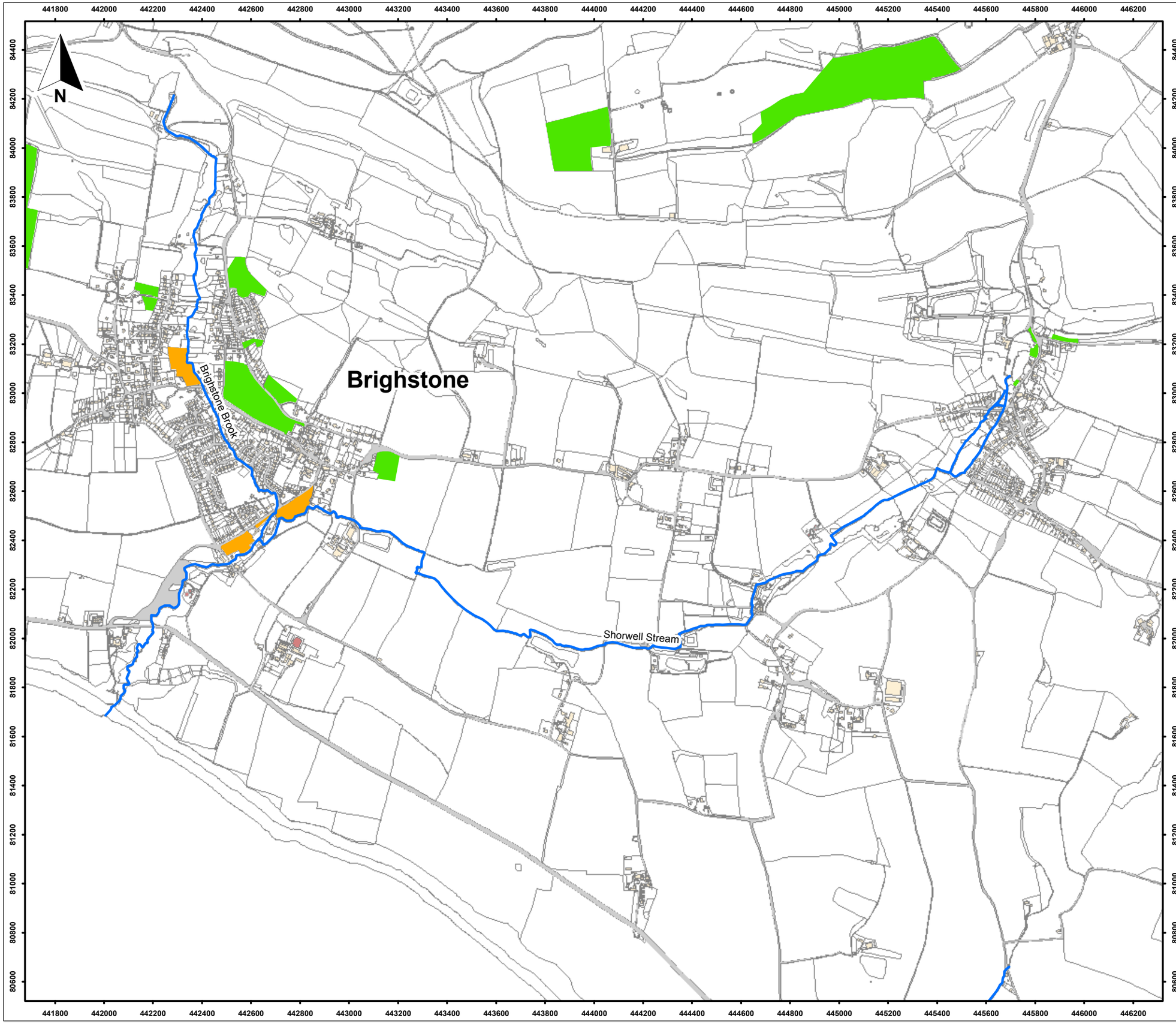
Factors to be considered in safe development could include:

- Ensuring that the sequential approach to landuse planning is, where possible, applied on site. This approach would see more and highly vulnerable landuse types being placed in the lower risk zones.
- Finished first floor levels should be set above the predicted 1 in 100 year fluvial flood levels, plus a climate change allowance and above the 1 in 200 year predicted tide levels for the year 2115. The Environment Agency should be consulted for fluvial flood levels and the Environment Agency should be asked to confirm if the predicted tide levels in Figure 1 in Appendix B are still the most recent predictions. A freeboard allowance should be applied; again the Environment Agency should be consulted on this aspect of the design.
- Buildings should be designed so that safe access and egress can be facilitated in the event of the 1 in 100 year (plus climate change) and 1 in 200 year tidal event (plus climate change).
- Development should not increase the risk of flooding elsewhere. As such, the potential for displaced flood water to impact adjacent areas should be considered. This typically applies if an existing building footprint is being increased in fluvial floodplains and defended tidal floodplains. The displacement of water aspect of development along an undefended coastline is not necessarily a concern.

- Building design should account for the potential depths of water that might occur and appropriate flood resilient and or resistant design features should be incorporated.

- Surface water generated by development should be managed using sustainable techniques. The FRA or drainage assessment should explore the Environment Agency and CIRIA SuDS hierarchy. Discharge rates and volumes should not increase post development, in addition to this PPS25 requirement, the Council and the Environment Agency want to see developers seeking to reduce run-off rates and volumes.

A site specific FRA is required for all those potential sites which are within the extent of either Flood Zone 2 or 3. If the Sites Database states that the site is within 20m of a Main river (in field *'Riv_20_Buf'*) then the Environment Agency should be consulted.



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

Notes:
Site is attributed with the flood probability associated with the highest probability flood zone the site intersects

The mapped extent of Flood Zone 3b has been used to identify Functional Floodplain
The 1 in 100 year fluvial flood zone for the present day and the 1 in 200 year tidal extent predicted for the year 2115 has been used to identify sites at a High Probability. The 1 in 1000 year fluvial flood zone for the present day and the 1 in 1000 year tidal extent predicted for the year 2115 has been used to identify sites at a Medium Probability. Sites only in Flood Zone 1 have been assigned a Low Probability

0 200 400 600 Meters

Scale: 1:15,000 @ A3

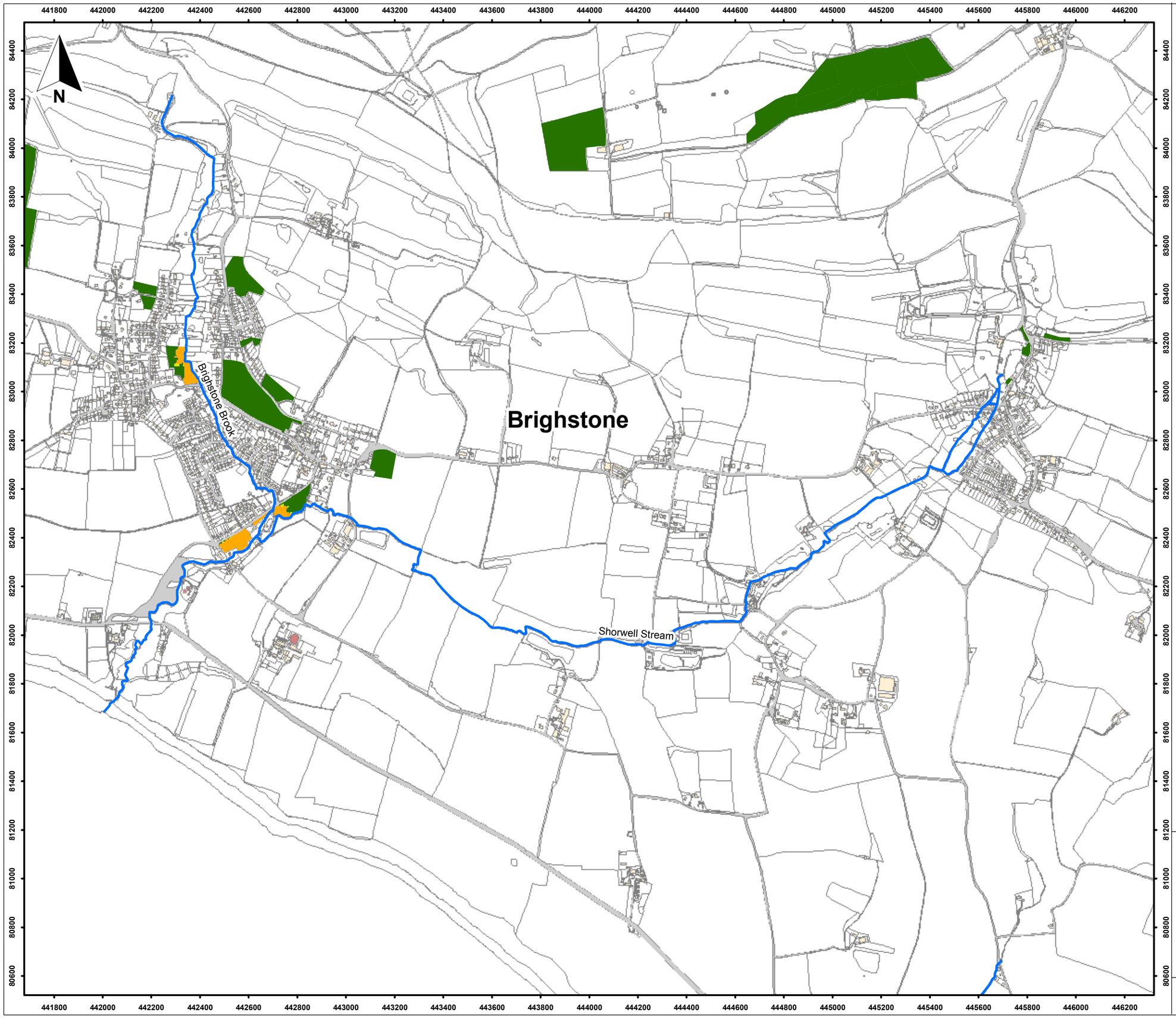
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 31
Potential Development Sites
Qualitative Flood Risk
Brighstone

November 2009
25793-A34a.mxd squij

Entec



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

0 200 400 600 Meters

Scale: 1:15,000 @ A3

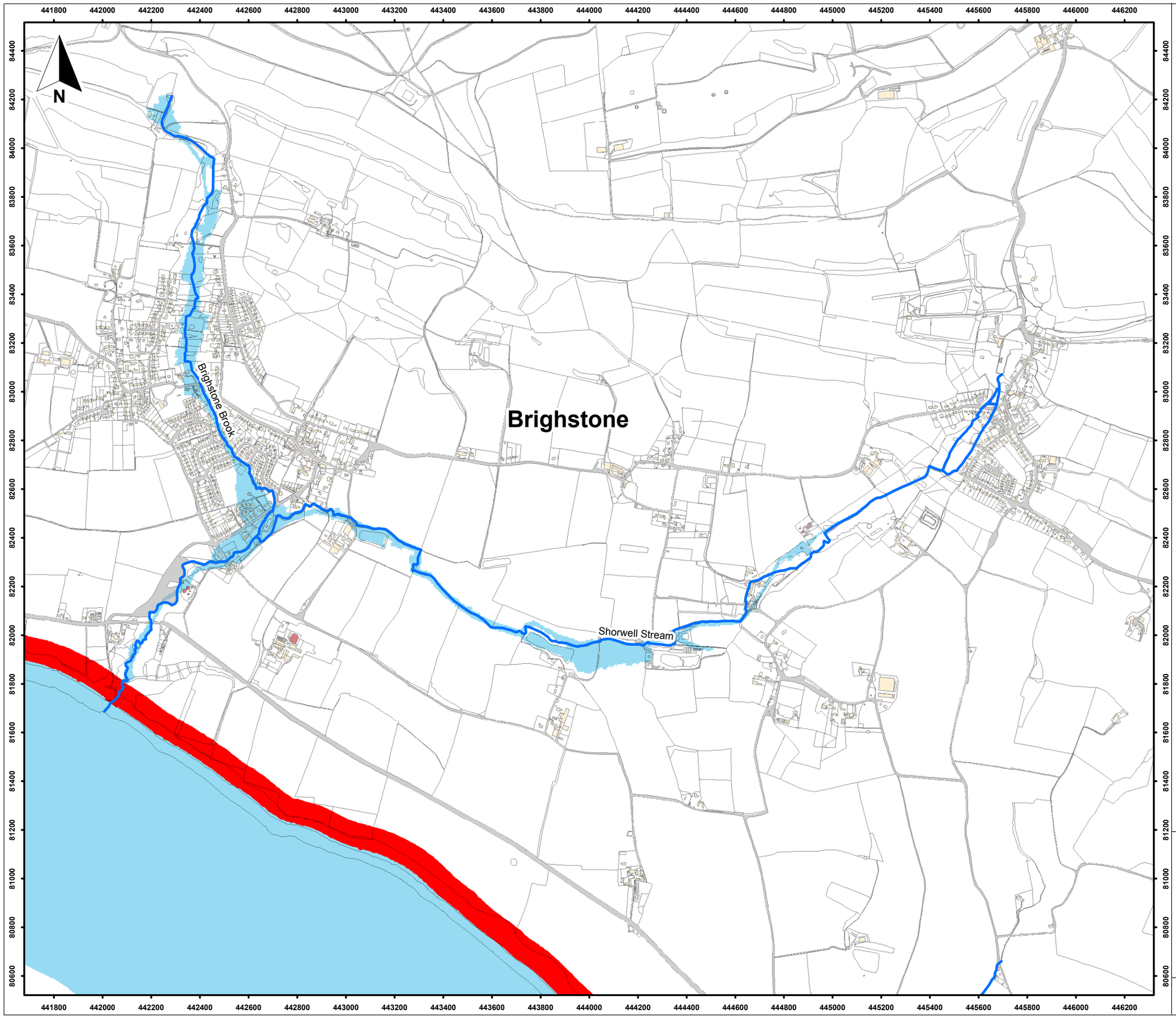
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 32
Potential Development Sites
Site Specific Flood Risk Definition
Brighstone

November 2009
25793-A35a.mxd squij

Entec



Key:

Main Rivers

Potential Exposure Risk

High

Medium

Low

Environment Agency Flood Zone 2 (November 2009)

0 200 400 600 Meters

Scale: 1:15,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 33
Qualitative Wind and Wave Exposure Risk - Brighstone

November 2009
25793-A36.mxd squij

Entec

Key:

- Location of reported surface water flooding issues. Supplied by Southern Water for the period upto and including 2006.
- Environment Agency Flood Zone 2 (November 2009)
- Potential Surface Water Flow Routes and Ponding areas (1:100+cc) Over 0.2m deep
- Potential Development Sites
- Outside the Limits of the Surface Water Model

Notes:
Only predicted surface water flow routes and ponding areas, over 0.1m deep and greater than 25m2 in areas are shown

0 200 400 600 Meters

Scale: 1:12,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 34
Potential Surface Water Flow Routes and Ponding Areas (1 in 100 year storm + climate change) - Brighstone

November 2009
25793-A37.mxd squij

Entec

Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix H
Ventnor

June 2010

ISLE of WIGHT COUNCIL

Overview

Ventnor is a Smaller Regeneration Area and it is built on a relatively steep south east facing slope, elevation which rises quickly from the shoreline. Flood risk in the town is considered to only be small.

Please review this discussion along side the mapping provided in this Appendix.

Sustainability and Regeneration Objectives

Ventnor is a Smaller Regeneration Area. It is an area of need in terms of regeneration and therefore the Isle of Wight Council will be receptive to development proposals. Ventnor SRA has been identified as having the potential to accommodate further development to meet the regeneration aims and needs of the local community, through improving local services and strengthening public transport. Development will be encouraged on brownfield sites in the first instance and tourism will be promoted.

Sites at Risk

Ventnor has no fluvial Flood Zones and little in the way of tidal Flood Zones. All the potential development sites are located within Flood Zone 1

Climate Change

Figures 37 and 38, illustrate that the potential impact of climate change does little to increase the flood risk in Ventnor. This is due to much of the ground being above the predicted future extreme tide levels.

Potential Surface Water Flow Routes and Ponding Areas

Method

The potential surface water flow routes and ponding areas presented in the SFRA, illustrate areas of predicted flooding greater than 25m^2 in spatial extent and only flooding which is more than 0.1m deep. This refinement of the TuFLOW model output is necessary so as to establish the primary areas of predicted flood risk. The modelling approach utilises a 5m resolution ground model grid. The TuFLOW model does not incorporate the Southern Water surface water drains or sewers, which during a storm event would provide storage capacity. Southern Water advised that the modelling should assume that the surface water sewer network could accommodate the 1 in 20 year storm. Therefore, the 1 in 20 year rainfall depths for the critical storm were subtracted from the 1 in 100 year (plus climate change) rain fall depths.

The 1 in 100 year (plus climate change) winter profile storm hyetographs (hyetograph refers to a graph presenting rainfall depth over time) were generated by deriving catchment descriptors from the Flood Estimation Handbook CD-ROM (FEH) and applying the FEH Rain Profile Method. The storm durations were determined by the critical

drainage pathway lengths in each of the model areas. The model boundaries were determined by the topography, the local watersheds were traced to ensure that all contributing parts of the catchments were included in the model.

Results

The patterns of predicted surface water flow routes and ponding areas are primarily determined by two key model parameters, the topographic model and the rainfall hyetograph. In Ventnor the most significant influence is provided by the topographic model. The topography of Ventnor is generally characterised by a steeply sloping south facing slope with very few well defined flow routes. When the LiDAR is examined at the local level, it is apparent that there are a large number of small *rills* which follow the contours of the slope. The source of these features is not clear, although it is likely that the process of removing the buildings from the ground model has been an influence. The presence of rills that are aligned with the contours is that the down-slope flow of water is interrupted, resulting in a series of what appear to be lateral flow routes. In the east of the town, this phenomenon is replaced with broad, unconfined shallow flooding as this part of the hillside is devoid of any significant topographic features which would collect and channel the flows.

The form of the ground topographic model in Ventnor is such that it is likely that the surface flow routes and ponding areas predicted in figure 40 are potentially inaccurate. These results have been included for completeness, but they should not be used to guide site-specific flood risk assessments. A more detailed approach, in which the ground model is vertically adjusted using survey data, and through the inclusion of the Southern Water surface water drainage network, would be necessary to improve the definition of the surface water flood risks.

Surface Drainage and Infiltration SuDS Potential

The central area of Ventnor is characterised by soils with an SPR of about 47%, while the fringe areas of the town have a much lower SPR of about 2%. A Secondary Aquifer with an intermediate leaching potential follows the coastline through the town with a width of approximately 350m. A thin band of Principal Aquifer overlain by soils of intermediate leaching potential lies adjacent the Secondary Aquifer. The north of the town, up towards Lowtherville, is underlain by a Principal Aquifer overlain with soils of high leaching potential. A substantial area of mass movement is identified in the town which is associated with clay strata. Due to the presence of this band of mass movement and the Secondary Aquifer, infiltration potential over much of the town is classified as low. Due to the soils and mass movement along the coast, the use of infiltration SuDS techniques is considered unsuitable. The impact that surface water drainage might have on areas of geological instability should be considered. The presence of a SAC, along the coastline, requires precautions be taken to ensure that contaminants are not introduced into the environment in these areas. Consideration should be given to the potential for tide locked surface water drainage outfalls. On site attenuation and storage will need to be provided to ensure that high tides do not result in sites flooding.

Wave Exposure Risk

The coastline of Ventnor has been classified as being at medium risk of wave exposure (see Section 6 of the SFRA Report). It is recommended that for any site within the 50m buffer, where ground levels are less or equal to the predicted peak 1 in 200 year tide in 2115 level plus a 4m allowance for wave height, building design should consider the impact of being potentially exposed to airborne beach material and the corrosive effects of sea spray.

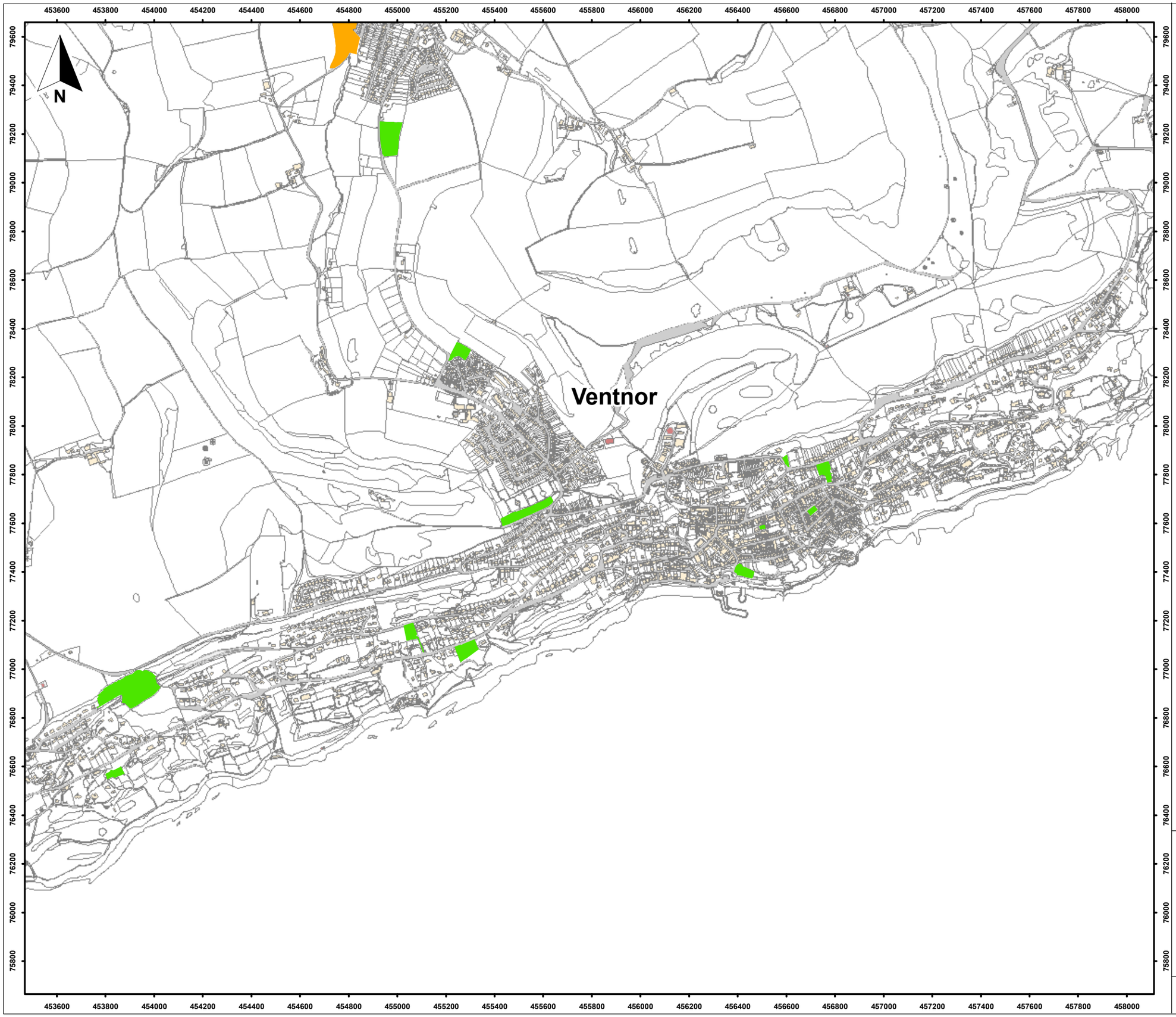
Flood Risk Management Guidance and Site Specific FRAs

The principal of avoidance should be applied when considering sites within Ventnor and given that the flood risk zones only impact a very small land area in the town, avoidance of risk should be pursued in spatial planning process.

Should a circumstance arrive where development is proposed in a flood risk zone, the following will apply. The development of any previously undeveloped site in Flood Zones 2 and 3 is considered by PPS25 as an increase in flood risk and should be avoided. The redevelopment of any previously developed sites within the Flood Zones will require the PPS25 Sequential test to be passed and the Exception Test satisfied where necessary.

Factors to be considered in safe development could include:

- Ensuring that the sequential approach to landuse planning is, where possible, applied on site. This approach would see more and highly vulnerable landuse types being placed in the lower risk zones.
- Finished first floor levels should be set above the predicted 1 in 200 year predicted tide levels for the year 2115. The Environment Agency should be consulted to confirm if the predicted tide levels in Figure 1 in Appendix B are still the most recent predictions and if not provide new ones. A freeboard allowance should be applied, again the Environment Agency should be consulted on this aspect of the design.
- Buildings should be designed so that safe access and egress can be facilitated in the event of the 1 in 100 year (plus climate change) and 1 in 200 year tidal event (plus climate change).
- Development should not increase the risk of flooding elsewhere. As such, the potential for displaced flood water to impact adjacent areas should be considered. This typically applies if an existing building footprint is being increased in fluvial floodplains and defended tidal floodplains. The displacement of water aspect of development along an undefended coastline is not necessarily a concern.
- Building design should account for the potential depths of water that might occur and appropriate flood resilient and or resistant design features should be incorporated.
- Surface water generated by development should be managed using sustainable techniques. The FRA or drainage assessment should explore the Environment Agency and CIRIA SuDS hierarchy. Discharge rates and volumes should not increase post development, in addition to this PPS25 requirement, the Council and the Environment Agency want to see developers seeking to reduce run-off rates and volumes.



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

Notes:
Site is attributed with the flood probability associated with the highest probability flood zone the site intersects

The mapped extent of Flood Zone 3b has been used to identify Functional Floodplain
The 1 in 100 year fluvial flood zone for the present day and the 1 in 200 year tidal extent predicted for the year 2115 has been used to identify sites at a High Probability. The 1 in 1000 year fluvial flood zone for the present day and the 1 in 1000 year tidal extent predicted for the year 2115 has been used to identify sites at a Medium Probability. Sites only in Flood Zone 1 have been assigned a Low Probability

0 200 400 600 800 Meters

Scale: 1:15,000 @ A3

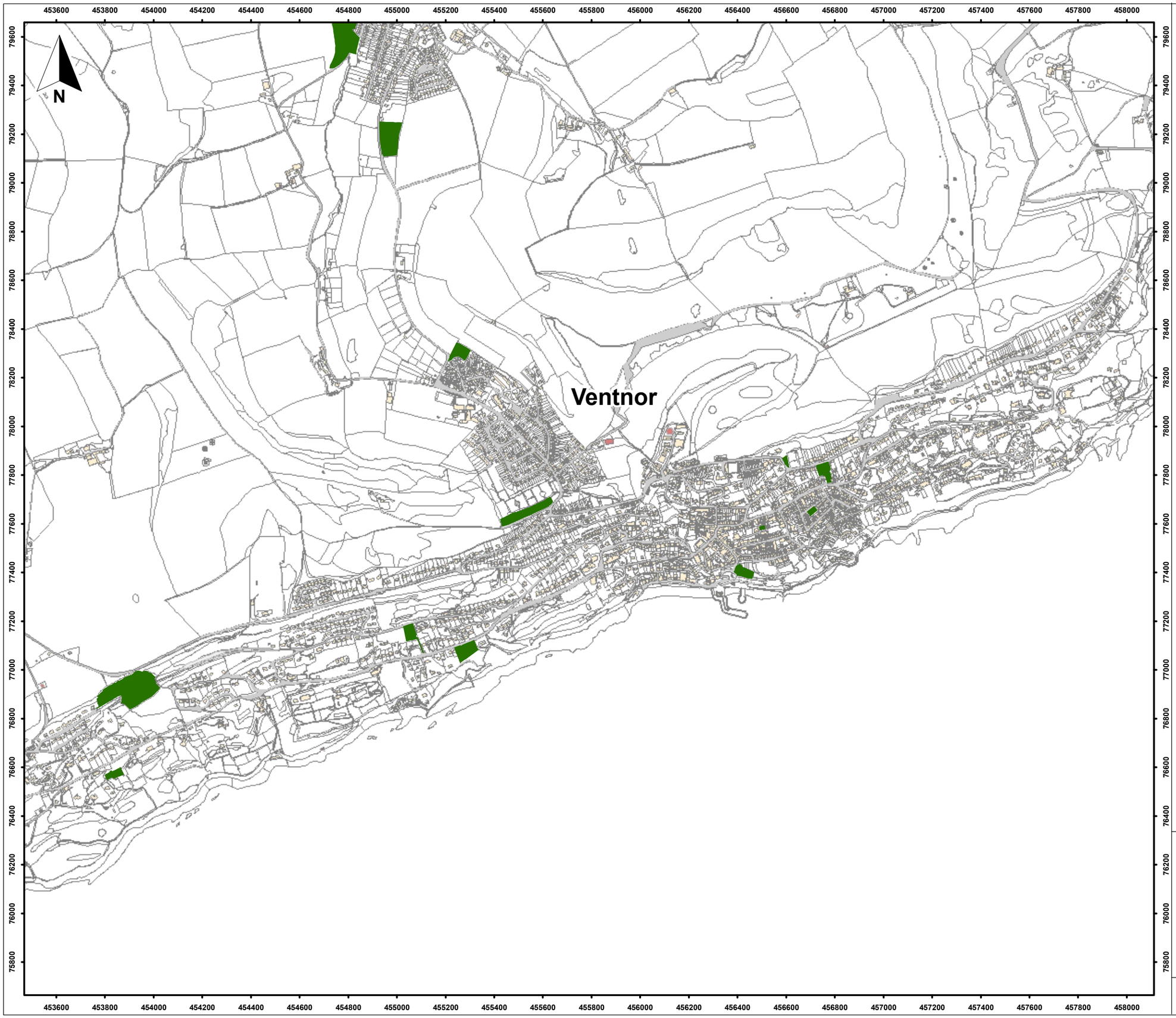
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 35
Potential Development Sites
Qualitative Flood Risk
Ventnor

November 2009
25793-A38a.mxd squij

Entec



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

0 200 400 600 800 Meters

Scale: 1:15,000 @ A3

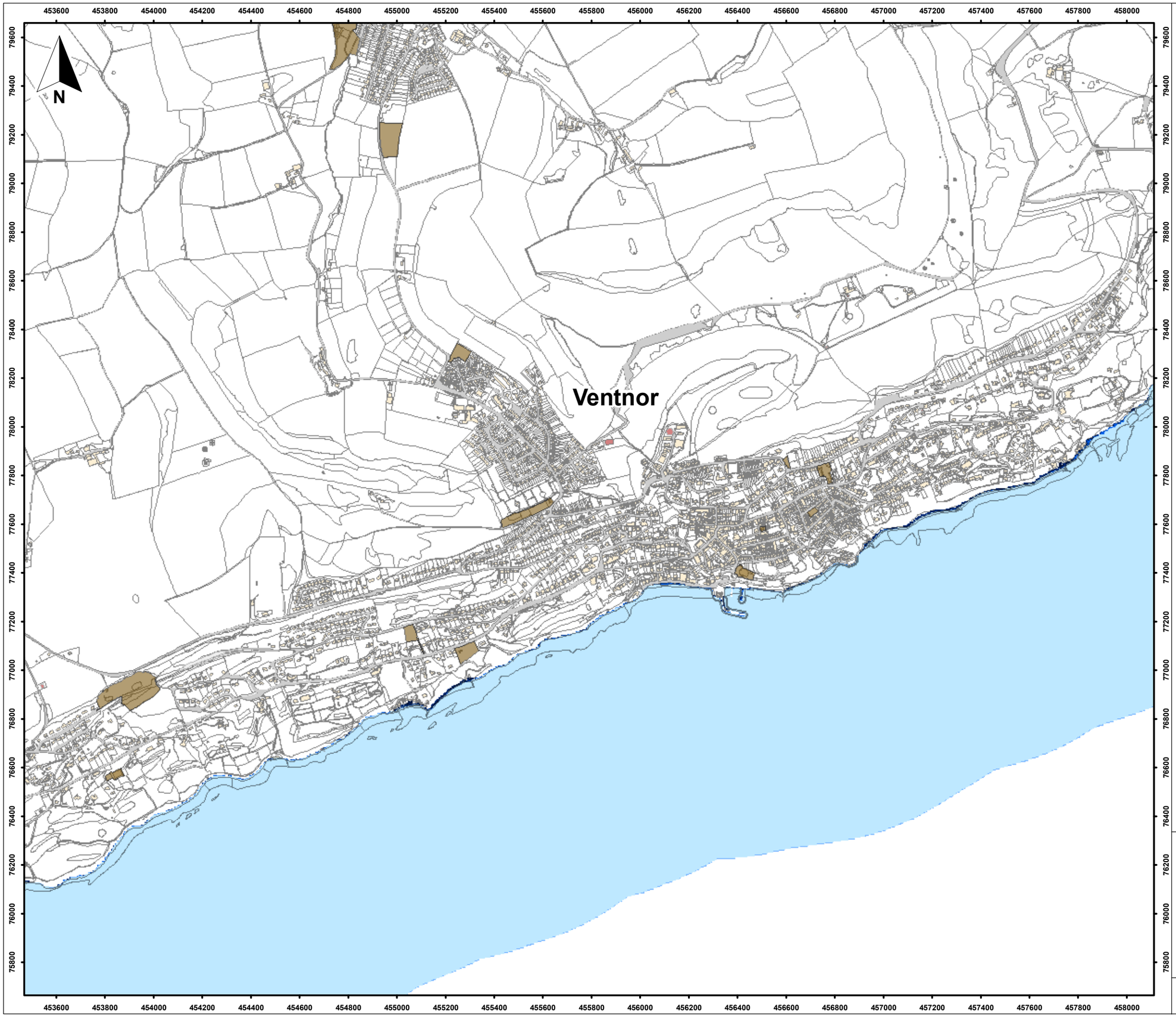
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 36
Potential Development Sites
Site Specific Flood Risk Definition
Ventnor

November 2009
25793-A39a.mxd squij

Entec



Key:

Predicted 1 in 1000 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 600 800 Meters

Scale: 1:15,000 @ A3

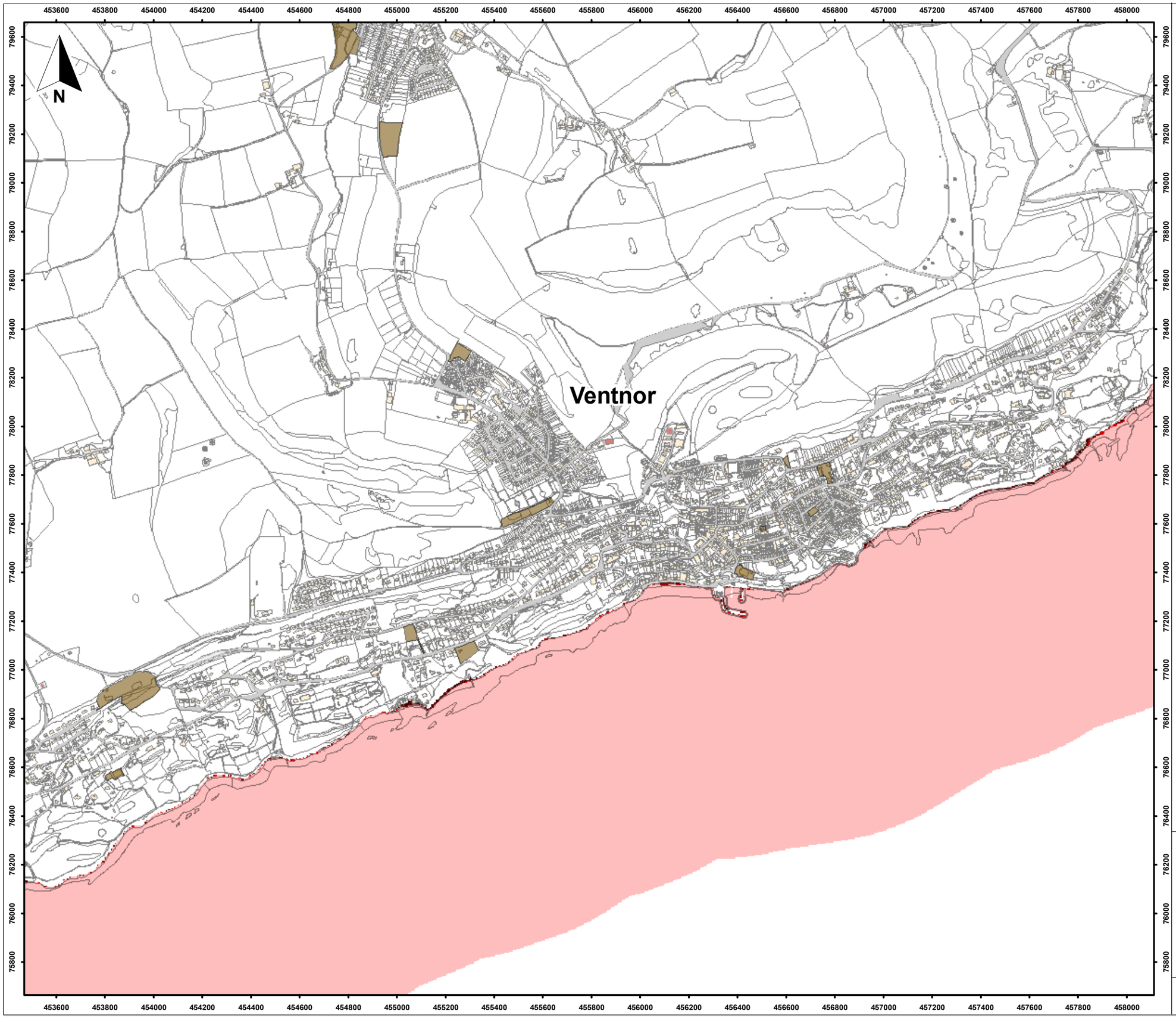
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 37
Potential Development Sites
Flood Zone 2
Climate Change Scenarios
Ventnor

November 2009
25793-A40a.mxd squij

Entec



Key:

Predicted 1 in 200 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 600 Meters

Scale: 1:15,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 38
Potential Development Sites
Flood Zone 3
Climate Change Scenarios
Ventnor

November 2009
25793-A41a.mxd squij

Entec

Key:

Main Rivers

Potential Exposure Risk

High

Medium

Low

Environment Agency Flood Zone 2 (November 2009)

0 200 400 600 800 Meters

Scale: 1:15,000 @ A3

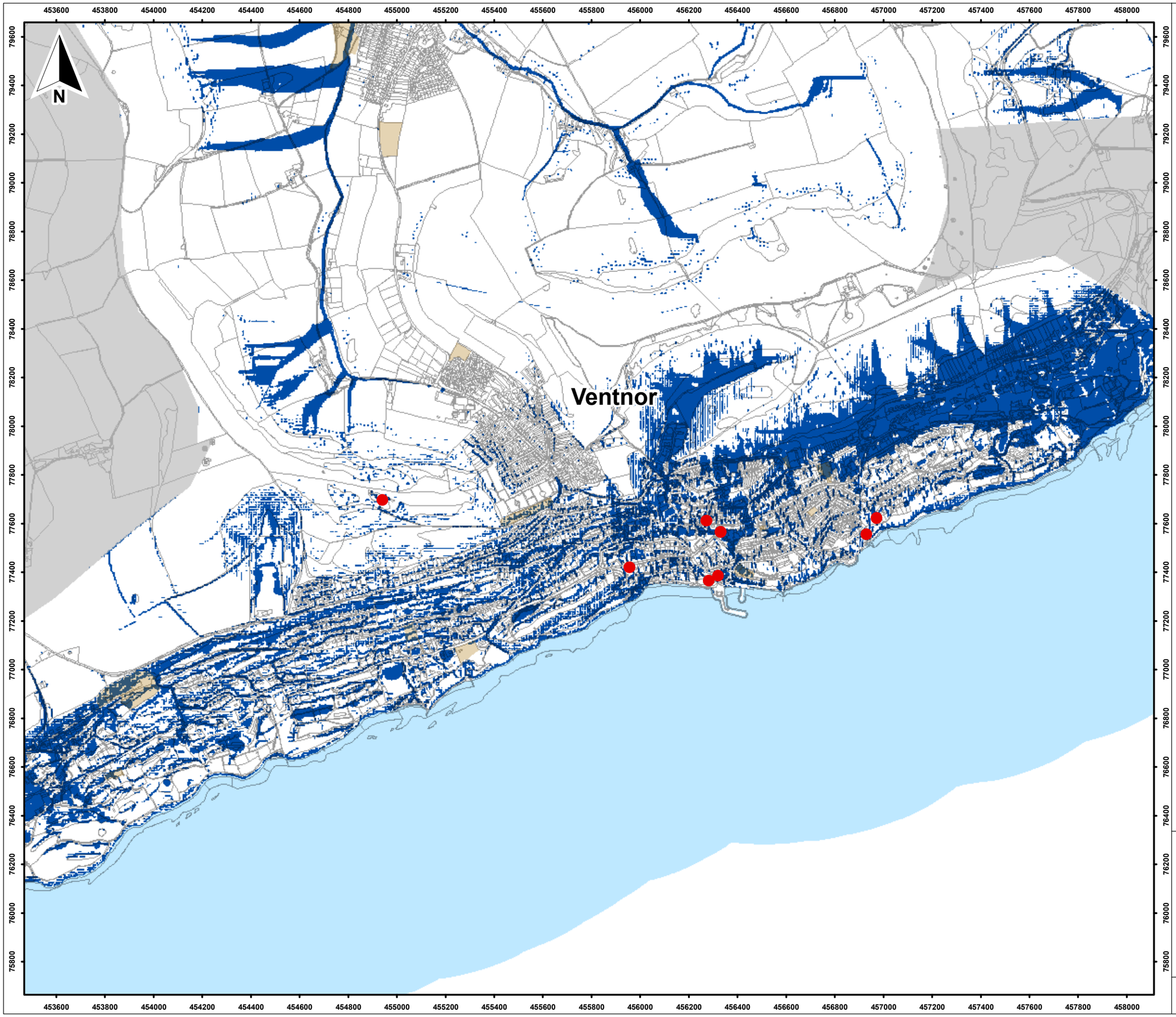
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 39
Qualitative Wind and Wave Exposure Risk - Ventnor

November 2009
25793-A42.mxd squij

Entec



Key:

- Location of reported surface water flooding issues. Supplied by Southern Water for the period upto and including 2006.
- Environment Agency Flood Zone 2 (November 2009)
- Potential Surface Water Flow Routes and Ponding areas (1:100+cc) Over 0.2m deep
- Potential Development Sites
- Outside the Limits of the Surface Water Model

Notes:
Only predicted surface water flow routes and ponding areas, over 0.1m deep and greater than 25m2 in areas are shown

0 200 400 600 800 Meters

Scale: 1:15,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 40
Potential Surface Water Flow Routes and Ponding Areas (1 in 100 year storm + climate change) - Ventnor

November 2009
25793-A43.mxd squij

Entec

Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix I
Wroxall

June 2010

Overview

Wroxall is classified as a Rural Service Centre and it is situated in the upper catchment of the Eastern Yar, it is located in a valley with hills to the east and west. Flood risk in Wroxall is limited to areas immediately adjacent the river, with only 2 sites seriously affected.

Please review this discussion along side the mapping provided in this Appendix.

Sustainability and Regeneration Objectives

Development within the wider countryside will be focused on the Rural Service Centres such as Wroxall and should support their role as wider centres for outlying villages, hamlets and surrounding countryside. For the rural service centres development will be expected to ensure their future viability. Within the rural service centres and outlying rural areas, development will be expected, in the first instance, to meet a rural need and maintain or enhance the viability of local communities and will be subject to local considerations.

Wroxall RSC has been identified as having the potential to accommodate further development to meet the regeneration aims and needs of the local community, through improving local services and strengthening public transport. Development will be encouraged on brownfield sites in the first instance and tourism will be promoted.

Sites at Risk

Flood risk in the town is fluvial, which affects areas adjacent to the tributary of the Eastern Yar which flows from south to north along the western side of the settlement.

The Flood Zones through Wroxall are narrow, owing to the narrow valley floor which is bounded by relatively steep topography. Only one of the potential development sites in the settlement is directly influenced by fluvial flooding. This is the large site on the western bank of the river. The eastern strip of this site falls into flood zone 3a. Owing to the topography much of it remains in Flood Zone 1.

Potential Surface Water Flow Routes and Ponding Areas

Method

The potential surface water flow routes and ponding areas presented in the SFRA, illustrate areas of predicted flooding greater than 25m^2 in spatial extent and only flooding which is more than 0.1m deep. This refinement of the TuFLOW model output is necessary so as to establish the primary areas of predicted flood risk. The modelling approach utilises a 5m resolution ground model grid. The TuFLOW model does not incorporate the Southern Water surface water drains or sewers, which during a storm event would provide storage capacity. Southern Water advised that the modelling should assume that the surface water sewer network could accommodate the 1 in 20 year

storm. Therefore, the 1 in 20 year rainfall depths for the critical storm were subtracted from the 1 in 100 year (plus climate change) rain fall depths.

The 1 in 100 year (plus climate change) winter profile storm hyetographs (hyetograph refers to a graph presenting rainfall depth over time) were generated by deriving catchment descriptors from the Flood Estimation Handbook CD-ROM (FEH) and applying the FEH Rain Profile Method. The storm durations were determined by the critical drainage pathway lengths in each of the model areas. The model boundaries were determined by the topography, the local watersheds were traced to ensure that all contributing parts of the catchments were included in the model.

Results

Wroxall is situated in the bottom of a small valley which drains towards the north. Only SAR (Synthetic Aperture Radar) data is available for Wroxall. SAR data typically includes far less small surface detail than LiDAR, as such it is just the general surface trends which are included in the model. The surface water modelling predicts flow routes in the valley bottoms and it also predicts that there is a potential surface water flood risk posed to the southern portion of the large potential development site located on the western bank of the watercourse. This potential risk should be reviewed if and when the site is developed.

Surface Drainage and Infiltration SuDS Potential

The runoff potential in Wroxall is varied, with four SPR classifications being present. In the north east, SPR values are about 15%, and in the south east the value is 29%. The north west has SPR values around 47% while the south west has SPR values of 60%. Soil leaching potential in the town is slightly more uniform, with the west and far east parts having intermediate leaching potential associated with a Principal Aquifer, while the north of the town is characterised by a Secondary Aquifer with intermediate leaching potential soils. The south is underlain by Unproductive Strata. The areas of Principal Aquifer are classified as having a medium infiltration potential while the other areas of the town has been assigned a low infiltration potential. An area potentially susceptible to mass movement associated with clay strata has been identified in Wroxall this zone has been classified as having low suitability for infiltration SuDS Techniques. Each potential development site in the Sites Database is assigned a classification for infiltration potential, groundwater contamination and runoff.

Wroxall is one few towns on the Isle of Wight without a coastline and consequently unconstrained discharge of surface waters is not possible. Infiltration potential is therefore a potential limiting factor in the use of infiltration SuDS. The western side of Wroxall and the areas along its eastern margin have been assigned a moderate suitability for infiltration SuDS techniques. The remainder of the town has been classified as having a low suitability for infiltration SuDS.

Flood Risk Management Guidance and Site Specific FRAs

The principal of avoidance should be applied when considering sites within Wroxall. The Flood Zones 2 and 3 only occupy small land areas and as such attempts to avoid these zones should be made. One large site in Wroxall has been identified as a potential development site and Figure 42 illustrates the delineation of risks across this site. If this site is brought forward for development then a sequential risk based approach to landuse distributions should be applied. Lower lying areas of higher flood risk should be designated for water compatible or less vulnerable uses.

The development of any previously undeveloped site in Flood Zones 2 and 3 is considered by PPS25 as an increase in flood risk and should be avoided. The redevelopment of any previously developed sites within the Flood Zones will require the PPS25 Sequential test to be passed and the Exception Test satisfied where necessary.

Factors to be considered in safe development could include:

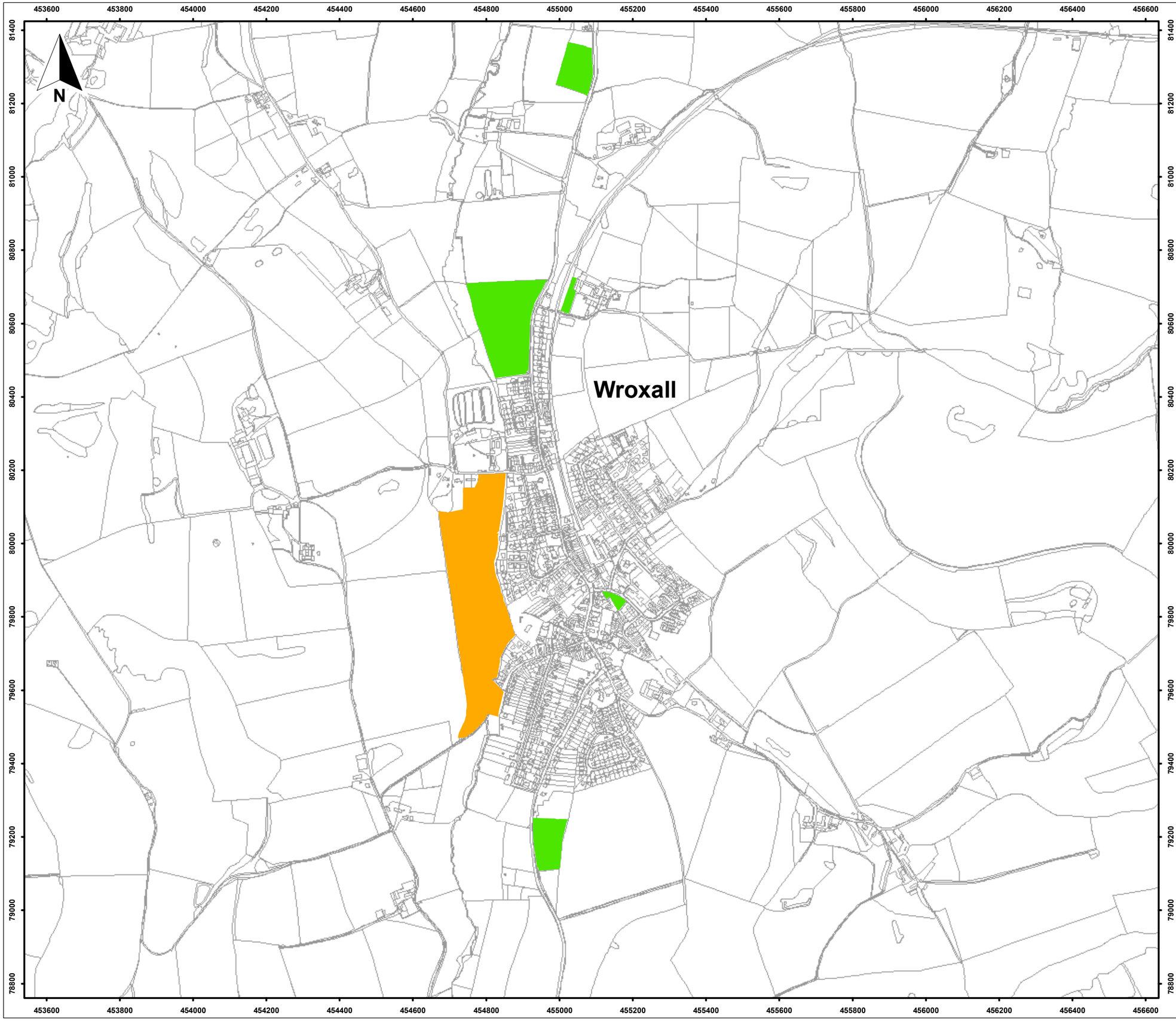
- Finished first floor levels should be set above the predicted 1 in 100 year fluvial flood levels, plus a climate change allowance. The Environment Agency should be consulted for fluvial flood levels. A freeboard allowance should be applied, again the Environment Agency should be consulted on this aspect of the design.

- Buildings should be designed so that safe access and egress can be facilitated in the event of the 1 in 100 year (plus climate change).

- Development should not increase the risk of flooding elsewhere. As such, the potential for displaced flood water to impact adjacent areas should be considered. This typically applies if an existing building footprint is being increased in fluvial floodplains and defended tidal floodplains. The displacement of water aspect of development along an undefended coastline is not necessarily a concern.

- Building design should account for the potential depths of water that might occur and appropriate flood resilient and or resistant design features should be incorporated.

- Surface water generated by development should be managed using sustainable techniques. The FRA or drainage assessment should explore the Environment Agency and CIRIA SuDS hierarchy. Discharge rates and volumes should not increase post development, in addition to this PPS25 requirement, the Council and the Environment Agency want to see developers seeking to reduce run-off rates and volumes.



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

Notes:
Site is attributed with the flood probability associated with the highest probability flood zone the site intersects

The mapped extent of Flood Zone 3b has been used to identify Functional Floodplain
The 1 in 100 year fluvial flood zone for the present day and the 1 in 200 year tidal extent predicted for the year 2115 has been used to identify sites at a High Probability. The 1 in 1000 year fluvial flood zone for the present day and the 1 in 1000 year tidal extent predicted for the year 2115 has been used to identify sites at a Medium Probability. Sites only in Flood Zone 1 have been assigned a Low Probability

0 200 400 Meters

Scale: 1:10,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 41
Potential Development Sites
Qualitative Flood Risk
Wroxall

November 2007
25793-A44a.mxd squij

Entec

Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

0 200 400 Meters

Scale: 1:10,000 @ A3

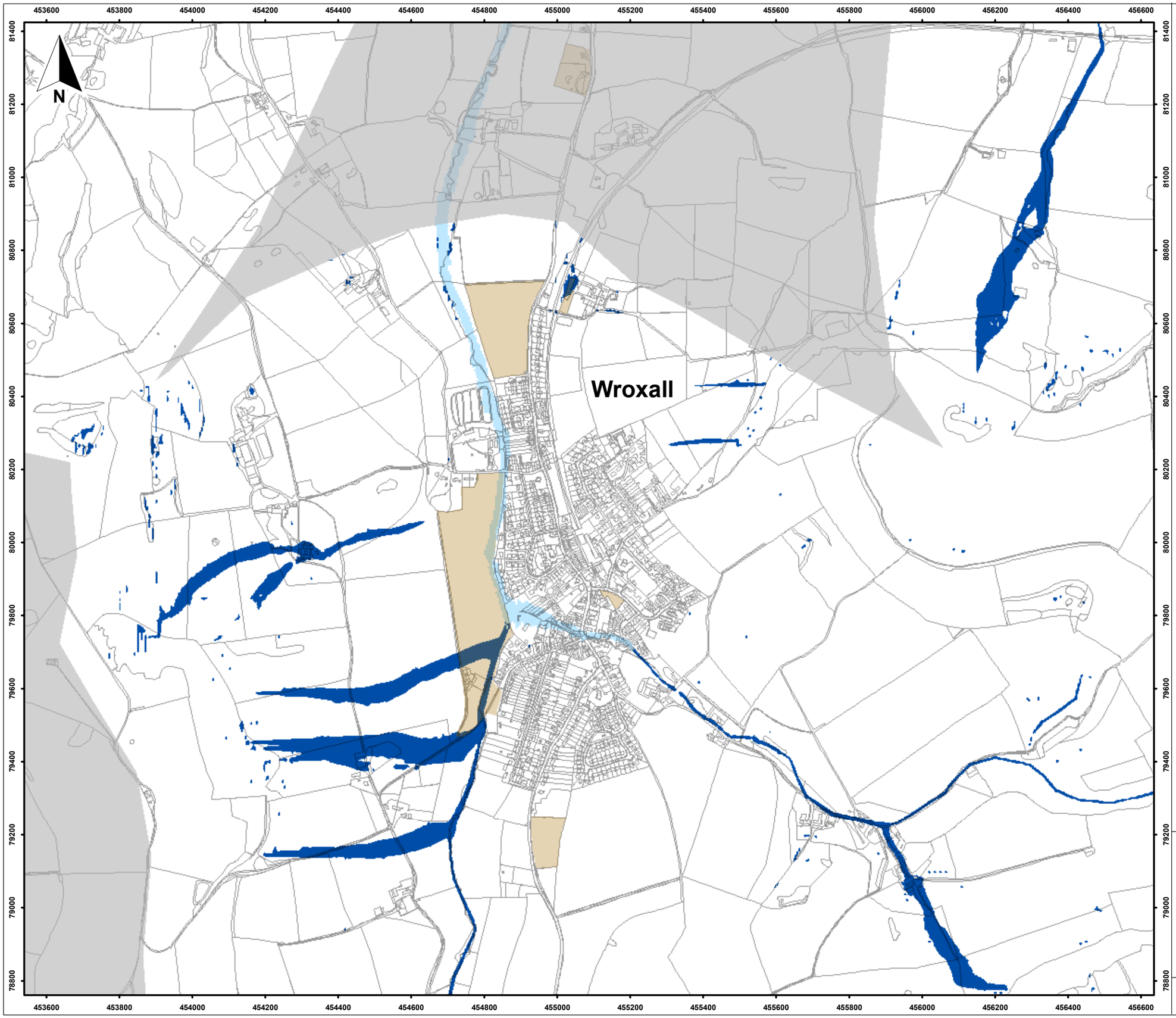
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 42
Potential Development Sites
Site Specific Flood Risk Definition
Wroxall

November 2009
25793-A45a.mxd squij

Entec



Key:

- Location of reported surface water flooding issues. Supplied by Southern Water for the period upto and including 2006.
- Environment Agency Flood Zone 2 (November 2009)
- Potential Surface Water Flow Routes and Ponding areas (1:100+cc)
- Potential Development Sites
- Outside the Limits of the Surface Water Model

Notes:
Only predicted surface water flow routes and ponding areas, over 0.2m deep and greater than 25m2 are shown

0 200 400 Meters

Scale: 1:10,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 43
Potential Surface Water Flow Routes and Ponding Areas (1 in 100 year storm + climate change) - Wroxall

November 2007
25793-A46.mxd squij

Entec

Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix J
The Bay

June 2010

Overview

The Bay RDA is classified as a Key Regeneration Area (KRA) and is comprised of Sandown, Lake and Shanklin which are located along the stretch of coastline in the south east of the Island. The settlements have developed into a linear urban centre. Tourism and leisure are the main commercial activities in Sandown and Shanklin. Topography changes from low lying areas north east and west of Sandown, to higher lying areas south of Shanklin. Flood risk to development sites in The Bay area is associated with tidal flooding along the coast and fluvial/tidal flooding in the low lying areas in the north of the RDA. Fluvial flooding from Scotchells Brook in the west of The Bay is also a potential issue

Please review this discussion in conjunction with the mapping provided in this Appendix.

Sustainability and Regeneration Objectives

The key objectives for The Bay area are to encourage regeneration of Sandown and Shanklin for tourism, while adding a more diverse business base and strengthening of the community. This will be achieved through a focus on tourist facilities, development of services including transport links to other parts of the Island, encouraging development on brownfield sites, and supporting residential growth.

Sites at Risk

The Isle of Wight Autumn 2000 Flood Investigation Study – (*Sandown Town Council Report*) identifies the following to have been flooded during the Autumn of 2000:

- South Wight Housing Association on East Yar Road was flooded as a result of on site drainage capacity being exceeded.
- Fort Holiday Park is in the floodplain and water is described as having backed up the ditches in East Sandown and the surrounding areas causing an overflow into the holiday park.
- Booker Cash and Carry suffered flooding due to what was described as poorly designed on site drainage.

The Isle of Wight Autumn 2000 Flood Investigation Study – (*Shanklin Town Council Report*) attributed heavy rainfall exceeding the capacity of surface drainage systems as the cause of isolated surface water flooding incidents.

Two key areas at risk of flooding have been highlighted, these being, the north of Sandown in the Yaverland area and to the west of Sandown adjacent to Scotchells Brook. These two areas will be assessed separately of each other:

North Sandown: The Eastern Yar has recorded historic flood events. In January 1974 and October 2000, flooding occurred north of Sandown. In both instances the historic flood outlines held by the Environment Agency impact upon some potential development sites. The affected sites are attributed accordingly in the Sites Database. Some of the sites in north Sandown are only partially within Flood Zone 3 (2115), as such the primary method of flood risk management should be through a risk based sequential approach to land use planning. There are two sites located behind the B3395 and between north Sandown and the zoo. These sites are assessed as being completely within the tidal Flood Zone 3 extent in 2115. On the basis that development of these sites can be supported by the

East Sandown: A large potential development site located to the east of Sandown is flagged as being impacted by flood zone 3, however when the risks are assessed at the site specific level, it is clear that only the northern most tip is in Flood Zone 3, with the majority being in Flood Zone 1.

In line with the Sequential Test and the principal of risk avoidance, sites in Flood Zone 1 should be considered before sites in higher flood risk zones.

Climate Change

Along the coast, the impact of climate change is minimal. Only two potential development sites, near Eastcliffe Promenade, possibly fall within the future 2115 Flood Zone 2 extent. To the north of Sandown in the Eastern Yar floodplain, climate change is predicted to bring about a moderate increase in the extent of Flood Zone 2 and 3 (see Figures 46 and 47 in Appendix A). This will have the impact of increasing flood risk to some of the potential development sites, as well as existing properties.

The site on the corner of Avenue Road and St Johns Crescent is one example where flood risk status is predicted to turn from highly unlikely to likely (flood zone 1 to flood zone 3) within the next 100 years. No other potential development sites that are currently not impacted by the Flood Zones have been identified as being impacted within the next 100 years. Many of those sites currently within the tidal Flood Zones are predicted to experience a reduction in the amount of land currently within Flood Zone 1.

The impact of fluvial climate change has been assessed to be of less significance, as the few areas of fluvial floodplain highlighted as being potentially sensitive to the impacts of climate change, are currently within the extents of tidal Flood Zones 2 and 3.

Potential Surface Water Flow Routes and Ponding Areas

Method

The potential surface water flow routes and ponding areas presented in the SFRA, illustrate areas of predicted flooding greater than 25m^2 in spatial extent and only flooding which is more than 0.1m deep. This refinement of the TuFLOW model output is necessary so as to establish the primary areas of predicted flood risk. The modelling

approach utilises a 5m resolution ground model grid. The TuFLOW model does not incorporate the Southern Water surface water drains or sewers, which during a storm event would provide storage capacity. Southern Water advised that the modelling should assume that the surface water sewer network could accommodate the 1 in 20 year storm. Therefore, the 1 in 20 year rainfall depths for the critical storm were subtracted from the 1 in 100 year (plus climate change) rain fall depths.

The 1 in 100 year (plus climate change) winter profile storm hyetographs (hyetograph refers to a graph presenting rainfall depth over time) were generated by deriving catchment descriptors from the Flood Estimation Handbook CD-ROM (FEH) and applying the FEH Rain Profile Method. The storm durations were determined by the critical drainage pathway lengths in each of the model areas. The model boundaries were determined by the topography, the local watersheds were traced to ensure that all contributing parts of the catchments were included in the model.

Results

The surface water modelling in The Bay area predicts that there are a significant number of potential surface water flow routes in both the urban and rural parts of the catchment. The vast majority of this model area is covered by detailed LiDAR topographic data which includes a representation of small topographic depressions, along which the TuFLOW model has routed the surface water flows. In many cases these drainage features are just upslope extensions of the fluvial drainage network which are not covered by the current Flood Zones. In addition to natural topographic features it can clearly be seen that the model has routed flow along the railway line and along some of the highways. Many of the potential development sites in this Regeneration and Development Area are predicted to be impacted by surface water flow routes, this risk should be considered during the planning stage of any future development of these sites. There is also a reasonably high density of recorded surface water flooding incidents in The Bay area, many of which correlate well with the predicted surface water flooding risk areas. The exact causes of these incidents are not clear, but it is likely to be a combination of either the capacity of the surface water drainage network or overland surface flow.

In accordance with the modelling approach used in all areas, the Southern Water surface water drainage network has been represented by removing an assumed capacity (the 1 in 20 year storm). The Bay area catchment is largely urban and it is likely that the Southern Water surface water drains will discharge into the English Channel or the Eastern Yar Estuary, in which case there is a potential for the performance of the surface water network to be influenced by the tide level. The series of reported incidents along the edge of the Eastern Yar Estuary in the north of the area may be a result of discharge restrictions resulting from high tide levels. A more detailed understanding of the risks posed to the potential development sites and the existing infrastructure could be achieved through the use of an integrated model which includes the Southern Water surface drainage network and a variable tidal boundary.

Surface Drainage and Infiltration SuDS Potential

The soils underlying The Bay area have a low SPR of around 15%. In the north of Sandown and in a small area south of Shanklin there are soils with higher SPR values of about 60%. Much of The Bay is underlain by a Principal Aquifer with high leaching soils. The southern half of Sandown comprised of an Unproductive Strata and a Secondary Aquifer with soils of a high leaching potential. The western edge of The Bay and the southern end of Shanklin are underlain by a Principal Aquifer with an intermediate leaching potential.

In the far south of The Bay, areas of mass movement have been identified, which causes the infiltration potential to be set as low. The infiltration potential is high for most of The Bay RDA. The only exception is along the western edge and in small areas in the south, where infiltration potential is classified as medium and low respectively.

Surface water can be discharged into the sea without restrictions on volume. The release of pollutants would need to appropriately mitigated. The urban areas of Shanklin and south Sandown have the potential for infiltration SuDS, but the high groundwater contamination potential must be considered.

Wave Exposure Risk

The coastline of The Bay has been classified as being at medium risk of wave exposure (see Section 6 of the SFRA Report). It is recommended that for any site within the 50m buffer, where ground levels are less or equal to the predicted peak 1 in 200 year tide in 2115 level plus a 4m allowance for wave height, building design should consider the impact of being potentially exposed to airborne beach material and the corrosive effects of sea spray.

Flood Risk Management Guidance and Site Specific FRAs

The principal of avoidance should be applied when considering sites within The Bay area. The development of any previously undeveloped site in Flood Zones 2 and 3 is considered by PPS25 as an increase in flood risk and should be avoided. The redevelopment of any previously developed sites within the Flood Zones will require the PPS25 Sequential test to be passed and the Exception Test satisfied where necessary.

Factors to be considered in safe development could include:

- Ensuring that the sequential approach to landuse planning is, where possible, applied on site. This approach would see more and highly vulnerable landuse types being placed in the lower risk zones.
- Finished first floor levels should be set above the predicted 1 in 100 year fluvial flood levels, plus a climate change allowance and above the 1 in 200 year predicted tide levels for the year 2115. The Environment Agency should be consulted for fluvial flood levels and the Environment Agency should be asked to confirm if the predicted tide levels in Figure 1 in Appendix B are still the most recent predictions. A freeboard allowance should be applied, again the Environment Agency should be consulted on this aspect of the design.

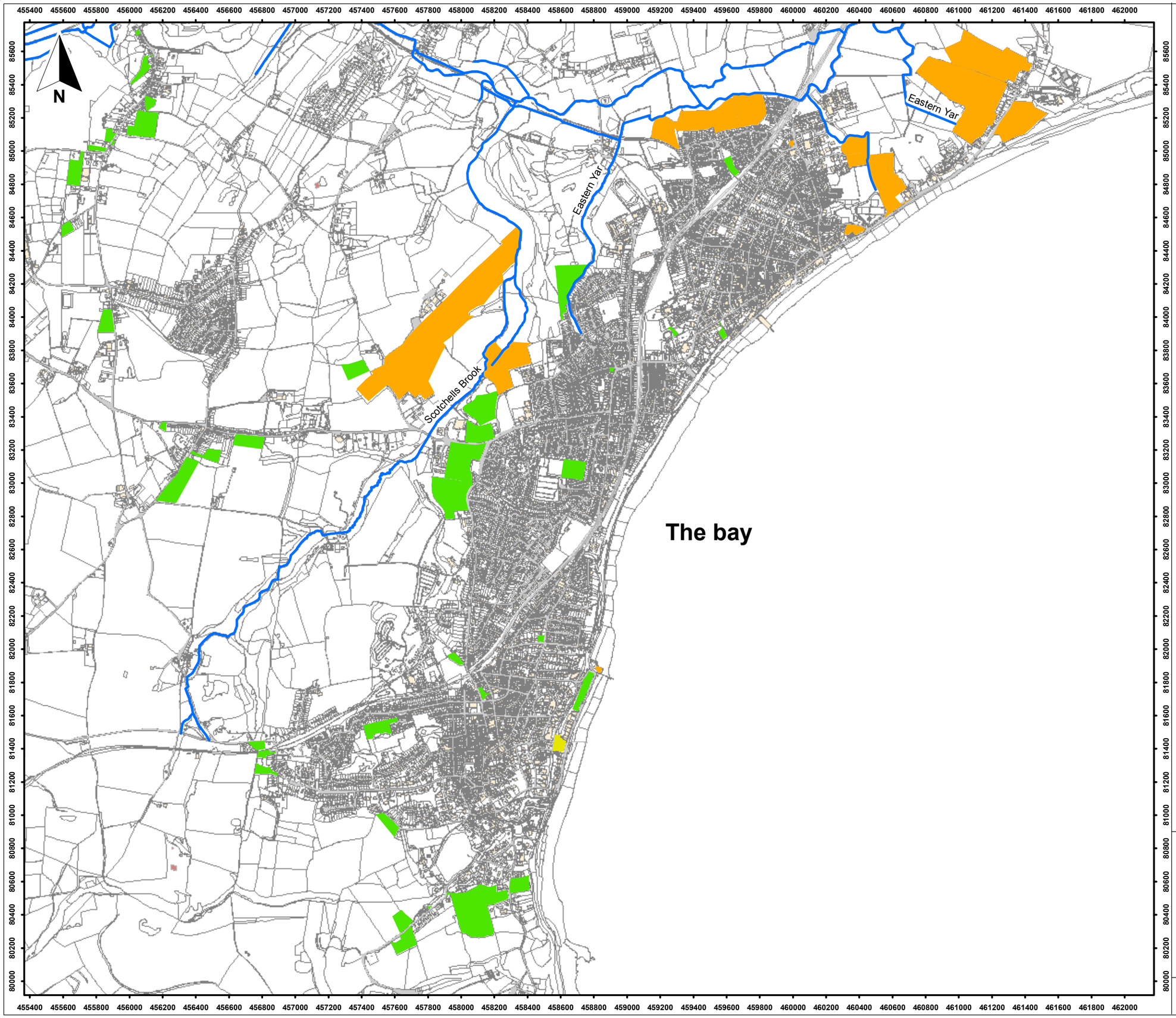
- Buildings should be designed so that safe access and egress can be facilitated in the event of the 1 in 100 year (plus climate change) and 1 in 200 year tidal event (plus climate change).

- Development should not increase the risk of flooding elsewhere. As such, the potential for displaced flood water to impact adjacent areas should be considered. This typically applies if an existing building footprint is being increased in fluvial floodplains and defended tidal floodplains. The displacement of water aspect of development along an undefended coastline is not necessarily a concern.

- Building design should account for the potential depths of water that might occur and appropriate flood resilient and or resistant design features should be incorporated.

- Surface water generated by development should be managed using sustainable techniques. The FRA or drainage assessment should explore the Environment Agency and CIRIA SuDS hierarchy. Discharge rates and volumes should not increase post development, in addition to this PPS25 requirement, the Council and the Environment Agency want to see developers seeking to reduce run-off rates and volumes.

There are a number of sites over 1ha in The Bay area, while two sites in particular are very large at 85 and 63ha. All sites over one hectare will require an FRA / Drainage Assessment to assess the drainage implications of the development. Historic records show surface water flooding to be an issue in Shanklin. It is advisable that any ensuing FRAs provide a detailed assessment of the local surface drainage network. A tributary of the Eastern Yar is located to the east of Scotchells Brook, and is recorded as a main river by the Environment Agency. No flood risk is associated with this river's headwaters. Any sites within 20 metres of the river and would require consent from the Agency in advance of any development proposals.



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

Notes:
Site is attributed with the flood probability associated with the highest probability flood zone the site intersects

The mapped extent of Flood Zone 3b has been used to identify Functional Floodplain The 1 in 100 year fluvial flood zone for the present day and the 1 in 200 year tidal extent predicted for the year 2115 has been used to identify sites at a High Probability. The 1 in 1000 year fluvial flood zone for the present day and the 1 in 1000 year tidal extent predicted for the year 2115 has been used to identify sites at a Medium Probability. Sites only in Flood Zone 1 have been assigned a Low Probability

0 200 400 600 800 1,000 Meters

Scale: 1:22,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 44
Potential Development Sites
Qualitative Flood Risk
The Bay

November 2009
25793-A47a.mxd squij

Entec

N

Eastern Yar

Eastern Yar

Scotchells Brook

The bay

Key:

Main Rivers

Probability of Flooding

Functional Floodplain

High Probability

Medium Probability

Low Probability

0 200 400 600 800 1,000 Meters

Scale: 1:22,000 @ A3

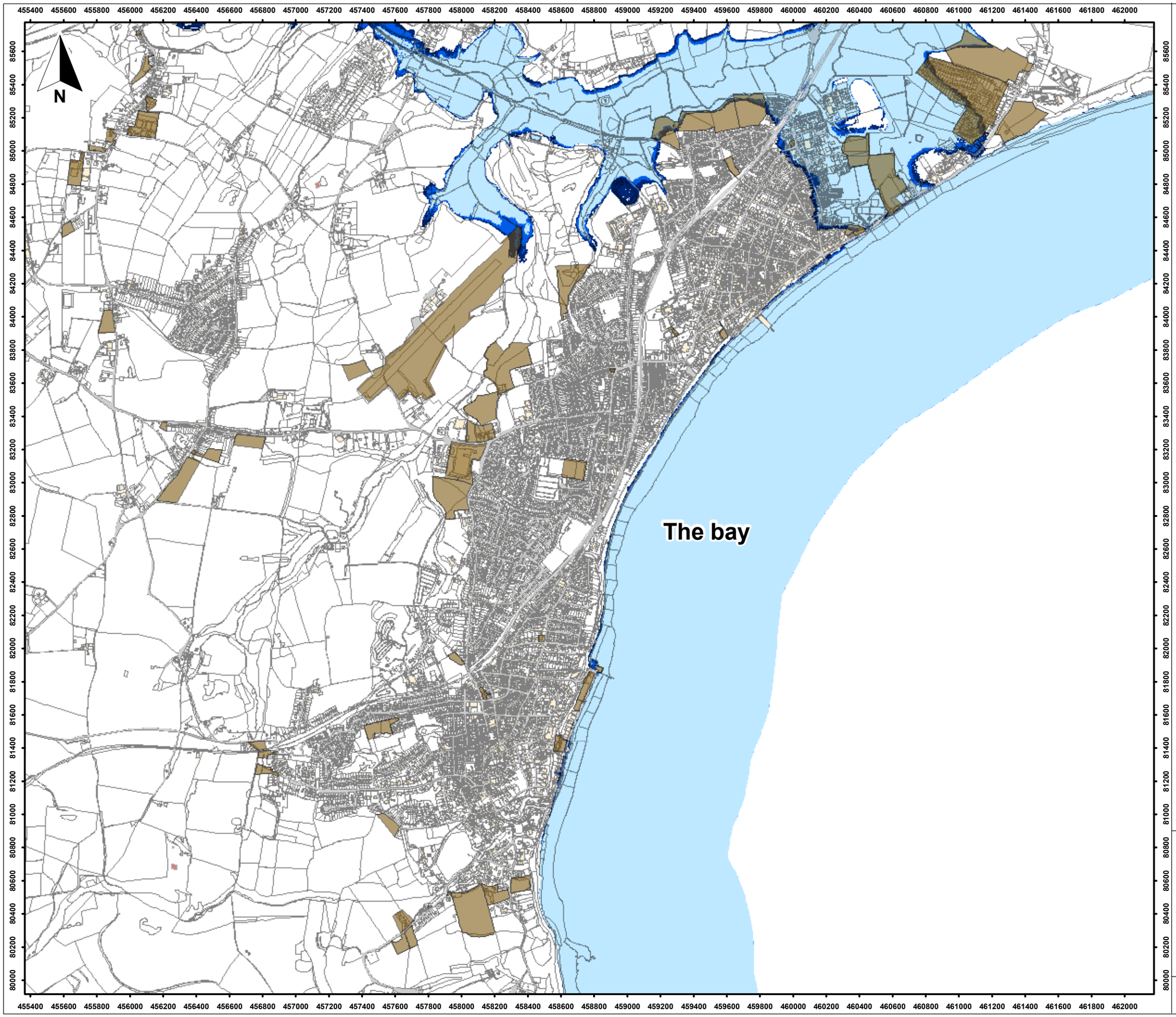
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 45
Potential Development Sites
Site Specific Flood Risk Definition
The Bay

November 2009
25793-A48a.mxd squij

Entec



Key:

Predicted 1 in 1000 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 600 800 1,000 1,200 Meters

Scale: 1:22,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 46
Potential Development Sites
Flood Zone 2
Climate Change Scenarios
The Bay

November 2009
25793-A49a.mxd squij

Entec

N

The bay

Key:

Predicted 1 in 200 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 600 800 1,000 Meters

Scale: 1:22,000 @ A3

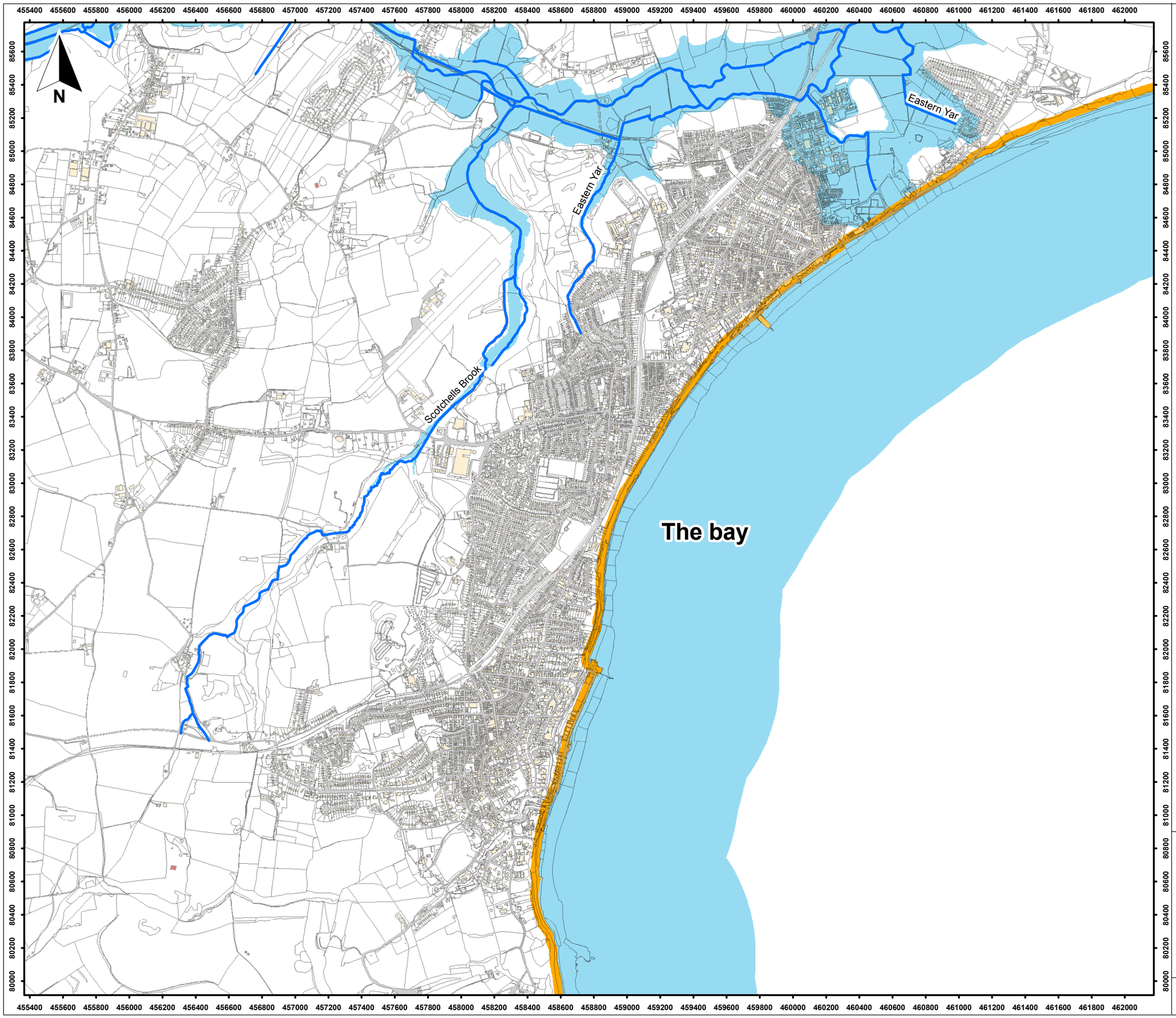
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 47
Potential Development Sites
Flood Zone 3
Climate Change Scenarios
The Bay

November 2009
25793-A50a.mxd squij

Entec



Key:

Main Rivers

Potential Exposure Risk

High

Medium

Low

Environment Agency Flood Zone 2 (November 2009)

0 200 400 600 800 1,000 Meters

Scale: 1:22,000 @ A3

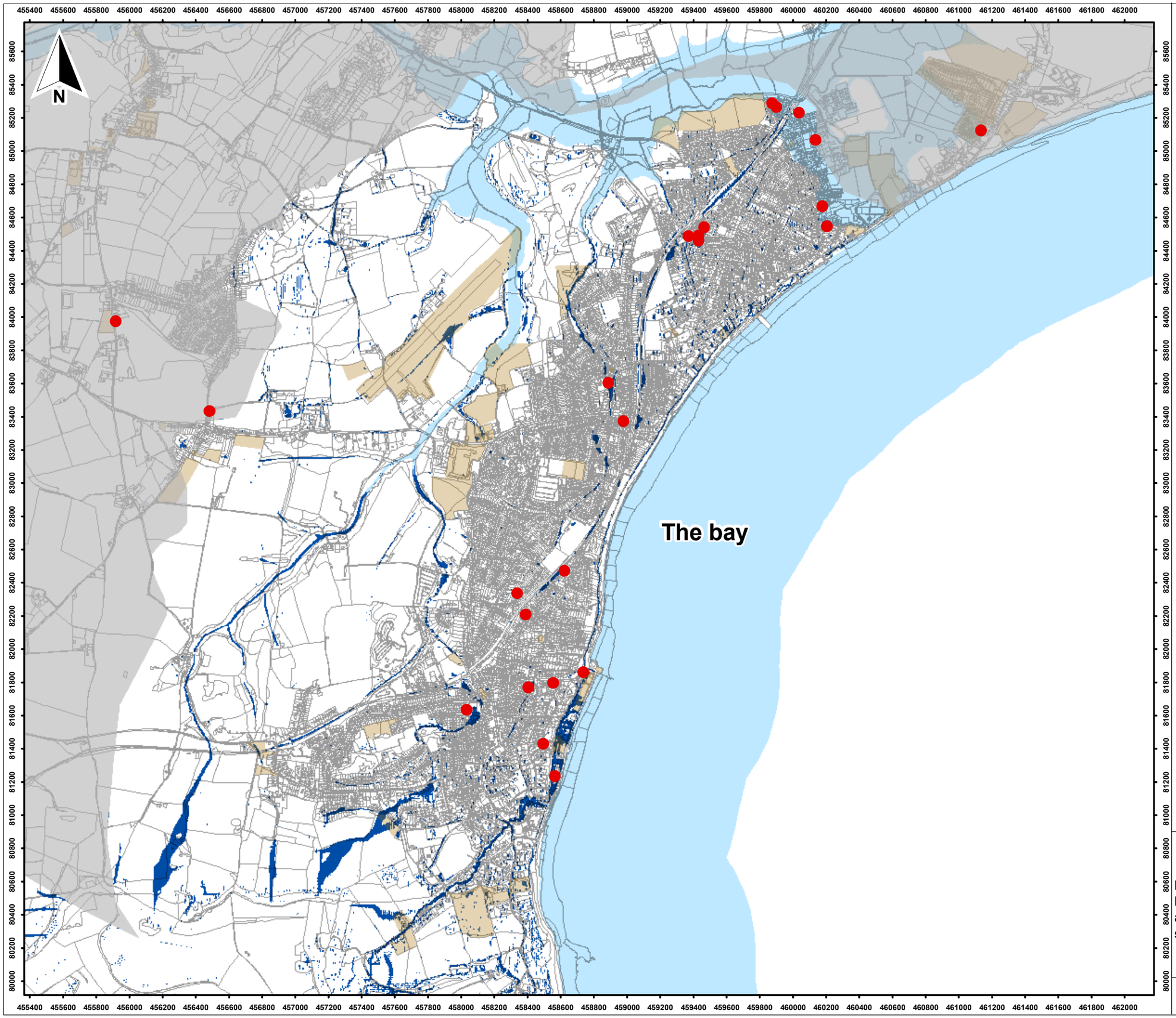
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 48
Qualitative Wind and Wave Exposure Risk - The Bay Area

November 2009
25793-A51.mxd squij

Entec



Key:

- Location of reported surface water flooding issues. Supplied by Southern Water for the period upto and including 2006.
- Environment Agency Flood Zone 2 (November 2009)
- Potential Surface Water Flow Routes and Ponding areas (1:100+cc) Over 0.2m deep
- Potential Development Sites
- Outside the Limits of the Surface Water Model

Notes:
Only predicted surface water flow routes and ponding areas, over 0.1m deep and greater than 25m2 in areas are shown

0 200 400 600 800 1,000 1,200 Meters

Scale: 1:22,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 49
Potential Surface Water Flow Routes and Ponding Areas (1 in 100 year storm + climate change) - The Bay Area

November 2009
25793-A52.mxd squij

Entec

Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix K
Brading

June 2010

ISLE of WIGHT COUNCIL

Overview

Please review this discussion in conjunction with the mapping provided in this Appendix.

Brading is classified as a Rural Service Centre, it is situated on the north western side of the Eastern Yar floodplain on the eastern limb of the Brading Downs. The Brading Downs follow the central ridge of chalk which runs across the Island. This chalk stratum is present under the middle of the settlement. Despite the Brading's inland location, flooding from extreme tides is a real risk to the settlement. Historic flood outlines are held by the Agency for two events which occurred in 2000 and 1974. The 2000 outline shows the floodwaters not to have crossed the railway line, which runs between the edge of the floodplain and the town. However, the 1974 event was more extensive and a couple of the potential development sites lie within this extent. The Sites Database indicates which of the potential development sites are affected.

The Isle of Wight Autumn 2000 Flood Investigation Study – (*Brading Town Council Report*) identified several site specific flooding incidents. These are listed below:

- Groundwater inundation from the Bagshot Beds is attributed for the cause of basement flooding at 63a High Street, Brading as no other method of flooding was obvious with the threshold being well above the road level.
- Nicholas Close is built on a peat marsh at a low elevation of between 1.5 to 3m AOD. A ditch is described to run parallel to the railway bank, which is culverted under the railway and then joins the Eastern Yar. Flooding is caused by excess water levels in the ditch and water backing up through the culvert from the Eastern Yar.

Sustainability and Regeneration Objectives

Development within the wider countryside will be focused on the Rural Service Centres such as Brading and should support their role as wider centres for outlying villages, hamlets and surrounding countryside. For the rural service centres development will be expected to ensure their future viability. Within the rural service centres and outlying rural areas, development will be expected, in the first instance, to meet a rural need and maintain or enhance the viability of local communities and will be subject to local considerations.

Brading RSC has been identified as having the potential to accommodate further development to meet the regeneration aims and needs of the local community, through improving local services and strengthening public transport. Development will be encouraged on brownfield sites in the first instance and tourism will be promoted.

Sites at Risk

The floodplain of the Eastern Yar forms the eastern boundary of this settlement. Essentially all sites to the east of the A3055 have some degree of potential flood risk. In this location the risk is posed by both fluvial and tidal sources, with the tidal risk presenting the greater flood water levels and thus greater extents. Development sites on

the west of the town are considered to provide more sustainable, from a flood risk perspective, development prospects.

Climate Change

The climate change outlines, modelled with LiDAR topographic data, are more extensive and indicate that a number of the potential sites situated between the railway line and the A3055 may become within a flood zone over the next 100 years. The sites which have been identified are attributed, in the Sites Database with details of which climate change horizon is likely to impact each site.

This is one of the areas where the greatest extent changes are predicted between the present day and future extreme flood extents. Any site that comes forward for development should ensure that the proposed development has accounted for the potential increase in flood extent and will remain safe.

Potential Surface Water Flow Routes and Ponding Areas

Method

The potential surface water flow routes and ponding areas presented in the SFRA, illustrate areas of predicted flooding greater than 25m^2 in spatial extent and only flooding which is more than 0.1m deep. This refinement of the TuFLOW model output is necessary so as to establish the primary areas of predicted flood risk. The modelling approach utilises a 5m resolution ground model grid. The TuFLOW model does not incorporate the Southern Water surface water drains or sewers, which during a storm event would provide storage capacity. Southern Water advised that the modelling should assume that the surface water sewer network could accommodate the 1 in 20 year storm. Therefore, the 1 in 20 year rainfall depths for the critical storm were subtracted from the 1 in 100 year (plus climate change) rain fall depths.

The 1 in 100 year (plus climate change) winter profile storm hyetographs (hyetograph refers to a graph presenting rainfall depth over time) were generated by deriving catchment descriptors from the Flood Estimation Handbook CD-ROM (FEH) and applying the FEH Rain Profile Method. The storm durations were determined by the critical drainage pathway lengths in each of the model areas. The model boundaries were determined by the topography, the local watersheds were traced to ensure that all contributing parts of the catchments were included in the model.

Results

The topography of Bading is dominated by a finger of high ground which extends from the west, which almost divides the drainage catchment into two. The modelling results clearly pick this up as water is gathered and routed off either the north east facing slope of the south west facing slope. Once the water has flowed off the high ground, the model predicts that it will be routed into and along the topographic low points. In Brading these appear to be either highways or field edges and/or agricultural drainage ditches. The main urban area of Brading is not predicted to be at a significant risk, nor are the potential development sites. The recorded incidents of surface

water flooding do not appear to correlate to the predicted flow routes and ponding areas, which may suggest that these incidents were not directly related to overland flows and possible the product of Nonetheless, surface water flood risk should be reviewed as part of any subsequent FRA.

Surface Drainage and Infiltration SuDS Potential

Soils in the south of Brading have a high SPR (50%), whilst soils in the north have much lower SPR values in the order of 2%. The area around the sewerage works in the north east of Brading has SPR values of around 25%. Therefore, runoff potential is low in the southern half of the town and higher in the north part of the town. The potential for infiltration SuDS in the Brading is low in the south and higher in the north. To areas of medium suitability exist near the sewerage works and in the Morton Old Road area in the south west of Brading. The groundwater vulnerability map reflects this suitability distribution.

The volume of discharge, through SuDS or conventional drainage systems, into the tidally influenced river need not be strictly controlled. Although the levels of drain outfalls need to take into account high tide levels and consider the implications of discharge being inhibited by high tides.

Brading Marshes SSSI and Solent and Southampton Water SPA are the only ecological designation in the immediate vicinity of the town. The location of ecologically designated areas suggests that the use of SuDS techniques which attenuate or remove pollutants would be aspirational.

Flood Risk Management Guidance and Site Specific FRAs

The principal of avoidance should be applied when considering sites within Brading. The development of any previously undeveloped site in Flood Zones 2 and 3 is considered by PPS25 as an increase in flood risk and should be avoided. The redevelopment of any previously developed sites within the Flood Zones will require the PPS25 Sequential test to be passed and the Exception Test satisfied where necessary.

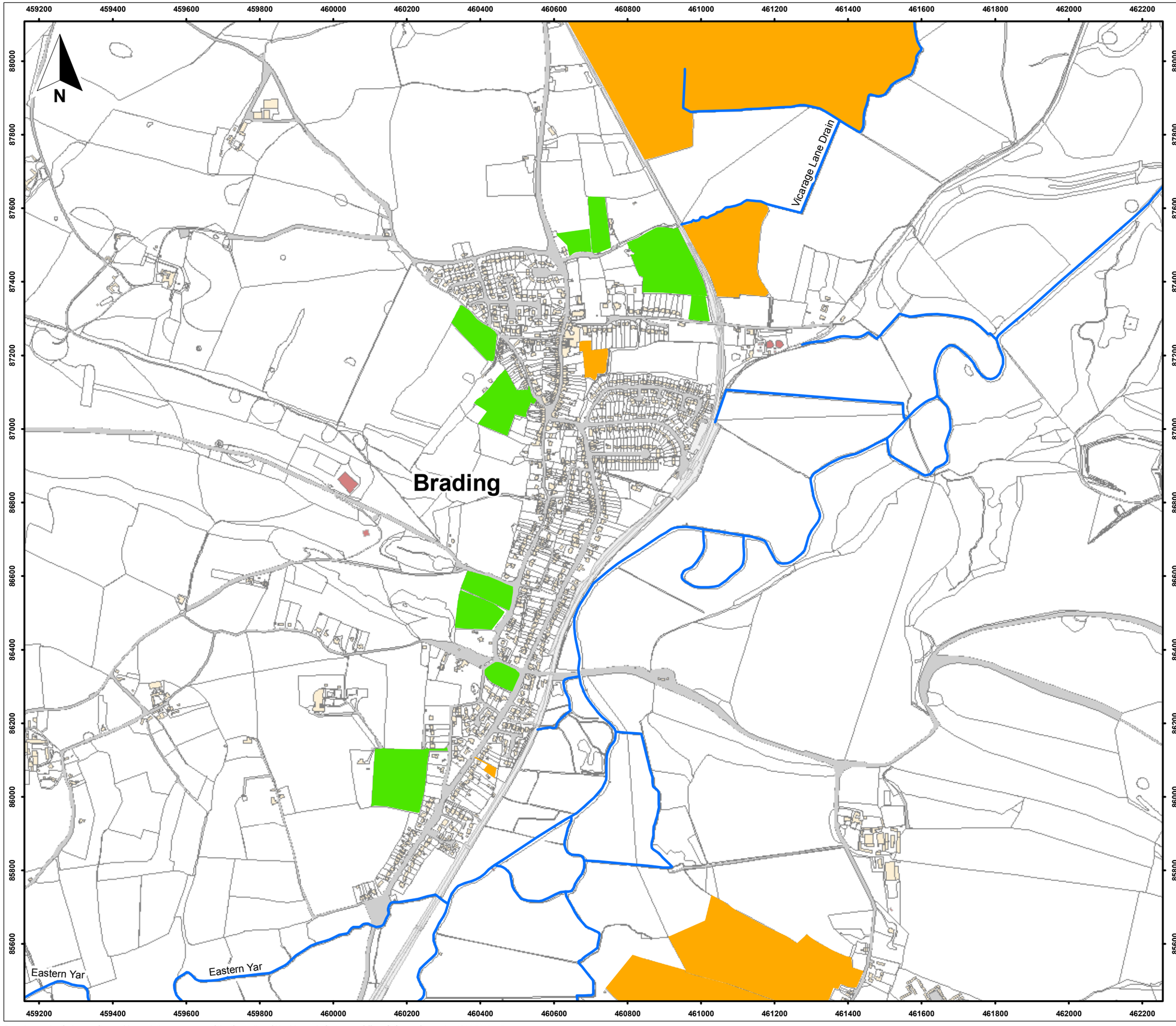
Factors to be considered in safe development could include:

- Ensuring that the sequential approach to landuse planning is, where possible, applied on site. This approach would see more and highly vulnerable landuse types being placed in the lower risk zones.
- Finished first floor levels should be set above the predicted 1 in 100 year fluvial flood levels, plus a climate change allowance and above the 1 in 200 year predicted tide levels for the year 2115. The Environment Agency should be consulted for fluvial flood levels and the Environment Agency should be asked to confirm if the predicted tide levels in Figure 1 in Appendix B are still the most recent predictions. A freeboard allowance should be applied, again the Environment Agency should be consulted on this aspect of the design.
- Buildings should be designed so that safe access and egress can be facilitated in the event of the 1 in 100 year (plus climate change) and 1 in 200 year tidal event (plus climate change).

- Development should not increase the risk of flooding elsewhere. As such, the potential for displaced flood water to impact adjacent areas should be considered. This typically applies if an existing building footprint is being increased in fluvial floodplains and defended tidal floodplains. The displacement of water aspect of development along an undefended coastline is not necessarily a concern.

- Building design should account for the potential depths of water that might occur and appropriate flood resilient and or resistant design features should be incorporated.

- Surface water generated by development should be managed using sustainable techniques. The FRA or drainage assessment should explore the Environment Agency and CIRIA SuDS hierarchy. Discharge rates and volumes should not increase post development, in addition to this PPS25 requirement, the Council and the Environment Agency want to see developers seeking to reduce run-off rates and volumes.



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

Notes:
Site is attributed with the flood probability associated with the highest probability flood zone the site intersects

The mapped extent of Flood Zone 3b has been used to identify Functional Floodplain
The 1 in 100 year fluvial flood zone for the present day and the 1 in 200 year tidal extent predicted for the year 2115 has been used to identify sites at a High Probability. The 1 in 1000 year fluvial flood zone for the present day and the 1 in 1000 year tidal extent predicted for the year 2115 has been used to identify sites at a Medium Probability. Sites only in Flood Zone 1 have been assigned a Low Probability

0 200 400 Meters

Scale: 1:10,000 @ A3

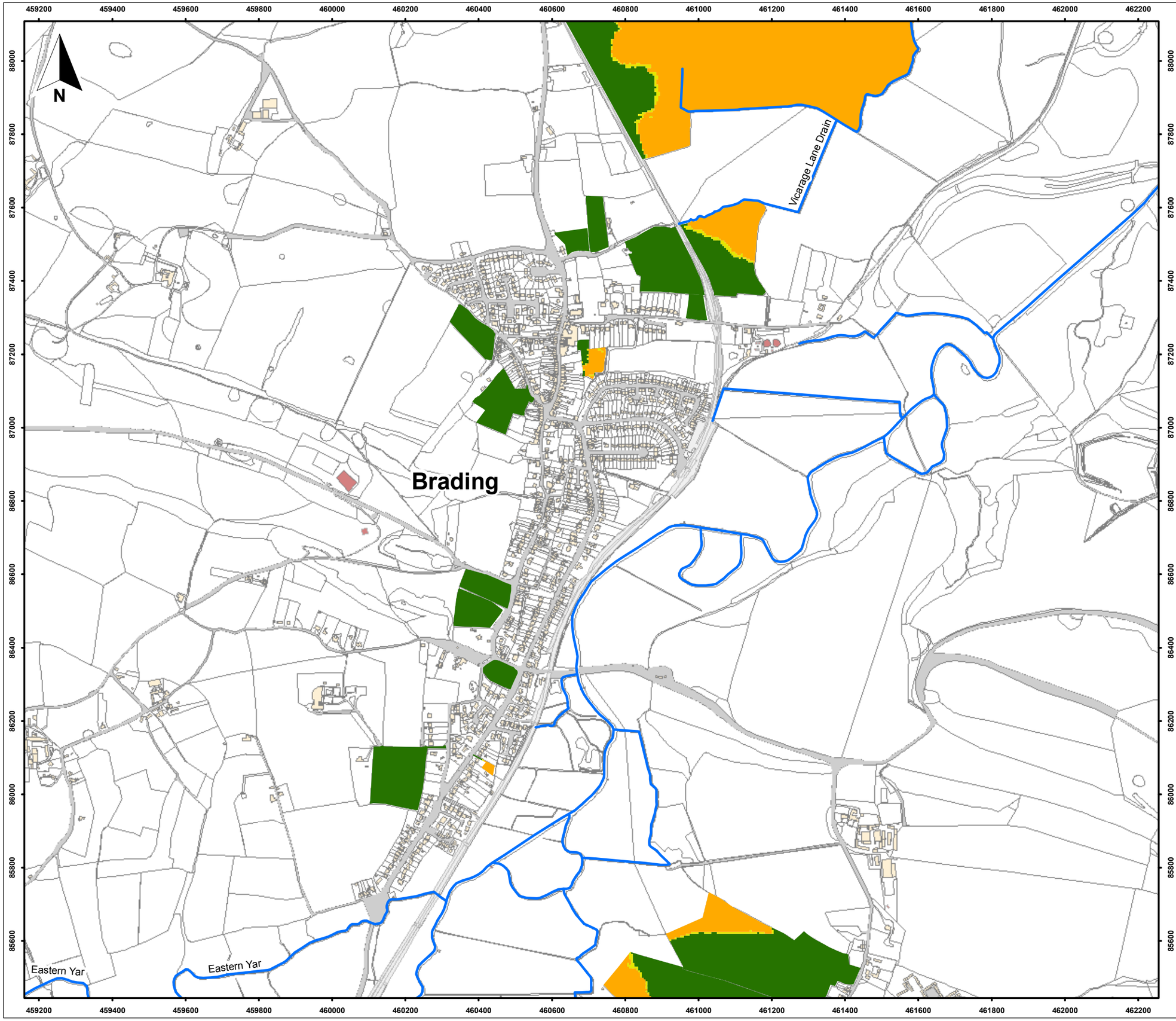
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 50
Potential Development Sites
Qualitative Flood Risk
Brading

November 2009
25793-A53a.mxd squij

Entec



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

0 200 400 Meters

Scale: 1:10,000 @ A3

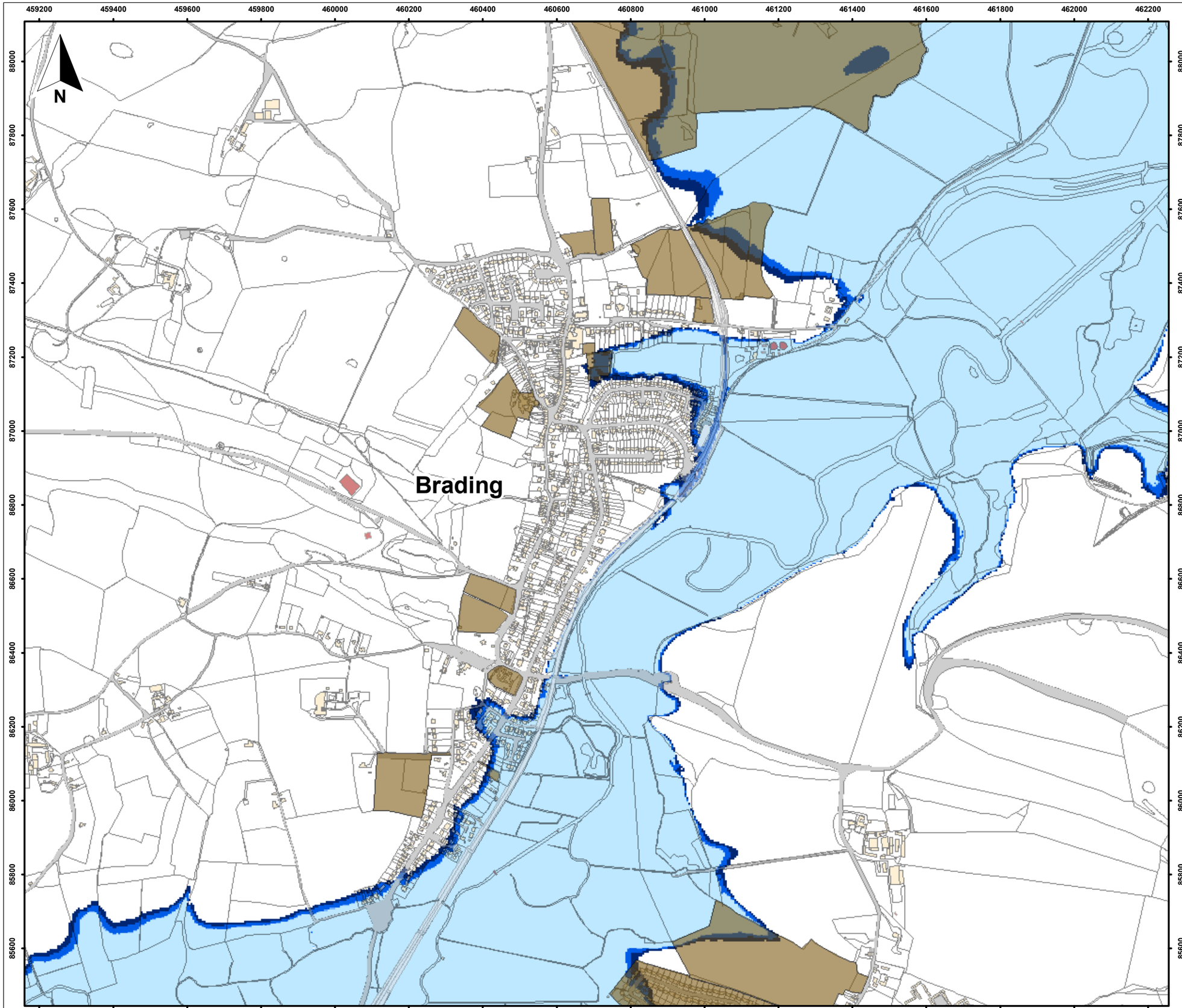
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 51
Potential Development Sites
Site Specific Flood Risk Definition
Brading

November 2009
25793-A54a.mxd squij

Entec



Key:

Predicted 1 in 1000 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 Meters

Scale: 1:22,000 @ A3

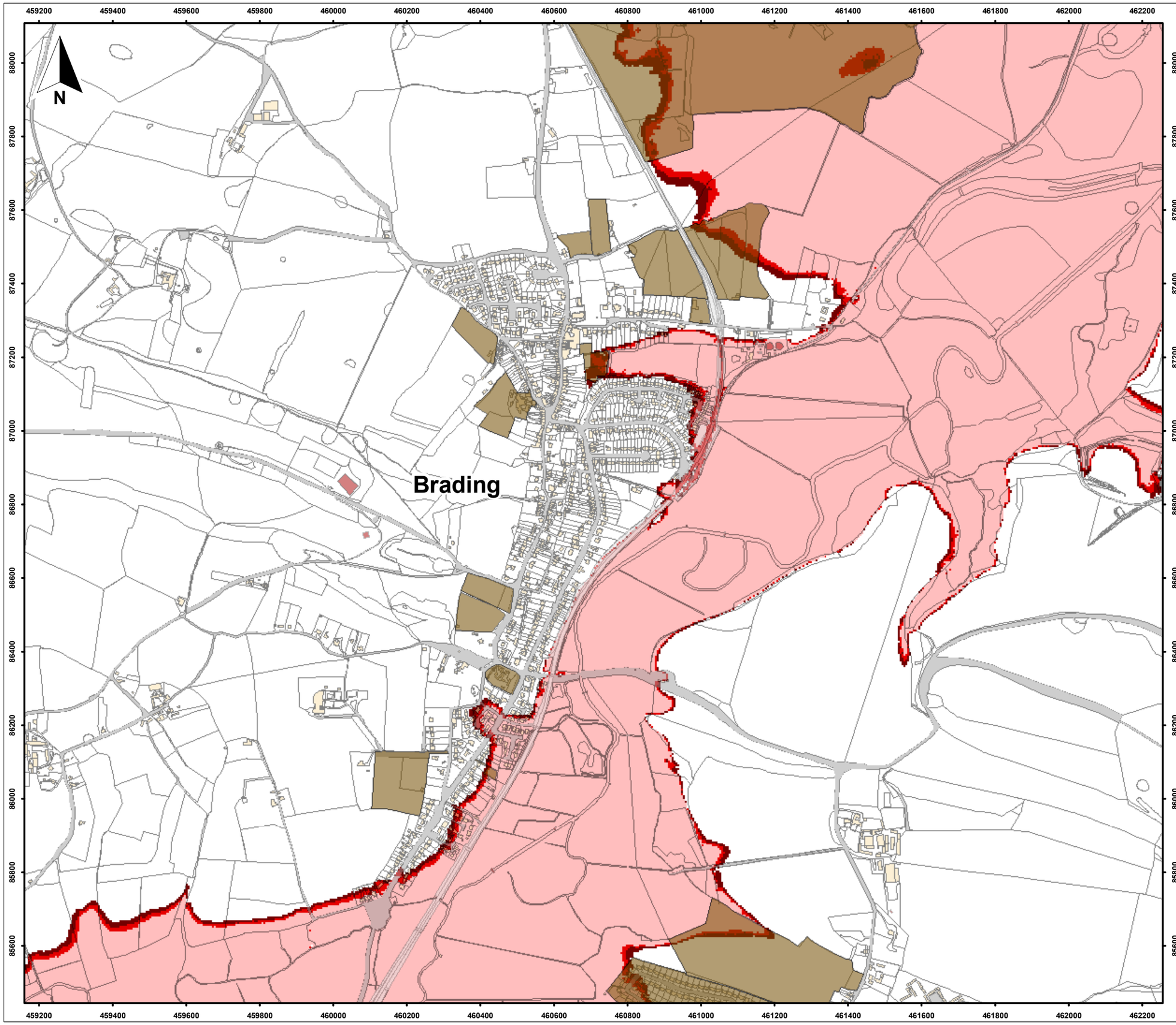
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 52
Potential Development Sites
Flood Zone 2
Climate Change Scenarios
Brading

November 2009
25793-A55a.mxd squij

Entec



Key:

Predicted 1 in 200 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 Meters

Scale: 1:10,000 @ A3

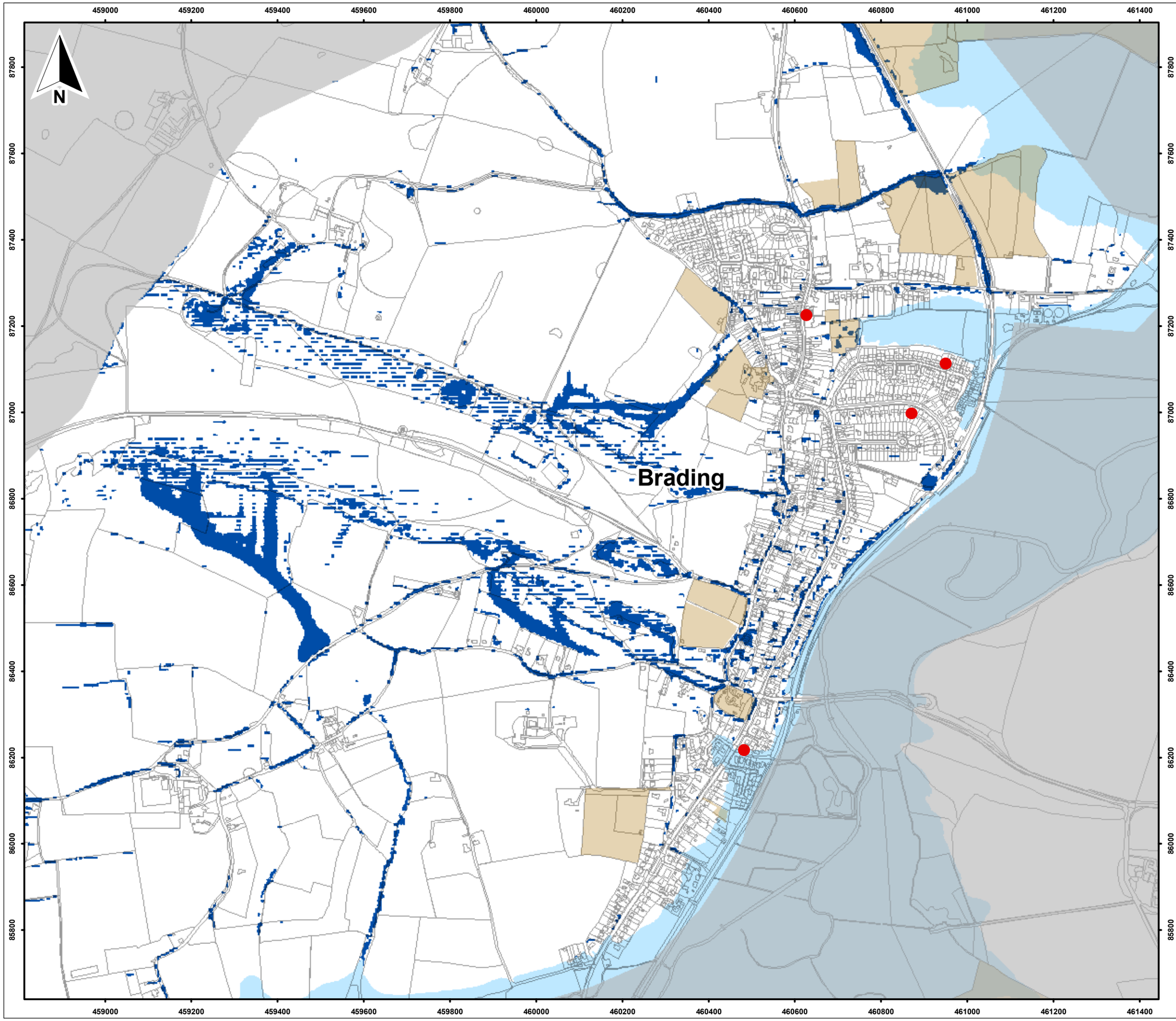
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 53
Potential Development Sites
Flood Zone 3
Climate Change Scenarios
Brading

November 2009
25793-A56a.mxd squij

Entec



Key:

- Location of reported surface water flooding issues. Supplied by Southern Water for the period upto and including 2006.
- Environment Agency Flood Zone 2 (November 2009)
- Potential Surface Water Flow Routes and Ponding areas (1:100+cc) Over 0.2m deep
- Potential Development Sites
- Outside the Limits of the Surface Water Model

Notes:
Only predicted surface water flow routes and ponding areas, over 0.1m deep and greater than 25m2 in areas are shown

0 200 400 Meters

Scale: 1:8,500 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 54
Potential Surface Water Flow Routes and Ponding Areas (1 in 100 year storm + climate change) - Brading

November 2009
25793-A57.mxd squij

Entec

Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix L
Bembridge

June 2010

Overview

Please review this discussion in conjunction with the mapping provided in this Appendix.

Bembridge is classified as a Rural Service Centre. Figure 55 illustrates that the potential development sites in Bembridge are not in Flood Zones 2 or 3. This is despite the town having a coastline to the south and east and Eastern Yar Floodplain to the north. Sites to the immediate south of the Eastern Yar tidal floodplain have been identified as being potentially within Flood Zone 3 when the influence of climate change is accounted for. The town is surrounded by tidal Flood Zones on three sides, but no watercourse with a fluvial Flood Zone passes through the town. The risk from the sea rapidly diminishes with distance from the coast as the town is built on a headland which reaches over 40m AOD in elevation in the centre of the headland.

The Isle of Wight Autumn 2000 Flood Investigation Study – (*Bembridge Parish Council Report*) identified several site specific flooding incidents, these are detailed below:

- 71 High Street is a small craft shop, adjacent to the shop is an access track to some yards and business premises. Flooding of the craft shop due to poor maintenance of the yard drainage causing water to overflow in to the shop. By way of mitigation, the shop owners have undertaken some drainage works.
- 33 Steyne Road is said to be a known problem to the Isle of Wight Council. This bungalow is built in a dip in the land and below the road level, excess surface water flows off the recreation ground and playing fields into the property. Water also is said to accumulate in the road at this point due to under capacity of the road drains. Extensive drainage works are required to resolve the problem.
- Behind 84 Steyne Road is a farmland drainage ditch, during the heavy rains the capacity of the ditch was exceeded and the property was flooded.

Sustainability and Regeneration Objectives

Development within the wider countryside will be focused on the Rural Service Centres such as Bembridge and should support their role as wider centres for outlying villages, hamlets and surrounding countryside. For the rural service centres development will be expected to ensure their future viability. Within the rural service centres and outlying rural areas, development will be expected, in the first instance, to meet a rural need and maintain or enhance the viability of local communities and will be subject to local considerations.

Bembridge RSC has been identified as having the potential to accommodate further development to meet the regeneration aims and needs of the local community, through improving local services and strengthening public transport. Development will be encouraged on brownfield sites in the first instance and tourism will be promoted."

Sites at Risk of Flooding

The Flood Zones (2 and 3) do not intersect with any of the proposed sites and as such, all the sites in Bembridge have been assessed, from a flood risk perspective, as being appropriate for all types of development.

Climate Change

The impact of climate change on the extents of Flood Zones 2 and 3 (Figures 57 and 58) are small along the south and east coasts of Bembridge. These small increases do not extend to include any of the potential development sites. The insensitive nature of this stretch of coastline to increasing sea levels is due to the topography quickly becoming elevated landward of the high water mark. The northern coast of Bembridge, which faces on to the Eastern Yar Estuary, is more sensitive to climate change owing to the much flatter topography of this shoreline.

Potential Surface Water Flow Routes and Ponding Areas

Method

The potential surface water flow routes and ponding areas presented in the SFRA, illustrate areas of predicted flooding greater than 25m^2 in spatial extent and only flooding which is more than 0.1m deep. This refinement of the TuFLOW model output is necessary so as to establish the primary areas of predicted flood risk. The modelling approach utilises a 5m resolution ground model grid. The TuFLOW model does not incorporate the Southern Water surface water drains or sewers, which during a storm event would provide storage capacity. Southern Water advised that the modelling should assume that the surface water sewer network could accommodate the 1 in 20 year storm. Therefore, the 1 in 20 year rainfall depths for the critical storm were subtracted from the 1 in 100 year (plus climate change) rain fall depths.

The 1 in 100 year (plus climate change) winter profile storm hyetographs (hyetograph refers to a graph presenting rainfall depth over time) were generated by deriving catchment descriptors from the Flood Estimation Handbook CD-ROM (FEH) and applying the FEH Rain Profile Method. The storm durations were determined by the critical drainage pathway lengths in each of the model areas. The model boundaries were determined by the topography, the local watersheds were traced to ensure that all contributing parts of the catchments were included in the model.

Results

Bembridge is situated on a headland, with very little in the way of a contributing drainage catchment that is outside the limits of the settlement. The land is the highest in the centre and it slopes down towards the coast in all directions. This topography results in the surface water modelling not predicting significant areas of surface water flood risk. The most notable feature is flow route which follows the line of the road running through the centre of the town from west to east, which does not appear to impact any of the potential development sites and is not flagged by any reported incidents. The absence of correlation between the recorded and the predicted, may be a result of surface water flood risk event not having recently occurred or because incidences may not been reported. Moreover, the SFRA surface water modelling does not incorporate details of the underground drainage network, rather an approximate capacity is assumed, please see Section 3.5.

Surface Drainage and Infiltration SuDS Potential

The town is built on Bembridge Marls which comprise of a series of blue and green clays. The Isle of Wight Autumn 2000 Flood Investigation Study – (*Bembridge Parish Council Report*) states that this will result in high surface runoff rates and high levels of ground saturation, which is of significance to the recorded flooding in the Steyne Road area. Soils in Bembridge have a high SPR (50%) in the south west, with decreasing values towards the north east (15%). Therefore, runoff potential is high in the south west and lower in the north east. The north and eastern portions of the town have been classified as having medium infiltration potential and the south and west parts of Bembridge have been classified as having low infiltration potential.

A wide range of SuDS techniques can be considered in Bembridge. Although infiltration SuDS are likely to be less suitable in the south west and only of moderate suitability in other areas. The volume of discharge into the estuary, either through SuDS or conventional drainage systems, need not be restricted. This is because the volume of drainage waters would be insignificant in comparison to tidal volumes. The coastal and estuarine areas of the town are associated with ecological designations (SSSIs, SACs and SPAs). These ecologically designated areas suggest that the use of SuDS techniques which attenuate or remove pollutants would be advisable.

Wave Exposure Risk

The coastline of Bembridge has been classified as being partly at medium and partly at high risk of wave exposure, with the greatest risk being associated with the eastern headland, (see Section 6 of the SFRA Report). It is recommended that for any site within the buffer zones, where ground levels are less or equal to the predicted peak 1 in 200 year tide in 2115 level plus a 4m allowance for wave height, building design should consider the impact of being potentially exposed to airborne beach material and the corrosive effects of sea spray.

Flood Risk Management Guidance and Site Specific FRAs

None of the potential development sites have been identified as being within either Flood Risk 2 or 3. Assuming this situation remains the same, the principal of flood risk avoidance has been followed. The development of any previously undeveloped site in Flood Zones 2 and 3 is considered by PPS25 as an increase in flood risk and should be avoided. The redevelopment of any previously developed sites within the Flood Zones will require the PPS25 Sequential test to be passed and the Exception Test satisfied where necessary.

Factors to be considered in safe development could include:

- Ensuring that the sequential approach to landuse planning is, where possible, applied on site. This approach would see more and highly vulnerable landuse types being placed in the lower risk zones.
- Finished first floor levels should be set above the predicted 1 in 100 year fluvial flood levels, plus a climate change allowance and above the 1 in 200 year predicted tide levels for the year 2115. The Environment Agency should be consulted for fluvial flood levels and the Environment Agency should be asked to confirm if the predicted tide levels in Figure 1 in Appendix B are still the most recent

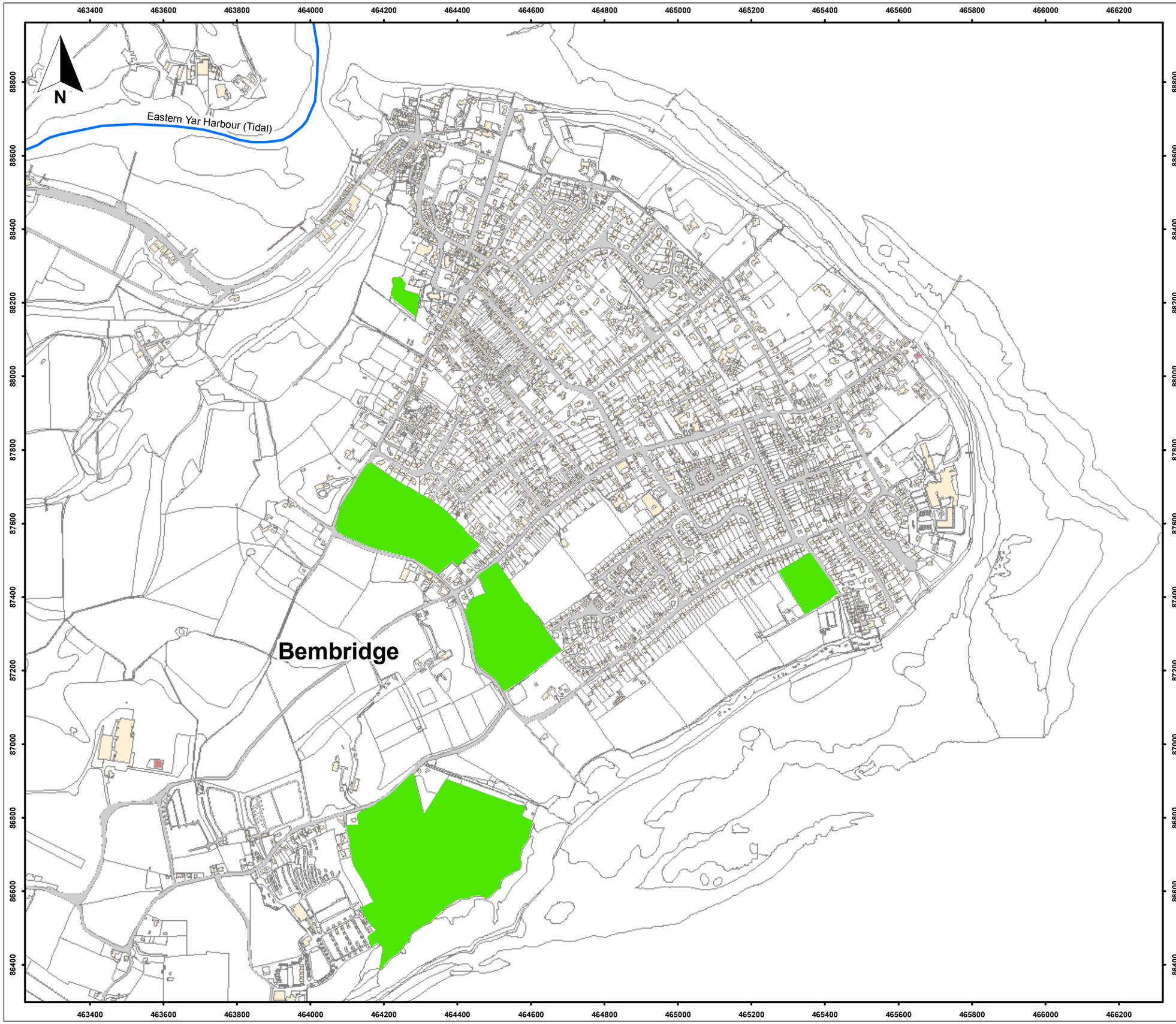
predictions. A freeboard allowance should be applied, again the Environment Agency should be consulted on this aspect of the design.

- Buildings should be designed so that safe access and egress can be facilitated in the event of the 1 in 100 year (plus climate change) and 1 in 200 year tidal event (plus climate change).

- Development should not increase the risk of flooding elsewhere. As such, the potential for displaced flood water to impact adjacent areas should be considered. This typically applies if an existing building footprint is being increased in fluvial floodplains and defended tidal floodplains. The displacement of water aspect of development along an undefended coastline is not necessarily a concern.

- Building design should account for the potential depths of water that might occur and appropriate flood resilient and or resistant design features should be incorporated.

- Surface water generated by development should be managed using sustainable techniques. The FRA or drainage assessment should explore the Environment Agency and CIRIA SuDS hierarchy. Discharge rates and volumes should not increase post development, in addition to this PPS25 requirement, the Council and the Environment Agency want to see developers seeking to reduce run-off rates and volumes.



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

Notes:
Site is attributed with the flood probability associated with the highest probability flood zone the site intersects

The mapped extent of Flood Zone 3b has been used to identify Functional Floodplain
The 1 in 100 year fluvial flood zone for the present day and the 1 in 200 year tidal extent predicted for the year 2115 has been used to identify sites at a High Probability. The 1 in 1000 year fluvial flood zone for the present day and the 1 in 1000 year tidal extent predicted for the year 2115 has been used to identify sites at a Medium Probability. Sites only in Flood Zone 1 have been assigned a Low Probability

0 200 400 Meters

Scale: 1:10,000 @ A3

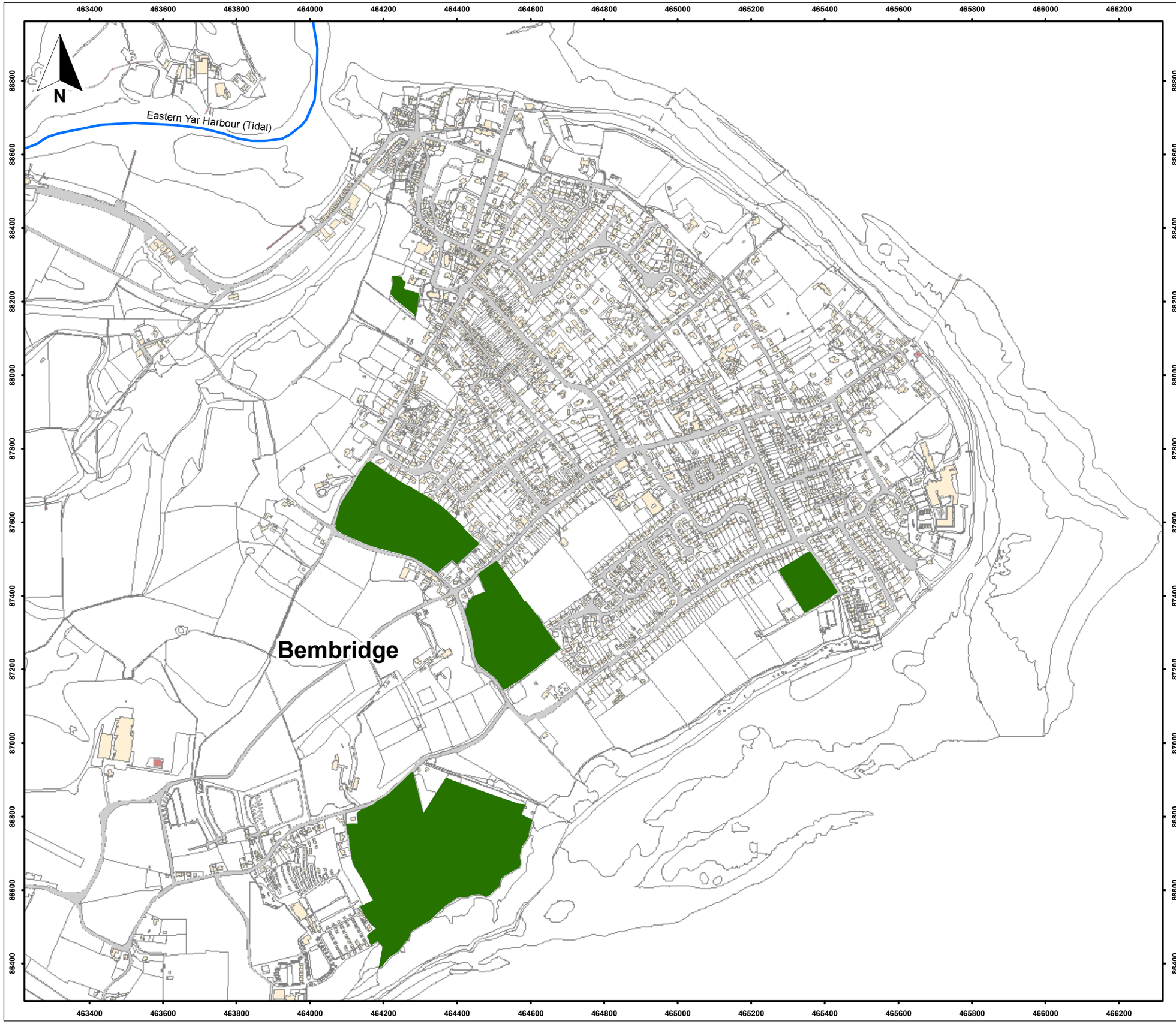
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 55
Potential Development Sites
Qualitative Flood Risk
Bembridge

November 2009
25793-A58a.mxd squij

Entec



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

0 200 400 Meters

Scale: 1:10,000 @ A3

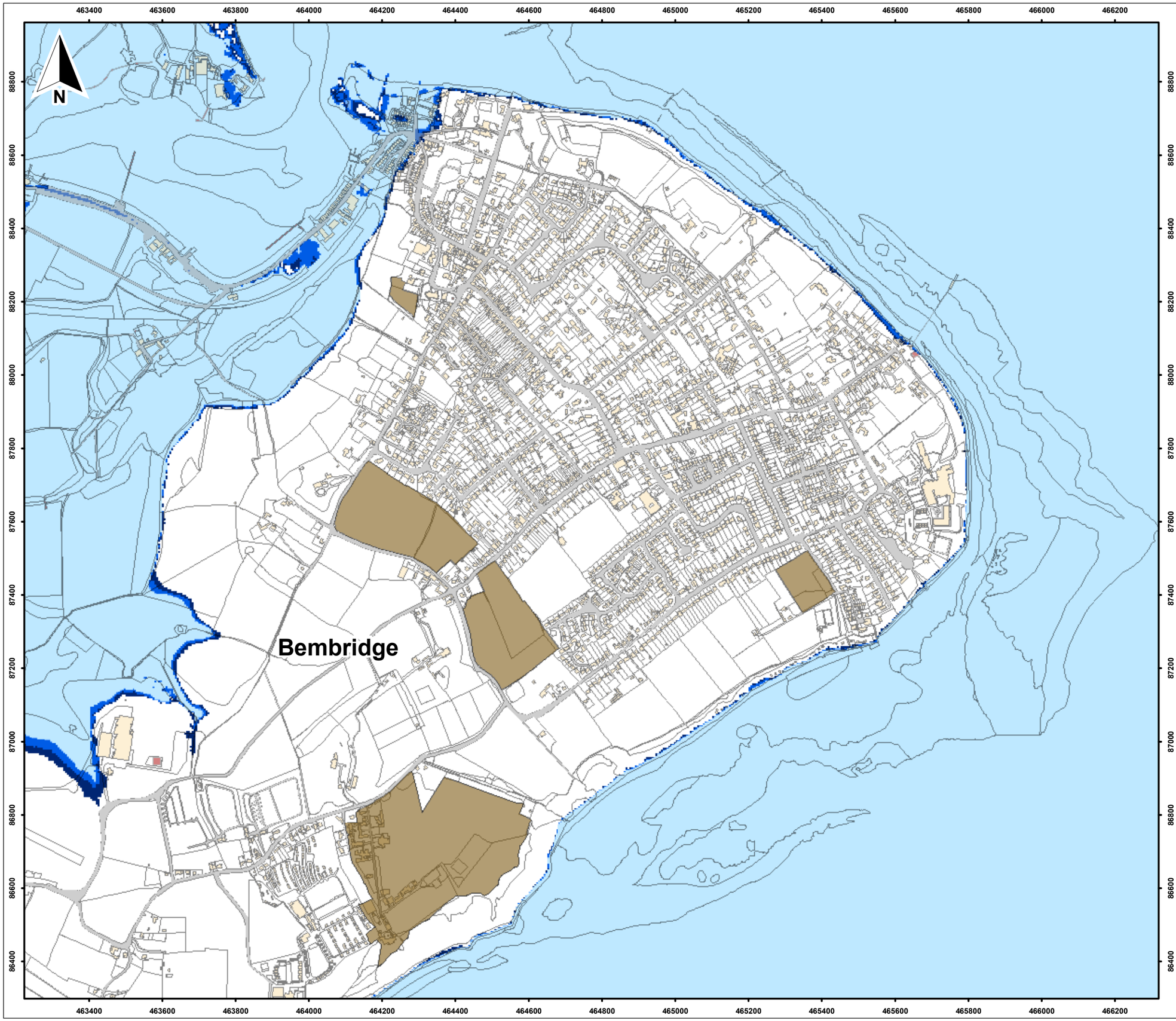
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 56
Potential Development Sites
Site Specific Flood Risk Definition
Bembridge

November 2009
25793-A59a.mxd squij

Entec



Key:

Predicted 1 in 1000 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 Meters

Scale: 1:22,000 @ A3

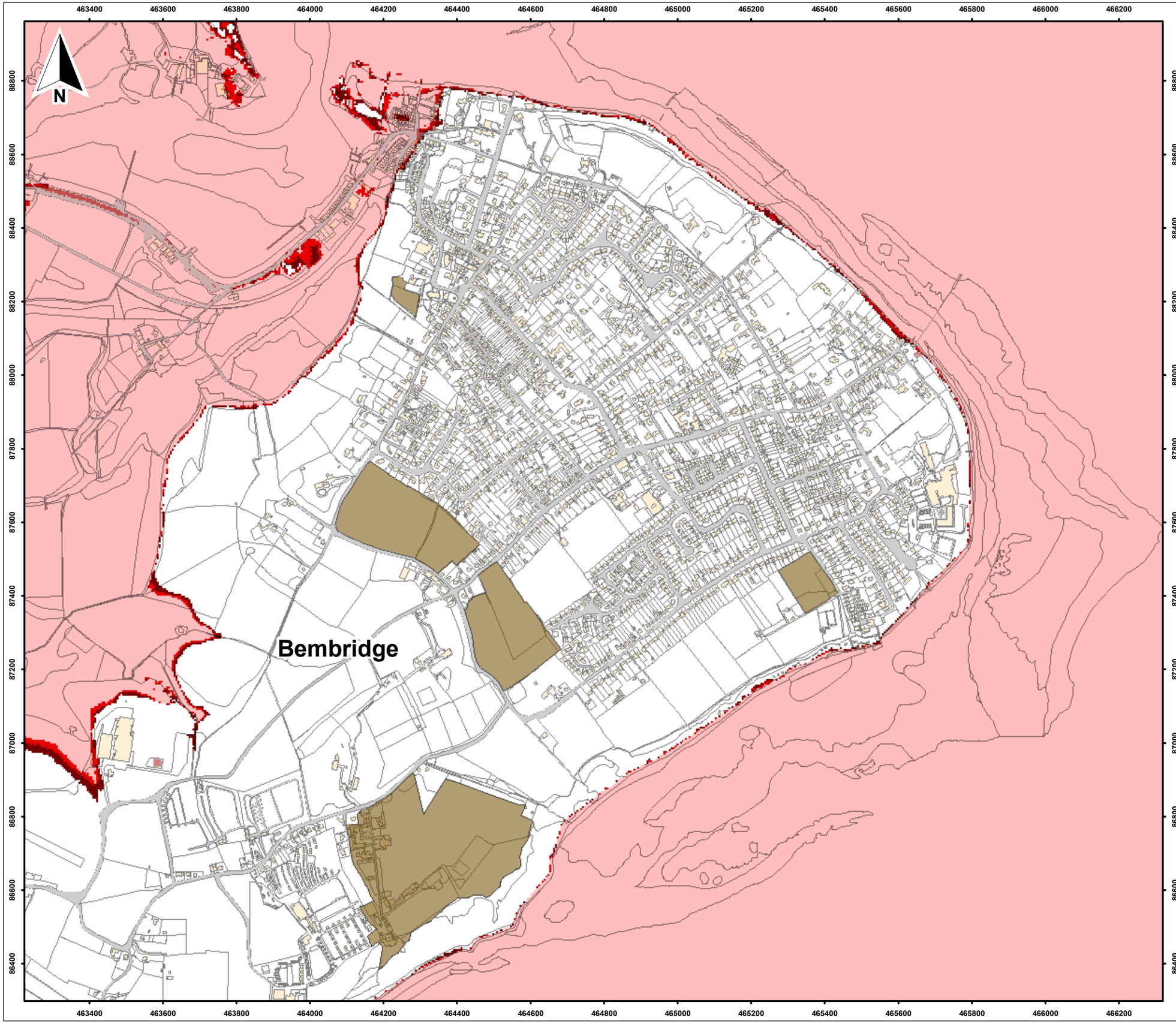
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 57
Potential Development Sites
Flood Zone 2
Climate Change Scenarios
Bembridge

November 2009
25793-A60a.mxd squij

Entec



Key:

Predicted 1 in 200 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 Meters

Scale: 1:10,000 @ A3

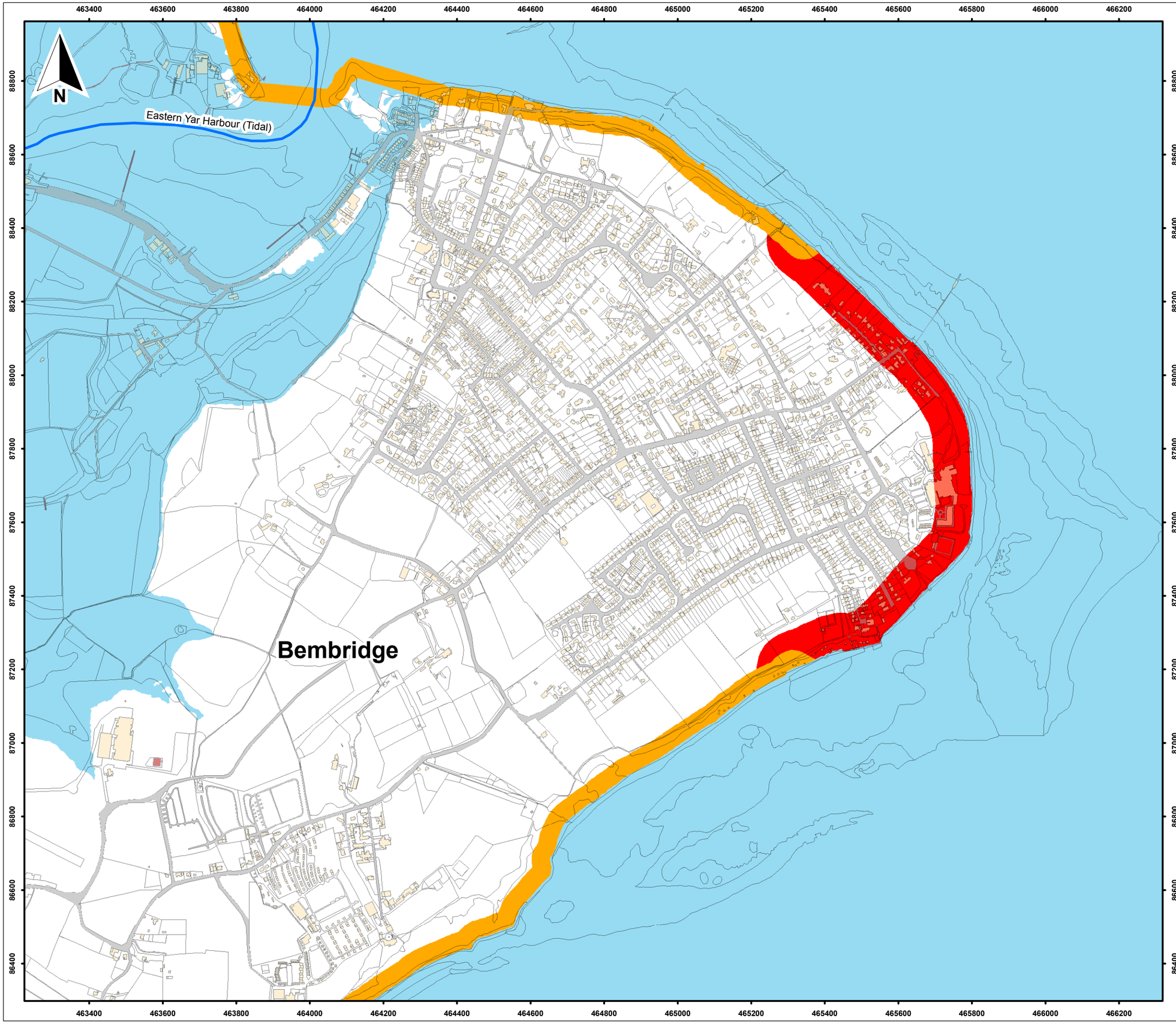
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 58
Potential Development Sites
Flood Zone 3
Climate Change Scenarios
Bembridge

November 2009
25793-A61a.mxd squij

Entec



Key:

Main Rivers

Potential Exposure Risk

High

Medium

Low

Environment Agency Flood Zone 2 (November 2009)

0 200 400 Meters

Scale: 1:10,000 @ A3

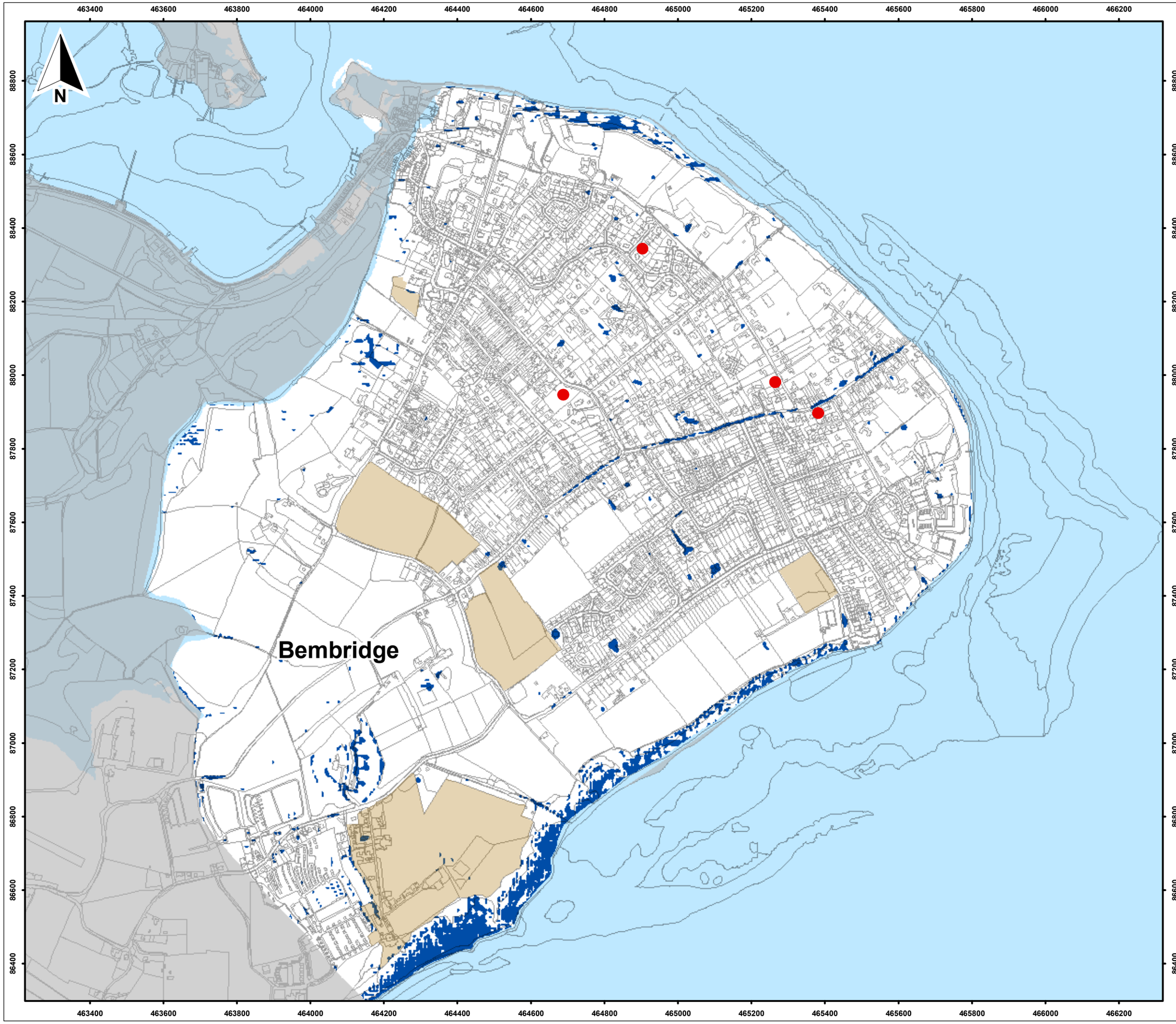
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 59
Qualitative Wind and Wave Exposure Risk - Bembridge

November 2009
25793-A62.mxd squij

Entec



Key:

- Location of reported surface water flooding issues. Supplied by Southern Water for the period upto and including 2006.
- Environment Agency Flood Zone 2 (November 2009)
- Potential Surface Water Flow Routes and Ponding areas (1:100+cc) Over 0.2m deep
- Potential Development Sites
- Outside the Limits of the Surface Water Model

Notes:
Only predicted surface water flow routes and ponding areas, over 0.1m deep and greater than 25m2 in areas are shown

0 200 400 Meters

Scale: 1:10,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 60
Potential Surface Water Flow Routes and Ponding Areas (1 in 100 year storm + climate change) - Bembridge

November 2009
25793-A63.mxd squij

Entec

Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix M
St Helens

June 2010

Overview

Please review this discussion in conjunction with the mapping provided in this Appendix.

St Helens is classified as a Rural Service Centre, which is situated in the north western corner of Bembridge harbour on the reasonably steep South Facing slope of the high ground between St Helens and Seaview. Owing to the mostly elevated topography (above the extent of the tidal Flood Zones) and absence of any Main Rivers running through the town, the flood risk posed to the potential development sites is minimal. Only a couple of site on the lowest land and nearest to the river are at risk.

Sustainability and Regeneration Objectives

Development within the wider countryside will be focused on the Rural Service Centres such as St Helens and should support their role as wider centres for outlying villages, hamlets and surrounding countryside. For the rural service centres development will be expected to ensure their future viability. Within the rural service centres and outlying rural areas, development will be expected, in the first instance, to meet a rural need and maintain or enhance the viability of local communities and will be subject to local considerations.

St Helens RSC has been identified as having the potential to accommodate further development to meet the regeneration aims and needs of the local community, through improving local services and strengthening public transport. Development will be encouraged on brownfield sites in the first instance and tourism will be promoted."

Sites at Risk

Flood risk in St Helens is present from both fluvial and tidal sources, with the later presenting potentially higher water levels and thus flood extents. Only a couple of smaller potential development sites in the south of the settlement are considered to be within the extent of the flood zone 2 and 3 extents (2115), these risk areas should be avoided and managed through a risk based sequential approach to landuse planning.

There is a large potential development site to the south west of St Helens which is located on a piece of land between the A3055 and the B3330. This site is assesses as being at significant risk of flooding, indeed a large portion of the site was flooded in 1974. Flood risk to this site is posed by the Vicarage Lane Drain and the tidal risk associated with the wider Eastern Yar Estuary. Only the northern most portion of the site, adjacent to the B3330 is identified as being in Flood Zone 1.

Climate Change

There is very little difference in the extents for the modelled year 2015 and year 2105 flood zones. This implies that the increased sea level associated with climate change will only really have an impact on the depth and velocity of the flooding in those areas already covered by the flood map. Only two sites become partially affected

by the modelled climate change flood extents. The exact implications of climate change should be assessed for these two sites at the FRA level if they are released for planning.

Potential Surface Water Flow Routes and Ponding Areas

Method

The potential surface water flow routes and ponding areas presented in the SFRA, illustrate areas of predicted flooding greater than 25m^2 in spatial extent and only flooding which is more than 0.1m deep. This refinement of the TuFLOW model output is necessary so as to establish the primary areas of predicted flood risk. The modelling approach utilises a 5m resolution ground model grid. The TuFLOW model does not incorporate the Southern Water surface water drains or sewers, which during a storm event would provide storage capacity. Southern Water advised that the modelling should assume that the surface water sewer network could accommodate the 1 in 20 year storm. Therefore, the 1 in 20 year rainfall depths for the critical storm were subtracted from the 1 in 100 year (plus climate change) rain fall depths.

The 1 in 100 year (plus climate change) winter profile storm hyetographs (hyetograph refers to a graph presenting rainfall depth over time) were generated by deriving catchment descriptors from the Flood Estimation Handbook CD-ROM (FEH) and applying the FEH Rain Profile Method. The storm durations were determined by the critical drainage pathway lengths in each of the model areas. The model boundaries were determined by the topography, the local watersheds were traced to ensure that all contributing parts of the catchments were included in the model.

Results

The surface water modelling does not predict there to be significant surface water flood risks in the village of St Helens or across any of the potential development sites in the area. Potential flow routes are defined, but these are largely limited to the rural areas.

Surface Drainage and Infiltration SuDS Potential

Surface runoff potential in the town of St. Helens is varied. The lower half of the town is characterised by a SPR of 25%, while in the north west the SPR is in the order of 15%. This increases to 50% in the far north eastern corner of St Helens. The north and south of the town are characterised by soils with high leaching potential, underlain by a Secondary Aquifer. Infiltration potential is classified as medium in the north west and south and low in the north east.

The south and eastern parts of the town fall within the SPA and SSSI designations which cover the Eastern Yar Estuary. This potentially sensitive environment requires discharge of surface water be contaminant free. It is therefore appropriate that SuDS, with an ability to remove or attenuate pollutants, be considered. SuDS are less suitable for those areas of low infiltration potential around the centre of the town.

Wave Exposure Risk

The coastline near St Helens has been classified as being at medium risk of wave exposure (see Section 6 of the SFRA Report). It is recommended that for any site within the 50m buffer, where ground levels are less or equal to the predicted peak 1 in 200 year tide in 2115 level plus a 4m allowance for wave height, building design should consider the impact of being potentially exposed to airborne beach material and the corrosive effects of sea spray. The estuary has not been attributed with a Wave Exposure Risk because of its sheltered situation.

Flood Risk Management Guidance and Site Specific FRAs

The principal of avoidance should be applied when considering sites within St Helens. The development of any previously undeveloped site in Flood Zones 2 and 3 is considered by PPS25 as an increase in flood risk and should be avoided. The redevelopment of any previously developed sites within the Flood Zones will require the PPS25 Sequential test to be passed and the Exception Test satisfied where necessary.

Factors to be considered in safe development could include:

- Ensuring that the sequential approach to landuse planning is, where possible, applied on site. This approach would see more and highly vulnerable landuse types being placed in the lower risk zones.
- Finished first floor levels should be set above the predicted 1 in 100 year fluvial flood levels, plus a climate change allowance and above the 1 in 200 year predicted tide levels for the year 2115. The Environment Agency should be consulted for fluvial flood levels and the Environment Agency should be asked to confirm if the predicted tide levels in Figure 1 in Appendix B are still the most recent predictions. A freeboard allowance should be applied, again the Environment Agency should be consulted on this aspect of the design.
- Buildings should be designed so that safe access and egress can be facilitated in the event of the 1 in 100 year (plus climate change) and 1 in 200 year tidal event (plus climate change).
- Development should not increase the risk of flooding elsewhere. As such, the potential for displaced flood water to impact adjacent areas should be considered. This typically applies if an existing building footprint is being increased in fluvial floodplains and defended tidal floodplains. The displacement of water aspect of development along an undefended coastline is not necessarily a concern.
- Building design should account for the potential depths of water that might occur and appropriate flood resilient and or resistant design features should be incorporated.
- Surface water generated by development should be managed using sustainable techniques. The FRA or drainage assessment should explore the Environment Agency and CIRIA SuDS hierarchy. Discharge rates and volumes should not increase post development, in addition to this PPS25 requirement, the Council and the Environment Agency want to see developers seeking to reduce run-off rates and volumes.

The Agency have a flood event outline for the October 2000 event that occurred on the Eastern Yar, this does not extend to cover any of the potential development sites, nonetheless it represents a useful source of information which should be considered in the FRA for either of the two potential sites that have been identified as being at flood risk, should they be put forward for planning. As with all sites over 1ha a FRA will be required and many of the proposed sites in St Helens are over the threshold, the Potential Development Site Attribution dataset details these sites and defines the area of each.

461400 461600 461800 462000 462200 462400 462600 462800 463000 463200 463400 463600 463800 464000 464200

90200 90000 89800 89600 89400 89200 89000 88800 88600 88400 88200 88000 87800 87600

N

St Helens

Vicarage Lane Drain

Eastern Yar

Eastern Yar Harbour (Tidal)

Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

Notes:
Site is attributed with the flood probability associated with the highest probability flood zone the site intersects

The mapped extent of Flood Zone 3b has been used to identify Functional Floodplain
The 1 in 100 year fluvial flood zone for the present day and the 1 in 200 year tidal extent predicted for the year 2115 has been used to identify sites at a High Probability. The 1 in 1000 year fluvial flood zone for the present day and the 1 in 1000 year tidal extent predicted for the year 2115 has been used to identify sites at a Medium Probability. Sites only in Flood Zone 1 have been assigned a Low Probability

0 200 400 Meters

Scale: 1:10,000 @ A3

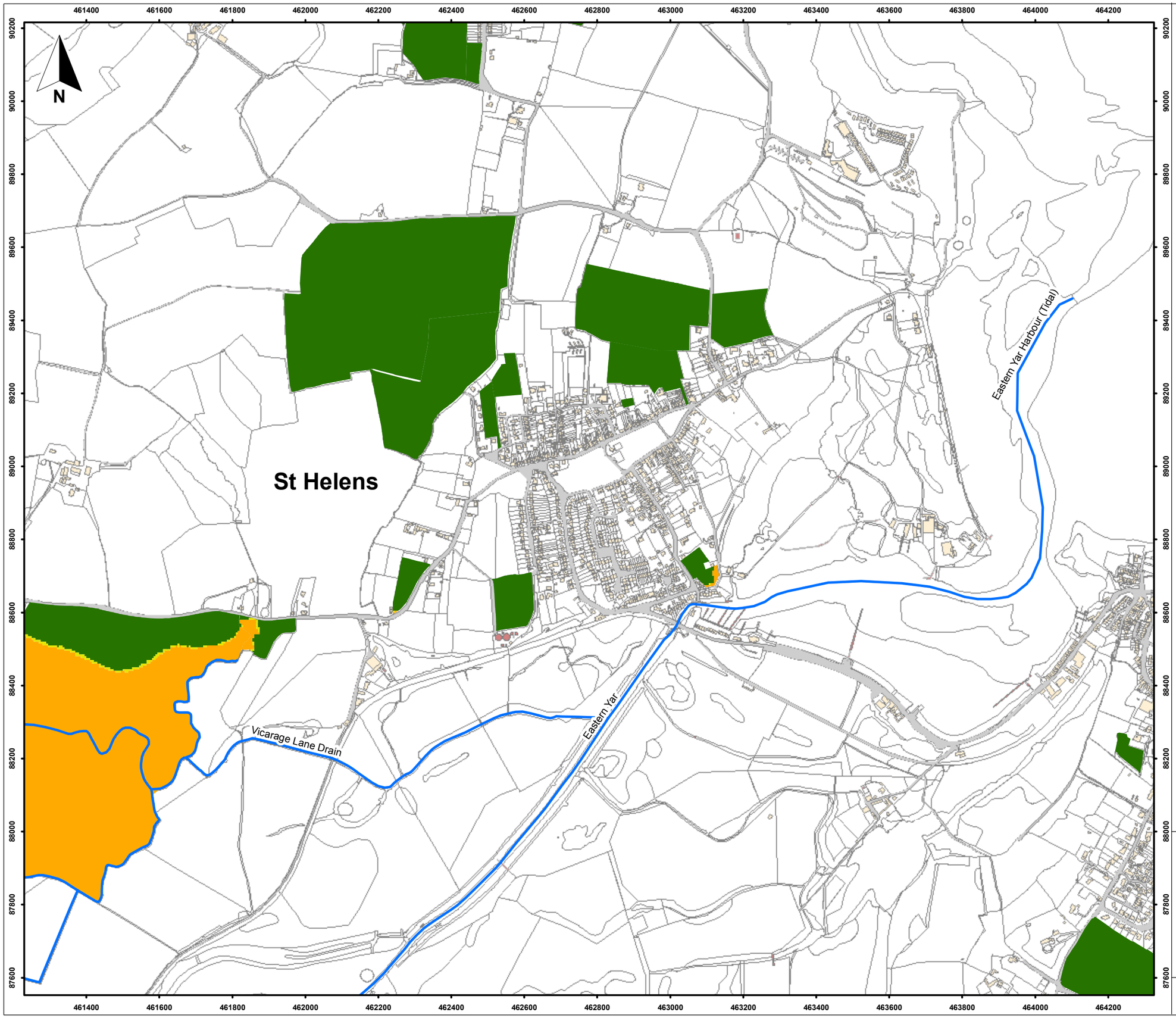
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 61
Potential Development Sites
Qualitative Flood Risk
St Helens

November 2009
25793-A64a.mxd squij

Entec



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

0 200 400 600 Meters

Scale: 1:10,000 @ A3

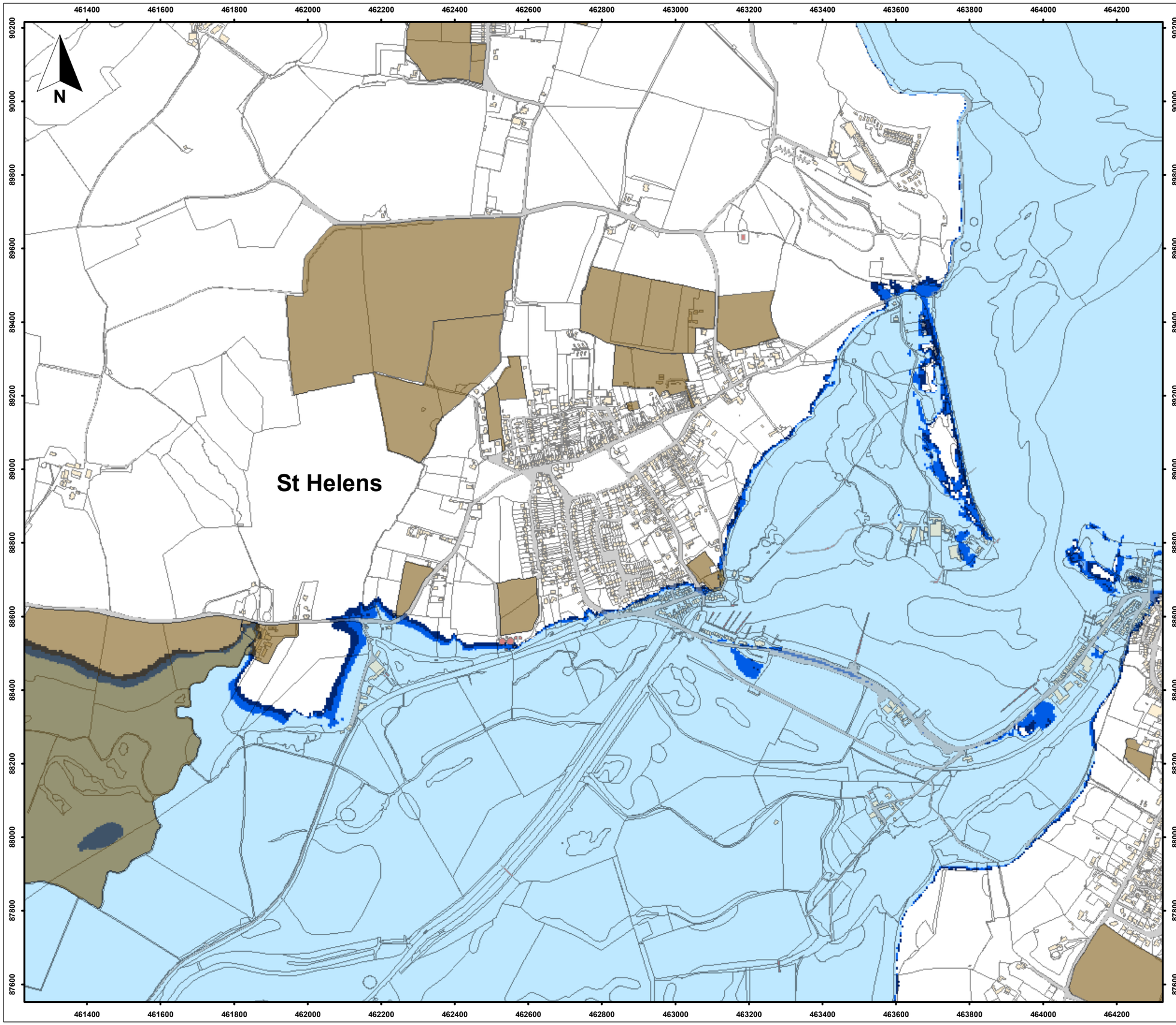
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 62
Potential Development Sites
Site Specific Flood Risk Definition
St Helens

November 2009
25793-A65a.mxd squij

Entec



Key:

Predicted 1 in 1000 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 Meters

Scale: 1:22,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 63
Potential Development Sites
Flood Zone 2
Climate Change Scenarios
St Helens

November 2009
25793-A66a.mxd.squij

Entec

461400 461600 461800 462000 462200 462400 462600 462800 463000 463200 463400 463600 463800 464000 464200

90200 90000 89800 89600 89400 89200 89000 88800 88600 88400 88200 88000 87800 87600

N

St Helens

Key:

Predicted 1 in 200 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 Meters

Scale: 1:10,000 @ A3

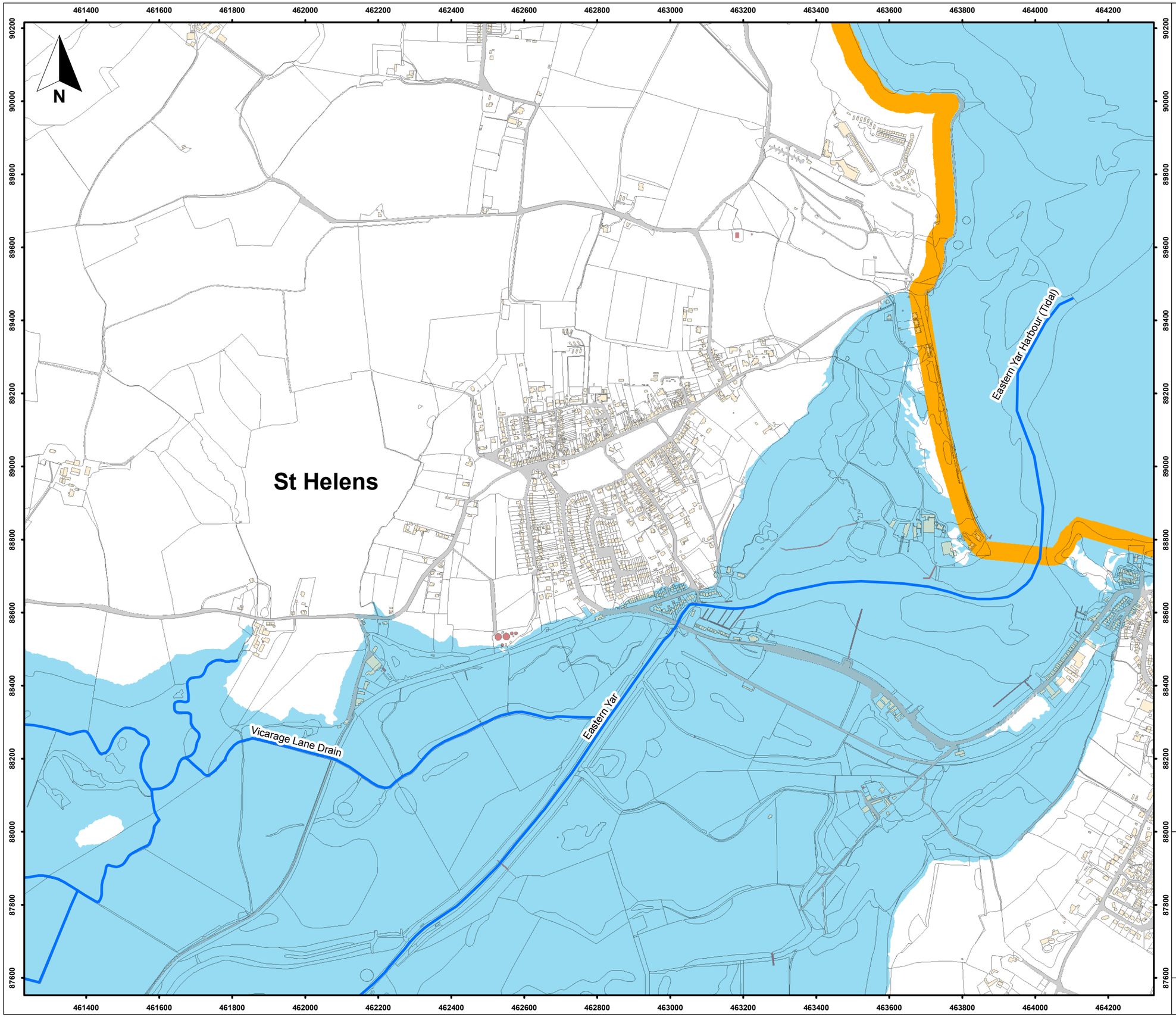
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 64
Potential Development Sites
Flood Zone 3
Climate Change Scenarios
St Helens

November 2009
25793-A67a.mxd.squij

Entec



Key:

Main Rivers

Potential Exposure Risk

High

Medium

Low

Environment Agency Flood Zone 2 (November 2009)

0 200 400 Meters

Scale: 1:10,000 @ A3

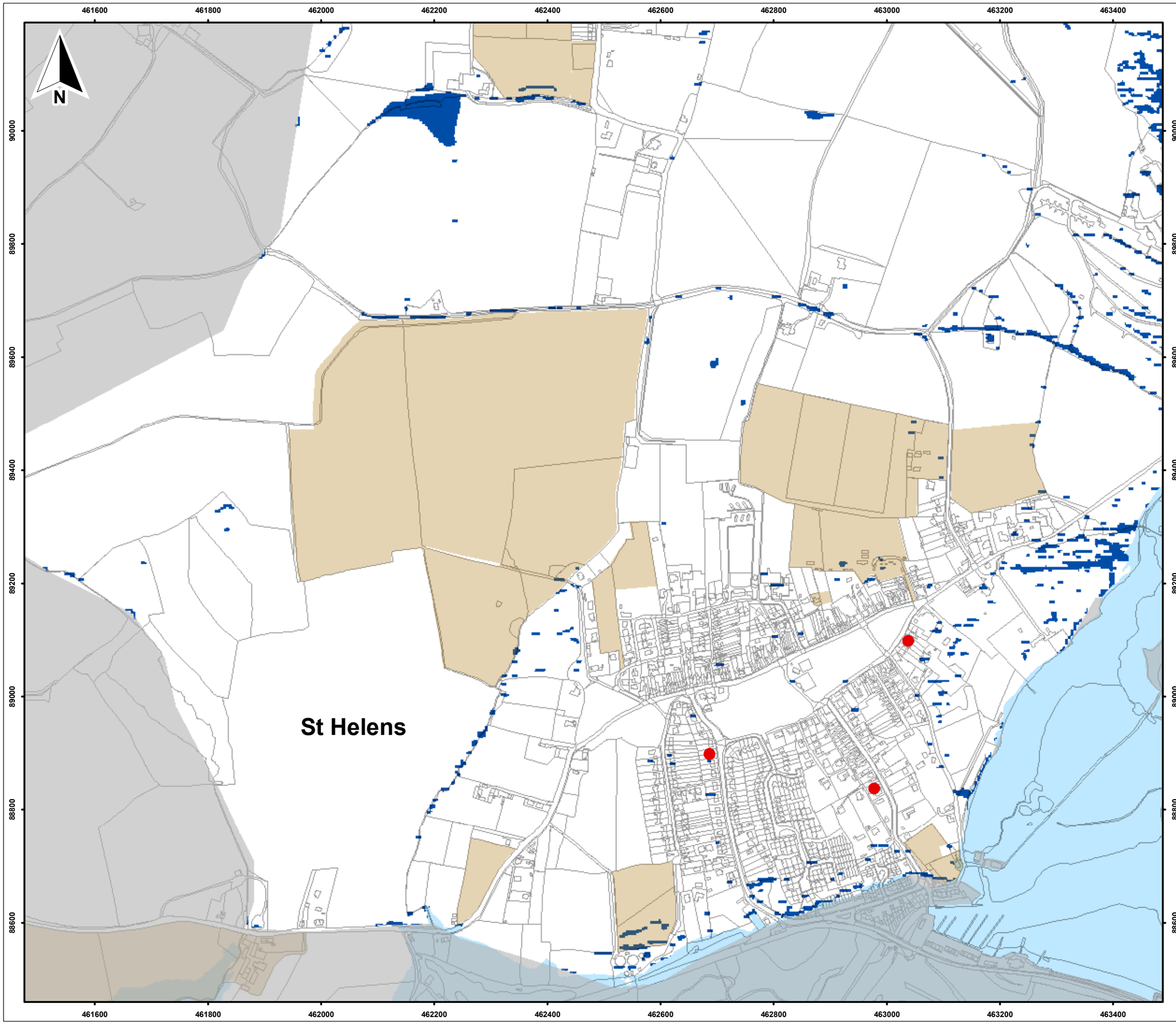
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 65
(Qualitative Wind and Wave Exposure Risk - St Helens)

November 2009
25793-A68.mxd squij

Entec



Key:

- Location of reported surface water flooding issues. Supplied by Southern Water for the period upto and including 2006.
- Environment Agency Flood Zone 2 (November 2009)
- Potential Surface Water Flow Routes and Ponding areas (1:100+cc) Over 0.2m deep
- Potential Development Sites
- Outside the Limits of the Surface Water Model

Notes:
Only predicted surface water flow routes and ponding areas, over 0.1m deep and greater than 25m2 in areas are shown

0 200 Meters

Scale: 1:6,500 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 66
Potential Surface Water Flow Routes and Ponding Areas (1 in 100 year storm + climate change) - St Helens

November 2009
25793-A69a.mxd squij

Entec

Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix N
Ryde

June 2010

Overview

Please review this discussion in conjunction with the mapping provided in this Appendix.

Ryde is a Key Regeneration Area, which is located on the north eastern coast of the Island and is a Georgian and Victorian resort town. Ryde as a Key Regeneration Area is the urban area with the largest population and is a Smaller retail and employment centre for the Island. It is a coastal town with traditional enclosed pasture land to the south, with pockets of landscape improvement areas. Critical to the character of Ryde is the sloping land from the foreshore to the ridge and the valley that divides the town. Importantly, the Environment Agency do not have Flood Zones for the Binstead Watercourse which flows through the western part of the town. The implications of this are discussed in the *Additional Information for Site Specific Flood Risk Assessment* section of this Ryde discussion.

Sustainability and Regeneration Objectives

A Public Realm, Strategy has been prepared for Ryde to establish a locally distinctive framework to guide future regeneration proposals in the area. A major new interchange has also been planned, offering enhanced transport facilities for ferry, rail, bus and taxi users. It is intended that Ryde builds on its role as a hub for high speed trans-Solent connections and an Island public transport interchange to strengthen its role as a residential community, centre for small business and as gateway for tourists.

Sites at Risk

Flood Risk in Ryde is dominated by the threat of tidal flooding and fluvial flooding from Monkton Mead Brook and has historically been a problem with the most significant recent events taking place in the winter of 1993, winter 1999 and autumn 2000. It was stated in the *Monkton Mead Brook Flood Risk Mapping Report* (2005) that the coincidence of high tidal events, failure of pumps, debris in the channel and inadequate surface drainage exacerbated the flooding in these recent events.

The town of Ryde is built along the coast and on the sides of the valley through which Monkton Mead Brook flows. The floodplain of the Monkton Mead brook is only partially developed. Several of the potential development sites are located in this floodplain and along the seafront. A detailed hydraulic model is held by the Environment Agency for the Monkton Mead Brook and this was used in the SFRA to define the functional floodplain (Flood Zone 3b – see Section 4.1). The existence of this model has enabled three flood risk zones to be defined through Ryde, these being Flood Zones 2, 3a and 3b. The sites identified as being at anything other than 'Low Probability' in Figure 67 are sites where FRAs would be required as they are partially within the extents of Flood Zone 2 and 3. To remain in line with the Sequential Test though, sites outside the flood risk zones 2 and 3 should be considered first. Sites over 1 hectare, which are located within Flood Zone 1 will require a FRA.

Figure 68 defines the flood risk across each of the potential development sites. This detailed flood risk classification reveals that although the flood risk close to the Monkton Mead Brook is high, it becomes very low with distance away from the river and up the valley sides. The two large potential large sites to the south of Ryde either side of Rosemary Lane in the Rosemary Vineyard are good examples of this zonation of flood risk). This shows that although parts of the potential sites are in either Flood Zone 2 or 3 the vast majority of the area is in Flood Zone 1. A risk based approach to landuse planning should be applied t steer development to the areas of lowest risk within the affected sites.

The Monkton Mead Flood Alleviation Study (2000) identified that the tunnelled section of railway under Ryde runs below sea level and has two pumps to drain it. These pumps exit to the sea near the hovercraft terminal. It took almost three days for the pumps to drain the tunnel following the event of 9th October 2000. Some of the flooding problems which arose on the 9th were the result of large amounts of debris in the channel. As the flows increased the debris was washed downstream and when an obstacle to flow was encountered (e.g. a culvert) a blockage was caused leading to flooding.

Climate Change

The extent to which Ryde is affected by Climate change is illustrated in Figures 69 and 70. The impact of climate change on the predicted extent of tidal Flood Zone outlines is an issue that should be considered if and when any of the potential sites currently identified as partially being at risk of flooding are released for planning. Climate change has the potential to increase the extents of the Flood Zones and as such plots of land, or parts of sites, currently outside the Flood Zone envelope may become included within the next 100 years. In line with the LPAs approach to managing the predicted climate change induced impacts of sea level rise, the 2115 climate change epoch has been used to assess tidal risk to the potential development sites.

Potential Surface Water Flow Routes and Ponding Areas

Method

The potential surface water flow routes and ponding areas presented in the SFRA, illustrate areas of predicted flooding greater than 25m^2 in spatial extent and only flooding which is more than 0.1m deep. This refinement of the TuFLOW model output is necessary so as to establish the primary areas of predicted flood risk. The modelling approach utilises a 5m resolution ground model grid. The TuFLOW model does not incorporate the Southern Water surface water drains or sewers, which during a storm event would provide storage capacity. Southern Water advised that the modelling should assume that the surface water sewer network could accommodate the 1 in 20 year storm. Therefore, the 1 in 20 year rainfall depths for the critical storm were subtracted from the 1 in 100 year (plus climate change) rain fall depths.

The 1 in 100 year (plus climate change) winter profile storm hyetographs (hyetograph refers to a graph presenting rainfall depth over time) were generated by deriving catchment descriptors from the Flood Estimation Handbook

CD-ROM (FEH) and applying the FEH Rain Profile Method. The storm durations were determined by the critical drainage pathway lengths in each of the model areas. The model boundaries were determined by the topography, the local watersheds were traced to ensure that all contributing parts of the catchments were included in the model.

Results

The topography of Ryde is entirely comprised of high resolution LiDAR data which includes the representation of small topographic features. In all urban areas the LiDAR has been edited to remove the buildings. This editing process results in a slightly un even surface profile, which can result in the production of small depressions that fill with water. It is likely that this has been the situation in the northern parts of Ryde where there are many small isolated areas of predicted flooding. The most significant potential flood flow route is predicted in the south of Ryde flowing from west to east towards Monkton Mead Brook and through one of the potential development sites. This potential risk should be reviewed further should this site be put forward for planning submission.

There does not appear to be a strong pattern to the distribution of the recoded incidents of surface water flooding and they do not correlate with the predicted flood flow routes or ponding areas. This might suggest that the recorded incidents are related to factors other than overland flows.

Surface Drainage and Infiltration SuDS Potential

Ryde has varied topography, with the central part of the settlement being located in the bottom of river valleys, whereas the northern and southern parts are on much higher ground.

Soils in Ryde have SPR values of between 15% and 50% with. The areas of Haylands and Elmfield are where the lower SPR and runoff potentials. These areas of lower runoff potential are characterised by Secondary Aquifer geology and soils with a high leaching potential. The remainder of the town is comprised of Secondary Aquifers with low leaching soils and areas of Unproductive Strata. SuDS infiltration potential is classified as medium for the areas with high leaching soils over a Secondary Aquifer. A SAP is located on the northern edge of town, adjacent the coast. The presence of this ecological designation means that care should be taken not to introduce pollutants into the environment. Around coastal areas, surface water could be discharged into the sea with out restriction, providing the surface water was not contaminated.

Wave Exposure Risk

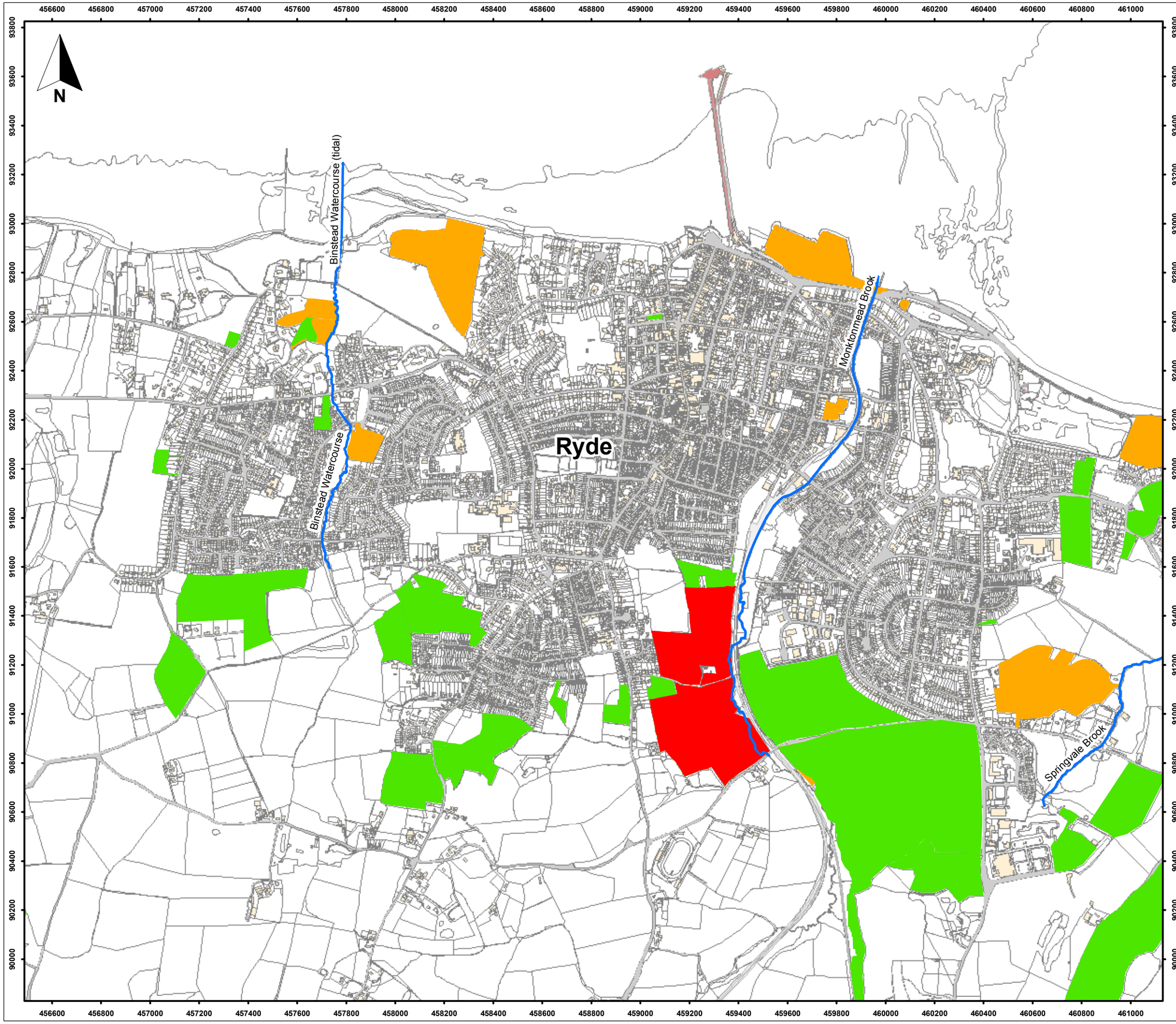
The coastline near Ryde has been classified as being at medium risk of wave exposure (see Section 6 of the SFRA Report). It is recommended that for any site within the 50m buffer, where ground levels are less or equal to the predicted peak 1 in 200 year tide in 2115 level plus a 4m allowance for wave height, building design should consider the impact of being potentially exposed to airborne beach material and the corrosive effects of sea spray. The inter tidal area has not been attributed with a Wave Exposure Risk because of its sheltered situation.

Flood Risk Management Guidance and Site Specific FRAs

The principal of avoidance should be applied when considering sites within Ryde. The development of any previously undeveloped site in Flood Zones 2, 3a or 3b is considered by PPS25 as an increase in flood risk and should be avoided. The redevelopment of any previously developed sites within the Flood Zones will require the PPS25 Sequential test to be passed and the Exception Test satisfied where necessary.

Factors to be considered in safe development could include:

- Ensuring that the sequential approach to landuse planning is, where possible, applied on site. This approach would see more and highly vulnerable landuse types being placed in the lower risk zones.
- Finished first floor levels should be set above the predicted 1 in 100 year fluvial flood levels, plus a climate change allowance and above the 1 in 200 year predicted tide levels for the year 2115. The Environment Agency should be consulted for fluvial flood levels and the Environment Agency should be asked to confirm if the predicted tide levels in Figure 1 in Appendix B are still the most recent predictions. A freeboard allowance should be applied, again the Environment Agency should be consulted on this aspect of the design.
- Buildings should be designed so that safe access and egress can be facilitated in the event of the 1 in 100 year (plus climate change) and 1 in 200 year tidal event (plus climate change).
- Development should not increase the risk of flooding elsewhere. As such, the potential for displaced flood water to impact adjacent areas should be considered. This typically applies if an existing building footprint is being increased in fluvial floodplains and defended tidal floodplains. The displacement of water aspect of development along an undefended coastline is not necessarily a concern.
- Building design should account for the potential depths of water that might occur and appropriate flood resilient and or resistant design features should be incorporated.
- Surface water generated by development should be managed using sustainable techniques. The FRA or drainage assessment should explore the Environment Agency and CIRIA SuDS hierarchy. Discharge rates and volumes should not increase post development, in addition to this PPS25 requirement, the Council and the Environment Agency want to see developers seeking to reduce run-off rates and volumes.



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

Notes:
Site is attributed with the flood probability associated with the highest probability flood zone the site intersects

The mapped extent of Flood Zone 3b has been used to identify Functional Floodplain
The 1 in 100 year fluvial flood zone for the present day and the 1 in 200 year tidal extent predicted for the year 2115 has been used to identify sites at a High Probability. The 1 in 1000 year fluvial flood zone for the present day and the 1 in 1000 year tidal extent predicted for the year 2115 has been used to identify sites at a Medium Probability. Sites only in Flood Zone 1 have been assigned a Low Probability

0 200 400 600 800 Meters

Scale: 1:15,000 @ A3

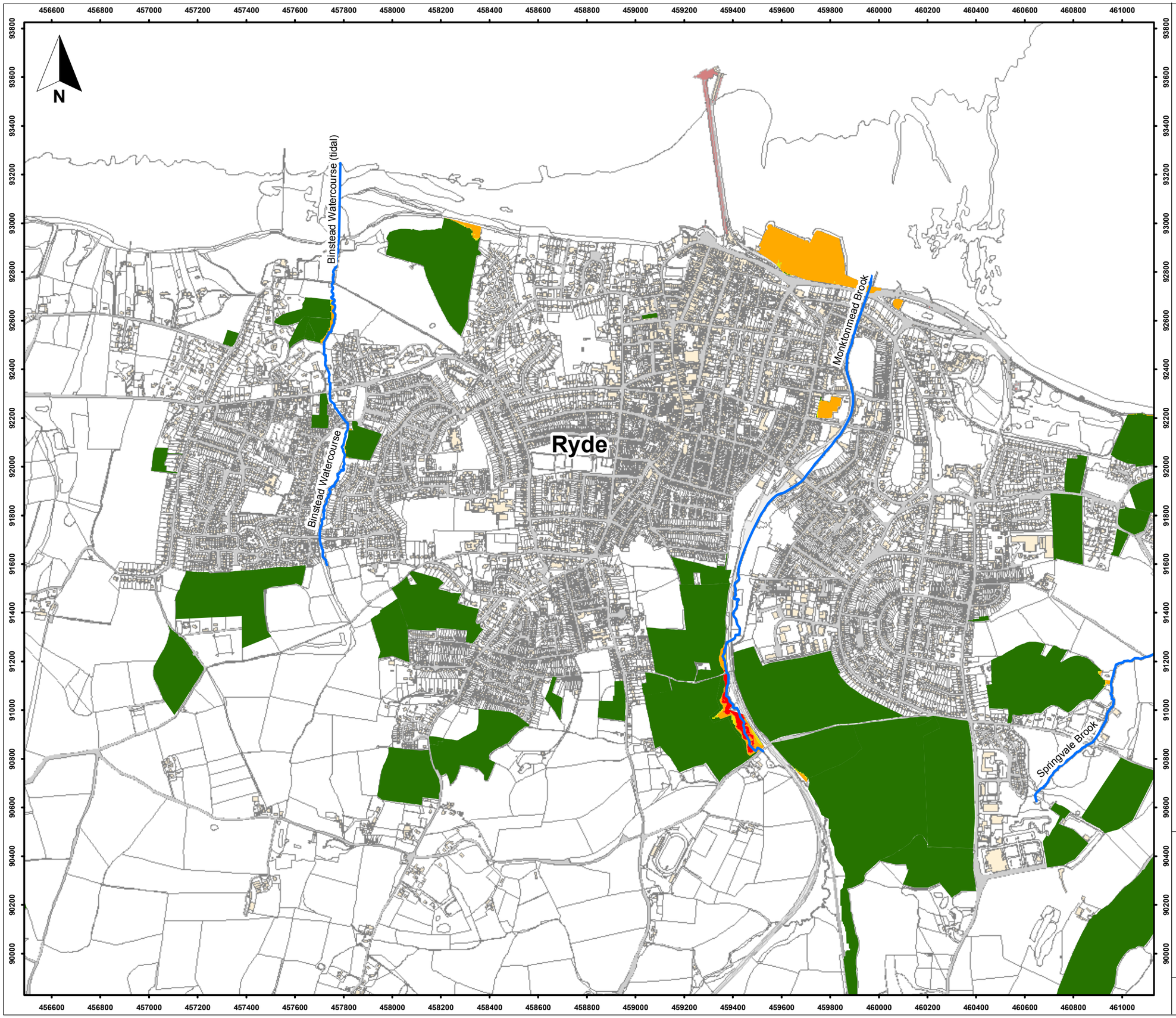
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 67
Potential Development Sites
Qualitative Flood Risk
Ryde

November 2009
25793-A76a.mxd squij

Entec



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

0 200 400 600 800 Meters

Scale: 1:15,000 @ A3

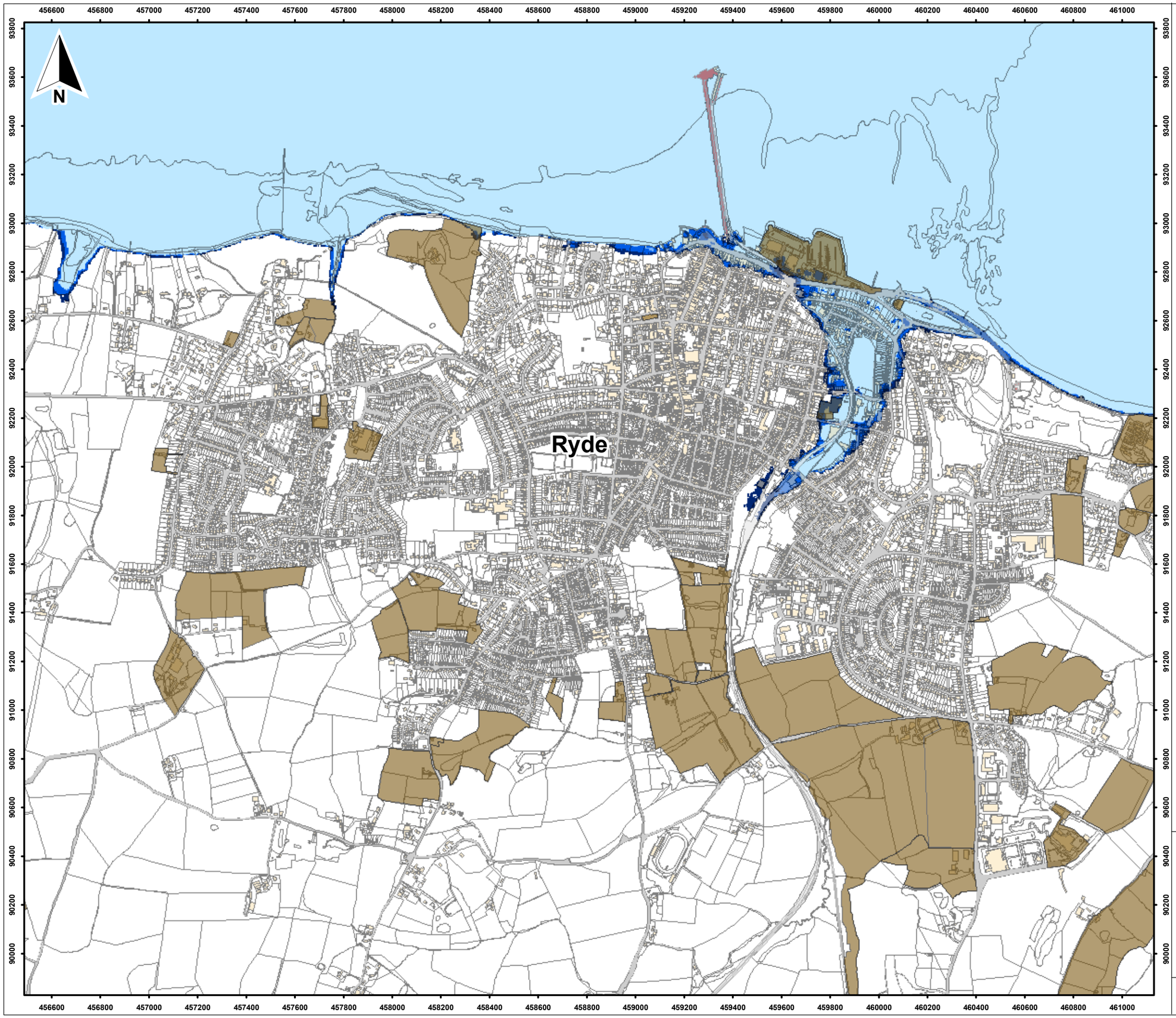
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 68
Potential Development Sites
Site Specific Flood Risk Definition
Ryde

November 2009
25793-A77a.mxd squij

Entec



Key:

Predicted 1 in 1000 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 600 800 Meters

Scale: 1:15,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 69
Potential Development Sites
Flood Zone 2
Climate Change Scenarios
Ryde

November 2009
25793-A78a.mxd squij

Entec

Ryde

N

Key:

Predicted 1 in 200 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 600 800 Meters

Scale: 1:15,000 @ A3

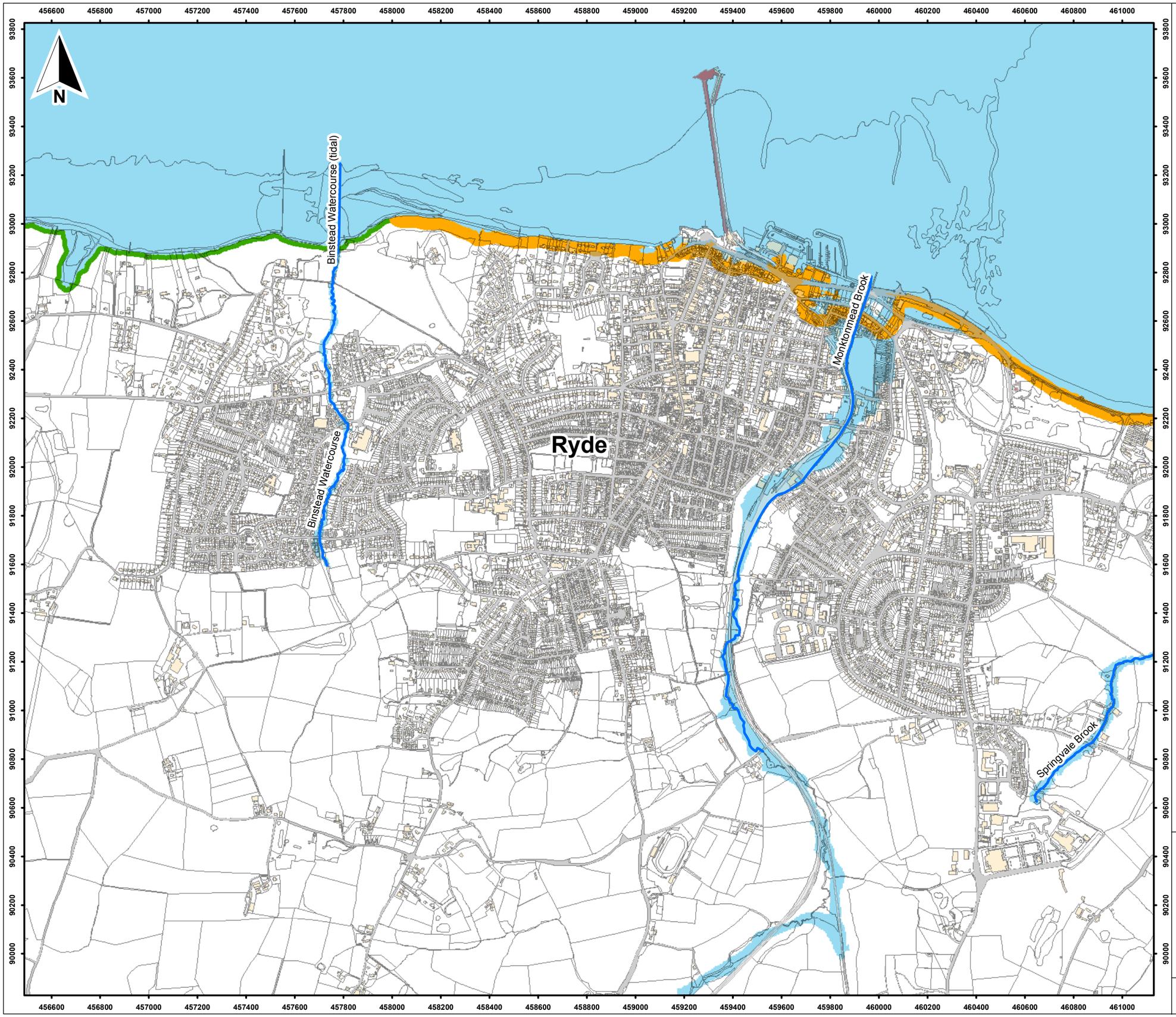
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 70
Potential Development Sites
Flood Zone 3
Climate Change Scenarios
Ryde

November 2009
25793-A79a.mxd squij

Entec



Key:

Main Rivers

Potential Exposure Risk

High

Medium

Low

Environment Agency Flood Zone 2 (November 2009)

0 200 400 600 800 Meters

Scale: 1:15,000 @ A3

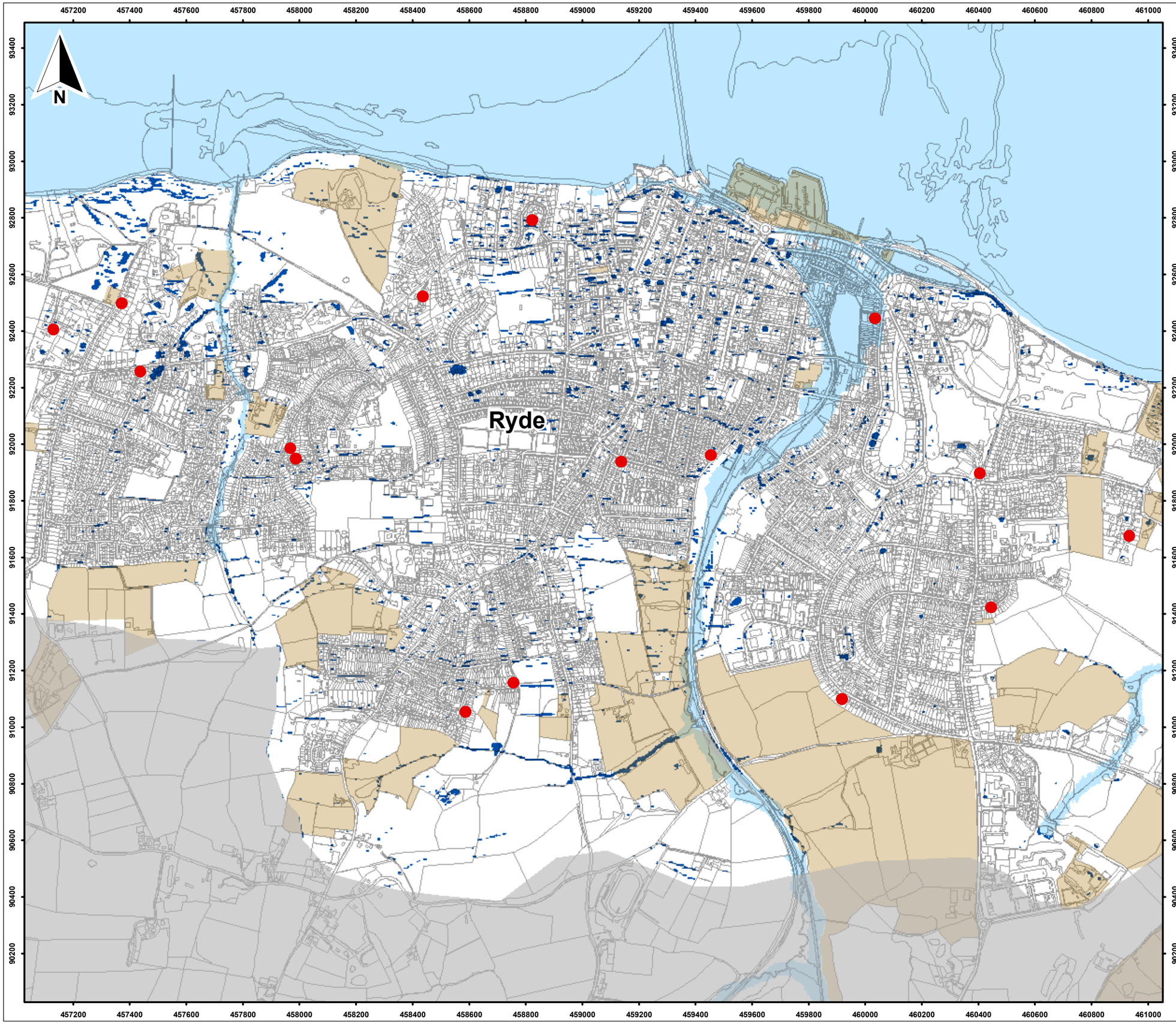
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 71
Qualitative Wind and Wave Exposure Risk - Ryde

November 2009
25793-A80.mxd squij

Entec



Key:

- Location of reported surface water flooding issues. Supplied by Southern Water for the period upto and including 2006.
- Environment Agency Flood Zone 2 (November 2009)
- Potential Surface Water Flow Routes and Ponding areas (1:100+cc) Over 0.2m deep
- Potential Development Sites
- Outside the Limits of the Surface Water Model

Notes:
Only predicted surface water flow routes and ponding areas, over 0.1m deep and greater than 25m2 in areas are shown

0 200 400 600 800 Meters

Scale: 1:13,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 72
Potential Surface Water Flow Routes and Ponding Areas (1 in 100 year storm + climate change) - Ryde

November 2009
25793-A81.mxd squij

Entec

Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix O
Wootton

June 2010

ISLE of WIGHT COUNCIL

Overview

Please review this discussion in conjunction with the mapping provided in this Appendix.

The RDA of Wootton is classified as a Rural Service Centre and incorporates the settlements of Wootton and Fishbourne. The RDA is located on the coast between East Cowes and Ryde, with Wootton Creek dividing the two settlements. There are tidal and fluvial flood risks facing this Key Development Area, however only a small proportion of the potential development sites are assessed as being at risk of tidal or fluvial flooding.

Sustainability and Regeneration Objectives

Development within the wider countryside will be focused on the Rural Service Centres such as Wootton and should support their role as wider centres for outlying villages, hamlets and surrounding countryside. For the rural service centres development will be expected to ensure their future viability. Within the rural service centres and outlying rural areas, development will be expected, in the first instance, to meet a rural need and maintain or enhance the viability of local communities and will be subject to local considerations.

Wootton RSC has been identified as having the potential to accommodate further development to meet the regeneration aims and needs of the local community, through improving local services and strengthening public transport. Development will be encouraged on brownfield sites in the first instance and tourism will be promoted.

Sites at Risk

All the potential development sites in Wootton are located within Flood Zone 1, the areas of flood plain associated with Wootton Creek have been avoided.

The Isle of Wight Autumn 2000 Flood Investigation Study – (*Wootton Bridge Parish Council Report*) noted that two properties were flooded between the 15th September and 13th December. Large rainfall amounts prior to and during the flood event resulted in high volumes of runoff and an overcharging of the combined foul and storm sewer.

Climate Change

Climate change is predicted to have a relatively small impact on the flood extents in the tidal floodplain as the floodplain is topographically well defined. Nevertheless, flood depths are predicted to increase as a result of climate change.

Potential Surface Water Flow Routes and Ponding Areas

Method

The potential surface water flow routes and ponding areas presented in the SFRA, illustrate areas of predicted flooding greater than 25m^2 in spatial extent and only flooding which is more than 0.1m deep. This refinement of the TuFLOW model output is necessary so as to establish the primary areas of predicted flood risk. The modelling approach utilises a 5m resolution ground model grid. The TuFLOW model does not incorporate the Southern Water surface water drains or sewers, which during a storm event would provide storage capacity. Southern Water advised that the modelling should assume that the surface water sewer network could accommodate the 1 in 20 year storm. Therefore, the 1 in 20 year rainfall depths for the critical storm were subtracted from the 1 in 100 year (plus climate change) rain fall depths.

The 1 in 100 year (plus climate change) winter profile storm hyetographs (hyetograph refers to a graph presenting rainfall depth over time) were generated by deriving catchment descriptors from the Flood Estimation Handbook CD-ROM (FEH) and applying the FEH Rain Profile Method. The storm durations were determined by the critical drainage pathway lengths in each of the model areas. The model boundaries were determined by the topography, the local watersheds were traced to ensure that all contributing parts of the catchments were included in the model.

Results

The town of Wootton is build over a hill with the eastern half of the settlement being on a south east facing slope and the western half being on a north west facing slope. The potential flow routes reflect these varying slope aspects. Although within the town itself there are only minor potential flow routes predicted. The model predictions do not correlate with the recorded incidents of surface water flooding, which appear to be distributed throughout the eastern half of the town. The recorded flood incident data sets are good indications of potential hot-spots. However, the database is reliant upon the flooding incidents being reported by the public, as such there is a significant potential for database to be incomplete. The absence of a clear correlation between the predicted and the recorded flooding in Wootton is likely to be the result of either an event not having occurred or an event not having been reported. The potential development sites in Wootton are largely unaffected by the potential flow routes and ponding areas.

Surface Drainage and Infiltration SuDS Potential

Soils in the Wootton are characterised by an SPR of 50%, and consequently surface runoff potential is high. Wootton is underlain by areas of Secondary Aquifer and Unproductive Strata. Infiltration potential is classified as predominantly low, with areas of medium infiltration potential associated with the high leaching potential soils. Each potential development site in the Sites Database is assigned a classification for infiltration potential, groundwater contamination and runoff.

Wootton Creek Estuary is designated as an SPA. The presence of a SPA in the estuary necessitates the need for careful mitigation of contaminants in surface water drainage waters. Volumes of discharge into the estuary are likely to be permitted without a limit assuming appropriate mitigation measures for pollution are taken where necessary.

Wave Exposure Risk

The coastline near Sea View has been classified as being at low risk of wave exposure (see Section 6 of the SFRA Report). It is recommended that for any site within the 20m buffer, where ground levels are less or equal to the predicted peak 1 in 200 year tide in 2115 level plus a 4m allowance for wave height, building design should consider the impact of being potentially exposed to airborne beach material and the corrosive effects of sea spray.

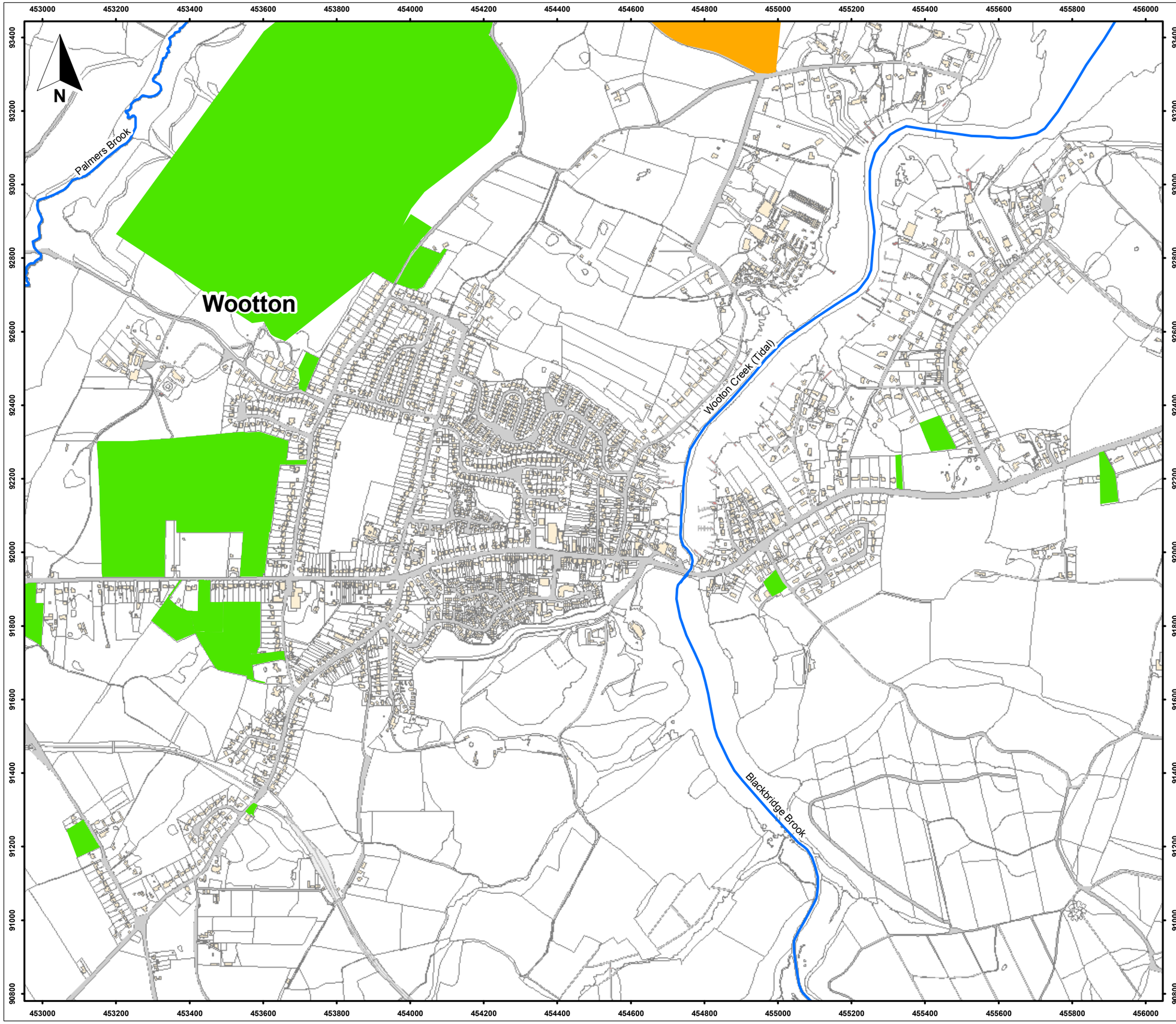
Flood Risk Management Guidance and Site Specific FRAs

The principal of avoidance should be applied when considering sites within Wootton. The development of any previously undeveloped site in Flood Zones 2 and 3 is considered by PPS25 as an increase in flood risk and should be avoided. The redevelopment of any previously developed sites within the Flood Zones will require the PPS25 Sequential test to be passed and the Exception Test satisfied where necessary.

Factors to be considered in safe development could include:

- Ensuring that the sequential approach to landuse planning is, where possible, applied on site. This approach would see more and highly vulnerable landuse types being placed in the lower risk zones.
- Finished first floor levels should be set above the predicted 1 in 100 year fluvial flood levels, plus a climate change allowance and above the 1 in 200 year predicted tide levels for the year 2115. The Environment Agency should be consulted for fluvial flood levels and the Environment Agency should be asked to confirm if the predicted tide levels in Figure 1 in Appendix B are still the most recent predictions. A freeboard allowance should be applied, again the Environment Agency should be consulted on this aspect of the design.
- Buildings should be designed so that safe access and egress can be facilitated in the event of the 1 in 100 year (plus climate change) and 1 in 200 year tidal event (plus climate change).
- Development should not increase the risk of flooding elsewhere. As such, the potential for displaced flood water to impact adjacent areas should be considered. This typically applies if an existing building footprint is being increased in fluvial floodplains and defended tidal floodplains. The displacement of water aspect of development along an undefended coastline is not necessarily a concern.
- Building design should account for the potential depths of water that might occur and appropriate flood resilient and or resistant design features should be incorporated.

- Surface water generated by development should be managed using sustainable techniques. The FRA or drainage assessment should explore the Environment Agency and CIRIA SuDS hierarchy. Discharge rates and volumes should not increase post development, in addition to this PPS25 requirement, the Council and the Environment Agency want to see developers seeking to reduce run-off rates and volumes.



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

Notes:
Site is attributed with the flood probability associated with the highest probability flood zone the site intersects

The mapped extent of Flood Zone 3b has been used to identify Functional Floodplain
The 1 in 100 year fluvial flood zone for the present day and the 1 in 200 year tidal extent predicted for the year 2115 has been used to identify sites at a High Probability. The 1 in 1000 year fluvial flood zone for the present day and the 1 in 1000 year tidal extent predicted for the year 2115 has been used to identify sites at a Medium Probability. Sites only in Flood Zone 1 have been assigned a Low Probability

0 200 400 Meters

Scale: 1:10,000 @ A3

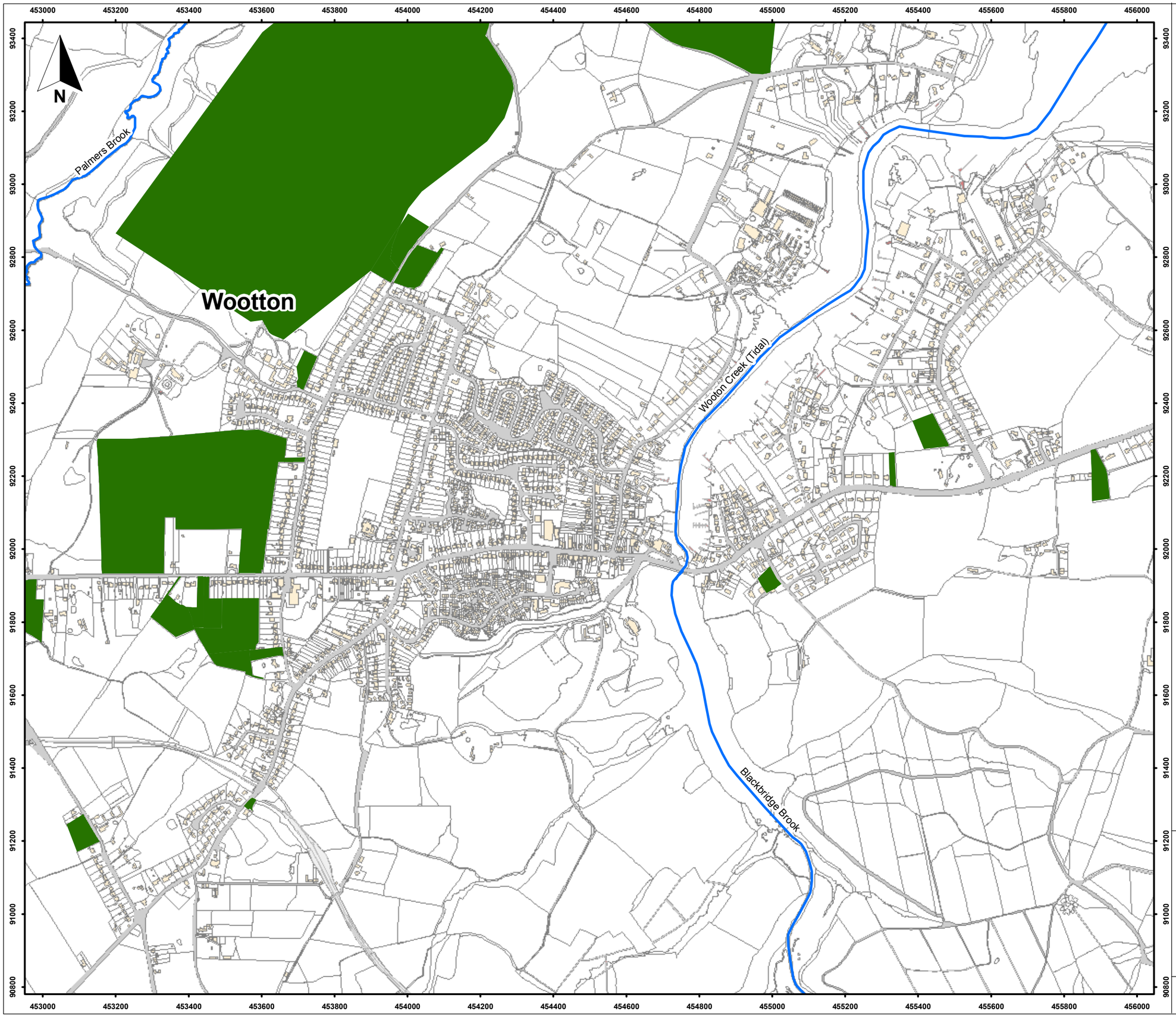
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

IoW SFRA Draft Output

Figure 73
Potential Development Sites
Qualitative Flood Risk
Wootton

November 2009
25793-A82a.mxd squij

Entec



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

0 200 400 Meters

Scale: 1:10,000 @ A3

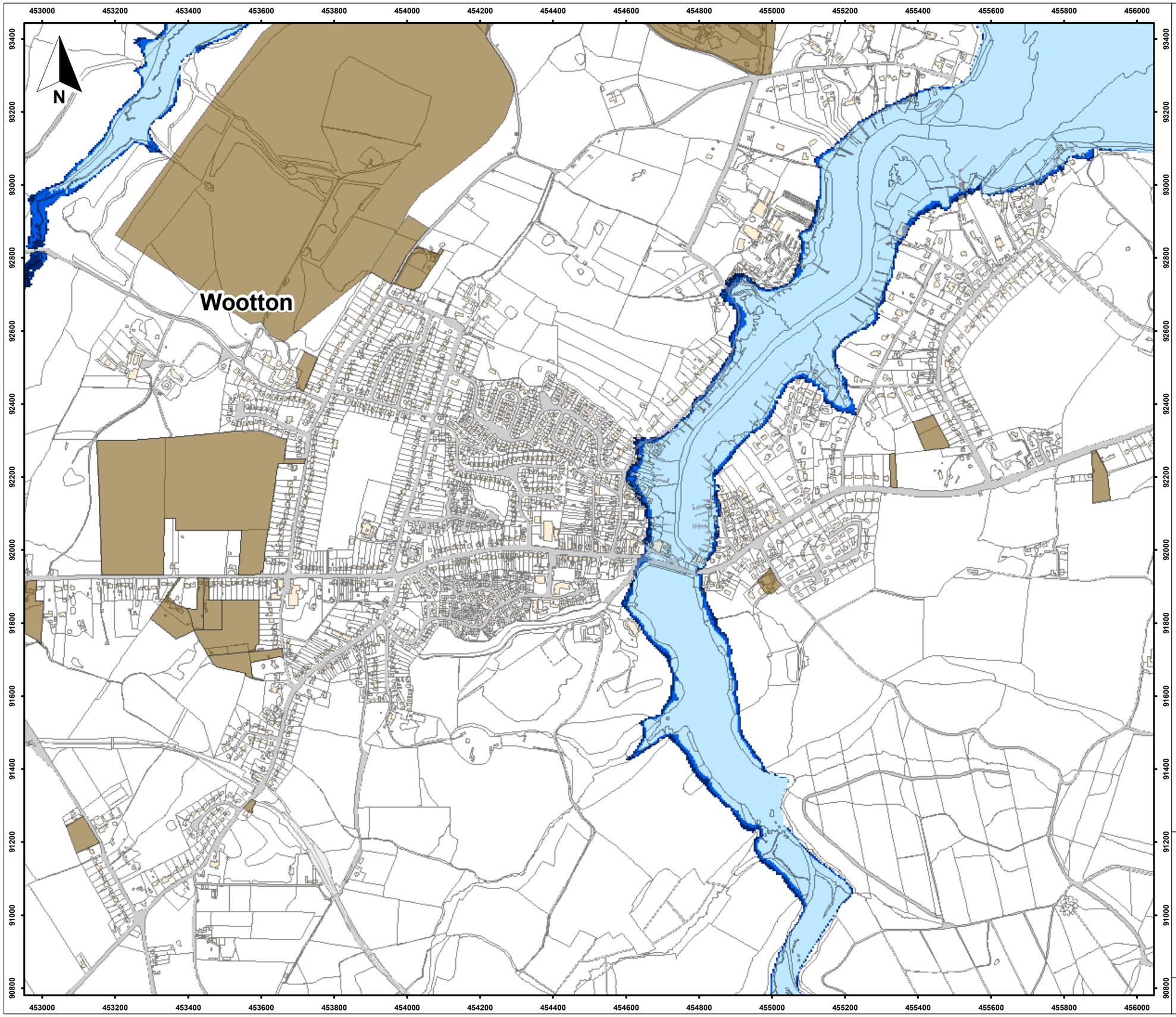
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

IoW SFRA Draft Output

Figure 74
Potential Development Sites
Site Specific Flood Risk Definition
Wootton

November 2009
25793-A83a.mxd squij

Entec



Key:

Predicted 1 in 1000 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 Meters

Scale: 1:10,000 @ A3

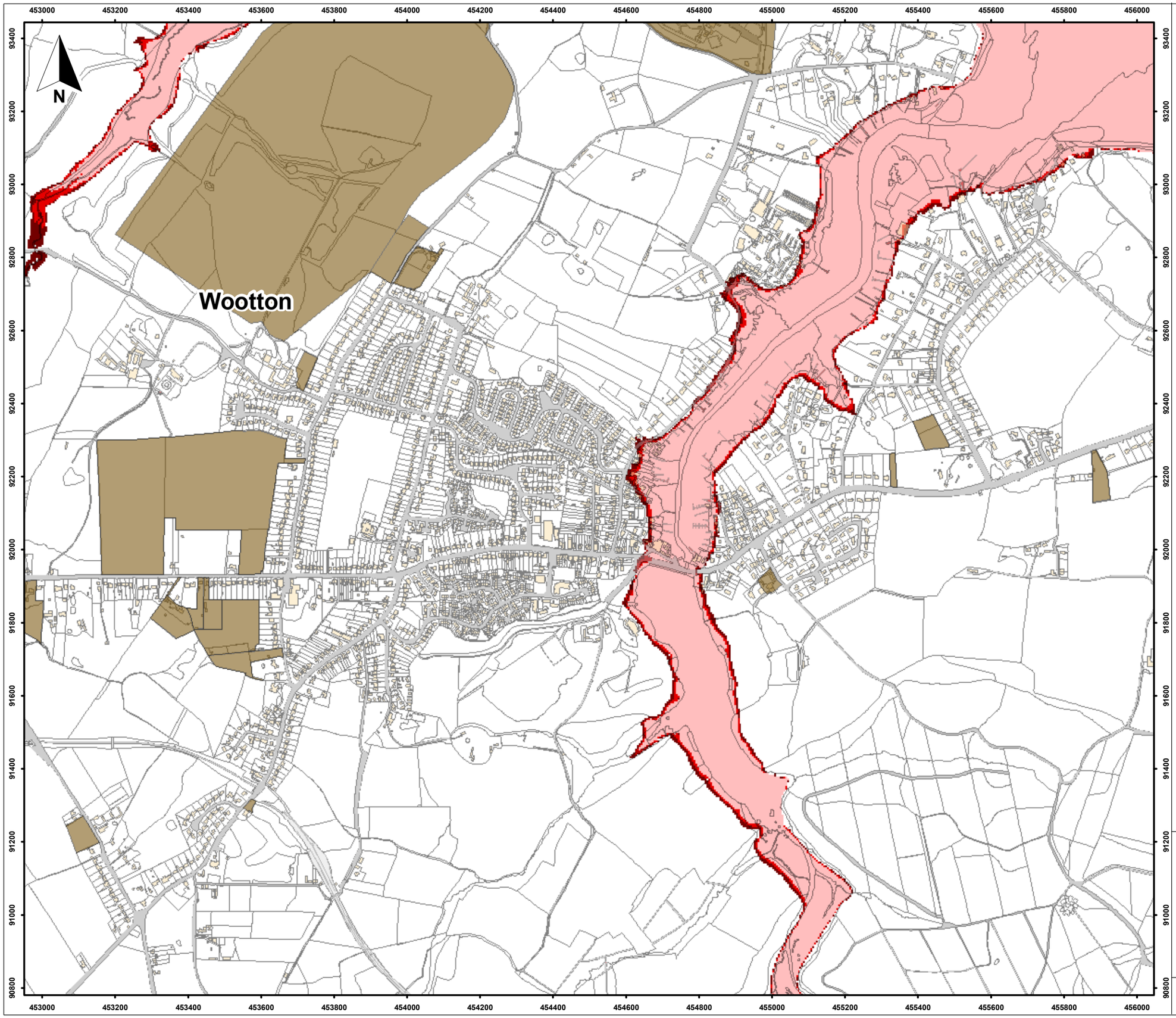
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 75
Potential Development Sites
Flood Zone 2
Climate Change Scenarios
Wootton

November 2009
25793-A84a.mxd squij

Entec



Key:

Predicted 1 in 200 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 Meters

Scale: 1:10,000 @ A3

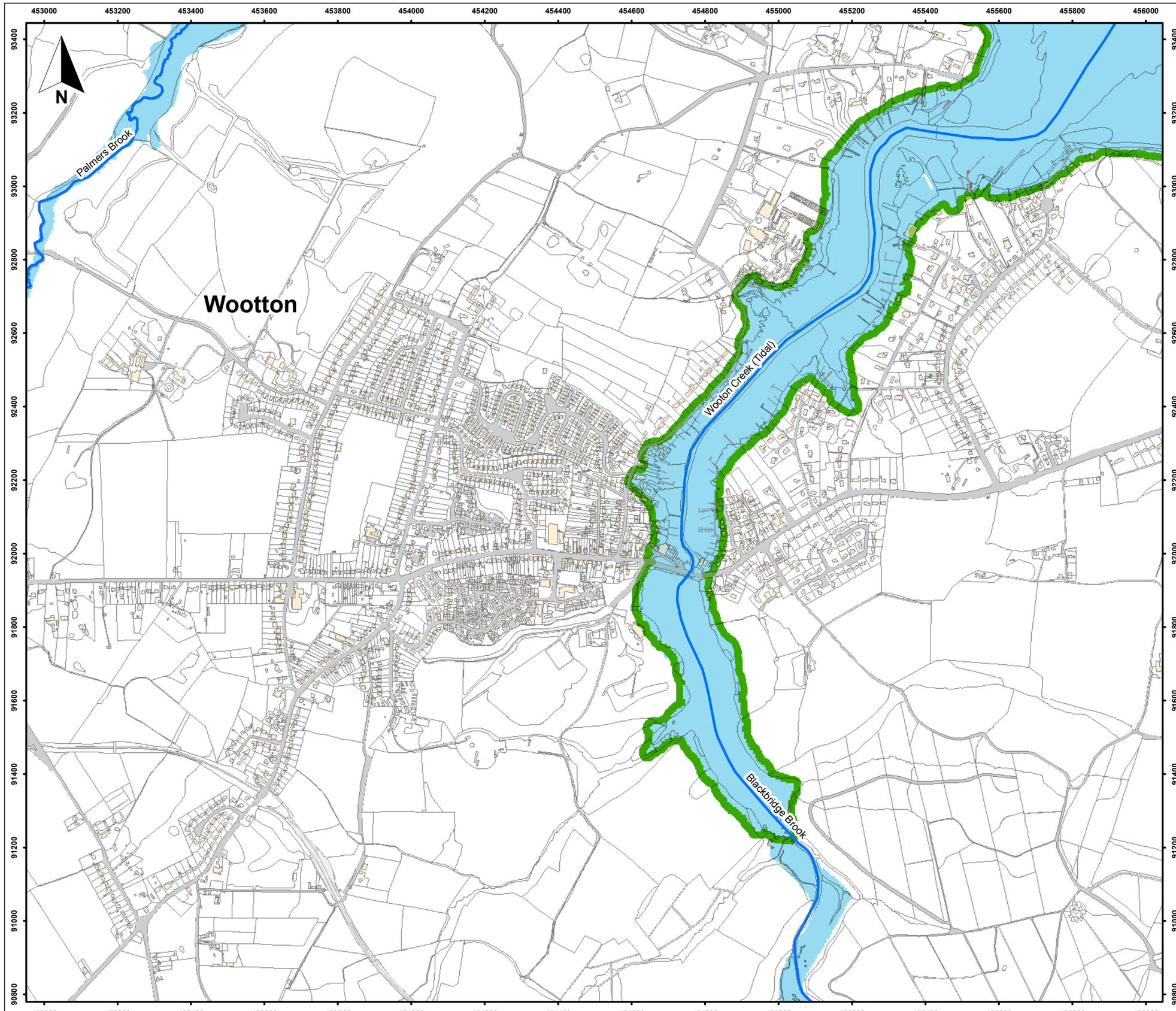
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 76
Potential Development Sites
Flood Zone 3
Climate Change Scenarios
Wootton

November 2009
25793-A85a.mxd squij

Entec



Key:

Main Rivers

Potential Exposure Risk

High

Medium

Low

Environment Agency Flood Zone 2 (November 2009)

0 200 400 Meters

Scale: 1:10,000 @ A3

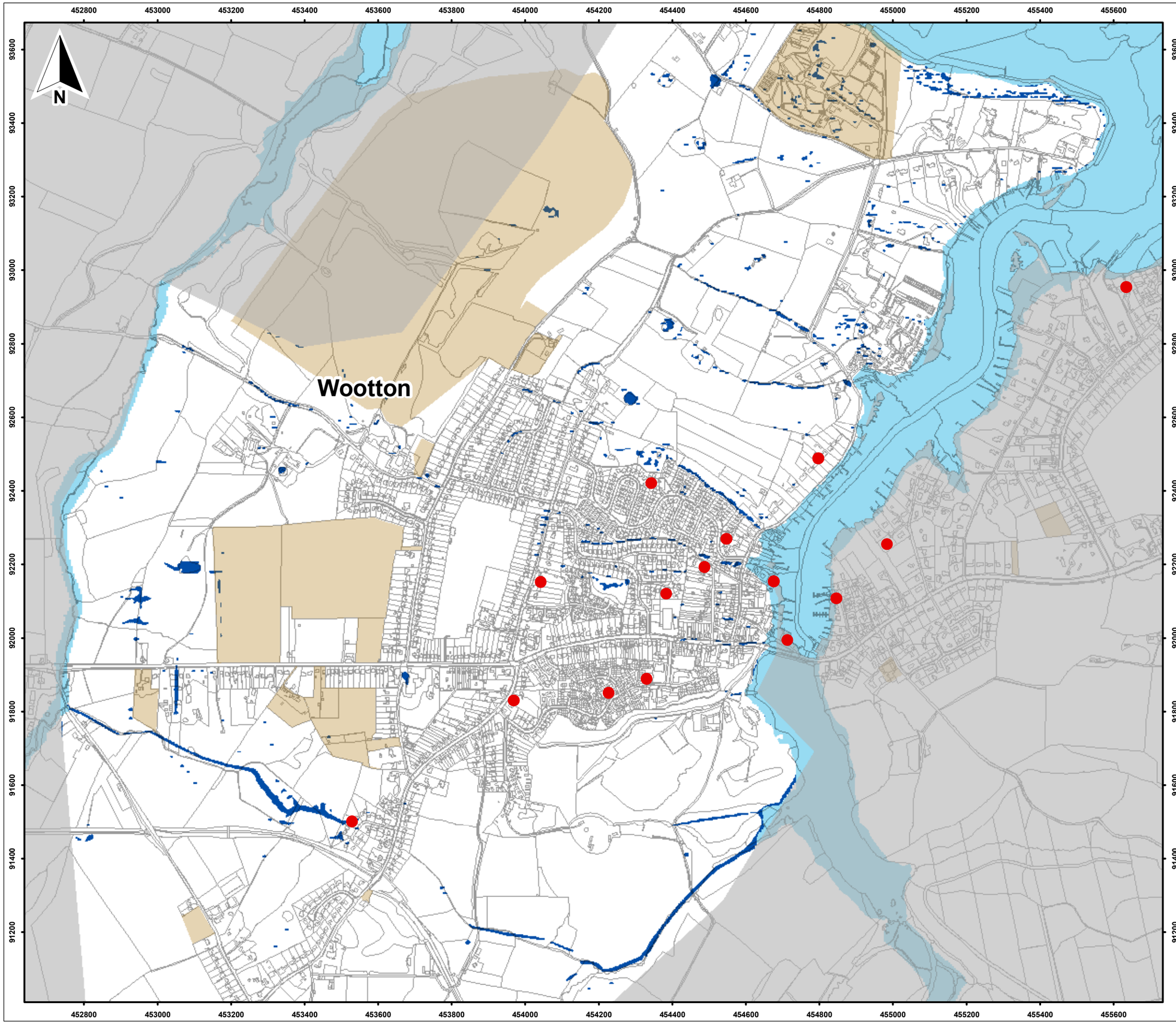
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

IoW SFRA Draft Output

Figure 77
Qualitative Wind and Wave Exposure Risk - Wootton

November 2009
25793-A86.mxd squij

Entec



Key:

- Location of reported surface water flooding issues. Supplied by Southern Water for the period upto and including 2006.
- Environment Agency Flood Zone 2 (November 2009)
- Potential Surface Water Flow Routes and Ponding areas (1:100+cc) Over 0.2m deep
- Potential Development Sites
- Outside the Limits of the Surface Water Model

Notes:
Only predicted surface water flow routes and ponding areas, over 0.1m deep and greater than 25m2 in areas are shown

0 200 400 600 Meters

Scale: 1:10,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

IoW SFRA Draft Output

Figure 78
Potential Surface Water Flow Routes and Ponding Areas (1 in 100 year storm + climate change) - Wootton

November 2009
25793-A87a.mxd squij

Entec

Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix P
Newport

June 2010

ISLE of WIGHT COUNCIL

Overview

Please review this discussion in conjunction with the mapping provided in this Appendix.

Newport has the greatest density of watercourses of any town on the Island, all of which are classified as Main Rivers and a significant number of these have got Agency Flood Zones associated with them. There exists both tidal and fluvial flood risks in Newport. The tidal flood risk, as defined by the Flood Zone extends as far up the Medina Estuary as the bridge where the A3020 crosses the River Medina. However, the tidal mapping of the Medina Estuary carried out for this SFRA indicates that the tidal flood risk may extend further upstream. This discrepancy is likely to be due to different methodologies used. Section 5 details the flood mapping methodology used in this SFRA and notes how the extents were determined solely on the basis of the LiDAR topographic data and the extreme sea levels. No site specific information relating to the location of weirs or other control structures was included.

Fluvial Flood Zones exist for the River Medina, Lukely Brook, Pan Stream and Gunville Stream. Parkhurst Stream and the tributaries of Pan Stream however, which are designated as main rivers, do not have Flood Zones.

The Isle of Wight Autumn 2000 Flood Investigation Study –(*Newport Isle of Wight Council Flood Report*) found that although parts of Newport are in the Medina and Lukely Brook floodplains, only St Cross Mill was reported as flooding due to high river levels. Through Newport channel improvement works designed in the 1960s were sufficient to prevent more extensive flooding, although the standard of protection will diminish with time. No tidal flooding was reported during the winter of 2000 / 2001.

The Isle of Wight Autumn 2000 Flood Investigation Study – (*Newport Isle of Wight Council Flood Report*) identified several site specific flooding incidents. These are listed below:

- 47 Garden Way was flooded due to excess water coming down the slope off adjacent Downside School playing fields and pooling against the side of the house.
- 185 Fairlee Road was flooded due to water pooling of water in the road and overflowing the driveway and into the property. This location is a low point in the road that will accumulate water from both sides. In addition surface water would come down from Mews Lane. Insufficient capacity of road and footpath drains has been attributed as the cause of the flooding.
- 2 New Close Farm Cottages, Nunnery Lane. This property lies at the base of a short valley with high ground on three sides. The accumulation of excess runoff entering the property from the slopes must have resulted from saturated areas or areas of low permeability.
- Lukely Mill which is situated adjacent to Lukely Brook flooded when the capacity of Lukely Brook was exceeded.
- 239 Gunville Road, Gunville. The capacity of Gunville Brook was exceeded which caused flooding of the property

Sustainability and Regeneration Objectives

The Spatial Strategy for the Medina Valley area is to plan for housing and employment growth, accommodating the planned urban extensions at East Cowes and Newport. Sites to meet the supply requirement of PPS3 will be allocated in the Medina Valley Area Action Plan.

To deliver the broad distribution of housing required within the Medina Valley, housing will be developed on the existing allocations and on sites with extant permission. Should there be a need to allocate further sites over the plan period they will be identified through the AAP process.

Within the Medina Valley, the focus for employment will be to provide a range of sites for appropriate growth sectors, office and general workspace needs. Existing employment sites and buildings will be safeguarded where they are important to sustaining the local economy and meeting the Council's regeneration led development objectives.

To ensure that there is an adequate supply of sites for businesses which require access to water frontage, employment sites with deep water frontage will be safeguarded for uses which require deep water. The Council will seek to safeguard and maintain the function and facilities of appropriate existing wharf sites.

The assessment of flood risk in Newport, Cowes and East Cowes and the classification of flood risks for each of the proposed sites will aid in the land allocation decision process due to take place as part of the Medina Valley AAP.

Sites at Risk

The sites assessed to be at risk are those which intersect the Flood Zones present within Newport. Figure 79, highlights quite a number of large sites that are assessed as being at risk of flooding, however Figure 80 illustrates that only a small portion of each of these sites are with Flood Zones 2 and 3. This is because the topography rises quickly from the edge of the floodplain. The large potential development sites adjacent to Gunville Stream are examples of this. In line with the LPAs approach to managing the predicted climate change induced impacts of sea level rise, the 2115 climate change epoch has been used to assess tidal risk to the potential development sites. The sites most significantly impacted sites are those along side the Medina Estuary downstream of where the A3020 crosses the river.

Parkhurst Stream, which flows down Horsebridge Hill to the North West of Newport, and the tributaries of Pan Stream to the east of the town have no Flood Zones. Does not have an associated fluvial flood zone, this is likely to be because the watercourse's drainage area falls below the 3km^2 applied by the Environment Agency. Owing to the presence of the Pan Stream, there is likely to be an associated fluvial flood risk, this potential risk should be assessed and appropriately managed in accordance with PPS25 as part of any future development.

Climate Change

The potential sites most vulnerable to the impact of climate change, and the associated increase in sea level, are:

- those on both banks of the Medina between Seaclose Park and the crossing of the A3020
- The region of adjacent to the River Medina in the Coppin's Bridge and East Street
- Along the lower reaches of Lukely Brook just upstream of its confluence with the River Medina.

In these areas there is potentially significant increase in the predicted extent of the tidal flood risk zones when the predicted impacts of climate change are accounted for. In line with e LPAs approach to managing the predicted climate change induced impacts of sea level rise, the 2115 climate change epoch has been used to assess tidal risk to the potential development sites.

Potential Surface Water Flow Routes and Ponding Areas

Method

The potential surface water flow routes and ponding areas presented in the SFRA, illustrate areas of predicted flooding greater than 25m^2 in spatial extent and only flooding which is more than 0.1m deep. This refinement of the TuFLOW model output is necessary so as to establish the primary areas of predicted flood risk. The modelling approach utilises a 5m resolution ground model grid. The TuFLOW model does not incorporate the Southern Water surface water drains or sewers, which during a storm event would provide storage capacity. Southern Water advised that the modelling should assume that the surface water sewer network could accommodate the 1 in 20 year storm. Therefore, the 1 in 20 year rainfall depths for the critical storm were subtracted from the 1 in 100 year (plus climate change) rain fall depths.

The 1 in 100 year (plus climate change) winter profile storm hyetographs (hyetograph refers to a graph presenting rainfall depth over time) were generated by deriving catchment descriptors from the Flood Estimation Handbook CD-ROM (FEH) and applying the FEH Rain Profile Method. The storm durations were determined by the critical drainage pathway lengths in each of the model areas. The model boundaries were determined by the topography, the local watersheds were traced to ensure that all contributing parts of the catchments were included in the model.

Results

Newport has a relatively large upslope catchment area, which means that the surface water generated from outside the town boundary flows through the town. The modelling predicts a series of potential flow routes and ponding areas throughout the urban area. The modelling has routed the surface water run-off into the topographic low points (valleys), these areas are clearly evident in those locations where there is currently no Flood Zone designation. Potential flow routes can be observed in almost all the valleys which lead down towards the town.

These flow routes are predicted to impact a large number of the potential development sites, this is a risk which should be further investigated to ensure that the risk is sustainably managed and the situation not exacerbated to downstream areas as a result of any future development. The incorporation of Southern Water's surface water drainage network and information relating to the tidal influence on the outfall of surface water drains would be useful additions to further work.

Much of the topography of Newport is comprised of high resolution LiDAR data which includes the representation of small topographic features. In all urban areas the LiDAR has been edited to remove the buildings. This editing process results in a slightly uneven surface profile, which can result in the production of small depressions that fill with water. It is likely that this has been the situation in the densely built urban parts of the modelled catchments where there are many small isolated areas of predicted flooding.

In the south west of the town, Figure 90 depicts large unconfined extents of shallow flooding, this pattern of flooding is the product of SAR (Synthetic Aperture Radar) topographic data being used as there is currently no available LiDAR coverage in this area. The modelling indicates a potential risk in the south east of the town, the predictions could be refined through the use of LiDAR data as and when it becomes available.

Surface Drainage and Infiltration SuDS Potential

Newport's soils for the most part, have a high runoff potential with SPR values between 47% and 50%. Only the southern edge of town has low SPR values of between 15% and 30% (low/medium runoff potential). The southern edge of the town associated with lower runoff potential soils is also underlain by a Principal Aquifer with soils of an intermediate leaching potential. The majority of the rest of the town is predominantly underlain by a Secondary Aquifer with intermediate to high leaching potential. Infiltration Potential is classified as being medium in the centre of the town and low around the edges. Figures 8, 9 and 10 in Appendix A should be consulted.

A small area covered by SPZ 1, 2 and 3 (See Figure 7 in Appendix A) is located in the Lukely Brook area of the south western part of Newport. This area is coincident with a Principal Aquifer and the potential for groundwater contamination requires additional consideration. Infiltration SuDS techniques should be avoided in areas where land contamination is identified as being an issue. The impact of sea level rise on the high water level should be considered when designing the outfall levels of any future surface drainage systems. The Environment Agency will be pushing for an integrated urban drainage scheme is the Pan Extension Project in Newport.

Flood Risk Management Guidance and Site Specific FRAs

The principal of avoidance should be applied when considering sites within Newport. The development of any previously undeveloped site in Flood Zones 2 and 3 is considered by PPS25 as an increase in flood risk and should be avoided. The redevelopment of any previously developed sites within the Flood Zones will require the PPS25 Sequential test to be passed and the Exception Test satisfied where necessary.

Factors to be considered in safe development could include:

- Ensuring that the sequential approach to landuse planning is, where possible, applied on site. This approach would see more and highly vulnerable landuse types being placed in the lower risk zones.

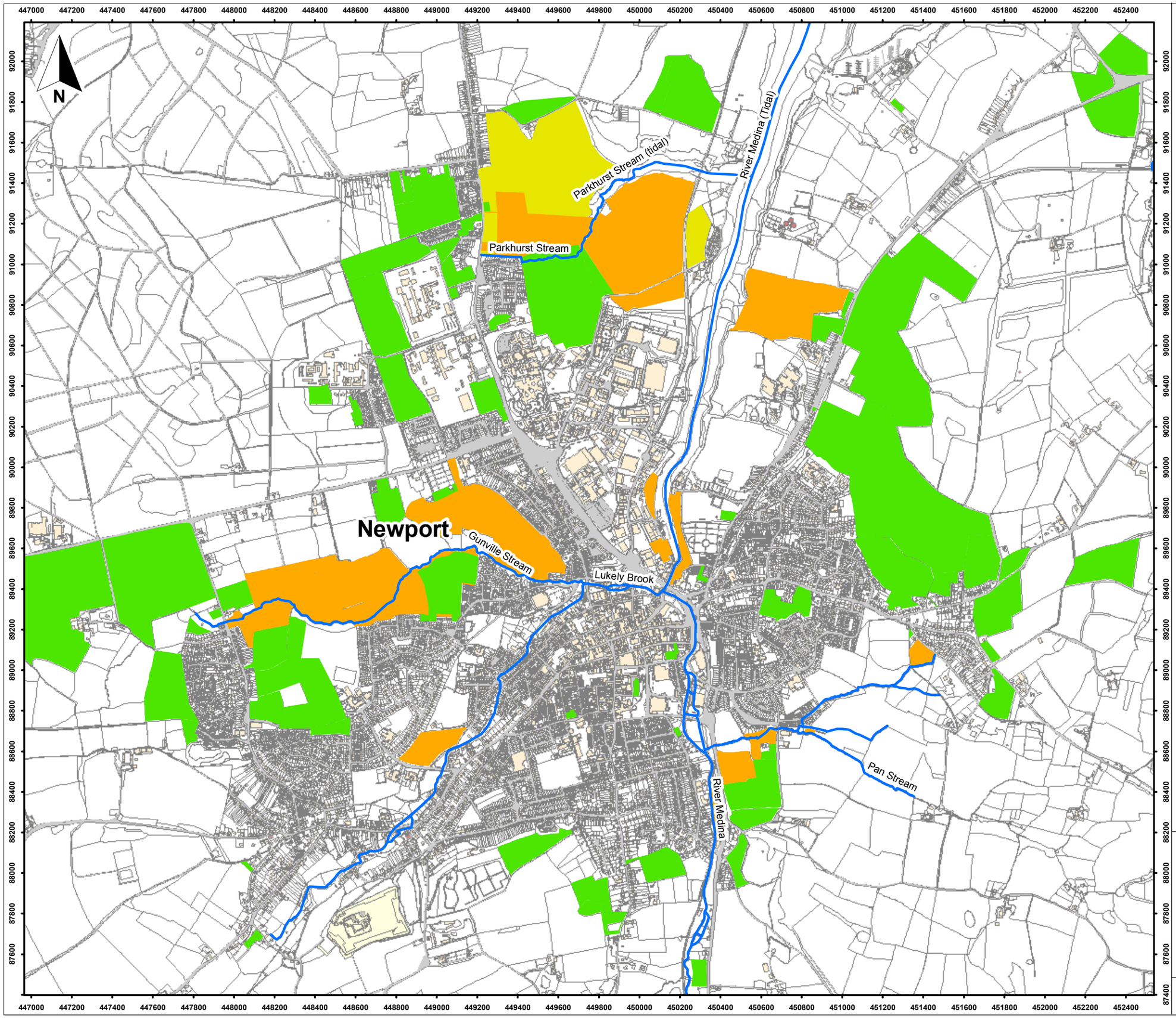
- Finished first floor levels should be set above the predicted 1 in 100 year fluvial flood levels, plus a climate change allowance and above the 1 in 200 year predicted tide levels for the year 2115. The Environment Agency should be consulted for fluvial flood levels and the Environment Agency should be asked to confirm if the predicted tide levels in Figure 1 in Appendix B are still the most recent predictions. A freeboard allowance should be applied, again the Environment Agency should be consulted on this aspect of the design.

- Buildings should be designed so that safe access and egress can be facilitated in the event of the 1 in 100 year (plus climate change) and 1 in 200 year tidal event (plus climate change).

- Development should not increase the risk of flooding elsewhere. As such, the potential for displaced flood water to impact adjacent areas should be considered. This typically applies if an existing building footprint is being increased in fluvial floodplains and defended tidal floodplains. The displacement of water aspect of development along an undefended coastline is not necessarily a concern.

- Building design should account for the potential depths of water that might occur and appropriate flood resilient and or resistant design features should be incorporated.

- Surface water generated by development should be managed using sustainable techniques. The FRA or drainage assessment should explore the Environment Agency and CIRIA SuDS hierarchy. Discharge rates and volumes should not increase post development, in addition to this PPS25 requirement, the Council and the Environment Agency want to see developers seeking to reduce run-off rates and volumes.



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

Notes:
Site is attributed with the flood probability associated with the highest probability flood zone the site intersects

The mapped extent of Flood Zone 3b has been used to identify Functional Floodplain
The 1 in 100 year fluvial flood zone for the present day and the 1 in 200 year tidal extent predicted for the year 2115 has been used to identify sites at a High Probability. The 1 in 1000 year fluvial flood zone for the present day and the 1 in 1000 year tidal extent predicted for the year 2115 has been used to identify sites at a Medium Probability. Sites only in Flood Zone 1 have been assigned a Low Probability

0 200 400 600 800 Meters

Scale: 1:18,000 @ A3

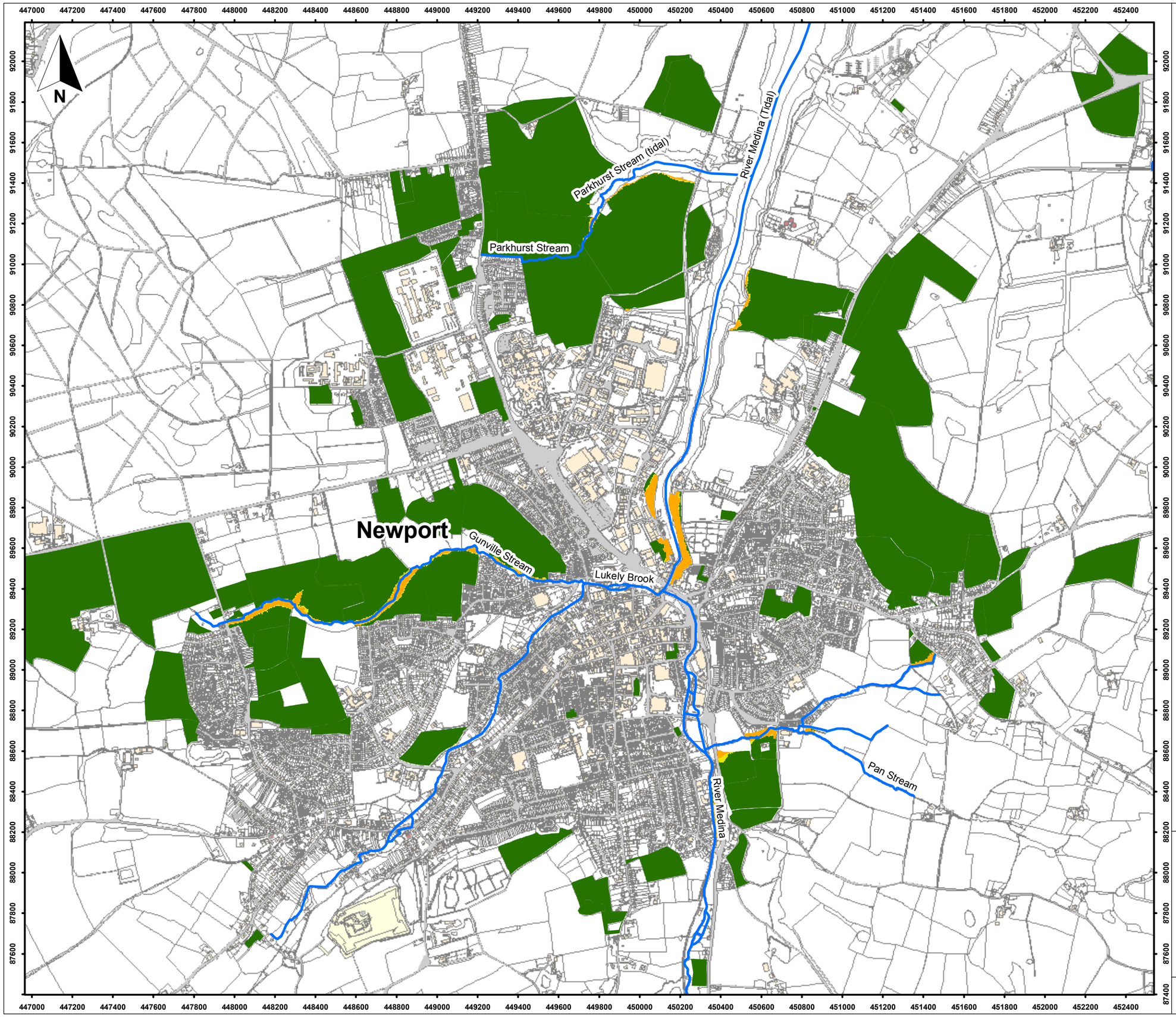
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

IoW SFRA Draft Output

Figure 79
Potential Development Sites
Qualitative Flood Risk
Newport

November 2009
25793-A88a.mxd squij

Entec



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

0 200 400 600 800 Meters

Scale: 1:18,000 @ A3

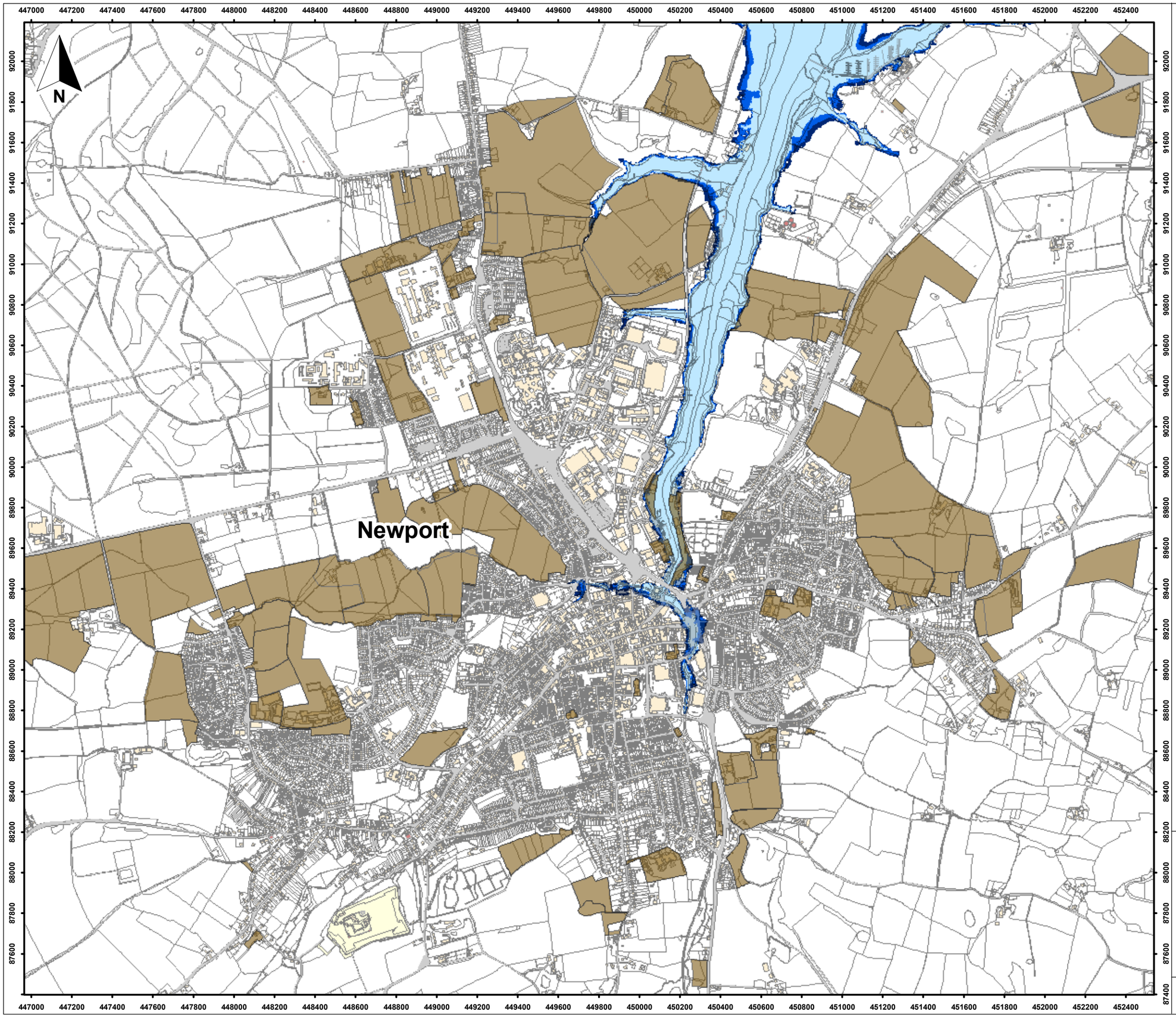
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 80
Potential Development Sites
Site Specific Flood Risk Definition
Newport

November 2009
25793-A89a.mxd squij

Entec



Key:

Predicted 1 in 1000 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 600 800 Meters

Scale: 1:18,000 @ A3

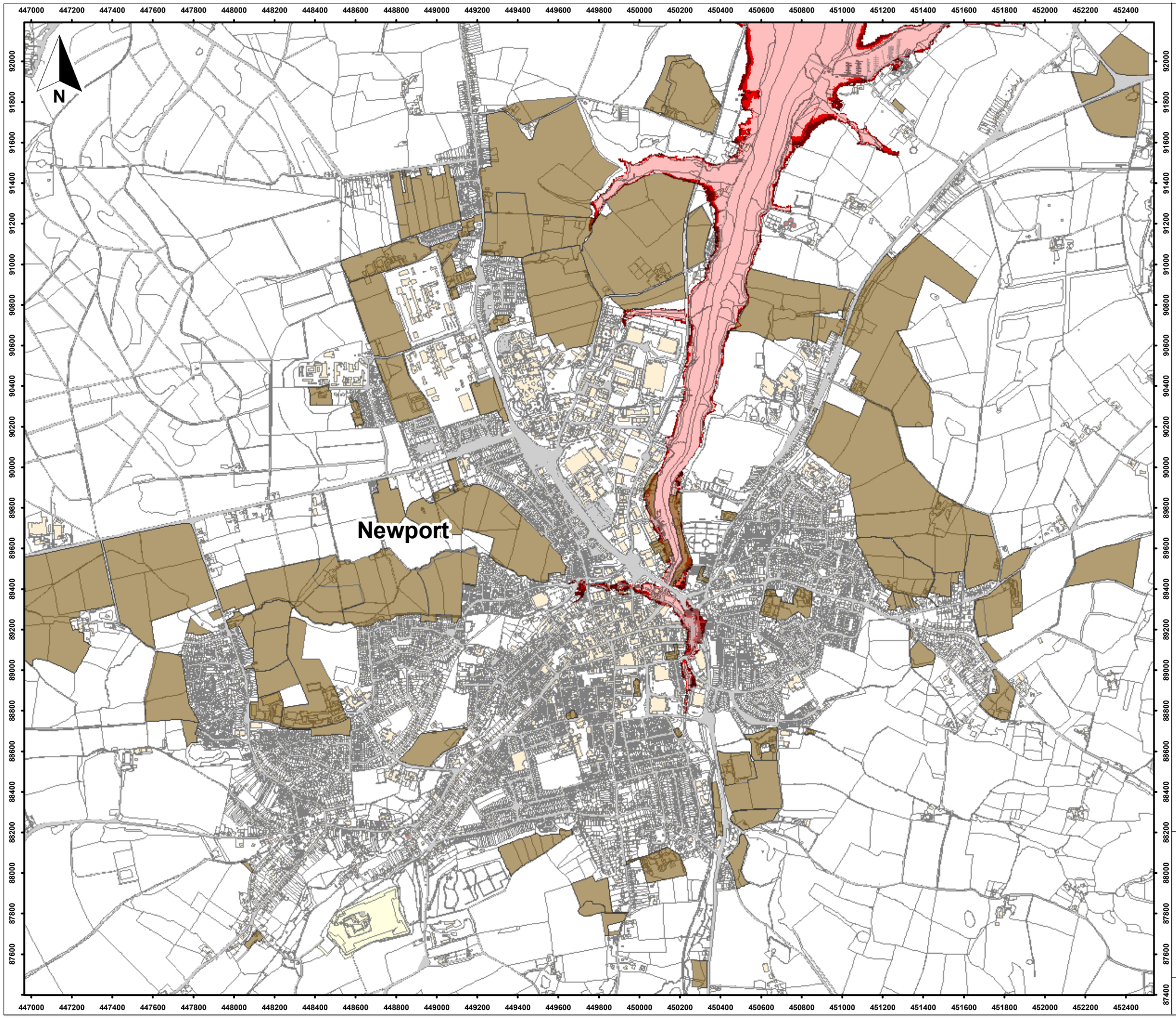
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 81
Potential Development Sites
Flood Zone 2
Climate Change Scenarios
Newport

November 2009
25793-A90a.mxd squij

Entec



Key:

Predicted 1 in 200 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 600 800 Meters

Scale: 1:18,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

IoW SFRA Draft Output

Figure 82
Potential Development Sites
Flood Zone 3
Climate Change Scenarios
Newport

November 2009
25793-A91a.mxd squij

Entec

N

Newport

Parkhurst Stream (tidal)

Parkhurst Stream

River Medina (Tidal)

Gunville Stream

Lukely Brook

River Medina

Pan Stream

Key:

Main Rivers

Potential Exposure Risk

High

Medium

Low

Environment Agency Flood Zone 2 (November 2009)

0 200 400 600 800 Meters

Scale: 1:18,000 @ A3

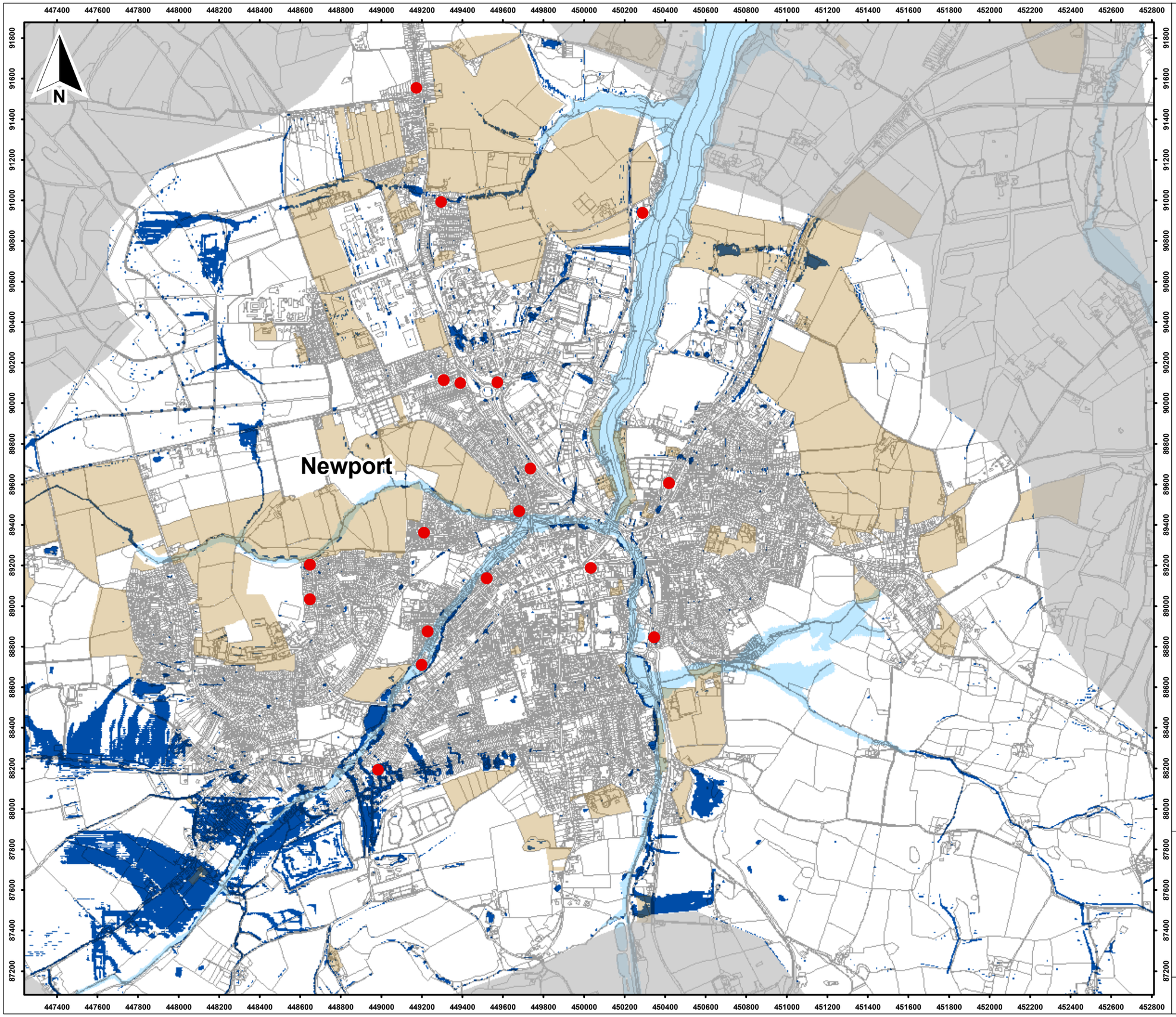
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 83
Qualitative Wind and Wave Exposure Risk - Newport

November 2009
25793-A92.mxd squij

Entec



Key:

- Location of reported surface water flooding issues. Supplied by Southern Water for the period upto and including 2006.
- Environment Agency Flood Zone 2 (November 2009)
- Potential Surface Water Flow Routes and Ponding areas (1:100+cc) Over 0.2m deep
- Potential Development Sites
- Outside the Limits of the Surface Water Model

Notes:
Only predicted surface water flow routes and ponding areas, over 0.1m deep and greater than 25m2 in areas are shown

0 200 400 600 800 Meters

Scale: 1:18,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 84
Potential Surface Water Flow Routes and Ponding Areas (1 in 100 year storm + climate change) - Newport

November 2009
25793-A93a.mxd squij

Entec

Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix Q
Cowes and East Cowes

June 2010

ISLE of WIGHT COUNCIL

Overview

Please review this discussion in conjunction with the mapping provided in this Appendix.

Cowes and East Cowes form part of the Medina Valley Area Action Plan. Cowes and East Cowes have been grouped together in the SFRA as they are geographically close and are connected (in terms of flood risk) by the Medina Estuary and the northern Solent coastline. While they are hydraulically independent of each other, they share very similar characteristics. Both areas are situated on high ground which slopes down to the sea or estuary and neither settlement has significant upslope contributing catchments.

Cowes is located on the western side of the Medina Estuary and represents one of the main transport connections to the mainland, via high-speed passenger ferry services to and from Southampton. Cowes' waterfront is characterised by detached and semi-detached properties and a number of maritime related services and supply businesses. The waterfront of East Cowes has a greater prevalence of industrial activity while also possessing a strategic cross-Solent link in the form of a car ferry service between East Cowes and Southampton.

There exists a belt of land along either side of the estuary which is relatively flat and this area is currently within the Flood Zones. Beyond this coastal belt, the land quickly rises in elevation, which explains the small difference between Flood Zones 2 and 3.

Sustainability and Regeneration Objectives

The Spatial Strategy for the Medina Valley area is to plan for housing and employment growth, accommodating the planned urban extensions at East Cowes and Newport. Sites to meet the supply requirement of PPS3 will be allocated in the Medina Valley Area Action Plan.

To deliver the broad distribution of housing required within the Medina Valley, housing will be developed on the existing allocations and on sites with extant permission. Should there be a need to allocate further sites over the plan period they will be identified through the AAP process.

Within the Medina Valley, the focus for employment will be to provide a range of sites for appropriate growth sectors, office and general workspace needs. Existing employment sites and buildings will be safeguarded where they are important to sustaining the local economy and meeting the Council's regeneration led development objectives.

To ensure that there is an adequate supply of sites for businesses which require access to water frontage, employment sites with deep water frontage will be safeguarded for uses which require deep water. The Council will seek to safeguard and maintain the function and facilities of appropriate existing wharf sites.

There are two gateways for the Island within the Medina Valley at Cowes and East Cowes and, as a minimum, the Isle of Wight Council will work with ferry operators to ensure that current levels of service will be supported and

maintained. There is limited growth that can be accommodated within the existing land holding at East Cowes and no plans to expand facilities outside of the existing operational land. Any change to the way in which the port operates will need to clearly address the impact of traffic flows in the area

The assessment of flood risk in Newport, Cowes and East Cowes and the classification of flood risks for each of the proposed sites will aid in the land allocation decision process due to take place as part of the Medina Valley AAP

Sites at Risk

Two large potential development sites are located at the mouth of the Medina Estuary, one in Cowes and one in East Cowes. The site in East Cowes extends over a greater range of topographic elevations and as such only about half the site is predicted to be in Flood Zone 3. The large site in Cowes on the other hand, is almost all situated at a lower elevation and as such the majority of the site is located within Flood Zone 3. Pending completion of the Sequential Test, PPS25 recommends that these flood zone 3 locations are suitable for less vulnerable development types. Only upon successful application of the Exception Test should more vulnerable development be permitted. Where possible more vulnerable development should be directed towards the parts of the site assessed as being in Flood Zone 3.

Figure 85 highlights that two large potential development sites on the western bank of the Medina Estuary are at High probability of flood risk. This is because lowest parts of the site coincide with the tidal flood risk predictions. In line with e LPAs approach to managing the predicted climate change induced impacts of sea level rise, the 2115 climate change epoch has been used to assess tidal risk to the potential development sites. Nevertheless, the majority of both the sites is classified a having a low probability of flooding (Flood Zone 1). The observed zonation of flood risks is a product of the topography of the land, which rises quickly, once landward of the former railway line.

Climate Change

Figures 87 and 89 depict the 1 in 200 and 1 in 1000 predicted tidal flood extents with a climate change allowance in the Cowes and East Cowes region of the Medina Estuary. The areas potentially most susceptible to the impact of climate change in Cowes are:

- The area behind the marina, by the high speed ferry terminal, at the lower end of Denmark Road and St Mary's Road, covering the area of The Cut and Cross Street.
- The area behind the Medina Road Boat Yard and the Langley Road part of town
- Parts of the High Street

The main area susceptible to climate change in East Cowes is behind the industrial units along Clarence Road extending down to Marina Close and Britannia Way. Those potential sites which fall within the modelled climate change extents are identified in the Sites Database.

Potential Surface Water Flow Routes and Ponding Areas

Method

The potential surface water flow routes and ponding areas presented in the SFRA, illustrate areas of predicted flooding greater than 25m^2 in spatial extent and only flooding which is more than 0.1m deep. This refinement of the TuFLOW model output is necessary so as to establish the primary areas of predicted flood risk. The modelling approach utilises a 5m resolution ground model grid. The TuFLOW model does not incorporate the Southern Water surface water drains or sewers, which during a storm event would provide storage capacity. Southern Water advised that the modelling should assume that the surface water sewer network could accommodate the 1 in 20 year storm. Therefore, the 1 in 20 year rainfall depths for the critical storm were subtracted from the 1 in 100 year (plus climate change) rain fall depths.

The 1 in 100 year (plus climate change) winter profile storm hyetographs (hyetograph refers to a graph presenting rainfall depth over time) were generated by deriving catchment descriptors from the Flood Estimation Handbook CD-ROM (FEH) and applying the FEH Rain Profile Method. The storm durations were determined by the critical drainage pathway lengths in each of the model areas. The model boundaries were determined by the topography, the local watersheds were traced to ensure that all contributing parts of the catchments were included in the model.

Results

Cowes and East Cowes are hydraulically independent of each other, but they share very similar characteristics. Both areas are situated on high ground which slopes down to the sea in all directions other than towards the south. In addition to this, both areas do not have a significant upslope contributing catchments. Owing to the slightly larger size of Cowes and the topographic form of the land, there are a larger number of potential flow routes here. There is a strong correlation between some of the recorded incidents of flooding and the modelling predictions along the main road leading down towards the Red Jet ferry terminal and Marina. There are some larges areas of potential development along the Medina Estuary in south Cowes through which the modelling predicts surface water flow routes. The same occurs in north western Cowes where a long potential flow route flows from the higher central areas down towards the coastline.

Significant potential flow routes are not predicted to affect the urban areas of East Cowes. In both areas the modelling predicts areas of surface water accumulation in the flatter areas by the coast. The nature of the flooding in these areas (the duration of inundation) will be significantly influenced by the configuration of the local surface water drainage network and the relationship between drainage outfalls and tide levels. Further, more detailed

modelling work which incorporates these additional datasets will provide a more comprehensive appreciation of the flood risks in these coastal areas.

The topography of Cowes and East Cowes is entirely comprised of high resolution LiDAR data which includes the representation of small topographic features. In all urban areas the LiDAR has been edited to remove the buildings. This editing process results in a slightly un even surface profile, which can result in the production of small depressions that fill with water. It is likely that this has been the situation in the densely built urban parts of the modelled catchments where there are many small isolated areas of predicted flooding.

Surface Drainage and Infiltration SuDS Potential

Both Cowes and East Cowes are underlain by soils with a SPR of between 47% and 50% resulting in relatively high runoff rates. A distinctly different soil classification covers the sides of the estuary where the SPR value is more in the region of 15% which means in these areas the runoff rates will be lower. The area around Cowes and East Cowes is underlain by Secondary Aquifers. Infiltration potential is classified as being medium along the high land and low nearer sea level. A particular point of interest Cowes is the presence of a small area classified as SPZ 1. This area is located at the water treatment works between The Moorings and Windmill Chase.

SuDS in this RDA are only constrained with respect to the low infiltration potential of the south west half of the town. It could be possible to discharge unrestricted volumes uncontaminated surface water into the Medina Estuary. Before infiltration SuDS are implemented, the potential for contaminated land must be considered.

Flood Risk Management Guidance and Site Specific FRAs

The principal of avoidance should be applied when considering sites within Cowes and East Cowes. The development of any previously undeveloped site in Flood Zones 2 and 3 is considered by PPS25 as an increase in flood risk and should be avoided. The redevelopment of any previously developed sites within the Flood Zones will require the PPS25 Sequential test to be passed and the Exception Test satisfied where necessary.

Factors to be considered in safe development could include:

- Ensuring that the sequential approach to landuse planning is, where possible, applied on site. This approach would see more and highly vulnerable landuse types being placed in the lower risk zones.
- Finished first floor levels should be set above the predicted 1 in 100 year fluvial flood levels, plus a climate change allowance and above the 1 in 200 year predicted tide levels for the year 2115. The Environment Agency should be consulted for fluvial flood levels and the Environment Agency should be asked to confirm if the predicted tide levels in Figure 1 in Appendix B are still the most recent predictions. A freeboard allowance should be applied, again the Environment Agency should be consulted on this aspect of the design.

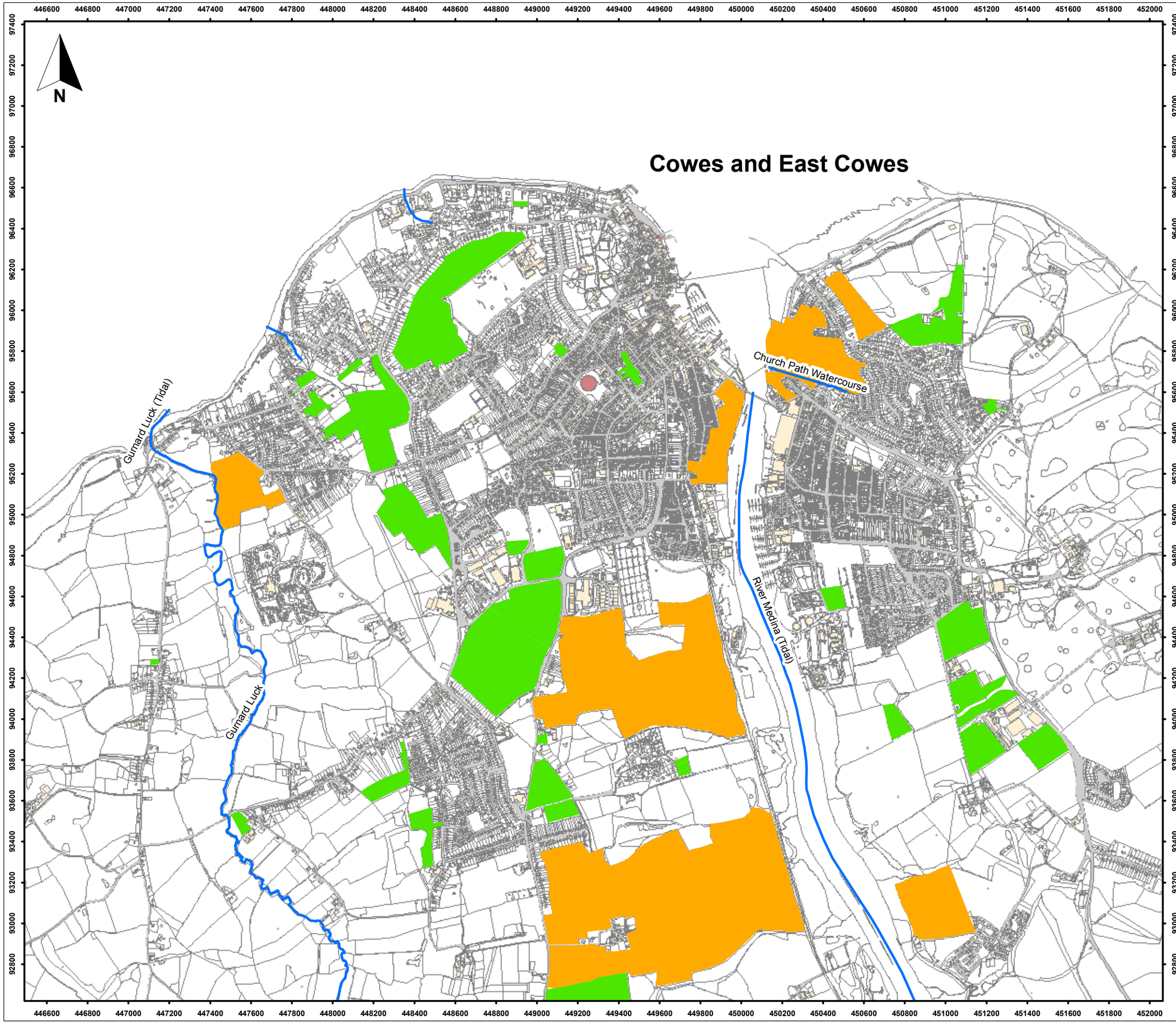
- Buildings should be designed so that safe access and egress can be facilitated in the event of the 1 in 100 year (plus climate change) and 1 in 200 year tidal event (plus climate change).

- Development should not increase the risk of flooding elsewhere. As such, the potential for displaced flood water to impact adjacent areas should be considered. This typically applies if an existing building footprint is being increased in fluvial floodplains and defended tidal floodplains. The displacement of water aspect of development along an undefended coastline is not necessarily a concern.

- Building design should account for the potential depths of water that might occur and appropriate flood resilient and or resistant design features should be incorporated.

- Surface water generated by development should be managed using sustainable techniques. The FRA or drainage assessment should explore the Environment Agency and CIRIA SuDS hierarchy. Discharge rates and volumes should not increase post development, in addition to this PPS25 requirement, the Council and the Environment Agency want to see developers seeking to reduce run-off rates and volumes.

Cowes and East Cowes



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

Notes:
Site is attributed with the flood probability associated with the highest probability flood zone the site intersects

The mapped extent of Flood Zone 3b has been used to identify Functional Floodplain
The 1 in 100 year fluvial flood zone for the present day and the 1 in 200 year tidal extent predicted for the year 2115 has been used to identify sites at a High Probability. The 1 in 1000 year fluvial flood zone for the present day and the 1 in 1000 year tidal extent predicted for the year 2115 has been used to identify sites at a Medium Probability. Sites only in Flood Zone 1 have been assigned a Low Probability

0 200 400 600 800 Meters

Scale: 1:18,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 85
Potential Development Sites
Qualitative Flood Risk
Cowes and East Cowes

November 2009
25793-A94a.mxd squij

Entec

Cowes and East Cowes

N

Gurnard Luck (Tidal)

Gurnard Luck

Church Path Watercourse

River Medina (Tidal)

Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

0 200 400 600 800 Meters

Scale: 1:18,000 @ A3

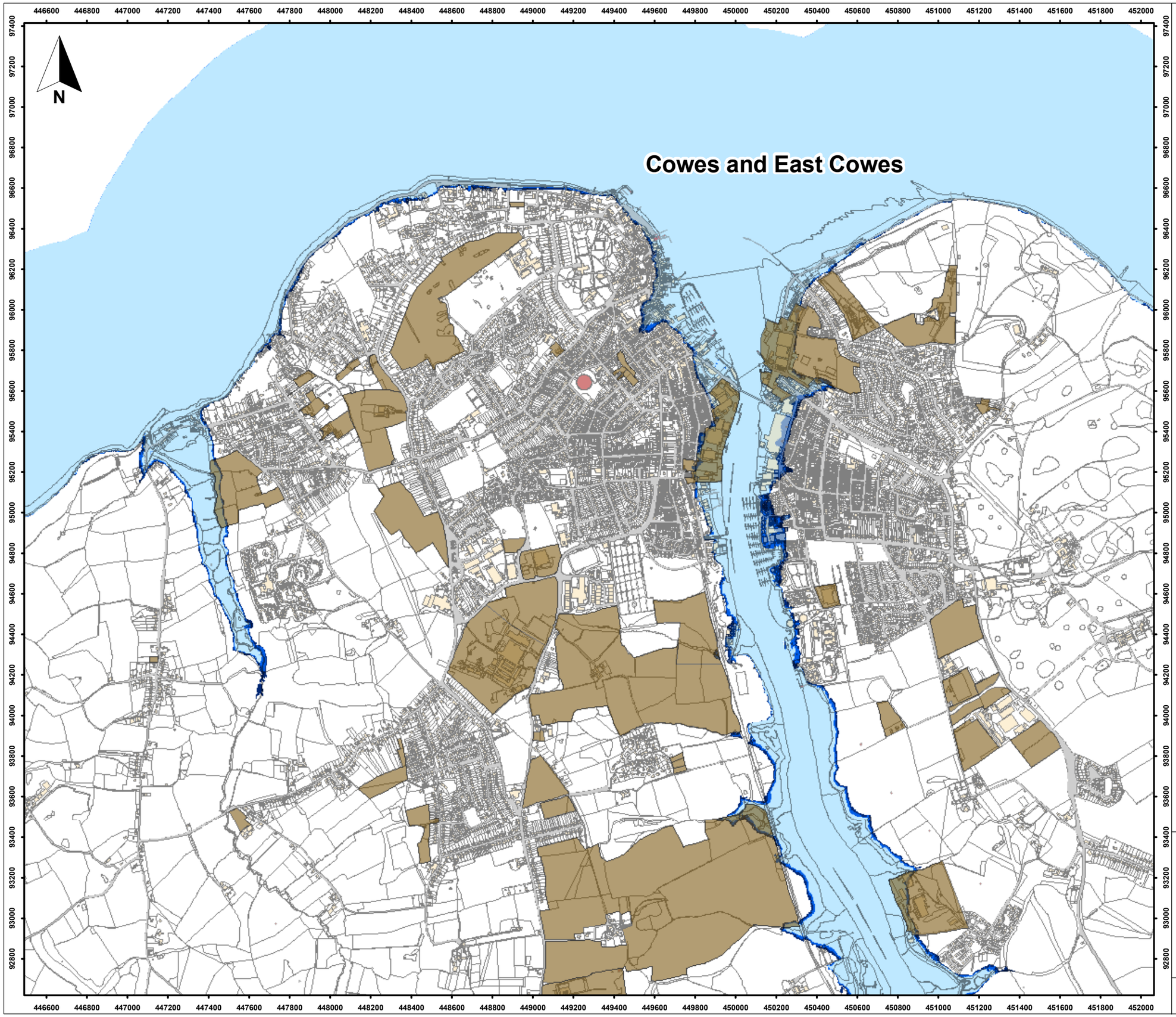
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 86
Potential Development Sites
Site Specific Flood Risk Definition
Cowes and East Cowes

November 2009
25793-A95a.mxd squij

Entec



Key:

Predicted 1 in 1000 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 600 800 Meters

Scale: 1:18,000 @ A3

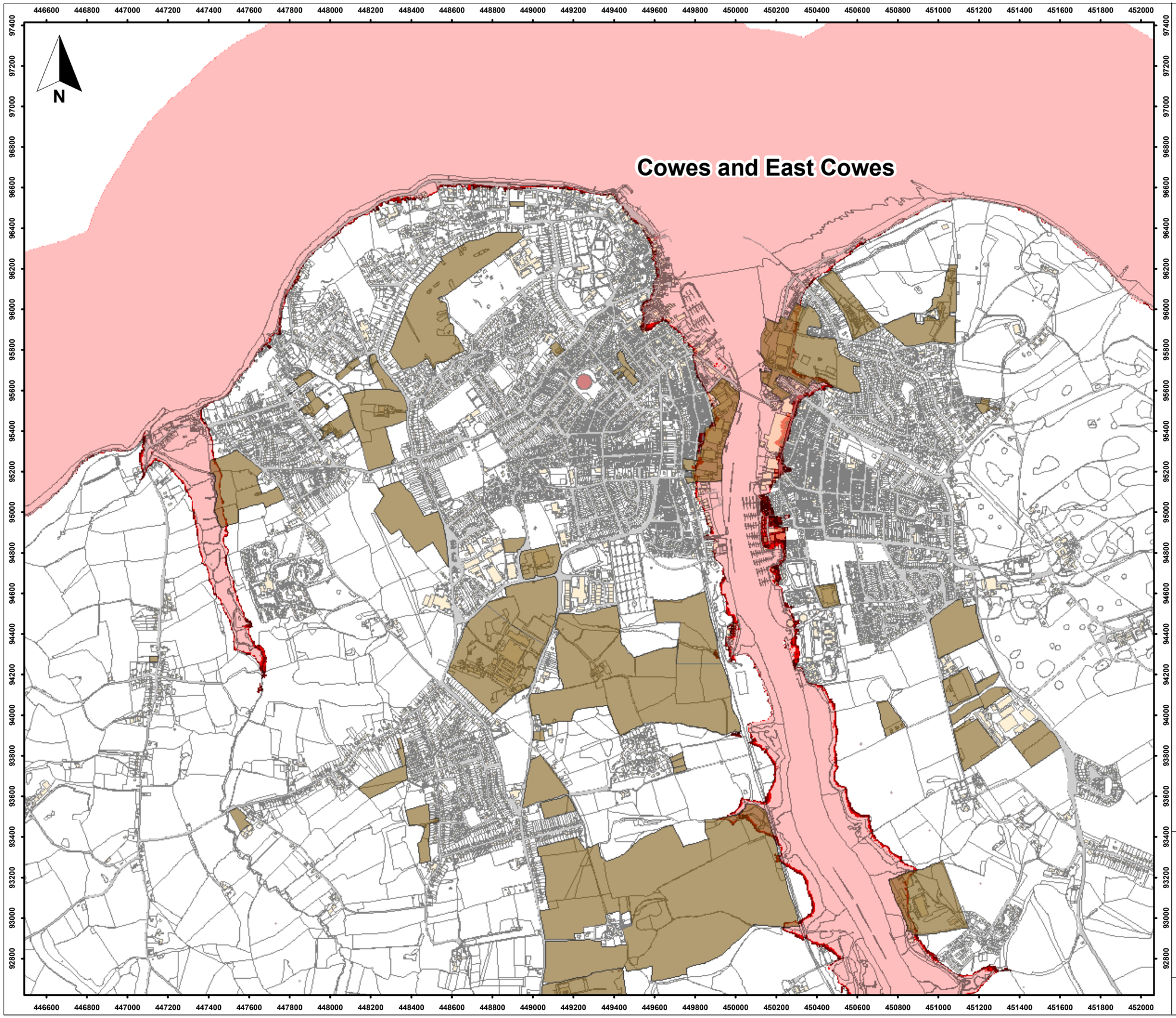
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 87
Potential Development Sites
Flood Zone 2
Climate Change Scenarios
Cowes and East Cowes

November 2009
25793-A96a.mxd squij

Entec



Key:

Predicted 1 in 200 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 600 800 Meters

Scale: 1:18,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 88
Potential Development Sites
Flood Zone 3
Climate Change Scenarios
Cowes and East Cowes

November 2009
25793-A97a.mxd squij

Entec

Cowes and East Cowes

N

Gunnard Luck (Tidal)

Gunnard Luck

Church Path Watercourse

River Medina (Tidal)

Key:

Main Rivers

Potential Exposure Risk

High

Medium

Low

Environment Agency Flood Zone 2 (November 2009)

0 200 400 600 800 Meters

Scale: 1:18,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 89
Qualitative Wind and Wave Exposure Risk - Cowes and East Cowes

November 2009
25793-A98.mxd squij

Entec

Cowes and East Cowes

N

447400 447600 447800 448000 448200 448400 448600 448800 449000 449200 449400 449600 449800 450000 450200 450400 450600 450800 451000 451200 451400 451600 451800 452000 452200 452400

97000 96800 96600 96400 96200 96000 95800 95600 95400 95200 95000 94800 94600 94400 94200 94000 93800 93600 93400 93200 93000 92800 92600

Key:

- Location of reported surface water flooding issues. Supplied by Southern Water for the period upto and including 2006.
- Environment Agency Flood Zone 2 (November 2009)
- Potential Surface Water Flow Routes and Ponding areas (1:100+cc) Over 0.2m deep
- Potential Development Sites
- Outside the Limits of the Surface Water Model

Notes:
Only predicted surface water flow routes and ponding areas, over 0.1m deep and greater than 25m2 in areas are shown

0 200 400 600 800 Meters

Scale: 1:18,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 90
Potential Surface Water Flow Routes and Ponding Areas (1 in 100 year storm + climate change) - Cowes and East Cowes

November 2009
25793-A99a.mxd squij

Entec

Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix R
Arreton

June 2010

ISLE of WIGHT COUNCIL

Overview

Please review this discussion in conjunction with the mapping provided in this Appendix.

Arreton is a small settlement, classified as a Rural Service Centre (RSC), located in the mid reaches of the River Yar catchment in the South east quarter of the Island. The majority of the existing development and proposed development sites are outside of Flood Zones 2 and 3. The surface water modelling has identified a potential flow route which could form to the east of the main road (A3056), this should be reviewed and appropriately managed as part of any future development proposal.

Sustainability and Regeneration Objectives

Development within the wider countryside will be focused on the Rural Service Centres such as Arreton and should support their role as wider centres for outlying villages, hamlets and surrounding countryside. For the rural service centres development will be expected to ensure their future viability. Within the rural service centres and outlying rural areas, development will be expected, in the first instance, to meet a rural need and maintain or enhance the viability of local communities and will be subject to local considerations.

Arreton RSC has been identified as having the potential to accommodate further development to meet the regeneration aims and needs of the local community, through improving local services and strengthening public transport. Development will be encouraged on brownfield sites in the first instance and tourism will be promoted.

Sites at Risk

Within the vicinity of this Rural Service Centre only a small number of potential development sites have been identified. With the exception of the large site to the north of the settlement the majority of the sites are located within the Eastern Yar valley corridor. The fluvial flood zones in this area are not very extensive, for example, the Flood Zone 2 extent reaches maximums of between 250m and 300m. As such only two of the identified sites are predicted to be impacted by river flooding, the first is located to the east of Horringford and the other is situated between Little Budbridge Farm and Hale Common. Figure 92 illustrates the parts of the sites located within Flood Zone 2 and 3a.

Both the sites identified above were partially flooded during an event recorded in 1974.

Climate Change

The methodology applied to assess the potential impacts of climate change in the fluvial domain is outlined in Section 5.2 of the SFRA report. There are not considered to be significant differences between the Flood Zone 2 and 3 extents in this settlement. Nevertheless, any future development of the sites partially within Flood Zone 2 should be accompanied by an FRA which demonstrates that the spatial landuse planning and building designs have

been informed by a review of the implications of climate change on peak river levels. Unless otherwise agreed with the LPA and Environment Agency, a minimum of 100years worth of climate change should be applied in the FRA.

Potential Surface Water Flow Routes and Ponding Areas

Method

The potential surface water flow routes and ponding areas presented in the SFRA, illustrate areas of predicted flooding greater than 25m^2 in spatial extent and only flooding which is more than 0.1m deep. This refinement of the TuFLOW model output is necessary so as to establish the primary areas of predicted flood risk. The modelling approach utilises a 5m resolution ground model grid. The TuFLOW model does not incorporate the Southern Water surface water drains or sewers, which during a storm event would provide storage capacity. Southern Water advised that the modelling should assume that the surface water sewer network could accommodate the 1 in 20 year storm. Therefore, the 1 in 20 year rainfall depths for the critical storm were subtracted from the 1 in 100 year (plus climate change) rain fall depths.

The 1 in 100 year (plus climate change) winter profile storm hyetographs (hyetograph refers to a graph presenting rainfall depth over time) were generated by deriving catchment descriptors from the Flood Estimation Handbook CD-ROM (FEH) and applying the FEH Rain Profile Method. The storm durations were determined by the critical drainage pathway lengths in each of the model areas. The model boundaries were determined by the topography, the local watersheds were traced to ensure that all contributing parts of the catchments were included in the model.

Results

The results of the surface water analysis predict a potential ponding and flow route through the settlement. This route runs to the east of the main road and appears to currently skirt round the majority of the existing development. The route and ponding areas do however run through and alongside two of the settlement's potential development sites. Future development and regeneration within Arreton should consider the management and preservation of this potential flow route. Future development also provides the opportunity for current surface water issues to be addressed. The data made available to the SFRA has not identified any reported surface water flooding incidents in Arreton, this could be the result of either a flood event not having taken place or because any historic flooding has not been reported.

Surface Drainage and Infiltration SuDS Potential

The assessment of geology, soils and groundwater vulnerability mapping indicates that there is a medium potential for infiltration SuDS to be utilised. Site specific infiltration testing would be required at the detailed design stage of the SuDS design process. The area occupied by the Flood Zones is assessed as having a lower potential for

infiltration SuDS, owing to local geology variations within the floodplain. Where possible, SuDS attenuation basins/ponds or other features should be located outside Flood Zone 3.

For an area of approximately 1500m to 2000m there are not Source Protection Zone (SPZ) designations. The SPZ mapping is however subject to change, and should be reviewed with the Environment Agency when proposing any form of SuDS solution.

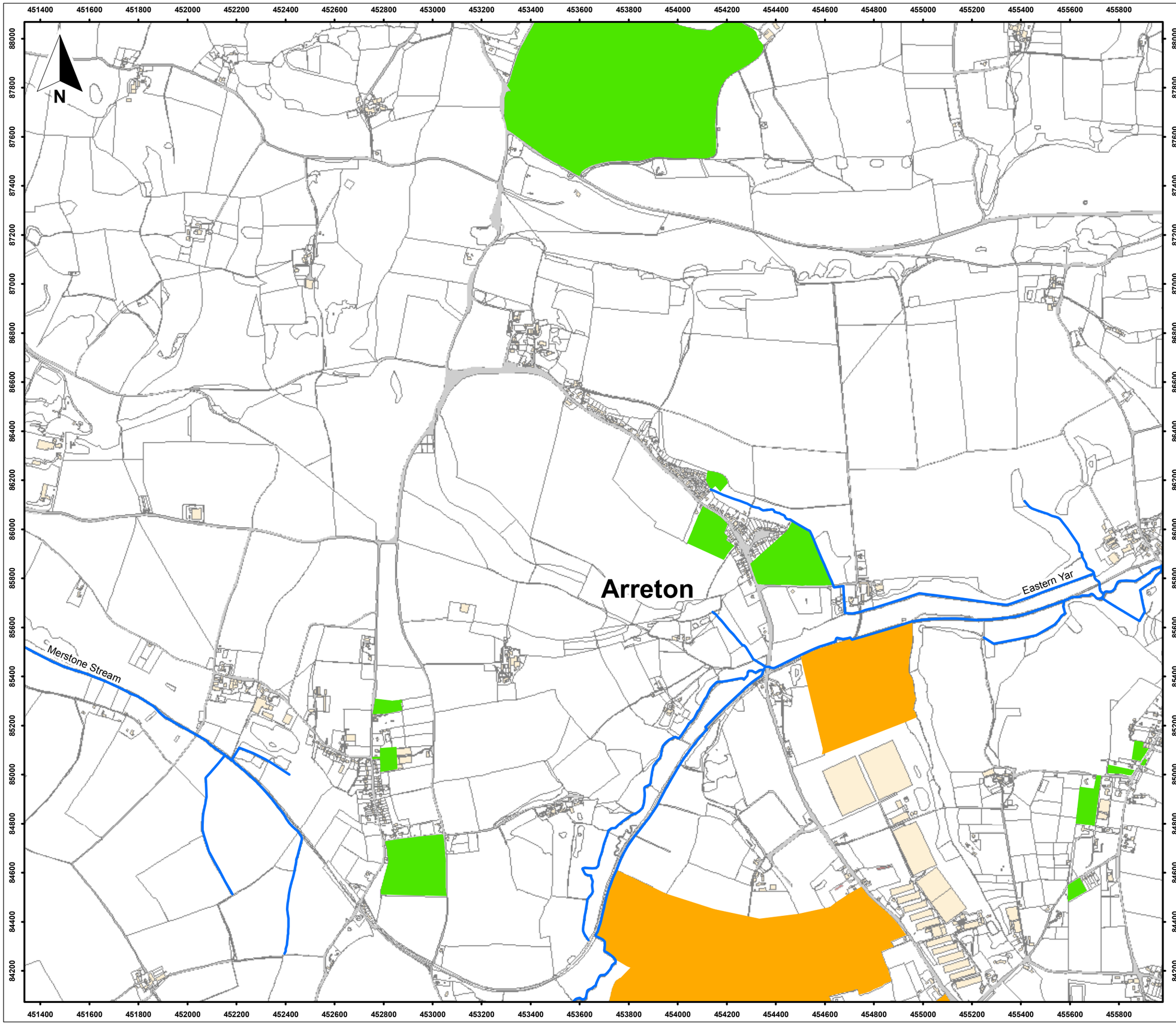
The geology mapping does not indicate that the area is susceptible to mass movement and/or slope instability.

Flood Risk Management Guidance and Site Specific FRAs

The principal of avoidance should be applied when considering sites within the Arreton area. The development of any previously undeveloped site in Flood Zones 2 and 3 is considered by PPS25 as an increase in flood risk and should be avoided. The redevelopment of any previously developed sites within the Flood Zones will require the PPS25 Sequential test to be passed and the Exception Test satisfied where necessary.

Factors to be considered in safe development could include:

- Ensuring that the sequential approach to landuse planning is, where possible, applied on site. This approach would see more and highly vulnerable landuse types being placed in the lower risk zones.
- Finished first floor levels should be set above the predicted 1 in 100 year fluvial flood levels, plus a climate change. The Environment Agency should be consulted for fluvial flood. A freeboard allowance should be applied, again the Environment Agency should be consulted on this aspect of the design.
- Buildings should be designed so that safe access and egress can be facilitated in the event of the 1 in 100 year (plus climate change.
- Development should not increase the risk of flooding elsewhere. As such, the potential for displaced flood water to impact adjacent areas should be considered. This typically applies if an existing building footprint is being increased in fluvial floodplains and defended tidal floodplains. The displacement of water aspect of development along an undefended coastline is not necessarily a concern.
- Building design should account for the potential depths of water that might occur and appropriate flood resilient and or resistant design features should be incorporated.
- Surface water generated by development should be managed using sustainable techniques. The FRA or drainage assessment should explore the Environment Agency and CIRIA SuDS hierarchy. Discharge rates and volumes should not increase post development, in addition to this PPS25 requirement, the Council and the Environment Agency want to see developers seeking to reduce run-off rates and volumes.



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

Notes:
Site is attributed with the flood probability associated with the highest probability flood zone the site intersects

The mapped extent of Flood Zone 3b has been used to identify Functional Floodplain The 1 in 100 year fluvial flood zone for the present day and the 1 in 200 year tidal extent predicted for the year 2115 has been used to identify sites at a High Probability. The 1 in 1000 year fluvial flood zone for the present day and the 1 in 1000 year tidal extent predicted for the year 2115 has been used to identify sites at a Medium Probability. Sites only in Flood Zone 1 have been assigned a Low Probability

0 200 400 600 Meters

Scale: 1:15,000 @ A3

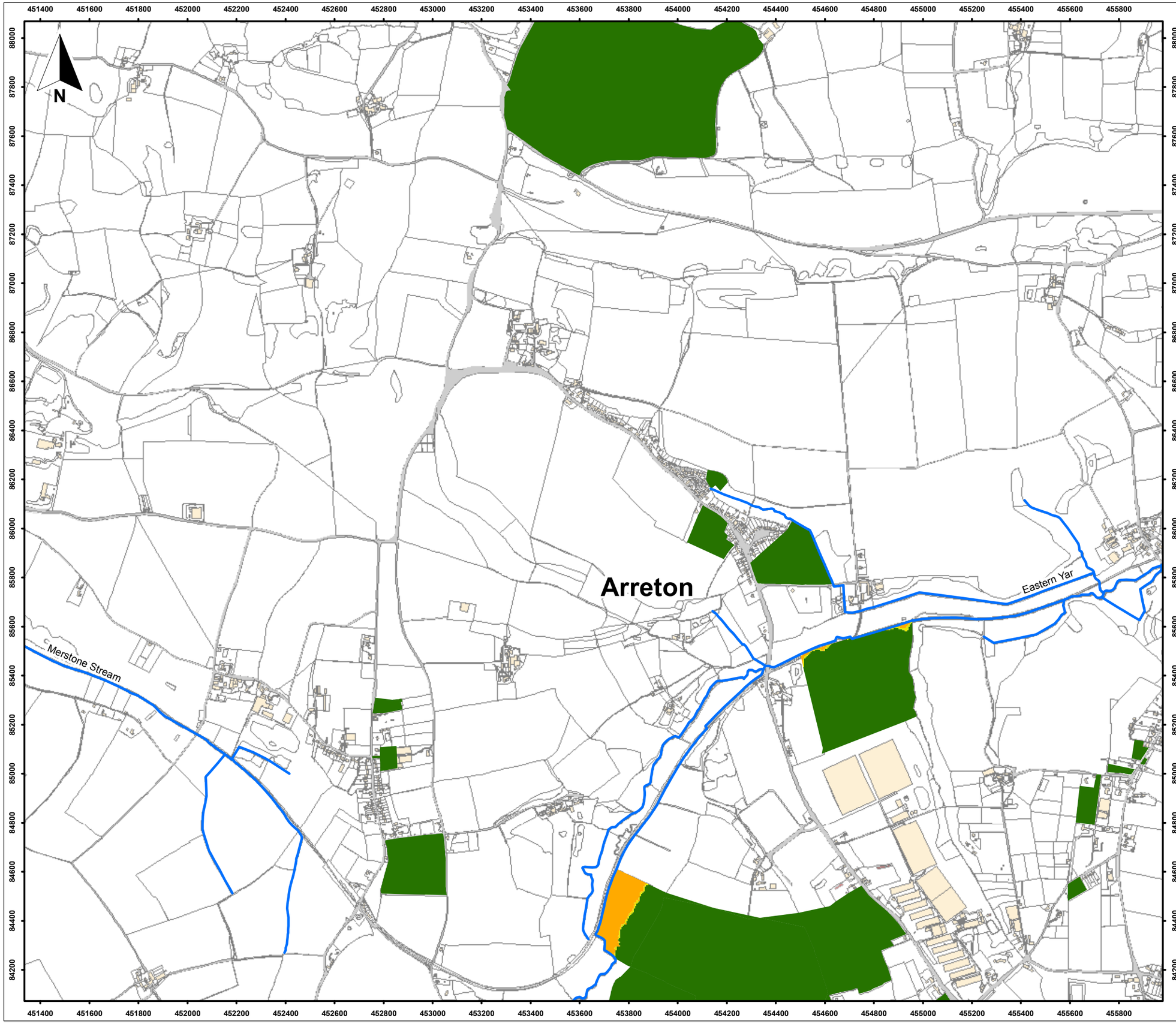
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 91
Potential Development Sites
Qualitative Flood Risk - Arreton

November 2009
25793-A100.mxd squij

Entec



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

0 200 400 600 Meters

Scale: 1:15,000 @ A3

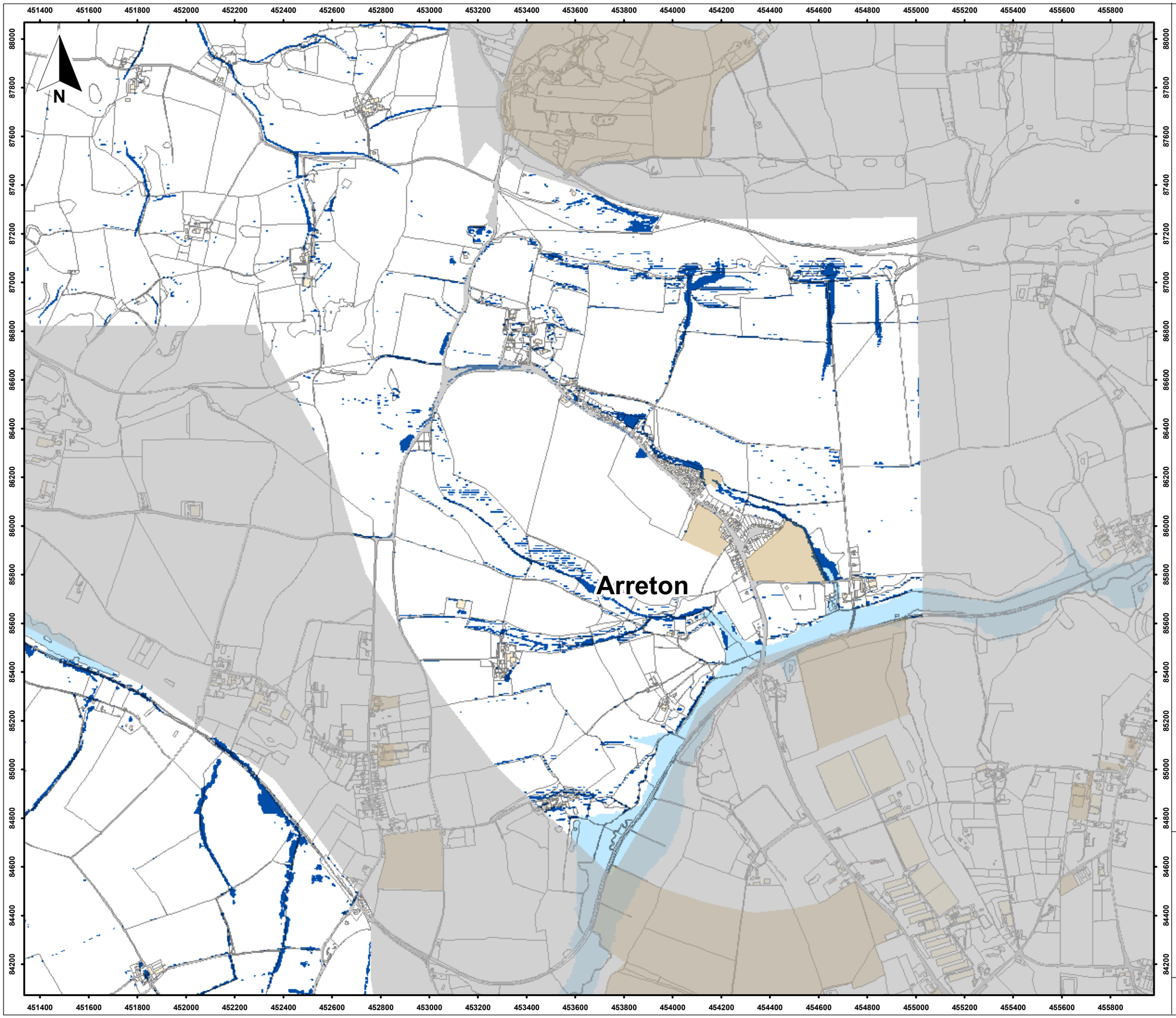
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 92
Potential Development Sites Site Specific Flood Risk Definition - Arreton

November 2009
25793-A101.mxd squij

Entec



Key:

- Location of reported surface water flooding issues. Supplied by Southern Water for the period upto and including 2006.
- Environment Agency Flood Zone 2 (November 2009)
- Potential Surface Water Flow Routes and Ponding areas (1:100+cc) Over 0.2m deep
- Potential Development Sites
- Outside the Limits of the Surface Water Model

Notes:
Only predicted surface water flow routes and ponding areas, over 0.1m deep and greater than 25m2 in areas are shown

0 200 400 600 Meters

Scale: 1:15,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 93
Potential Surface Water Flow Routes and Ponding Areas (1 in 100 year storm + climate change) - Arreton

November 2009
25793-A102.mxd squij

Entec

Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix S
Niton

June 2010

Overview

Please review this discussion in conjunction with the mapping provided in this Appendix.

Niton is classified as a Rural Service Centre which is located in the upper catchment of the Eastern Yar. The Environment Agency flood zones do not extend to cover watercourses with drainage areas of less than 3km^2, this has resulted in the flood zones not being produced for Niton. Nevertheless, the surface water modelling has provided an indication of route of the floodplain. Any development proposal in Niton, although currently in Flood Zone 1, should be accompanied by an FRA which either confirms the Flood Zone 1 location or demonstrates that any flood risks are appropriately managed in line with the requirements of PPS25.

Sustainability and Regeneration Objectives

Development within the wider countryside will be focused on the Rural Service Centres such as Niton and should support their role as wider centres for outlying villages, hamlets and surrounding countryside. For the rural service centres development will be expected to ensure their future viability. Within the rural service centres and outlying rural areas, development will be expected, in the first instance, to meet a rural need and maintain or enhance the viability of local communities and will be subject to local considerations.

Niton RSC has been identified as having the potential to accommodate further development to meet the regeneration aims and needs of the local community, through improving local services and strengthening public transport. Development will be encouraged on brownfield sites in the first instance and tourism will be promoted.

Sites at Risk

Niton is located in the upper reaches of the Eastern Yar catchment, the associated floodplain in the headwaters of the river are very narrow, as a result of the steeper topography. As such all the potential development sites located in Niton have been assessed as being outside the extent of Flood Zone 2. The Flood Zone 1 classification of all the potential sites in Niton is also a result of the Flood Zone extents not extending through the settlement. The Flood Zone mapping project typically only includes drainage areas of more than 3km^3. The surface water modelling does however identify the likely route of the floodplain – see the following sections. Further downstream, in Whitwell, two of the potential development sites have been assessed as fractionally encroaching into Flood Zones 2 and 3.

Climate Change

The results of the assessment approach outlined in Section 5.2 of the SFRA report do not identify any significant increase in the extent of fluvial flood risks, as the flood zones do not extend into the settlement centre. Owing to the headwater location of this settlement and the narrow valley floor, it is likely that the increased river flows predicted as a result of climate change, will have little impact on the spatial extent of the flood risk zone.

Potential Surface Water Flow Routes and Ponding Areas

Method

The potential surface water flow routes and ponding areas presented in the SFRA, illustrate areas of predicted flooding greater than 25m^2 in spatial extent and only flooding which is more than 0.1m deep. This refinement of the TuFLOW model output is necessary so as to establish the primary areas of predicted flood risk. The modelling approach utilises a 5m resolution ground model grid. The TuFLOW model does not incorporate the Southern Water surface water drains or sewers, which during a storm event would provide storage capacity. Southern Water advised that the modelling should assume that the surface water sewer network could accommodate the 1 in 20 year storm. Therefore, the 1 in 20 year rainfall depths for the critical storm were subtracted from the 1 in 100 year (plus climate change) rain fall depths.

The 1 in 100 year (plus climate change) winter profile storm hyetographs (hyetograph refers to a graph presenting rainfall depth over time) were generated by deriving catchment descriptors from the Flood Estimation Handbook CD-ROM (FEH) and applying the FEH Rain Profile Method. The storm durations were determined by the critical drainage pathway lengths in each of the model areas. The model boundaries were determined by the topography, the local watersheds were traced to ensure that all contributing parts of the catchments were included in the model.

Results

The surface water modelling has identified a potential flow route through the centre of Niton, which has the potential to impact upon a number of exiting developments. In terms of potential development sites, it is the sites to the north east of the settlement which are predicted to be the most significantly impacted. Development of these sites should therefore carefully consider how development may impact on this flow route. Inappropriate development could have the potential to increase flooding in Niton if the surface water flow routes were not preserved and correctly managed.

Surface Drainage and Infiltration SuDS Potential

The majority of the potential development sites in Niton are assessed as being in areas where infiltration SuDS techniques only have a low potential. This classification is the result of incomplete Groundwater Vulnerability data in the vicinity of this settlement. Nonetheless, infiltration SuDS should remain a preferred option unless infiltration testing demonstrates that it is not a feasible option. Caution should be applied when considering any drainage solution in the west of the settlement owing to the close proximity of a Source Protection Zone (SPZ) 1. The SPZ mapping is however subject to change, and should be reviewed with the Environment Agency when proposing any form of SuDS solution.

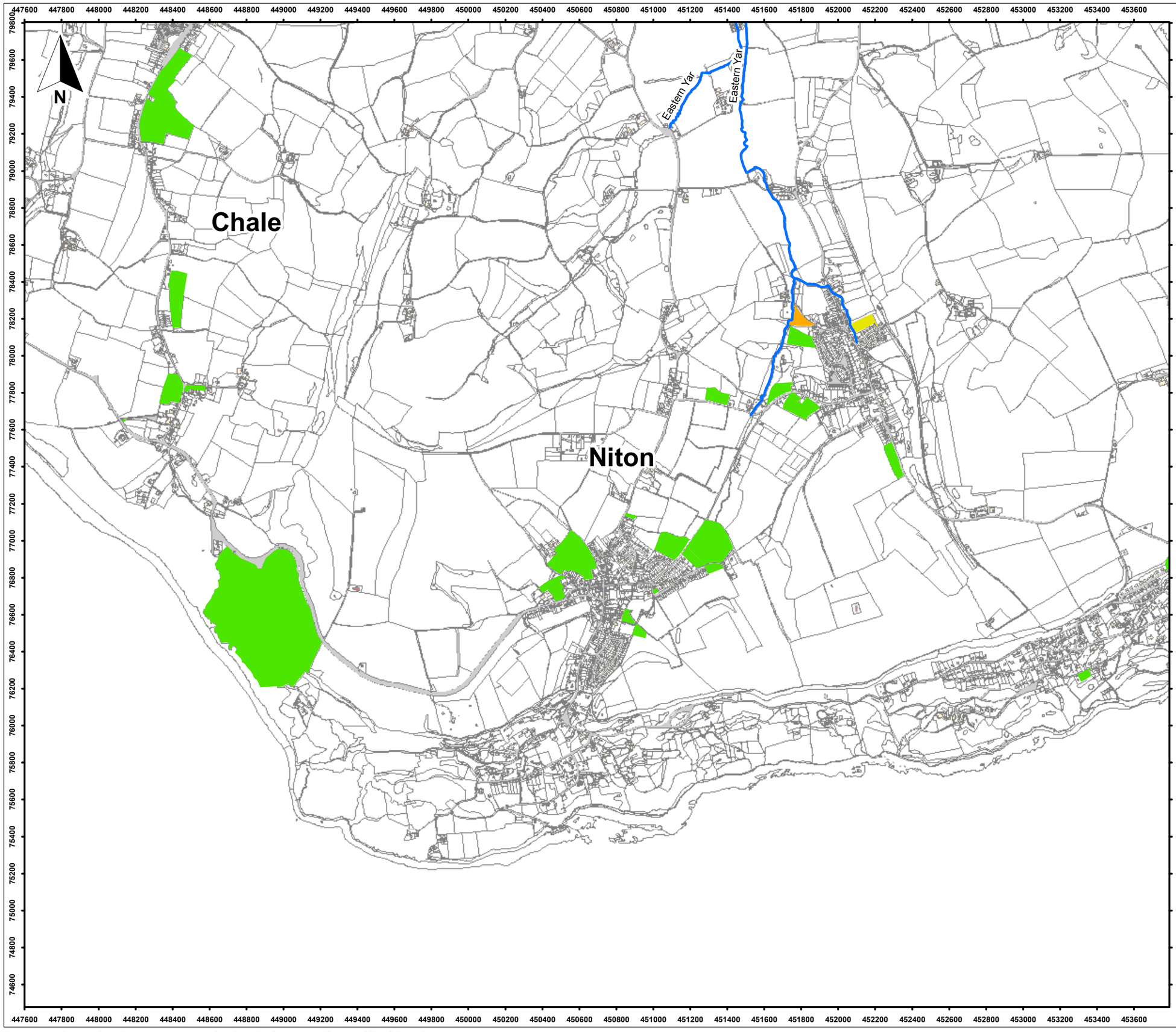
Flood Risk Management Guidance and Site Specific FRAs

The principal of avoidance should be applied when considering sites within the Niton area. The development of any previously undeveloped site in Flood Zones 2 and 3 is considered by PPS25 as an increase in flood risk and should be avoided. The redevelopment of any previously developed sites within the Flood Zones will require the PPS25 Sequential test to be passed and the Exception Test satisfied where necessary.

As there is no Flood Zone 2 and 3 extent in Niton, despite the presence of the upper reaches of the River Eastern Yar, it is recommended that the Environment Agency be consulted for all development proposals within Niton. It may be necessary for future FRAs to define the fluvial flood risk.

Factors to be considered in safe development could include:

- Ensuring that the sequential approach to landuse planning is, where possible, applied on site. This approach would see more and highly vulnerable landuse types being placed in the lower risk zones.
- Finished first floor levels should be set above the predicted 1 in 100 year fluvial flood levels, plus a climate change. The Environment Agency should be consulted for fluvial flood. A freeboard allowance should be applied, again the Environment Agency should be consulted on this aspect of the design. Site specific hydraulic modelling may be required to define these levels.
- Buildings should be designed so that safe access and egress can be facilitated in the event of the 1 in 100 year (plus climate change.
- Development should not increase the risk of flooding elsewhere. As such, the potential for displaced flood water to impact adjacent areas should be considered. This typically applies if an existing building footprint is being increased in fluvial floodplains and defended tidal floodplains. The displacement of water aspect of development along an undefended coastline is not necessarily a concern.
- Building design should account for the potential depths of water that might occur and appropriate flood resilient and or resistant design features should be incorporated.
- Surface water generated by development should be managed using sustainable techniques. The FRA or drainage assessment should explore the Environment Agency and CIRIA SuDS hierarchy. Discharge rates and volumes should not increase post development, in addition to this PPS25 requirement, the Council and the Environment Agency want to see developers seeking to reduce run-off rates and volumes.



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

Notes:
Site is attributed with the flood probability associated with the highest probability flood zone the site intersects

The mapped extent of Flood Zone 3b has been used to identify Functional Floodplain
The 1 in 100 year fluvial flood zone for the present day and the 1 in 200 year tidal extent predicted for the year 2115 has been used to identify sites at a High Probability. The 1 in 1000 year fluvial flood zone for the present day and the 1 in 1000 year tidal extent predicted for the year 2115 has been used to identify sites at a Medium Probability. Sites only in Flood Zone 1 have been assigned a Low Probability

0 200 400 600 800 1,000 Meters

Scale: 1:20,000 @ A3

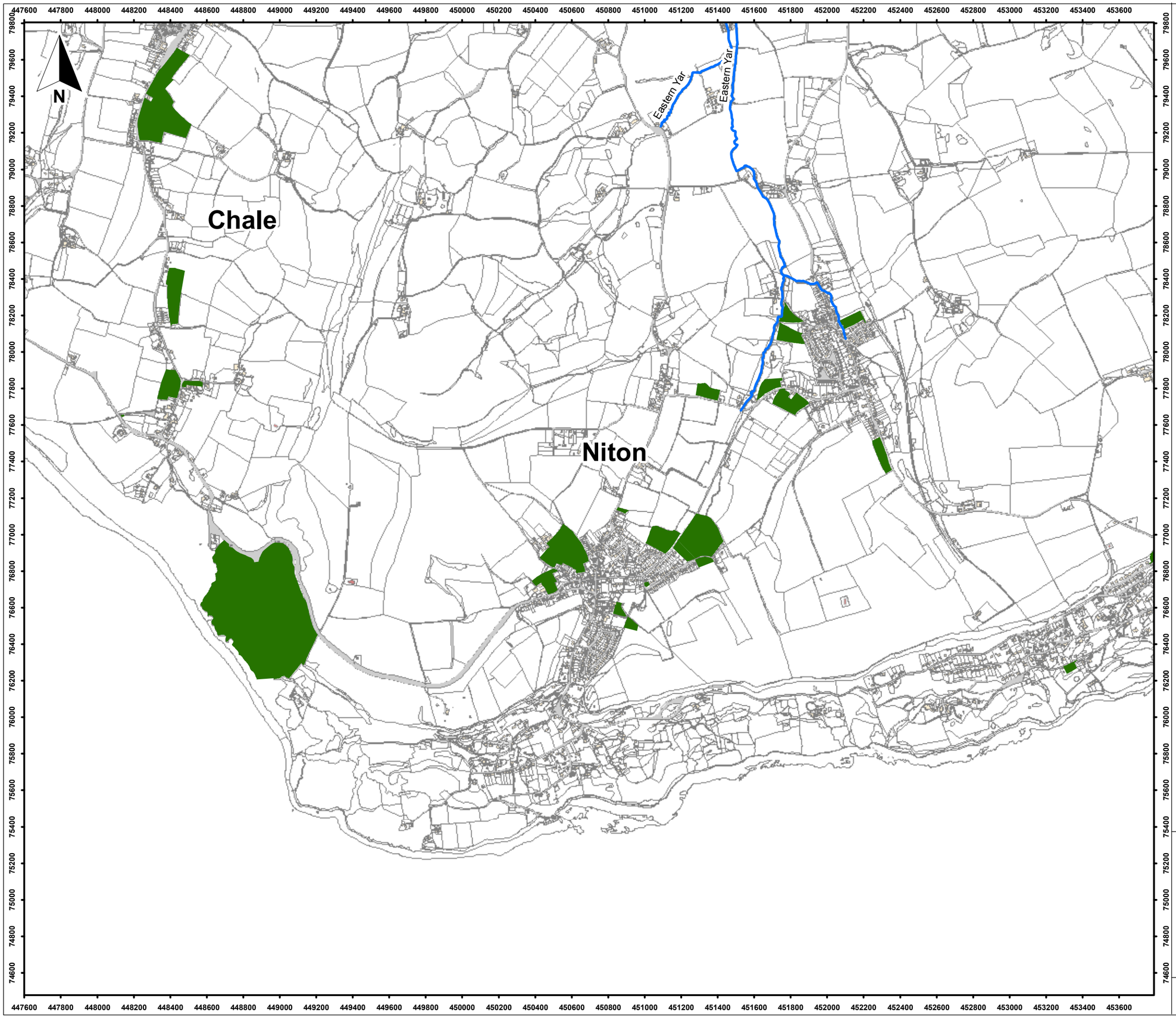
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 94
Potential Development Sites
Qualitative Flood Risk - Niton

November 2009
25793-A103.mxd squij

Entec



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

0 200 400 600 800 1,000 Meters

Scale: 1:20,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 95
Potential Development Sites Site Specific Flood Risk Definition - Niton

November 2009
25793-A104.mxd squij

Entec

N

Chale

Niton

Key:

Predicted 1 in 1000 year Tidal Extents

Year 2010

Year 2045

Year 2080

Year 2115

Potential Development Sites

0 200 400 600 800 1,000 Meters

Scale: 1:20,000 @ A3

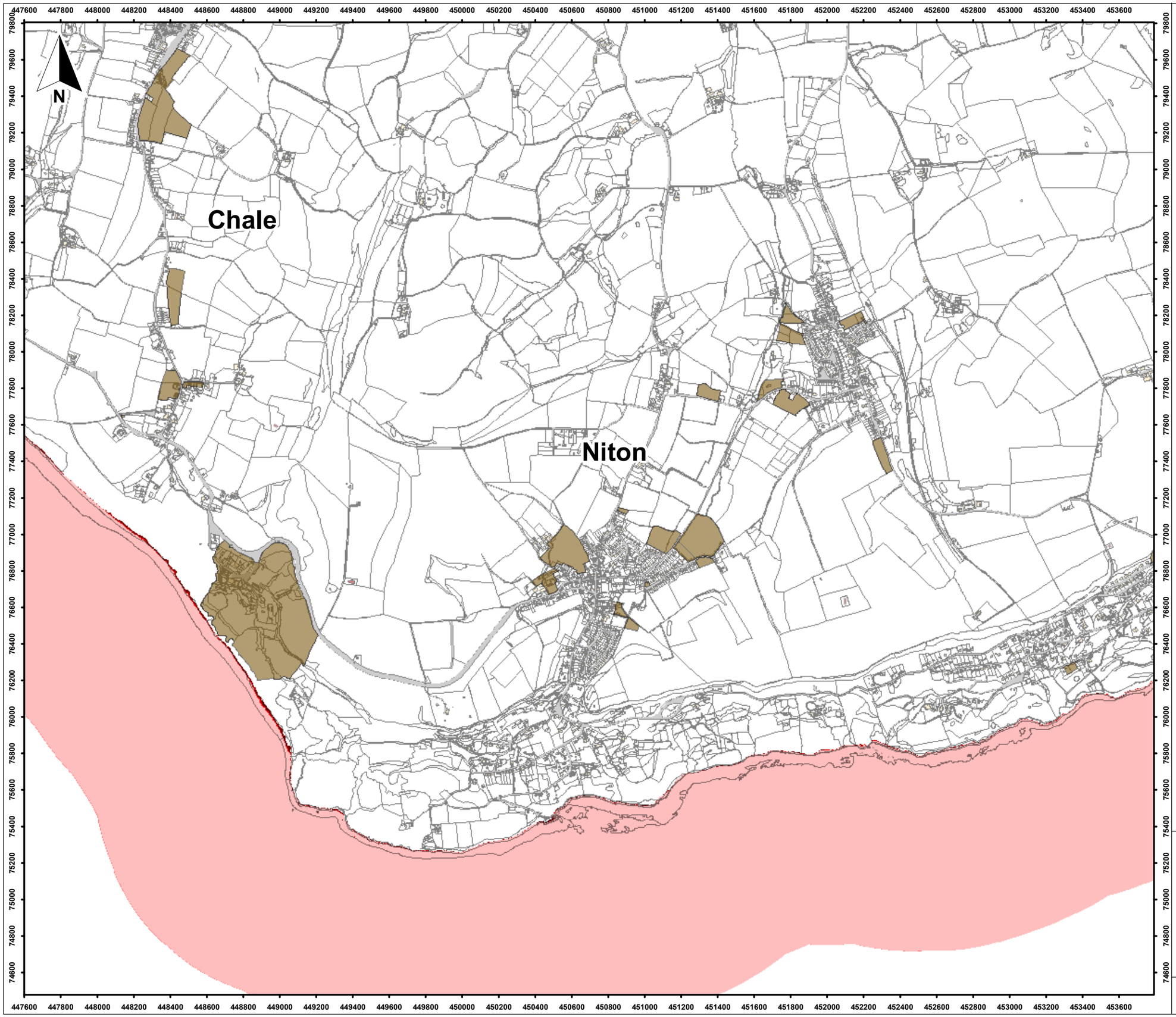
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 96
Potential Development Sites
Flood Zone 2 Climate Change Scenarios - Niton

November 2009
25793-A105.mxd squij

Entec



Key:

Predicted 1 in 200 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 600 800 Meters

Scale: 1:20,000 @ A3

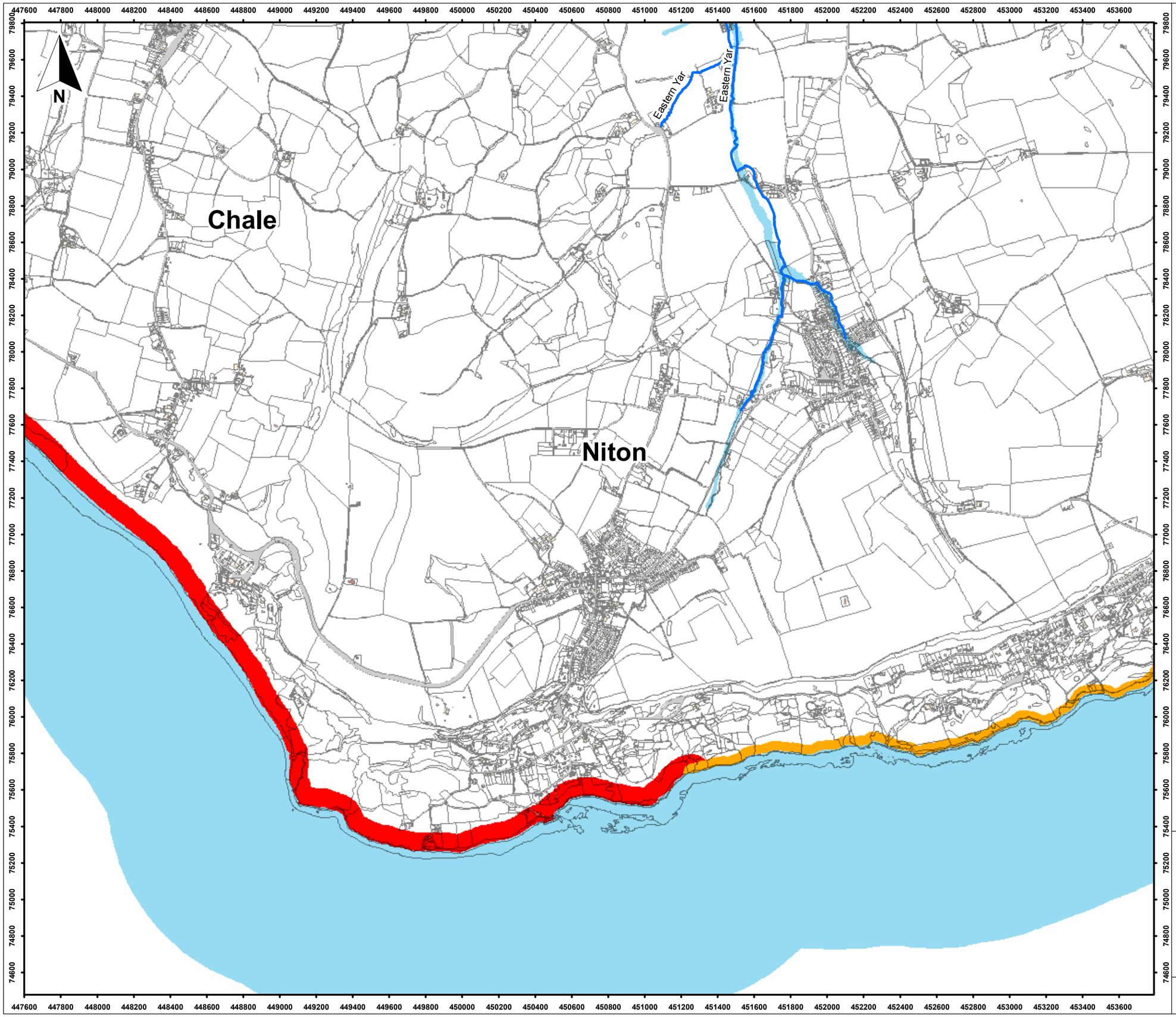
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 97
Potential Development Sites
Flood Zone 3 Climate Change
Scenarios - Niton

November 2009
25793-A106.mxd squij

Entec



Key:

Main Rivers

Potential Exposure Risk

High

Medium

Low

Environment Agency Flood Zone 2 (November 2009)

0 200 400 600 800 1,000 Meters

Scale: 1:20,000 @ A3

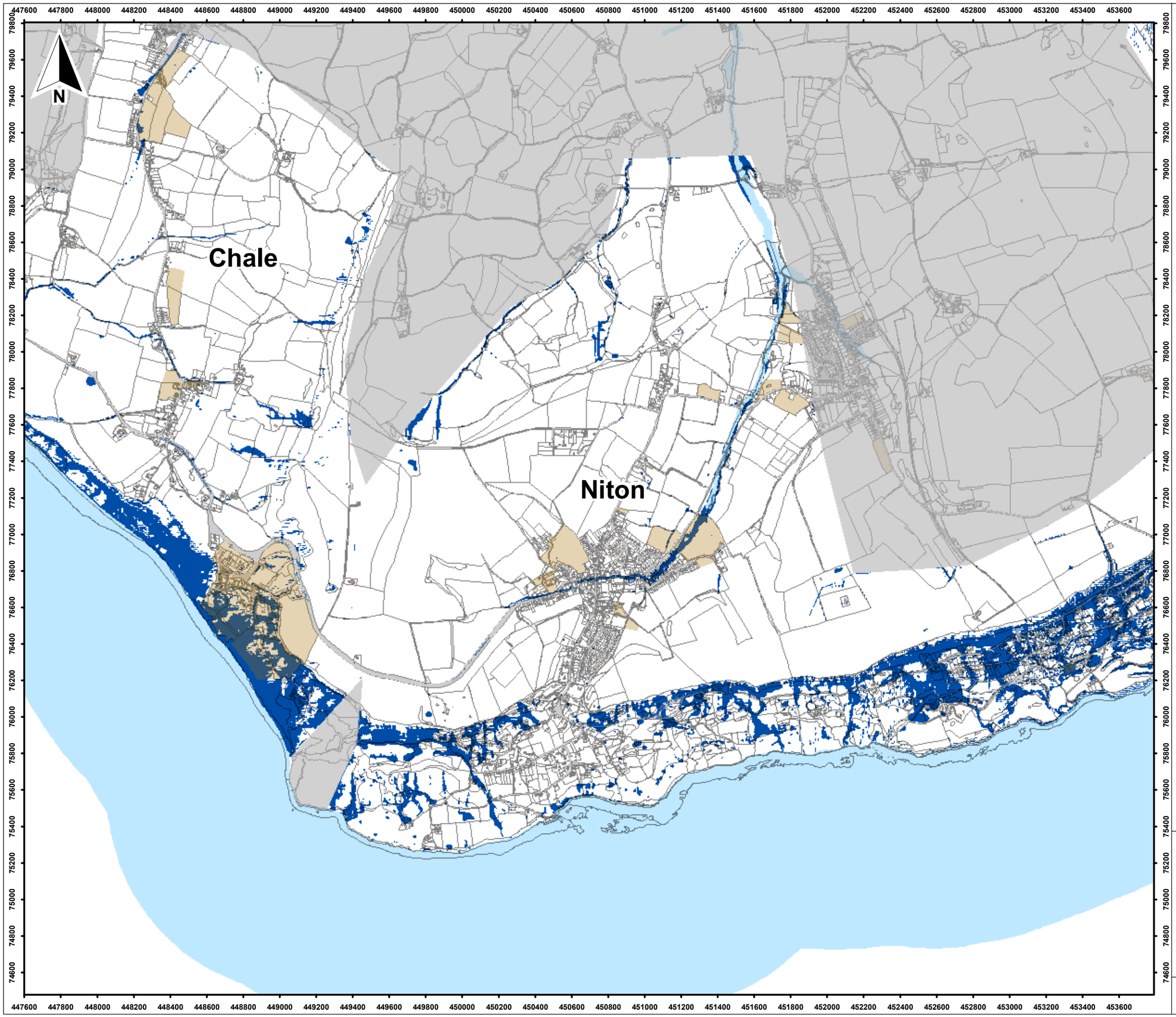
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 98
Qualitative Wind and Wave Exposure Risk - Niton

November 2009
25793-A107.mxd squij

Entec



Key:

- Location of reported surface water flooding issues. Supplied by Southern Water for the period upto and including 2006.
- Environment Agency Flood Zone 2 (November 2009)
- Potential Surface Water Flow Routes and Ponding areas (1:100+cc) Over 0.2m deep
- Potential Development Sites
- Outside the Limits of the Surface Water Model

Notes:
Only predicted surface water flow routes and ponding areas, over 0.1m deep and greater than 25m2 in areas are shown

0 200 400 600 800 1,000 Meters

Scale: 1:20,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 99
Potential Surface Water Flow Routes and Ponding Areas (1 in 100 year storm + climate change) - Niton

November 2009
25793-A108.mxd squij

Entec

Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix T
Chale

June 2010

Overview

Please review this discussion in conjunction with the mapping provided in this Appendix.

Chale is classified as a Rural Service Centre (RSC) and is located in the south of the Island to the west of St Catherine's Down. The Environment Agency flood zones do not extend to cover watercourses with drainage areas of less than 3km^2, this has resulted in the flood zones not being produced for Chale or Chale Green. Nevertheless, the surface water modelling has provided an indication of route of the floodplain in Chale Green. Any development proposal in Chale or Chale Green, although currently in Flood Zone 1, should be accompanied by an FRA which either confirms the Flood Zone 1 location or demonstrates that any flood risks are appropriately managed in line with the requirements of PPS25.

Sustainability and Regeneration Objectives

Development within the wider countryside will be focused on the Rural Service Centres (RSC) such as Chale and should support their role as wider centres for outlying villages, hamlets and surrounding countryside. For the rural service centres development will be expected to ensure their future viability. Within the rural service centres and outlying rural areas, development will be expected, in the first instance, to meet a rural need and maintain or enhance the viability of local communities and will be subject to local considerations.

Chale RSC has been identified as having the potential to accommodate further development to meet the regeneration aims and needs of the local community, through improving local services and strengthening public transport. Development will be encouraged on brownfield sites in the first instance and tourism will be promoted.

Sites at Risk

The potential development sites identified in Chale and Chale Green are located along the corridor of the B3399, all of which have been assessed as being in Flood Zone 1. This is because the settlement of Chale Green is located at the head/source of the River Medina. The OS mapping suggests however, that the water course does extend slightly further south into Chale Green than the Environment Agency flood zones. The inconsistency between the up valley extent of the flood zones and the OS mapping is because the Environment Agency typically on model watercourses with drainage areas of more than 3km^2, this threshold must be reached just down valley of Chale Green.

Two other small watercourses are identified on the OS mapping, which flow from north east to south west (St Catherine's Down to Walpan), again flood zones are not associated with these watercourses. The potential risk presented by these watercourses should be defined as part of any future development in the area.

Climate Change

The results of the assessment approach outlined in Section 5.2 of the SFRA report do not identify any significant increase in the extent of fluvial flood risks, as the flood zones do not extend into the settlement centre. Owing to the headwater location of this settlement and the narrow valley floor, it is likely that the increased river flows predicted as a result of climate change, will have little impact on the spatial extent of the flood risk zone.

Potential Surface Water Flow Routes and Ponding Areas

Method

The potential surface water flow routes and ponding areas presented in the SFRA, illustrate areas of predicted flooding greater than 25m^2 in spatial extent and only flooding which is more than 0.1m deep. This refinement of the TuFLOW model output is necessary so as to establish the primary areas of predicted flood risk. The modelling approach utilises a 5m resolution ground model grid. The TuFLOW model does not incorporate the Southern Water surface water drains or sewers, which during a storm event would provide storage capacity. Southern Water advised that the modelling should assume that the surface water sewer network could accommodate the 1 in 20 year storm. Therefore, the 1 in 20 year rainfall depths for the critical storm were subtracted from the 1 in 100 year (plus climate change) rain fall depths.

The 1 in 100 year (plus climate change) winter profile storm hyetographs (hyetograph refers to a graph presenting rainfall depth over time) were generated by deriving catchment descriptors from the Flood Estimation Handbook CD-ROM (FEH) and applying the FEH Rain Profile Method. The storm durations were determined by the critical drainage pathway lengths in each of the model areas. The model boundaries were determined by the topography, the local watersheds were traced to ensure that all contributing parts of the catchments were included in the model.

Results

The surface water modelling has highlighted a potential flow route/ponding area in the north of Chale Green. It is likely that this is an indication of the potential flood risk zone associated with the uppermost reaches of the River Medina (currently not covered by flood zones). Indeed the surface water flow route/ponding area does appear to follow the line of the river on the OS map.

The modelling also suggests that there is a potential flow route from St Catherine's Down towards Chale. The flow route appears to follow highway and the path of a small unnamed water course.

The large potential development site to the south of Chale, adjacent to the coast is highlighted by the modelling as being significantly at risk of surface water flooding. This location, under St Catherine's Hill, is very steep and topographic data in this area does not include any drainage gullies which would otherwise funnel the flow into defined flow routes. The result is an expansive *sheet* flow across the slope and water appears to being ponded behind undulations in the cliff slope. It is unlikely that the under an extreme rainfall conditions, the resultant

patterns would reflect the modelling predictions in this particular location. The very steep nature of much of the southern coastal fringe, results in a similar pattern of surface water flooding results.

Surface Drainage and Infiltration SuDS Potential

With the exception of the large coastal site, which is in an area of geological mass movement, the rest of Chale and Chale Green have been assessed as having a high suitability for the use of infiltration SuDS. All the identified sites are located outside the Source Protection Zones (SPZs). Nevertheless, a large SPZ is defined immediately north of Chale (in the Rookley area) and there is a small designation to the east near Niton. The SPZ mapping is however subject to change, and should be reviewed with the Environment Agency when proposing any form of SuDS solution.

Wave Exposure Risk

The coastal margin of the large potential development site to the south of Chale is identified as being within a zone of high potential exposure risk. For details of this classification process please consult Section 6 in the main SFRA document. If this site were to be brought forward for development, the potential risks posed by the action of waves and spray should be evaluated and appropriately managed. Mitigation measures could include corrosive resistant building materials and strengthened glass. A detailed investigation of ground levels may allow for the wave exposure risk to be re-evaluated.

Flood Risk Management Guidance and Site Specific FRAs

The principal of avoidance should be applied when considering sites within the Chale area. Any future development of the identified potential development sites in Chale and Chale Green, despite being in flood Zone 1 should be accompanied by a FRA to confirm the Flood Zone 1 designation. Currently un-modelled watercourses are considered to present a potential risk to the identified sites.

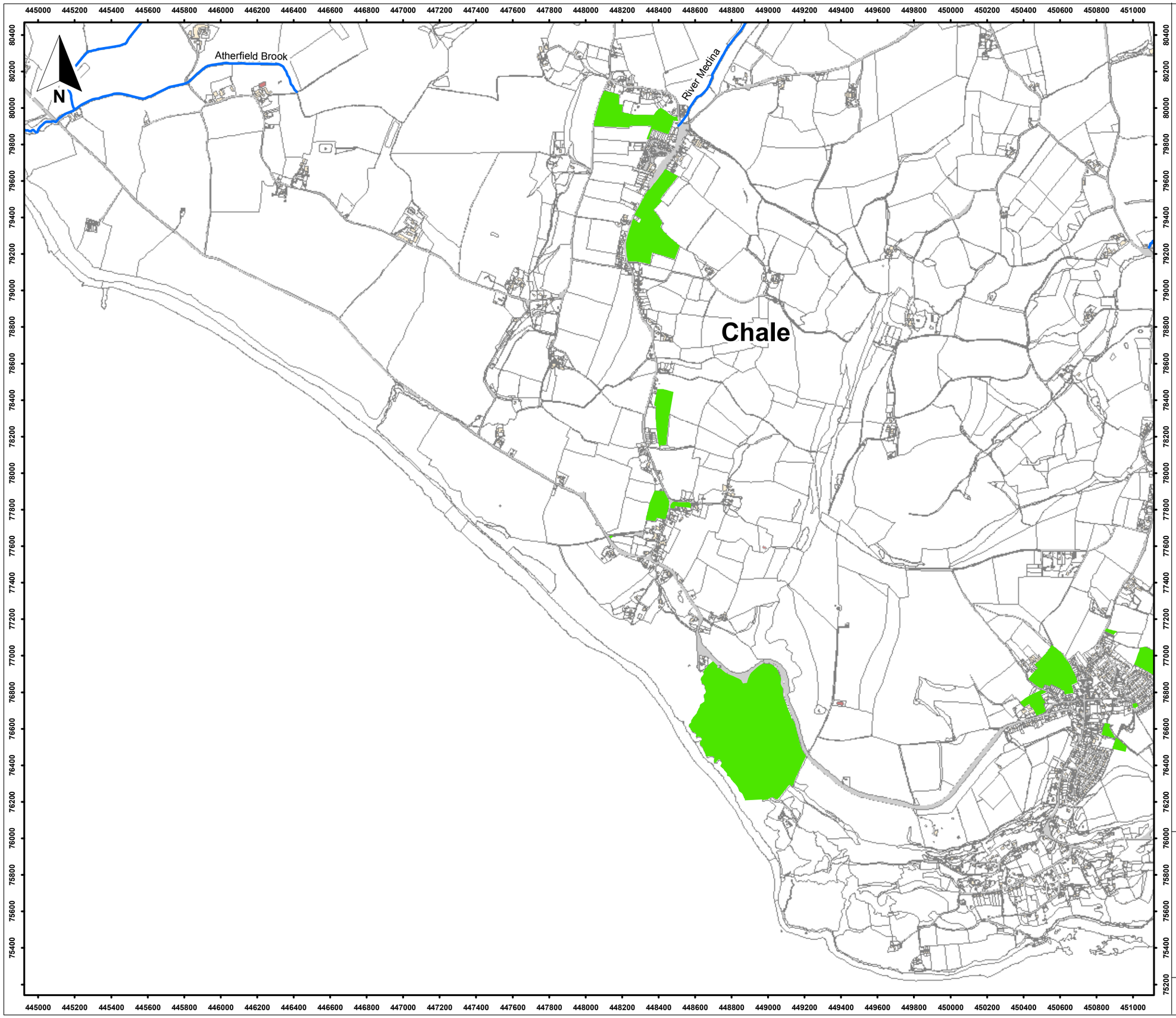
Factors to be considered in safe development could include:

- Ensuring that the sequential approach to landuse planning is, where possible, applied on site. This approach would see more and highly vulnerable landuse types being placed in the lower risk zones.
- Finished first floor levels should be set above the predicted 1 in 100 year fluvial flood levels, plus a climate change. The Environment Agency should be consulted for fluvial flood. A freeboard allowance should be applied, again the Environment Agency should be consulted on this aspect of the design. Site specific hydraulic modelling may be required to define these levels.
- Buildings should be designed so that safe access and egress can be facilitated in the event of the 1 in 100 year (plus climate change.

- Development should not increase the risk of flooding elsewhere. As such, the potential for displaced flood water to impact adjacent areas should be considered. This typically applies if an existing building footprint is being increased in fluvial floodplains and defended tidal floodplains. The displacement of water aspect of development along an undefended coastline is not necessarily a concern.

- Building design should account for the potential depths of water that might occur and appropriate flood resilient and or resistant design features should be incorporated.

- Surface water generated by development should be managed using sustainable techniques. The FRA or drainage assessment should explore the Environment Agency and CIRIA SuDS hierarchy. Discharge rates and volumes should not increase post development, in addition to this PPS25 requirement, the Council and the Environment Agency want to see developers seeking to reduce run-off rates and volumes.



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

Notes:
Site is attributed with the flood probability associated with the highest probability flood zone the site intersects

The mapped extent of Flood Zone 3b has been used to identify Functional Floodplain
The 1 in 100 year fluvial flood zone for the present day and the 1 in 200 year tidal extent predicted for the year 2115 has been used to identify sites at a High Probability. The 1 in 1000 year fluvial flood zone for the present day and the 1 in 1000 year tidal extent predicted for the year 2115 has been used to identify sites at a Medium Probability. Sites only in Flood Zone 1 have been assigned a Low Probability

0 200 400 600 800 1,000 Meters

Scale: 1:20,000 @ A3

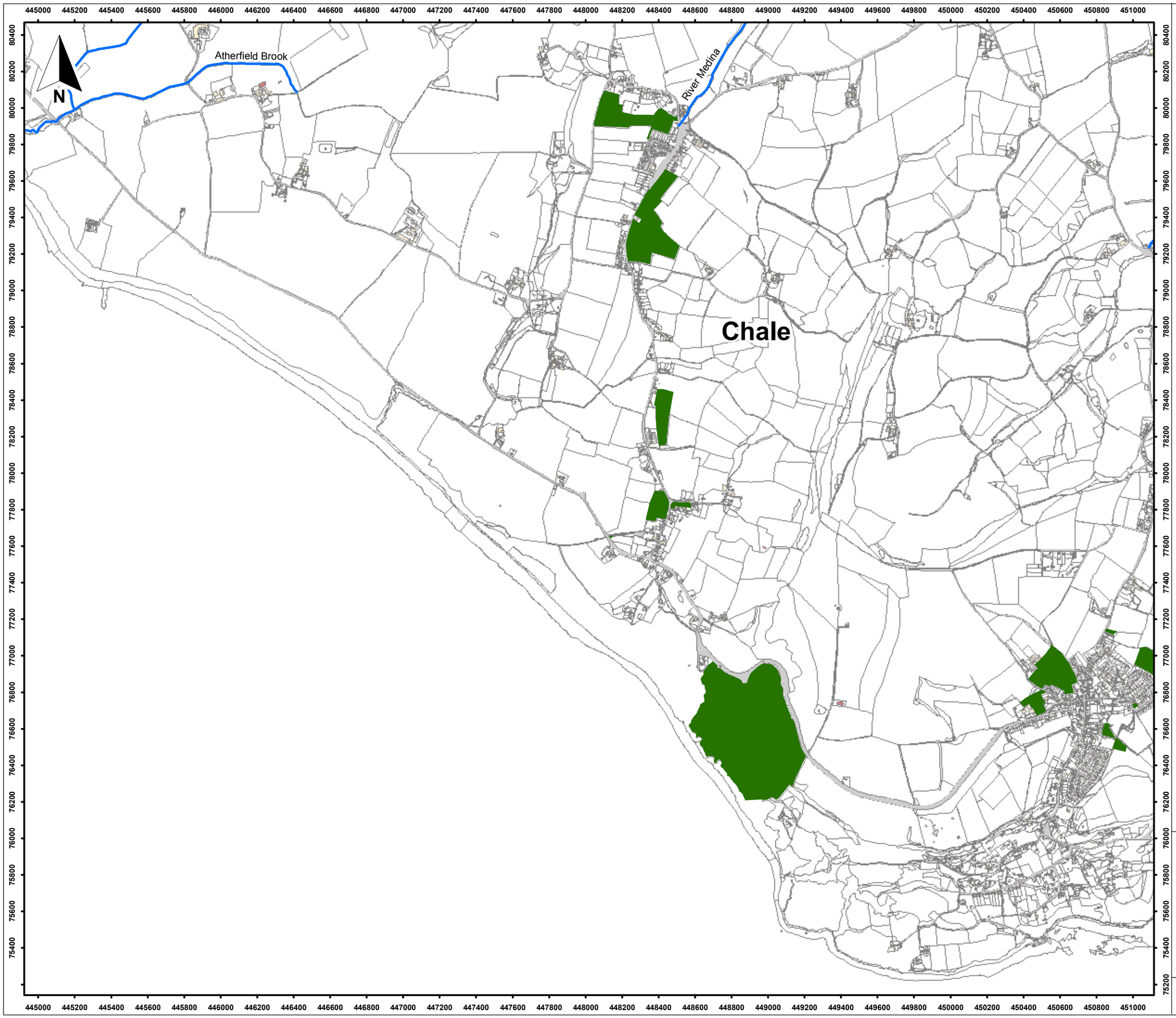
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 100
Potential Development Sites
Qualitative Flood Risk - Chale

November 2009
25793-A109.mxd squij

Entec



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

0 200 400 600 800 1,000 Meters

Scale: 1:20,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 101
Potential Development Sites Site Specific Flood Risk Definition - Chale

November 2009
25793-A110.mxd squij

Entec

N

Chale

Key:

Predicted 1 in 1000 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 600 800 1,000 Meters

Scale: 1:20,000 @ A3

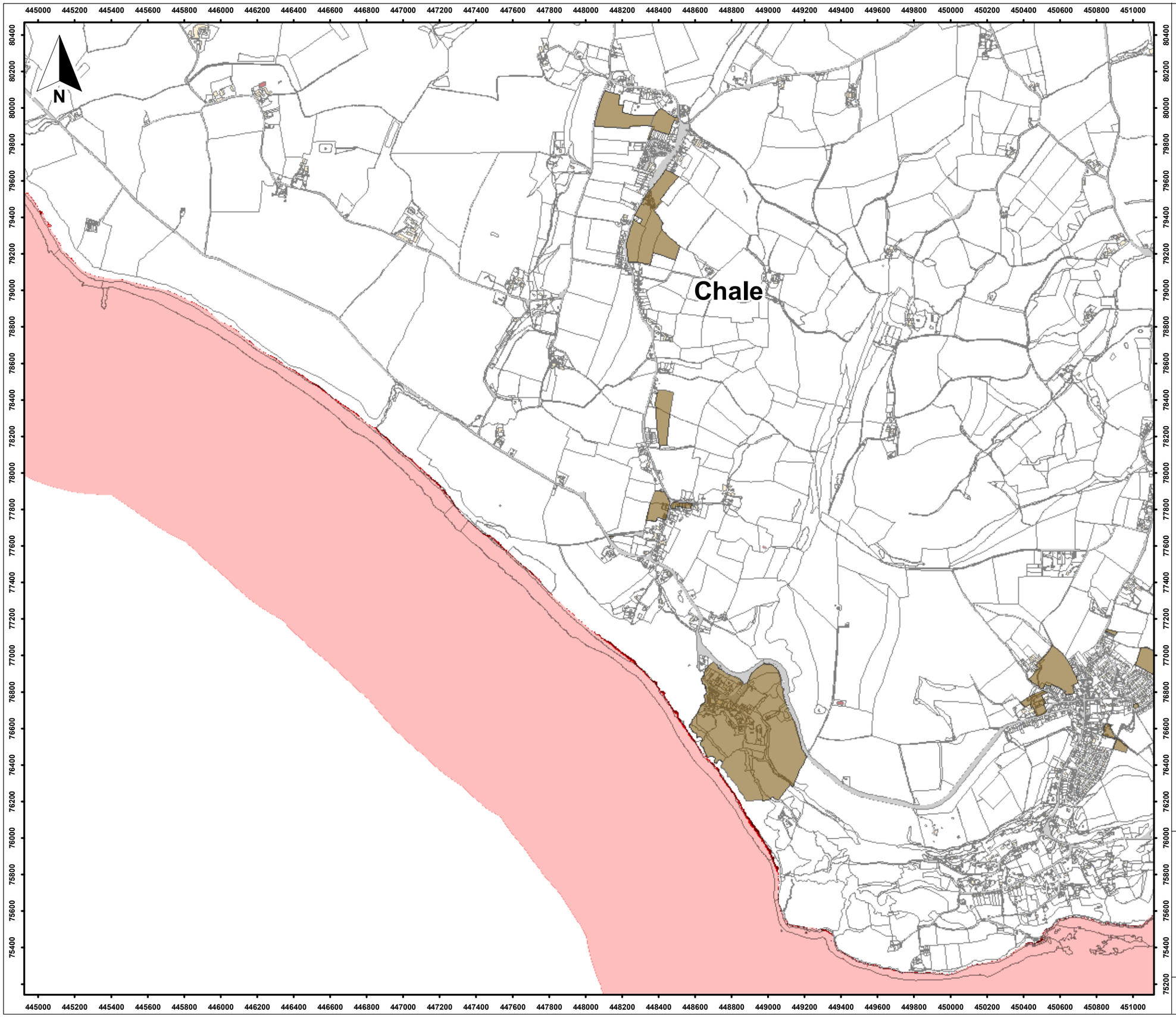
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 102
Potential Development Sites
Flood Zone 2 Climate Change Scenarios - Chale

November 2009
25793-A111.mxd squij

Entec



Key:

Predicted 1 in 200 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 600 800 Meters

Scale: 1:20,000 @ A3

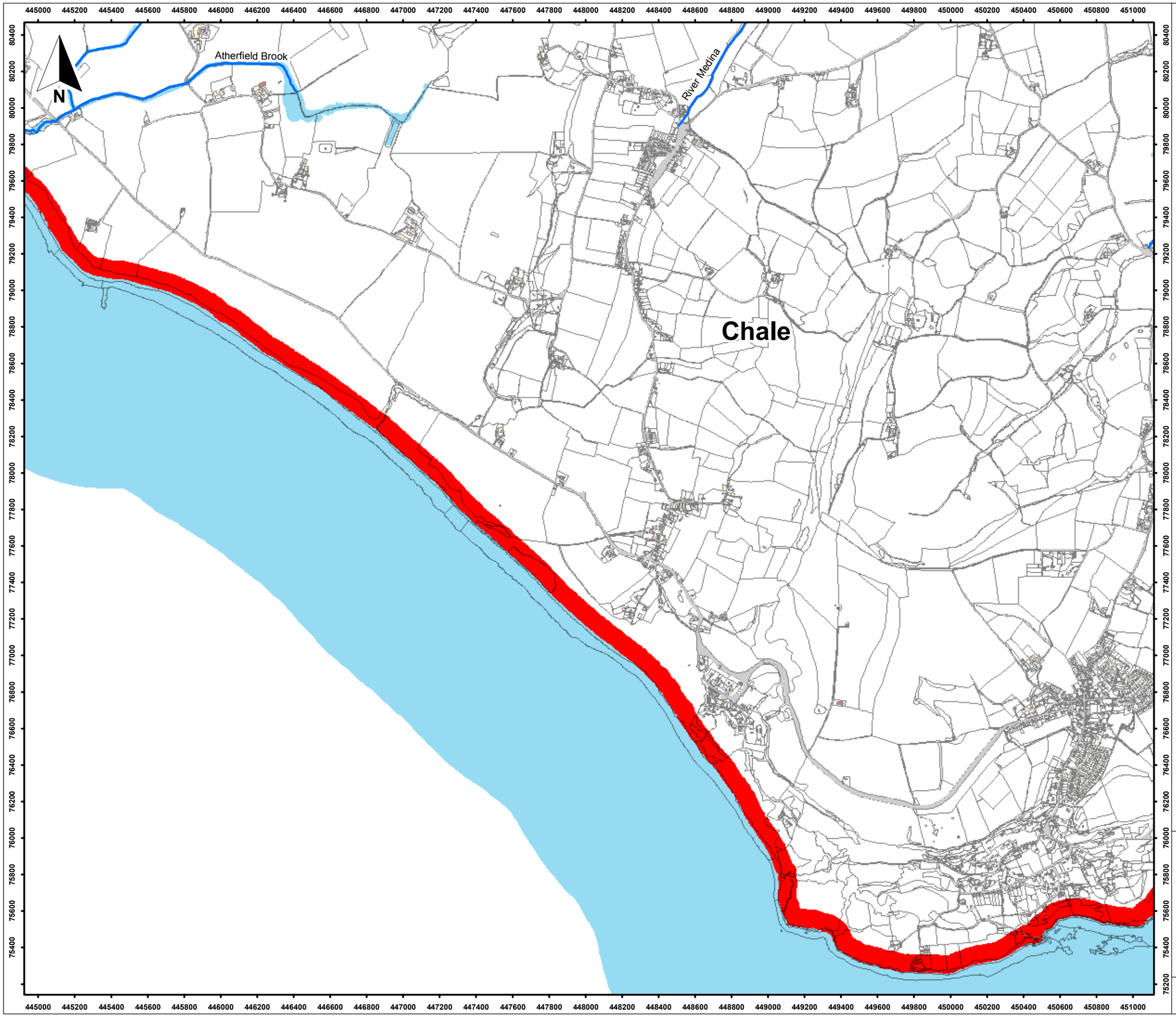
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 103
Potential Development Sites
Flood Zone 3 Climate Change Scenarios - Chale

November 2009
25793-A112.mxd squij

Entec



Key:

Main Rivers

Potential Exposure Risk

High

Medium

Low

Environment Agency Flood Zone 2 (November 2009)

0 200 400 600 800 1,000 Meters

Scale: 1:20,000 @ A3

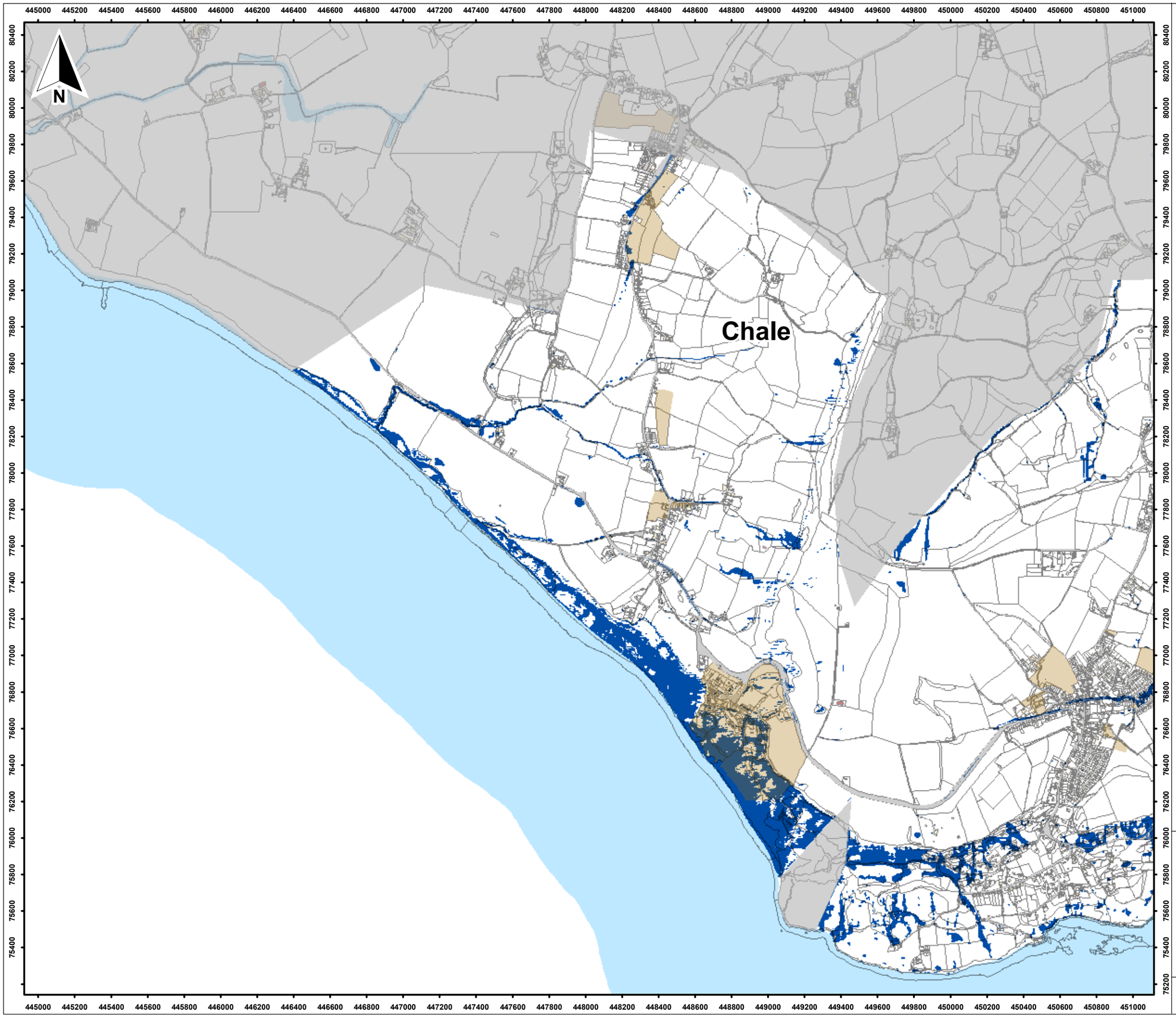
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 104
Qualitative Wind and Wave Exposure Risk - Chale

November 2009
25793-A113.mxd squij

Entec



Key:

- Location of reported surface water flooding issues. Supplied by Southern Water for the period upto and including 2006.
- Environment Agency Flood Zone 2 (November 2009)
- Potential Surface Water Flow Routes and Ponding areas (1:100+cc) Over 0.2m deep
- Potential Development Sites
- Outside the Limits of the Surface Water Model

Notes:
Only predicted surface water flow routes and ponding areas, over 0.1m deep and greater than 25m2 in areas are shown

0 200 400 600 800 1,000 Meters

Scale: 1:20,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 105
Potential Surface Water Flow Routes and Ponding Areas (1 in 100 year storm + climate change) - Chale

November 2009
25793-A114.mxd squij

Entec

Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix U
Rookley

June 2010

Overview

Please review this discussion in conjunction with the mapping provided in this Appendix.

Rookley is located in the south of the Island, around 5km south of Newport, and has been classified AS A Rural Service Centre (RSC). The settlements location on the knoll of a small hill places all existing development and potential development sites in Flood Zone 1. The local topography also places Rookley at the head of the predicted local surface water flow routes. Only the site areas will require FRAs to be undertaken for any future development, these FRAs should carefully consider the implications that landuse change may have on the potential run-off rates and volumes, as required by PPS25.

Sustainability and Regeneration Objectives

Development within the wider countryside will be focused on the Rural Service Centres (RSC) such as Rookley and should support their role as wider centres for outlying villages, hamlets and surrounding countryside. For the rural service centres development will be expected to ensure their future viability. Within the rural service centres and outlying rural areas, development will be expected, in the first instance, to meet a rural need and maintain or enhance the viability of local communities and will be subject to local considerations.

Rookley RSC has been identified as having the potential to accommodate further development to meet the regeneration aims and needs of the local community, through improving local services and strengthening public transport. Development will be encouraged on brownfield sites in the first instance and tourism will be promoted.

Sites at Risk

All the potential development sites in Rookley are in Flood Zone 1. There are rivers and associated flood zones located to the west and east of the site, but these do not affect the settlement or any of the potential development sites because these are positioned on higher ground.

Some of the access routes into and out of the settlement could be impacted during an extreme fluvial event. However a route north eastwards towards Merstone remain unaffected by the flood zone extents.

Climate Change

The method of assessment (See Section 5.2) used to assess the potential impacts of climate change in the fluvial domain do not predict that climate change will result in an increase in fluvial flood risk to the settlement of Rookley. This is because the settlement is located in Flood Zone 1.

Potential Surface Water Flow Routes and Ponding Areas

Method

The potential surface water flow routes and ponding areas presented in the SFRA, illustrate areas of predicted flooding greater than 25m^2 in spatial extent and only flooding which is more than 0.1m deep. This refinement of the TuFLOW model output is necessary so as to establish the primary areas of predicted flood risk. The modelling approach utilises a 5m resolution ground model grid. The TuFLOW model does not incorporate the Southern Water surface water drains or sewers, which during a storm event would provide storage capacity. Southern Water advised that the modelling should assume that the surface water sewer network could accommodate the 1 in 20 year storm. Therefore, the 1 in 20 year rainfall depths for the critical storm were subtracted from the 1 in 100 year (plus climate change) rain fall depths.

The 1 in 100 year (plus climate change) winter profile storm hyetographs (hyetograph refers to a graph presenting rainfall depth over time) were generated by deriving catchment descriptors from the Flood Estimation Handbook CD-ROM (FEH) and applying the FEH Rain Profile Method. The storm durations were determined by the critical drainage pathway lengths in each of the model areas. The model boundaries were determined by the topography, the local watersheds were traced to ensure that all contributing parts of the catchments were included in the model.

Results

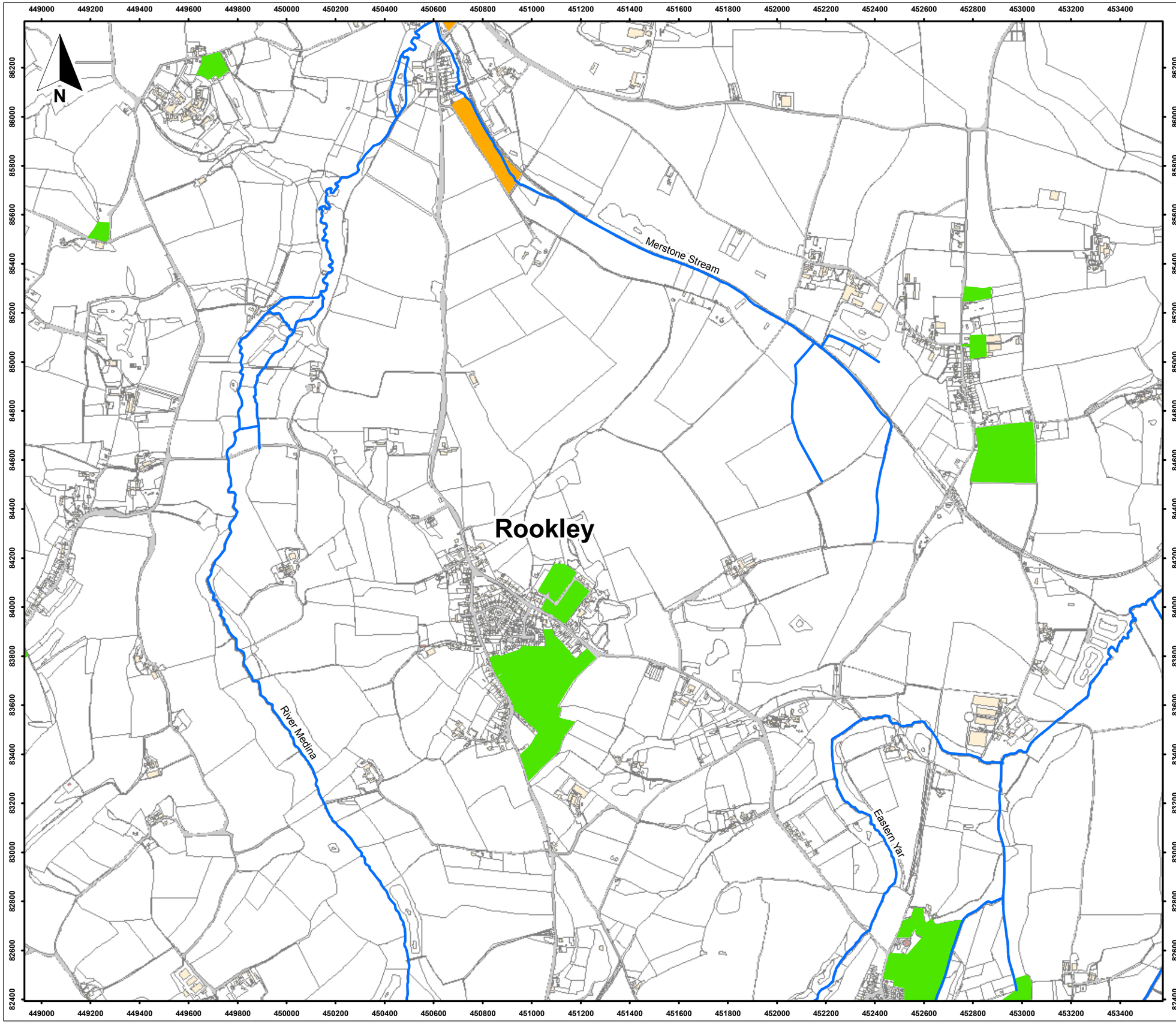
The settlement of Rookley is effectively situated on the knoll of a small hill. This is reflected in the patterns of the surface water flow routes which flow outwards from the settlement area in all directions towards the surrounding lower land. A potential flow route is identified to flow eastwards out of the centre of the large site to the south of the settlement.

Surface Drainage and Infiltration SuDS Potential

Owing to the local soils and geology Rookley has been identified as being of medium suitability for infiltration SuDS. However, Rookley is located within Source Protection Zones (SPZ) 1, 2 and 3. This means that any surface water drainage scheme in corporate robust pollution prevention measures. The Environment Agency should be consulted on all surface water drainage schemes in Rookley.

Flood Risk Management Guidance and Site Specific FRAs

Being at the top of a surface water drainage catchment, changes in landuse and the permeability of the ground have the influence to directly influence the patterns of surface water flow and the volumes of run-off generated. In line with the requirements of PPS25, all the potential development sites within Rookley are over 1 hectare and should any of them be taken forward, a FRA will be required to demonstrate how the surface water will be managed. PPS25 does not allow for flood risk to be increased elsewhere as a result of development.



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

Notes:
Site is attributed with the flood probability associated with the highest probability flood zone the site intersects

The mapped extent of Flood Zone 3b has been used to identify Functional Floodplain
The 1 in 100 year fluvial flood zone for the present day and the 1 in 200 year tidal extent predicted for the year 2115 has been used to identify sites at a High Probability. The 1 in 1000 year fluvial flood zone for the present day and the 1 in 1000 year tidal extent predicted for the year 2115 has been used to identify sites at a Medium Probability. Sites only in Flood Zone 1 have been assigned a Low Probability

0 200 400 600 Meters

Scale: 1:15,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 106
Potential Development Sites
Qualitative Flood Risk - Rookley

November 2009
25793-A115.mxd squij

Entec

N

Merstone Stream

Rookley

River Medina

Eastern Yar

449000 449200 449400 449600 449800 450000 450200 450400 450600 450800 451000 451200 451400 451600 451800 452000 452200 452400 452600 452800 453000 453200 453400

86200 86000 85800 85600 85400 85200 85000 84800 84600 84400 84200 84000 83800 83600 83400 83200 83000 82800 82600 82400

Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

0 200 400 600 Meters

Scale: 1:15,000 @ A3

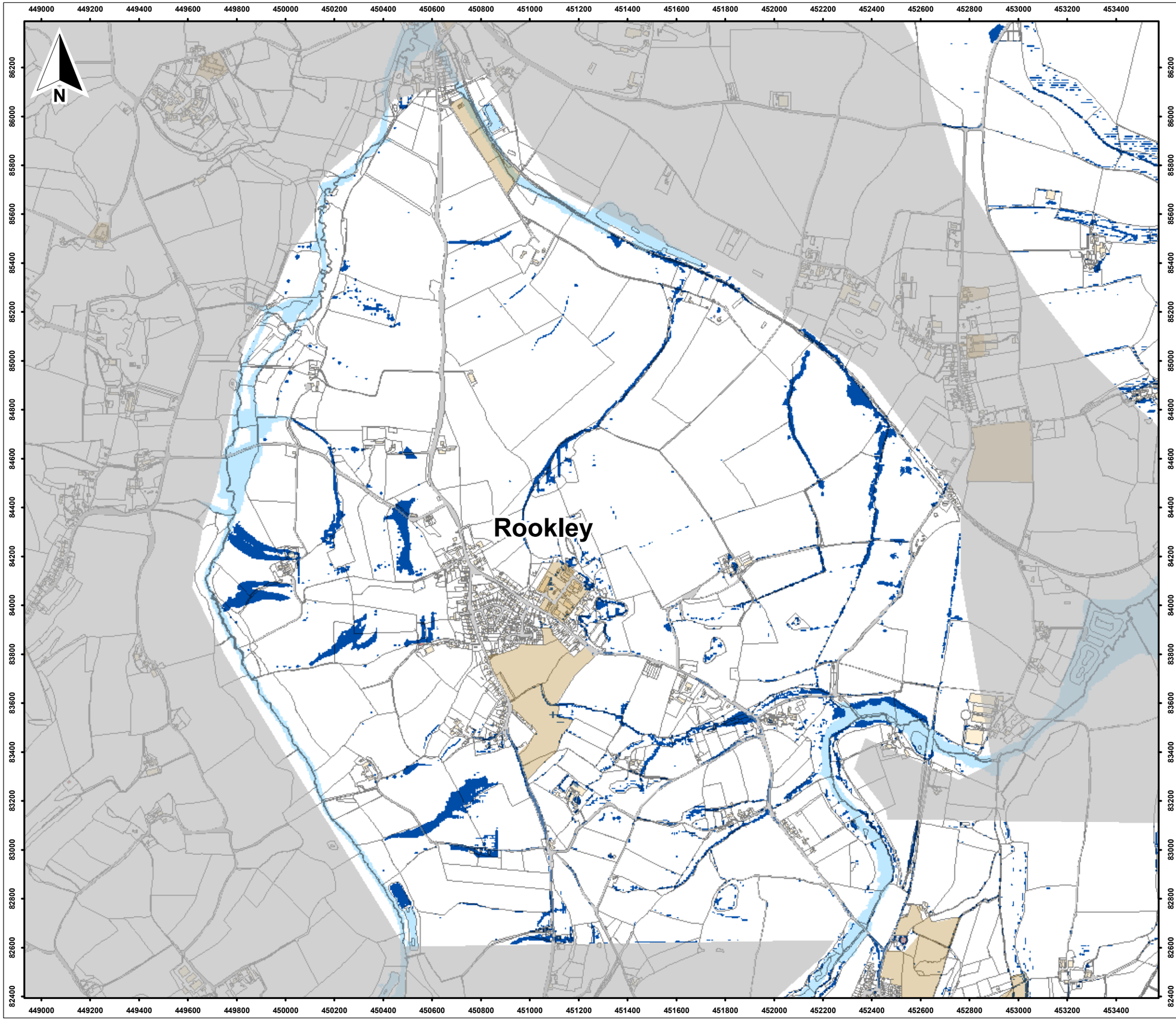
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 107
Potential Development Sites Site Specific Flood Risk Definition - Rookley

November 2009
25793-A116.mxd squij

Entec



Key:

- Location of reported surface water flooding issues. Supplied by Southern Water for the period upto and including 2006.
- Environment Agency Flood Zone 2 (November 2009)
- Potential Surface Water Flow Routes and Ponding areas (1:100+cc) Over 0.2m deep
- Potential Development Sites
- Outside the Limits of the Surface Water Model

Notes:
Only predicted surface water flow routes and ponding areas, over 0.1m deep and greater than 25m2 in areas are shown

0 200 400 600 Meters

Scale: 1:15,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 108
Potential Development Sites Site Specific Flood Risk Definition - Rookley

November 2009
25793-A117.mxd squij

Entec

Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix V
Godshill

June 2010

ISLE of WIGHT COUNCIL

Overview

Please review this discussion in conjunction with the mapping provided in this Appendix.

Godshill is located about 7km south of Newport on a north facing slope. The settlement is classified as a Rural Service Centre (RSC), which has been assessed as being completely within Flood Zone 1. Nonetheless, the SFRA identifies that there are two small fluvial watercourses in the north of the settlement for which flood zone extents are not available. All the potential development sites in Godshill are over 1 hectare and as part of any subsequent FRA process, the fluvial flood risk associated with these water courses should be assessed in line with Environment Agency guidance.

Sustainability and Regeneration Objectives

Development within the wider countryside will be focused on the Rural Service Centres (RSC) such as Godshill and should support their role as wider centres for outlying villages, hamlets and surrounding countryside. For the rural service centres development will be expected to ensure their future viability. Within the rural service centres and outlying rural areas, development will be expected, in the first instance, to meet a rural need and maintain or enhance the viability of local communities and will be subject to local considerations.

Godshill RSC has been identified as having the potential to accommodate further development to meet the regeneration aims and needs of the local community, through improving local services and strengthening public transport. Development will be encouraged on brownfield sites in the first instance and tourism will be promoted.

Sites at Risk

All the existing development and the potential development sites are within Flood Zone 1. There are however, two reaches of an un-named water course (See Figures 110 and 111) which flow from Godshill northwards towards join the Eastern Yar at Kennerly Farm. The Environment Agency do not hold Flood Zones for this watercourse, it is likely that the drainage area is below 3km^2, which is the minimum threshold typically applied when modelling flood zones.

As such the two potential development sites situated to the north of the town may in fact be at risk of fluvial flooding which the SFRA has not quantified.

Climate Change

The method of assessment (See Section 5.2) used to assess the potential impacts of climate change in the fluvial domain do not predict that climate change will result in an increase in fluvial flood risk to the settlement of Godshill. This is because the settlement is in Flood Zone 1

Potential Surface Water Flow Routes and Ponding Areas

Method

The potential surface water flow routes and ponding areas presented in the SFRA, illustrate areas of predicted flooding greater than 25m^2 in spatial extent and only flooding which is more than 0.1m deep. This refinement of the TuFLOW model output is necessary so as to establish the primary areas of predicted flood risk. The modelling approach utilises a 5m resolution ground model grid. The TuFLOW model does not incorporate the Southern Water surface water drains or sewers, which during a storm event would provide storage capacity. Southern Water advised that the modelling should assume that the surface water sewer network could accommodate the 1 in 20 year storm. Therefore, the 1 in 20 year rainfall depths for the critical storm were subtracted from the 1 in 100 year (plus climate change) rain fall depths.

The 1 in 100 year (plus climate change) winter profile storm hyetographs (hyetograph refers to a graph presenting rainfall depth over time) were generated by deriving catchment descriptors from the Flood Estimation Handbook CD-ROM (FEH) and applying the FEH Rain Profile Method. The storm durations were determined by the critical drainage pathway lengths in each of the model areas. The model boundaries were determined by the topography, the local watersheds were traced to ensure that all contributing parts of the catchments were included in the model.

Results

Godshill is situated on a gentle slope with a north, north west aspect, which results in the predicted surface water flow routes running in a roughly north and north westerly direction towards the lower ground of the Eastern Yar floodplain. The higher ground to the south of Godshill is represented in the ground topographic model with Synthetic Aperture Radar (SAR) data, which is of a lower quality than the Light Detecting and Ranging (LiDAR) data present in other parts of the Island. It is the nature of the ground topographic model which has resulted in the large areas of predicted surface water flooding in the area between Godshill and Wroxhall. It would appear that much of the flow generated by the up slope areas is captured by the B road which connects Beacon Alley to Godshill and the A3020. These highways are represented by slight depressions in the topographic ground which results in the flows being channelled along the route of the highway.

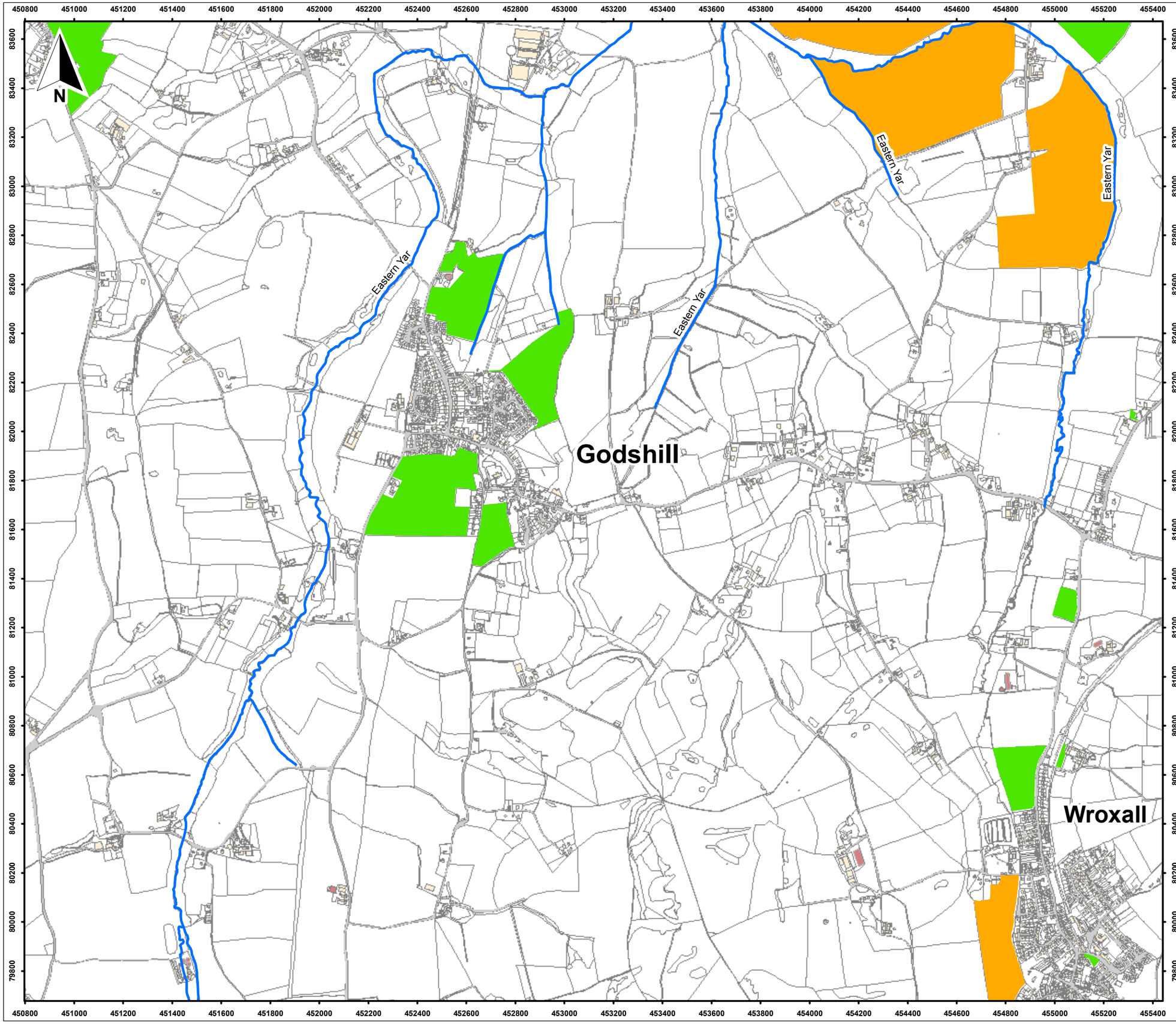
There are potentially significant areas of ponding within the centre of Godshill, these do not however correlate with any of the reported incidents provided by Southern Water. The absence of correlation may be a result of surface water flood risk event not having recently occurred or because incidences may not been reported. Moreover, the SFRA surface water modelling does not incorporate details of the underground drainage network, rather an approximate capacity is assumed, please see Section 3.5.

Surface Drainage and Infiltration SuDS Potential

The soils and geology of the area has resulted in whole of the Godshill settlement being classified as having a medium suitability for infiltration SuDS. All the identified sites are located within either Source Protection Zones (SPZs) 1, 2 and 3. The SPZ designation means that pollution control of groundwater resources is fundamental to any drainage solution. The Environment Agency should be consulted on any proposed drainage schemes.

Flood Risk Management Guidance and Site Specific FRA

All the sites within Godshill are in Flood Zone 1, but they are all larger than 1 hectare and the development of any one of the four sites should be accompanied by a FRA, the primary focus of which will need to be the sustainable management of surface water, which takes into account the requirements of PPS25, climate change influences and the potential flow paths and ponding areas identified in this SFRA. As part of the FRA process, the risk posed by the currently un-modelled water courses in the north of the settlement should be assessed and appropriately managed in accordance with the requirements of PPS25.



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

Notes:
Site is attributed with the flood probability associated with the highest probability flood zone the site intersects

The mapped extent of Flood Zone 3b has been used to identify Functional Floodplain
The 1 in 100 year fluvial flood zone for the present day and the 1 in 200 year tidal extent predicted for the year 2115 has been used to identify sites at a High Probability. The 1 in 1000 year fluvial flood zone for the present day and the 1 in 1000 year tidal extent predicted for the year 2115 has been used to identify sites at a Medium Probability. Sites only in Flood Zone 1 have been assigned a Low Probability

0 200 400 600 Meters

Scale: 1:15,000 @ A3

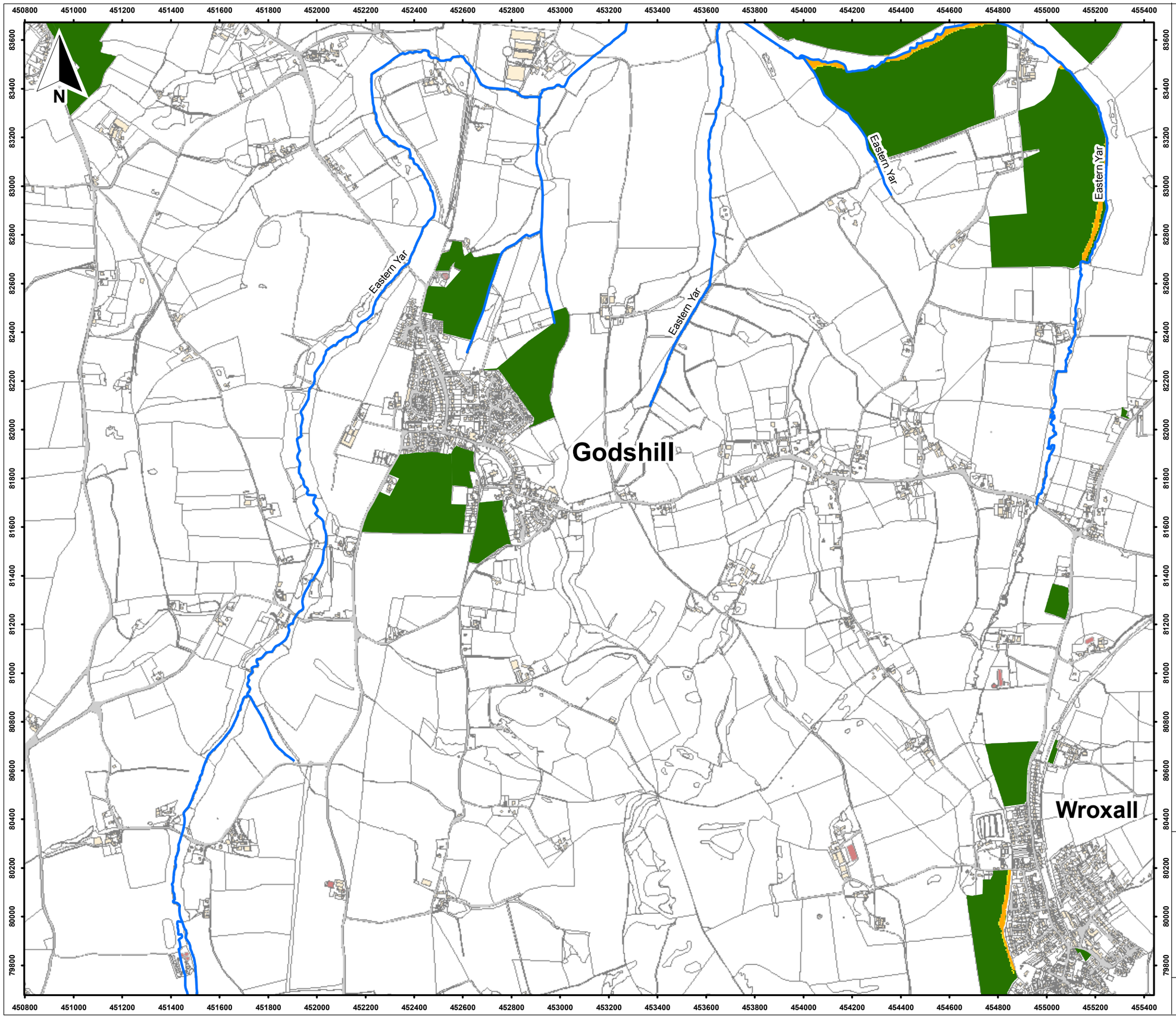
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 110
Potential Development Sites
Qualitative Flood Risk - Godshill

November 2009
25793-A118.mxd squij

Entec



Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

0 200 400 600 Meters

Scale: 1:15,000 @ A3

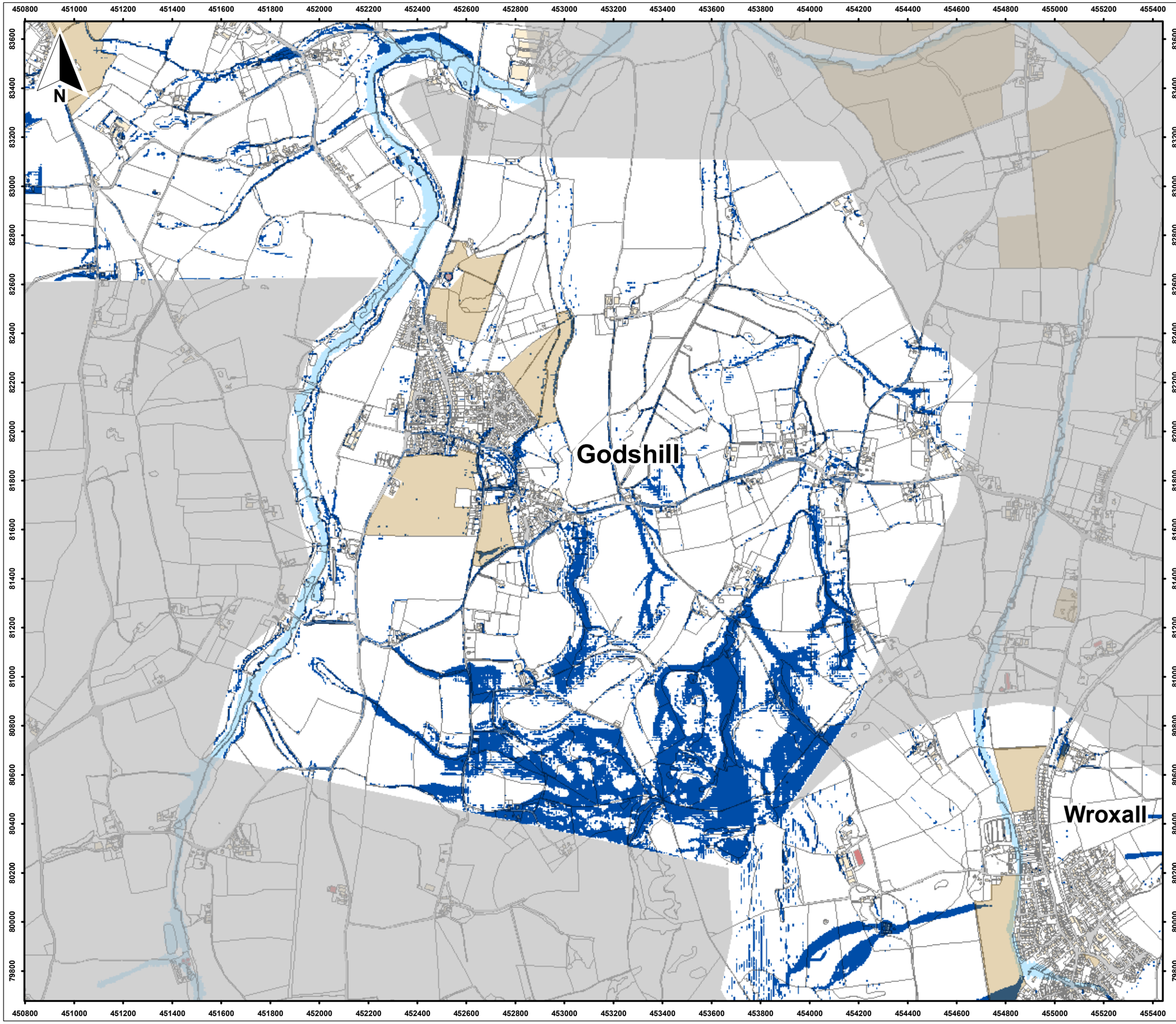
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 111
Potential Development Sites Site Specific Flood Risk Definition - Godshill

November 2009
25793-A119.mxd squij

Entec



Key:

- Location of reported surface water flooding issues. Supplied by Southern Water for the period upto and including 2006.
- Environment Agency Flood Zone 2 (November 2009)
- Potential Surface Water Flow Routes and Ponding areas (1:100+cc) Over 0.2m deep
- Potential Development Sites
- Outside the Limits of the Surface Water Model

Notes:
Only predicted surface water flow routes and ponding areas, over 0.1m deep and greater than 25m2 in areas are shown

0 200 400 600 Meters

Scale: 1:15,000 @ A3

H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

Isle of Wight SFRA MK2

Figure 112
Potential Surface Water Flow Routes and Ponding Areas (1 in 100 year storm + climate change) - Godshill

November 2009
25793-A120.mxd squij

Entec

Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix W
Supporting SuDS Information

June 2010

ISLE of WIGHT COUNCIL

W1 - Infiltration Potential and Groundwater Contamination Potential

W 1.2 - Infiltration Potential

Infiltration techniques generally requiring an infiltration rate of above 10mm/hr for the upper soil layers (Parrett, 2005) and are thus partially controlled by soil characteristics. The combination of the soil and geological characteristics enable the potential use of infiltration techniques on the site to be assessed. The most useful dataset made available for use in the SFRA to determine the infiltration potential was the Groundwater Vulnerability mapping (scale 1:100,000) see Figure 8 in Appendix A. This dataset subdivides soils into those with a high, medium and low leaching potential. Leaching potential is proportional to infiltration potential. In that high infiltration potential equates to high infiltration potential and *vice versa*.

Figure 9 in Appendix A, presents the assimilation of this assessment and can be consulted for regional overview of the applicability of infiltration SuDS techniques. For all sites in the Sites Database, an infiltration potential has been assigned. Figure 9 (in Appendix A) will potentially be of use when processing windfall sites.

Aquifer assessment

The Groundwater Vulnerability map of the Island also provides details on the aquifer type. It provides an indication of the ability of the underlying rocks strata to absorb water which infiltrates from the overlying soil layer. Without knowledge of site specific soil types and depths, it is not possible to fully assess the infiltration potential. As such, the underlying aquifer type (and its permeability) is may limit the infiltration potential and thus the applicability of infiltration SuDS. Three aquifer types exist as defined by the Groundwater Vulnerability map (NRF, 1995):

- Principal Aquifers (Highly Permeable);
- Secondary Aquifers (Variably Permeable); and
- Unproductive Stratas (Negligibly Permeable).

A matrix relating soil infiltration (leaching) potential and aquifer type (permeability) to infiltration potential is presented in Table W.1.1

Table W1.1 Infiltration Potential Derived from Aquifer Vulnerability Classification

Aquifer Vulnerability Classification	Description	Infiltration Potential
Minor_L	Variably permeable groundwater with low leaching potential	Low
Minor_I	Variably permeable groundwater with intermediate leaching potential	Low
Minor_H	Variably permeable groundwater high leaching potential	Medium
Major_L	Highly permeable groundwater with low leaching potential	Low
Major_I	Highly permeable groundwater with intermediate leaching potential	Medium
Major_H	Highly permeable groundwater with high leaching potential	High
Non_Aquifer	Regarded as containing insignificant quantities of groundwater. No soils data.	Low

It should be noted that those parts of the Island are classified as '*Non_Aquifer*' by the Groundwater Vulnerability map and have no soils information on which to assess infiltration potential. These areas have been considered for the purposes of this SFRA to have a low Infiltration potential. Site Specific FRAs should assess this generalisation at the site specific level.

Mass Movement Consideration

Mass movement was also considered during the assignment of assessment of the suitability of infiltration SuDS. The process by which mass movement occurs on the Island is through slippage as defined by the BGS map for the Island (Figure 7 – in Appendix1). Thus additional water in areas defined as being prone to slippage may further lubricate the rock strata, thereby potentially inducing a slippage event. Three rock types are associated with areas of slippage on the Island. These are:

- Clay (undifferentiated);
- Sandstone (undifferentiated) and Mudstone; and
- Rock (Undifferentiated).

Mass movement is an important factor in the areas where infiltration SuDS are otherwise suitable, since the addition of water into the soil profile or underlying rock strata has the potential to trigger a mass movement event. It has been considered inappropriate to implement infiltration SuDS techniques in these areas. The Sites Database accounts for this by assigning a low suitability to sites which overlay any of these geologies.

S1.2 - Groundwater Contamination Potential

The use of SuDS, although a preferred method of managing surface water, has the adverse potential to contaminate groundwater with surface pollutants. Groundwater is known to be vulnerable to contamination from diffuse and

point source pollutants through indirect discharges into or onto land. Aquifer remediation is difficult, prolonged and expensive and thus the prevention of pollution is important. The map of Groundwater Vulnerability provides a useful indication of those areas where the implementation of infiltration SuDS techniques has the potential to contaminate the aquifer below through the transfer of pollutants from the surface. It is not a map of contaminated land, rather it is an indication of where there is the potential for groundwater to be polluted.

Source Protection Zones (SPZ's) are defined by the Environment Agency and delineate the risk of groundwater contamination. Figure 7 in Appendix A shows the location of SPZ's on the Island. Generally, the risk is greatest nearest to the abstraction point. The dataset is made up of three main zones, which are the inner, outer and total catchment. A forth zone is sometimes included, and applies to a groundwater source of special interest. The Environment Agency website (Environment Agency, 2007), provides the following definition for each of the SPZ's:

- ***Zone 1 (Inner protection zone)*** – Any pollution that can travel to the borehole within 50 days from any point within the zone is classified as being inside zone 1. This applies at and below the water table. This zone also has a minimum 50 metre protection radius around the borehole. These criteria are designed to protect against the transmission of toxic chemicals and water-borne disease.

- ***Zone 2 (Outer protection zone***) – The outer zone covers pollution that takes up to 400 days to travel to the borehole, or 25% of the total catchment area – whichever area is the biggest. This travel time is the minimum amount of time that the Environment Agency believe pollutants need to be diluted, reduced in strength or delayed by the time they reach the borehole.

- ***Zone 3 (Total catchment)*** – The total catchment is the total area needed to support removal of water from the borehole, and to support any discharge from the borehole.

- ***Zone of special interest*** – This is usually where local conditions mean that industrial sites and other polluters could affect the groundwater source even though they are outside the normal catchment area.

The Assessment of Groundwater Contamination Potential

The potential for groundwater contamination was assessed by combining the infiltration potential classifications made in Section S1.1 and the Source Protection Zones. It was considered important to compile a dataset which utilised the most useful available information to provide broad classifications to give an Island wide appreciation of the potential to contaminate groundwater resources.

Unproductive Strata were assigned a low contamination potential, unless they were over a Zone 1 or 2 SPZ, in which case it was given a rating of 'high' or 'medium' respectively. Areas of high infiltration potential were all assigned high contamination risk values as were areas of medium infiltration potential were they were in SPZ zones 1 and 2. The remaining areas of medium infiltration potential were assigned medium contamination potential values. Three classifications, high, medium and low were created. The resultant contamination potential map can be seen in Figure 10 (Appendix A). Table W1.2 presents the results of the classification process. Please note, that the impact of mass movement on the infiltration potential has been omitted from this classification process.

Table W1.2 Classification of Groundwater Contamination Potential

		Contamination Potential			
		SPZ 1	**SPZ 2**	**SPZ 3**	**No SPZ**
Infiltration Potential	**High**	High	High	High	High
	Medium	High	High	Medium	Medium
	Low	Medium	Medium	Low	Low

The information presented in this section is intended to highlight areas were the simplest of SuDS techniques (i.e. infiltration SuDS) are and are not considered suitable

In line with PPS23 development should be appropriate and should not lead to pollution. As such, it is not appropriate to install infiltration systems in land affected by contamination as this could lead to pollution of underlying groundwater. Please refer to the Environment Agency's 'Groundwater Protection: Policy and Practice (GP3)' document, which is available at www.environment-agency.gov.uk

Supporting SuDS Information

Table W.2 SuDS - Suitability According to Subdivisions of Water Quality, Quantity and Environmental Benefits

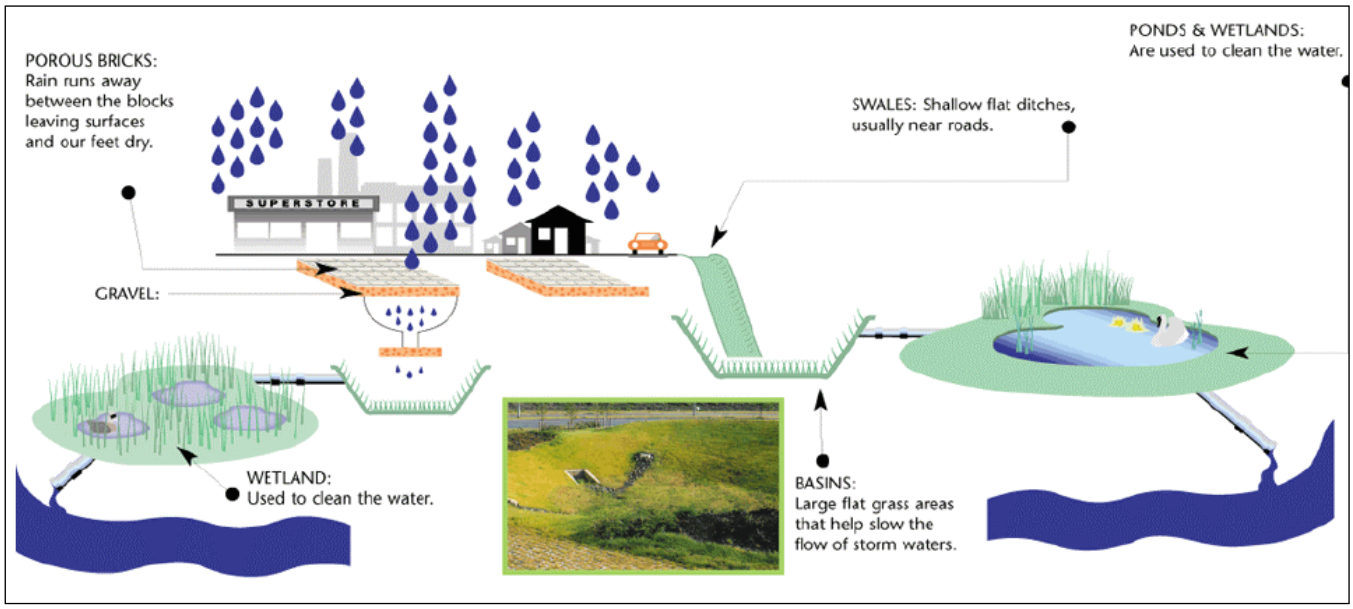
Technique	Description	Water quantity				Water quality								Enviro. benefits		
		Conveyance	Detention	Infiltration	Water harvesting	Sedimentation	Filtration	Adsorption	Biodegredation	Volatilisation	Precipitation	Phytoremediation	Nutrification	Aesthetics	Amenity	Ecology
Water butts, site layout	Good house keeping and design practices	=	=	#	=	=	=	=	=	=	=	=	=	=	=	=
Pervious pavements	Allow inflow of rainwater into underlying construction/soil		#	#	=	#	#	#	#	#				=	=	=
Filter drain	Linear drains/trenches filled with permeable material, often with a perforated pipe in the base of the trench	#	#				#	#	#	#						
Filter strips	Vegetated strips of gently sloping ground designed to drain water evenly from impermeable areas and filter out silt and other particulates	=	=	=		#	#	#	#					=	=	=
Swales	Shallow vegetated channels that conduct and/or retain water (and can permit infiltration when un-lined). The vegetation filters particulates	#	#	=		#	#	#	#			=		=	=	=
Ponds	Depressions used for storing and treating water. They have a permanent pool and bankside emergent and aquatic vegetation		#	=	#	#	#	#	#	#	#	#	#	#	#	#
Wetlands	As ponds, but the runoff flows slowly but continuously through aquatic vegetation that attenuates and filters the flow. Shallower than ponds	=	#	=	#	#	#	#	#	#	#	#	#	#	#	#
Detention basin	Dry depressions designed to store water for a specified retention time		#			#	=	=	#			=		=	=	=
Soakaways	Sub-surface structures that store and dispose of water via infiltration			#			#	#	#							
Infiltration trenches	As filter drains, but allowing infiltration through trench base and sides	=	#	#			#	#	#	#						
Infiltration basins	Depressions that store and dispose of water via infiltration		#	#			#	#	#	#				=	=	=
Green roofs	Vegetated roofs that reduce runoff volume and rate		#				#	#	#	#	#	#	#	#	=	#
Bioretention areas	Vegetated areas for collecting and treating water before discharge downstream, or to the ground via infiltration.		#	#		#	#	#	#	#	#	#	#	#	#	#
Sand filters	Treatment devices using sand beds as filter media		#	=			#	#	#	#	#					
Silt removal devices	Manhole and/or proprietary devices to remove silt					#										
Pipes, subsurface storage	Conduits and their accessories as conveyance measures and/or storage. Water quality can be targeted using sedimentation and filter media.	#	#			=	=									

High/primary process = Some opportunities, subject to design

Information in table modified after CIRIA (2007)

The information presented in Table E1 is based on the assumption that only a single SuDS technique is implemented on a site and is independent of connected SuDS.

Figure W.1 Likely Implementation of SuDS Management Train



Source of this Graphic = GDSDS (2005)

Table W.3 Influential site characteristics on the applicability of SuDS (Modified after CIRIA 2007)

SuDS Group	Technique	Soils		Area draining to a single SuDS component		Minimum depth to water table		Site slope		Available head	
		Impermeable	Permeable	0 – 2 ha	> 2 ha	0 – 1 m	> 1 m	0 – 5%	> 5 %	0-1 m	1 – 2 m
Retention	**Retention pond**	Y	Y[1]	Y	Y[5]	Y[2]	Y[2]	Y	Y	Y	Y
	Subsurface storage	Y	Y	Y	Y[5]	Y[2]	Y[2]	Y	Y	Y	Y
Wetland	**Shallow wetland**	Y[2]	Y[4]	Y[4]	Y[6]	Y[2]	Y[2]	Y	N	Y	Y
	Extended detention wetland	Y[2]	Y[4]	Y[4]	Y[6]	Y[2]	Y[2]	Y	N	Y	Y
	Pond/wetland	Y[2]	Y[4]	Y[4]	Y[6]	Y[2]	Y[2]	Y	N	Y	Y
	Pocket wetland	Y[2]	Y[4]	Y[4]	N	Y[2]	Y[2]	Y	N	Y	Y
	Submerged gravel wetland	Y[2]	Y[4]	Y[4]	Y[6]	Y[2]	Y[2]	Y	N	Y	Y
	Wetland channel	Y[2]	Y[4]	Y[4]	Y[6]	Y[2]	Y[2]	Y	N	Y	Y
Infiltration	**Infiltration trench**	N	Y	Y	N	N	Y	Y	Y	Y	N
	Infiltration basin	N	Y	Y	Y[5]	N	Y	Y	Y	Y	N
	Soakaway	N	Y	Y	N	N	Y	Y	Y	Y	N
Filtration	**Surface sand filter**	Y	Y	Y	Y[5]	N	Y	Y	N	N	Y
	Sub-surface sand filter	Y	Y	Y	N	N	Y	Y	N	N	Y
	Perimeter sand filter	Y	Y	Y	N	N	Y	Y	N	Y	Y
	Bioretention/filter strips	Y	Y	Y	N	N	Y	Y	N	Y	Y
	Filter trench	Y	Y[1]	Y	N	N	Y	Y	N	Y	Y
Detention	**Detention basin**	Y	Y[1]	Y	Y[5]	N	Y	Y	Y	N	Y
Open channels	**Conveyance swale**	Y	Y	Y	N	N	Y	Y	N[3]	Y	N
	Enhanced dry swale	Y	Y	Y	N	N	Y	Y	N[3]	Y	N
	Enhanced wet swale	Y[2]	Y[4]	Y	N	Y	Y	Y	N[3]	Y	N
Source control	**Green roof**	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
	Rainwater harvesting	Y	Y	Y	N	Y	Y	Y	Y	Y	
	Permeable pavement	Y	Y	Y	Y	N	Y	Y	N	Y	Y

Y = Yes
N = No
Y1 = with liner
Y2 = with surface baseflow
Y3 = Unless follows contours
Y4 = With liner and constant surface baseflow, or high ground water table
Y5 = possible, but not recommended (appropriate management train not in place)
Y6 = Where high flows are diverted around SuDS component

Additional policy and general guidance on SuDS and drainage include the following:

- PPS25 Practice Guide, 2007
- Water Framework Directive (200/60/EC);
- Highways Act, 1980;
- Town and Country Planning Act, 1990;
- Town and Country Planning Act, 1990 (amended) NB covers S106 Agreements;
- Town and Country Planning Act, 1991;
- Construction, Design and Management Regulations, 1994;
- Building Regulations Part C Approved Document H – Drainage and Waste Disposal of the Building Regulations 2002 Amendment;
- ODPM 2004. Planning Policy Statement 1: *Delivering Sustainable Development*;
- Communities and Local Government, 2006. Planning Policy Statement 25: *Development and Flood Risk*;
- Communities and Local Government, 2007. *Development and Flood Risk: A practice guide companion to PPS25* ;
- BRE Digest 365 Soakaway Design BSE EN 752-4: 1998 Drain and Sewer Systems outside buildings, part 4;
- CIRIA. Sustainable Drainage Systems – Hydraulic, Structural and water quality advice (CIRIA 609);
- CIRIA. The SUDS Manual (CIRIA C697);
- CIRIA. *Source control using constructed previous surfaces. Hydraulic, structural and water quality performance issues* (CIRIA 582);
- CIRIA. *Infiltration Drainage – manual of good practice* (CIRIA R156);
- CIRIA. *Review of the design and management of constructed wetlands* (CIRIA R180);
- CIRIA. *Control of pollution from highway drainage discharge* (CIRIA R142);
- CIRIA. *Design of flood storage reservoirs* (CIRIA Book 14);
- CIRIA. *Designing for exceedance in urban drainage systems – good practice* (CIRIA C635);
- CIRIA. *Rainwater and grey-water use in buildings* (CIRIA C539);

- Defra, 2004. *Making Space for Water – Developing a new Government strategy for flood and coastal erosion risk management in England: A Consultation Exercise;*
- Defra, 2005. *Making Space for Water – Taking forward a new Government strategy for flood and coastal erosion risk management in England: First Government response to the Autumn 2004;*
- Defra, 2006. *Urban Flood Risk and Integrated Drainage*. Scoping report and pilot studies;
- Environment Agency, 2003. Harvesting rainwater for domestic uses: an information guide;
- Groundwater Protection: Policy and Practice, Part 4 Legislation and Policies
- HR Wallingford. Use of SUDS in high density development;
- National SUDS Working Group, 2006. Interim Code of Practice for SUDS
- Planning Policy Statement 23
- WRc. Sewers for Adoption 6th Edition (SfA6) (published by Water UK).

Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix X
Environment Agency Standard
FRA Response Text

June 2010

ISLE of WIGHT COUNCIL

Information Taken from Operational Instruction 1045_08 Issued 23/03/2009 Version 2

EFR O 01 No Sequential Test

Environment Agency position

We OBJECT to this application in the absence of any evidence to demonstrate that the flood risk Sequential Test has been applied. We recommend that until then the application should not be determined for the following reasons:

Reasons

The application site lies within Flood Zone *<3a/3b/2>* defined by Planning Policy Statement 25 as having a *<high / medium>* probability of flooding. Paragraph D5 of PPS25 requires decision-makers to steer new development to areas at the lowest probability of flooding by applying a 'Sequential Test'. In this instance no evidence has been provided to indicate that this test has been carried out.

We ask to be reconsulted with the results of the Sequential Test. Our objection will remain until your Authority has carried out the Sequential Test to demonstrate that there are no reasonably available alternative sites in areas with a lower probability of flooding that would be appropriate for the type of development proposed.

Advice to planning liaison and consultees

This objection is unusually worded in that rather than asking the LPA to refuse the application it asks the LPA not to determine the application until the sequential test has been applied. This reflects the uniqueness of this situation where it is the actions/omission of the LPA that is the issue not something that the developer may or may not have done. Moreover the LPA could legitimately carry out the sequential test after consultation. This response therefore makes clear that the LPA must carry out the ST and should reconsult us once this has been carried out.

EFR O 02 Sequential Test submitted but not demonstrated

Environment Agency position

We OBJECT to this application because the flood risk Sequential Test submitted with the application fails to demonstrate that the Sequential Test has been adequately applied. We recommend that the application should not be determined until the Sequential Test has been demonstrated for the following reasons:

Reasons

The application site lies within Flood Zone *<3a/3b/2>* defined by Planning Policy Statement 25 as having a *<high / medium>* probability of flooding. Paragraph D.5 of PPS25 requires decision-makers to steer new development to areas at the lowest probability of flooding by applying a 'Sequential Test'. In this instance the evidence provided to indicate that this test has been carried out is inadequate for the following reasons:

Free text: State the deficiencies

We wish to be reconsulted on any revised Sequential Test. Our objection will remain until we receive a revised Sequential Test from your Authority which demonstrates that there are no reasonably available alternative sites in areas with a lower probability of flooding that would be appropriate for the type of development proposed.

Advice to planning liaison and consultees

Applying the Sequential Test is a task for the local planning authority as assisted through the supply of information by the applicant. Our ability to challenge the quality of the Sequential Test in most cases will be very limited not least by the fact that we lack access to the evidence base which the LPA will use when determining the Sequential Test. Caution is therefore required in using this objection. However, there may be cases where we have sufficiently strong grounds to challenge the quality of a Sequential Test, for example, where we know there are allocated sites at lower flood risk which appear suitable for the development proposed but which have not even been considered as part of the Sequential Test.

As in EFR O 01 –the objection is worded with a request not to determine the application until the Sequential Test has been demonstrated, for the same treasons as explained in the user notes to that paragraph.

EFR O 03 Issue: Sequential Test failed

Environment Agency position

We OBJECT to this application because the Sequential Test information submitted with the application has demonstrated that there are reasonably available sites with less flood risk on which this development could proceed instead. We therefore recommend that the application should be refused.

Reasons

The application site lies within Flood Zone *<3a/3b/2> defined by* Planning Policy Statement 25 (PPS25) as having a *<high/medium>* probability of flooding. Paragraph D5 of PPS25 requires decision-makers to steer new development to areas at the lowest probability of flooding by applying a 'Sequential Test'. In this instance the evidence provided to indicate that this test has been carried out indicates that there are reasonably available sites at lower flood risk. Developing this site therefore fails to apply the sequential approach advocated in paragraph 14 of PPS25.

Free text –list the reasonably available sites/sources of information

Advice to planning liaison and consultees

The previous paragraph covers the situation where the evidence supplied as the Sequential Test is grossly and obviously deficient in some way. In contrast this objection applies where the quality of the Sequential Test may not be in doubt but the outcome indicates that the application should be refused in accordance with PPS25 para D5.

EFR O 04 Proposed development incompatible with Flood Zone

Environment Agency position

We OBJECT to this application because the proposed development falls into a flood risk vulnerability category that is inappropriate to the Flood Zone in which the application site is located. We recommend that the application should be refused planning permission on this basis.

Reasons

Planning Policy Statement 25 (PPS25) classifies development types according to their vulnerability to flood risk and gives guidance on which developments are appropriate in each Flood Zone. PPS25 requires decision-makers to ensure that as part of the Sequential Test, development sites are appropriate to the type of development or land use proposed.

In this case, the application site lies within Flood Zone <*3a/3b functional floodplain*> defined by Planning Policy Statement 25 as having a high probability of flooding. The development type in the proposed application is classified as <*insert vulnerability category in line with table D.2, PPS25*> in accordance with table D.2 of PPS25. Tables D.1 and D.3 of PPS25 make clear that this type of development is not compatible with this Flood Zone and should not therefore be permitted.

EFR O 05 Part (c) of Exception Test failed

Environment Agency position

We OBJECT to this application because it has failed to meet the requirements of part (c) of the flood risk Exception Test and recommend that planning permission be refused on this basis for the following reasons:

Reasons

Planning Policy Statement 25 (PPS25) requires the Exception Test to be applied in the circumstances shown in tables D.1and D.3. Paragraph D9 of PPS25 makes clear that all three elements of the Test must be passed for development to be permitted. Part (c) of the Test requires the applicant to demonstrate that the development will be safe, without increasing flood risk elsewhere, and, where possible will reduce flood risk overall. Paragraph D13 requires that compliance with each part of the Exception Test is openly demonstrated.

The application site lies in a within Flood Zone <*3a/3b/2*> defined by Planning Policy Statement 25 as having a <*high / medium*> probability of flooding. Development classified as <*inset vulnerability classification*> is only appropriate in these areas following application of the Sequential Test and where the Exception Test has been applied in full and has been passed. In this instance the submitted flood risk assessment (FRA) fails to:

<*state the deficiencies*>, *for example >:*

i. Demonstrate that the development is ‘safe’ because….

ii. Increases flood risk in the surrounding area

iii. Address the opportunities presented by this development for reducing flood risk for example

EFR O 06 No FRA submitted (development in Flood Zones 3 or 2)

Environment Agency position

In the absence of a flood risk assessment (FRA), we OBJECT to this application and recommend refusal of planning permission on this basis for the following reasons:

Reasons

The application site lies within Flood Zone *<3a/3b/2>* defined by Planning Policy Statement 25 as having a *<high / medium>* probability of flooding. Paragraph E9 of PPS25 requires applicants for planning permission to submit a FRA when development is proposed in such locations.

In the absence of a FRA, the flood risks resulting from the proposed development are unknown. The absence of a FRA is therefore sufficient reason in itself for a refusal of planning permission. This reflects the precautionary approach to development in flood risk areas set out in paragraphs 10 and E9 of PPS25.

We will provide you with bespoke comments within 21 days of receiving formal reconsultation. Our objection will be maintained until an adequate FRA has been submitted.

EFR O 07 No FRA submitted (surface water)

Environment Agency position

In the absence of a flood risk assessment (FRA), we OBJECT to this application and recommend refusal of planning permission on this basis for the following reasons:

Reason

The application lies within Flood Zone 1 defined by Planning Policy Statement 25 as having a low probability of flooding. However the proposed scale of development may present risks of flooding on-site and/or off-site if surface water run-off is not effectively managed. Paragraph E9 of PPS25 requires applicants for planning permission to submit a FRA when development on this scale is proposed in such locations.

In the absence of a FRA, the flood risks resulting from the proposed development are unknown. The absence of a FRA is therefore sufficient reason in itself for a refusal of planning permission. This reflects the precautionary approach to development in flood risk areas set out in paragraphs 10 and E9 of PPS25

We ask to be re-consulted with the results of the FRA. Our objection will be maintained until an adequate FRA has been submitted.

Advice to planning liaison and consultees

Consider whether the PPS25 paragraph 26 reconsultation paragraph (EFR I 09) should be added. Refer to Town & Country Planning (Flooding) (England) Direction 2007

EFR O 08 Inadequate FRA

Environment Agency position

In the absence of an acceptable Flood Risk Assessment (FRA) we OBJECT to the grant of planning permission and recommend refusal on this basis for the following reasons:

Reason

The FRA submitted with this application does not comply with the requirements set out in Annex E, paragraph E3 of Planning Policy Statement 25 (PPS 25). The submitted FRA does not therefore, provide a suitable basis for assessment to be made of the flood risks arising from the proposed development.

In particular, the submitted FRA fails to <*state main deficiencies, for example*>

i. Take the impacts of climate change into account

ii. Consider the effect of a range of flooding events including extreme events on people and property.

iii. Consider the requirement for flood emergency planning including flood warning and evacuation of people for a range of flooding events up to and including the extreme event (as advised by PPS25, paragraph G12 and the PPS25 Practice Guide, paragraph 7.23)

If the applicants or agents wish to discuss this position with us, they should contact <*planning liaison name / contact number*>

Advice to planning liaison and consultees

It is important to detail precisely what aspects of the FRA are defective relative to annex E.

NOTE: _Flood emergency planning

In the case of Flood Emergency plans, it is important to be clear that our objection is a procedural one based on the fact that this issue has not been addressed in the FRA as required by Government planning policy in PPS25 and the Practice Guide. Other than flood warning for which we are responsible, we should make clear to the LPA that we will **not comment on the detail** of any Flood Emergency Plan because we are do not the responsible body to do this. Use with informative EFR I 12 ‘Flood warning and evacuation’.

EFR O 08 Risk to life and/or Property

Environment Agency position

We OBJECT to the application and recommend refusal of planning permission on this basis for the following reasons:

Reason

The site lies within Flood Zone <*3a/3b/2*> defined by Planning Policy Statement 25 as having a <*high / medium*> probability of flooding where <*notwithstanding the mitigating measures proposed,*> the risk to life and/or property,

<*both within the development and in upstream and/or downstream locations*> from <*tidal / fluvial*> inundation would be unacceptable if the development were to be allowed.

In particular: *(user to select/amend/add to as appropriate)*

i. The proposed development does not have a safe means of access and/or egress in the event of flooding. Consequently, there would be an unacceptable risk to the health and safety of the occupants in a flood event.

ii. The site is currently not defended to the appropriate standard taking into account climate change over the lifetime of the development and <no / inadequate> provision is made in the application to improve the existing defences to the required standard.

iii. The site lies within the flood plain and the proposed development will impede flood flow and/or reduce storage capacity thereby increasing the risk of flooding elsewhere.

iv. The site lies on a dry Island within the floodplain. Although the site itself would not be inundated during such an event, the area around this site would be flooded. During a flood, residents trying to leave the site would be at considerable danger from the floodwater itself and also from various other hazards such as underwater drops and water bourn debris. The journey to safe, dry areas completely outside the floodplain would involve crossing areas of potentially fast flowing floodwater. Those venturing out on foot in areas where flooding exceeds 100mm or so would be at risk from a wide range of hazards, including for example un marked drops, or access chambers where the cover has been swept away.

v. The information provided suggests that the proposed development will cause an unacceptable risk of surface water flooding to people and property elsewhere. This can apply in flood zone 1 as well, and will require modification of the wording above in that case.

If the applicants or agents wish to discuss this position with us, they should contact <planning liaison name / contact number>

EFR O 10 Culverting

Environment Agency position

We OBJECT to the proposed development which involves culverting works and recommend that planning permission be refused for the following reasons:

Reasons

Environment Agency policy includes a general opposition to culverting except for access purposes. We are opposed to the unnecessary culverting of watercourses, because it can increase the risk of flooding and the maintenance requirements for a watercourse. It can also destroy wildlife habitats, damage a natural amenity and interrupt the continuity of the linear habitat of a watercourse.

In this application, the proposed culverting is unacceptable because:

Free text: Add detail, for example:

- the culvert would cause a restriction of flow in the watercourse
- the culvert would increase the risk of blockage of the watercourse

Advice to applicant

Culverting of the watercourse will require the prior written approval of the Environment Agency under s.23 of the Land Drainage Act 1991 or s.109 of the Water Resources Act 1991. Consent is highly unlikely to be granted in this instance.

Please contact <*planning liaison name/contact number*> for a copy of our policy concerning culverting.

Advice to planning liaison and consultees

The objection will be much stronger if we can refer to any specific local information, for example, known problems with existing culverts on the same watercourse or capacity problems in the catchment. Local plans often contain policies against culverting thanks to our input over many years. Where a supportive policy in a relevant Local Development Document exists, we should use it.

We might also want to suggest options that do not involve culverting, such as reducing the length to the minimum for access crossings, or rearranging the layout of the site to retain an open watercourse. We should be careful however not to go too far in suggesting changes or designing solutions for the developer.

EFR O 11 Building next to a watercourse/flood defence

Environment Agency position

We OBJECT to the application and recommend refusal of planning permission on this basis for the following reasons:

Reason

The proposed development is unacceptable because it involves building <*over/ within X metres of*> a <*watercourse/flood defence/sea wall*>. This would:

Free text: Add site-specific reason or reasons based on following prompts

- restrict essential maintenance and emergency access to the <watercourse / sea wall / defences> The permanent retention of a continuous unobstructed area is an essential requirement for future maintenance and / or improvement works.
- result in an unacceptable obstruction to flood flows thereby increasing the risk of flooding.

- be likely to adversely affect the construction and stability of the flood defence <embankment/wall/ground anchors/power supplies> which will compromise its function. The proposal will therefore increase the risk of flooding in the locality.

Advice to planning liaison and consultees

Where the proposed development falls within the bye-law distance of a main river, remind the applicant of the need for consent using informative paragraph EFR I 01. Where we are objecting we should warn the applicant that consent is unlikely to be forthcoming. Flood risk (England): Conditions

With all these conditions, consider adding the following link paragraph:

Ask to be consulted on discharge of conditions

NMF LF 02 Request for consultation on discharge of condition

We ask to be consulted on the details submitted for approval to your Authority to discharge this condition and on any subsequent amendments/alterations.

EFR C 01 Secure implementation of the FRA

Environment Agency position

The proposed development will only be acceptable if the following measure(s) as detailed in the Flood Risk Assessment <*and/or other planning documents (list)*> submitted with this application are implemented and secured by way of a planning condition on any planning permission.

Condition

The development permitted by this planning permission shall only be carried out in accordance with the approved Flood Risk Assessment (FRA) <*date / reference number / compiler details*> and the following mitigation measures detailed within the FRA:

User to detail as appropriate referring to specific paragraph references or drawing numbers where relevant within the FRA to make the condition as clear as possible, for example:

i. Limiting the surface water run-off generated by the <state return event> critical storm so that it will not exceed the run-off from the undeveloped site and not increase the risk of flooding off-site.

ii. Provision of compensatory flood storage on / or in the vicinity of the site to a <year standard>.

iii. Demonstration within the FRA that the improvement/protection and maintenance of existing flood defences will be provided.

iv. Identification and provision of safe route(s) into and out of the site to an appropriate safe haven.

v. Confirmation of the opening up of any culverts across the site.

vi. Flood-proofing measures detailed on page ….in the proposed development.

vii. Finished floor levels are set no lower than < > m above Ordnance Datum (AOD).

Add others as required.

Reason

T*o be supplied by DC in free form or as set out below (if appropriate)*

i. To prevent flooding by ensuring the satisfactory storage of/disposal of surface water from the site.

ii. To prevent flooding elsewhere by ensuring that compensatory storage of flood water is provided. .

iii. To ensure the structural integrity of existing <and proposed> flood defences thereby reducing the risk of flooding.

iv. To ensure safe access and egress from and to the site.

v. To reduce the risk of flooding from blockages to the existing culvert (s).

vi. To reduce the impact of flooding on the proposed development and future occupants.

vii. To reduce the risk of flooding to the proposed development and future occupants.

Advice to planning liaison and consultees

In theory, mitigation details set out in a FRA (or other documents e.g. drawings or the Environmental Statement) could be considered to form part of the design approved by any grant of planning permission. If these details are then omitted from the finished development it ought to be possible for the LPA to take enforcement action on this basis. However, paragraph 19 of DOE Circular 11/95 notes that it "may well be easier to for local planning authorities to enforce compliance with a condition that has been breached, than to enforce on a material variation from the approved plans or description of development." Therefore, where there are important specific elements of mitigation suggested by the FRA which are crucial to the acceptability of the proposed scheme, it is clearer and more enforceable to pull these elements into a condition or series of conditions.

EFR C 02 Scheme to be agreed - issue not addressed/not satisfactorily addressed in FRA

Environment Agency position

The proposed development will only be acceptable if the following planning condition is imposed:

Condition

The development hereby permitted shall not be commenced until such time as a scheme to <*insert from list below*> has been submitted to, and approved in writing by, the local planning authority.

User to detail as appropriate, for example:

i. Ensure no raising of ground levels.

ii. Improve the existing surface water disposal system.

iii. Ensure access to/improvement/protection and maintenance of existing flood defences.

iv. Incorporate flood-proofing measures into the proposed development.

v. Ensure finished floor levels are set no lower than < > m above Ordnance Datum (AOD).

The scheme shall be fully implemented and subsequently maintained, in accordance with the timing / phasing arrangements embodied within the scheme, or within any other period as may subsequently be agreed, in writing, by the local planning authority.

Reason

i. To be supplied by DC in free form or as set out below (if appropriate).

ii. To prevent flooding by ensuring the satisfactory storage of/disposal of surface water from the site.

iii. To ensure the structural integrity of existing <and proposed> flood defences thereby reducing the risk of flooding.

iv. To reduce the impact of flooding on the proposed development and future occupants.

v. To reduce the risk of flooding to the proposed development and future occupants.

Advice to planning liaison and consultees

This condition needs to be used with **considerable caution**. It covers the situation where the risks posed by the proposed development appear from the FRA to be acceptable but either certain mitigation required has not been identified or has been identified but lacks sufficient detail, hence the need for a scheme to be agreed. Caution is required because if there is any uncertainty about the feasibility of addressing the flood risks associated with the development, for example, SUDS/flood storage and space requirements, or the requested condition would result in a material change to the application a safer course would be for us to object as per EFR O 08 above on the grounds that the FRA is inadequate.

EFR C 03 Outline application – reserved matters to include scheme to be agreed

Environment Agency position

We consider that outline planning permission should only be granted to the proposed development if the following planning condition is imposed as set out below.

Condition

The development hereby permitted shall not be commenced until such time as a scheme to <*insert from list below*> has been submitted to, and approved in writing by, the Local Planning Authority.

User to detail as appropriate, for example:

i. Ensure no raising of ground levels.

ii. Improve the existing surface water disposal system.

iii. Ensure access to/improvement/protection and maintenance of existing flood defences.

iv. Incorporate flood-proofing measures into the proposed development.

v. Ensure finished floor levels are set no lower than < > m above Ordnance Datum (AOD).

The scheme shall be fully implemented and subsequently maintained, in accordance with the timing / phasing arrangements embodied within the scheme, or within any other period as may subsequently be agreed, in writing, by the local planning authority.

Reason

This condition is required for the following reasons: (*to be supplied by function in free form or as set out below if appropriate)*

i. To avoid adverse impact on flood storage.

ii. To prevent flooding by ensuring the satisfactory storage of/disposal of surface water from the site.

iii. To ensure the structural integrity of existing <and proposed> flood defences thereby reducing the risk of flooding.

iv. To reduce the impact of flooding on the proposed development and future occupants.

v. To reduce the risk of flooding to the proposed development and future occupants.

Although we are satisfied at this stage that the proposed development could be allowed in principle, the applicant will need to provide further information relating to the proposals to an acceptable standard to ensure that the proposed development can go ahead without posing an unacceptable flood risk.

As the matters referred to in the suggested planning condition are not “reserved matters” as defined in the Town and Country Planning Act, 1990, it will be necessary to impose a separate condition for each issue to ensure that these matters are addressed by future developers.

Advice to planning liaison and consultees

*Like EFR C02 above, this condition needs to be used **with caution**. It is only appropriate to condition the matters listed where it is clear from the initial FRA that the mitigation proposed is achievable but some of the detail about exactly how that will be achieved is missing. Where there is doubt the feasibility of the proposed scheme in flood risk terms (for example, whether the space requirements for SUDS can be met within the site constraints), it will be more appropriate to object on the grounds that the FRA is inadequate to enable assess the flood risks posed as per EFR O 08.*

Historically, applicants for outline planning permission were able to rely on providing very scant detail (often just a red site outline) to accompany applications. Since September 2006, the requirement on applicants to submit a design and access statement with planning applications including at outline stage, means that applicants have to provide more design detail on this type of application. This should help us take a stronger line on outline applications where the applicant has supplied insufficient detail for to assess the associated flood risks.

EFR C 04 Working method statement –works in channel/bankside (ordinary watercourse)

Environment Agency position

The proposed development will only be acceptable if a planning condition is imposed requiring a working method statement to cover all <*channel / bank works*>.

Condition

Prior to the commencement of development, a working method statement to cover <*all channel / bank works*> shall be submitted to and agreed in writing by the local planning authority. Thereafter the development shall be carried out in accordance with the approved scheme and any subsequent amendments shall be agreed in writing with the local planning authority.

Reason

The construction phase of any proposed development affecting the <*bank or channel of a watercourse*> poses significant risks of:

Free text: Add detail of risks

Information for the applicant/LPA –method statement requirements

We would expect the method statement to cover the following requirements:

- timing of works
- methods used for all channel, bankside water margin works
- machinery (location and storage of plant, materials and fuel, access routes, access to banks etc.)
- protection of areas of ecological sensitivity and importance
- site supervision

We ask to be consulted on the details of this scheme when it is submitted for approval to your Authority.

Advice to planning liaison and consultees

This condition applies to situations where works are taking place in the channel or bankside of an ordinary watercourse and won't be covered by the need for a flood defence consent as would be the case with a main river, but the planning application does not provide any/sufficient information about how the developer intends to

undertake in-channel or bankside construction. In this situation the resulting risks are cross cutting. Reasons should not be standard however and should be written for each individual case.

EFR C 05 Details of surface water drainage scheme incorporating SUDS to be submitted

Environment Agency Position

The proposed development will only be acceptable if a planning condition is imposed requiring the following drainage details.

Condition

Development shall not begin until a surface water drainage scheme for the site, based on sustainable drainage principles and an assessment of the hydrological and hydro geological context of the development, has been submitted to and approved in writing by the local planning authority. The scheme shall subsequently be implemented in accordance with the approved details before the development is completed.

The scheme shall also include:

Free text: User to detail, for example:

- * details of how the scheme shall be maintained and managed after completion

Reason

To prevent the increased risk of flooding, to improve and protect water quality, improve habitat and amenity, and ensure future maintenance of these *<delete/add to as necessary>*

Advice to planning liaison and consultees

Like EFR C02 above, this condition needs to be used **with caution**. It is only appropriate to condition the use of SUDS where it is clear from the initial FRA that their use is achievable but some of the detail about exactly how that will be achieved is missing. Where there is doubt the feasibility of the proposed scheme can be met within the site constraints (particularly whether the space requirements for balancing ponds, swales, reed beds etc), it will be more appropriate to object on the grounds that the FRA is inadequate to enable assess the flood risks posed as per EFR O 08.

Flood risk (England): Informatives

EFR I 01 Consent – adjacent to main river

Advice to applicant

Under the terms of the Water Resources Act 1991, and the <*name local land drainage byelaw/sea defence byelaw*>, the prior written consent of the Environment Agency is required for any proposed works or structures, in, under, over or within <*width*> metres of the top of the bank of the <*watercourse name*>, designated a 'main river'.

EFR I 02 Consent – culverting

Advice to applicant

Erection of flow control structures or any culverting of a watercourse requires the prior written approval of the Environment Agency under s.23 of the Land Drainage Act 1991 or s.109 of the Water Resources Act 1991. The Environment Agency resists culverting on nature conservation and other grounds and consent for such works will not normally be granted except for access crossings.

EFR I 03 Description of SUDS

Advice to LPA/applicant

Surface water run-off should be controlled as near to its source as possible through a sustainable drainage approach to surface water management (SUDS). SUDS are an approach to managing surface water run-off which seeks to mimic natural drainage systems and retain water on or near the site as opposed to traditional drainage approaches which involve piping water off site as quickly as possible. SUDS involve a range of techniques including soakaways, infiltration trenches, permeable pavements, grassed swales, ponds and wetlands. SUDS offer significant advantages over conventional piped drainage systems in reducing flood risk by attenuating the rate and quantity of surface water run-off from a site, promoting groundwater recharge, and improving water quality and amenity.

The variety of SUDS techniques available means that virtually any development should be able to include a scheme based around these principles.

EFR I 04 Support for SUDS approach (England)

Advice to LPA/applicant

Support for the SUDS approach to managing surface water run-off is set out in paragraph 22 of Planning Policy Statement 1 (PPS): Delivering Sustainable Development and in more detail in Planning Policy Statement 25: Development and Flood Risk at Annex F. Paragraph F8 of the Annex notes that "Local Planning Authorities should ensure that their policies and decisions on applications support and complement Building Regulations on sustainable rainwater drainage".

EFR I 05 SUDS – infiltration

Advice to LPA/applicant

Approved Document Part H of the Building Regulations 2000 establishes a hierarchy for surface water disposal, which encourages a SUDS approach. Under Approved Document Part H the first option for surface water disposal should be the use of SUDS, which encourage infiltration such as soakaways or infiltration trenches. In all cases, it must be established that these options are feasible, can be adopted and properly maintained and would not lead to any other environmental problems. For example, using soakaways or other infiltration methods on contaminated land carries groundwater pollution risks and may not work in areas with a high water table. Where the intention is to dispose to soakaway, these should be shown to work through an appropriate assessment carried out under Building Research Establishment (BRE) Digest 365.

EFR I 06 SUDS – flow balancing

Advice to LPA/applicant

Flow balancing SUDS methods which involve the retention and controlled release of surface water from a site may be an option for some developments at a scale where uncontrolled surface water flows would otherwise exceed the local greenfield run off rate. Flow balancing should seek to achieve water quality and amenity benefits as well as managing flood risk.

EFR I 07 SUDS scheme to include SUDS strategy

Advice to LPA/applicant

The drainage scheme proposed should provide a sustainable drainage strategy to include SUDS elements with attenuation, storage and treatment capacities incorporated as detailed in the CIRIA SUDS Manual (C697).

EFR I 08 SUDS – further information sources (England)

Advice to LPA/applicant

Further information on SUDS can be found in:

- PPS25 page 33 Annex F
- PPS25 Practice Guide
- CIRIA C522 document Sustainable Drainage Systems-design manual for England and Wales
- CIRIA C697 document SUDS manual
- the Interim Code of Practice for Sustainable Drainage Systems. The Interim Code of Practice provides advice on design, adoption and maintenance issues and a full overview of other technical guidance on SUDS.

The Interim Code of Practice is available on both the Environment Agency's website: www.environment-agency.gov.uk and CIRIA's website: www.ciria.org.uk

EFR I 09 Request for LPA reconsultation if minded to approve contrary to Environment Agency objection

Advice to LPA

If you are minded to approve the application contrary to this advice, we request that you contact us to allow further discussion and/or representations from us as advised in PPS25 paragraph 26.

EFR I 10 FRA sources of information

Advice to applicant

The Environment Agency does not prepare or provide FRAs. However, our External Relations Team can provide any relevant flooding information that we have available. Please be aware that there may be a charge for this information. Please contact <*details*> or write in to <*details*> Your local planning authority should have undertaken a strategic flood risk assessment (SFRA), where information on flood risk locally which may inform your FRA has been collated. Please contact your local planning authority to determine what information may be available.

EFR I 11 Flood proofing

Advice to LPA/applicant

The Environment Agency recommends that in areas at risk of flooding consideration be given to the incorporation into the design and construction of the development of flood proofing measures. These include barriers on ground floor doors, windows and access points and bringing in electrical services into the building at a high level so that plugs are located above possible flood levels.

Additional guidance can be found in the Environment Agency Flood line Publication 'Damage Limitation'. A free copy of this is available by telephoning 0845 988 1188 or can be found on our website www.environment-agency.gov.uk click on ‘flood’ in subjects to find out about, and then ‘floodline’.

Reference should also be made to the Department for communities and local Government publication 'Preparing for Floods' please email: communities@twoten.com for a copy.

EFRI 12 Flood warning and evacuation

Advice to LPA

The Environment Agency does not normally comment on or approve the adequacy of flood emergency response and evacuation procedures accompanying development proposals, as we do not carry out these roles during a flood. Our involvement with this development during an emergency will be limited to delivering flood warnings to occupants/users.

Planning Policy Statement 25 and the associated Practice Guide (paragraphs 7.23 to 7.31) places responsibilities on LPAs to consult their Emergency Planners with regard to specific emergency planning issues relating to new development. In all circumstances where warning and evacuation are significant measures in contributing to managing flood risk, we will expect LPAs to formally consider the emergency planning and rescue implications of new development in making their decisions

EFR I 13 Flood risk standing advice applies- pre application

Advice to applicant

The proposed development falls within Flood Zone <*3/2*> as defined in Planning Policy Statement 25 and is therefore at risk of flooding.

We have produced a series of standard comments for local planning authorities (LPAs) and planning applicants to refer to on 'lower risk' development proposals where flood risk is an issue to replace direct case by case consultation with us. Your proposal falls within this category.

These standard comments are known as Flood Risk Standing Advice (FRSA). FRSA can be viewed on our web site at www.environment-agency.gov.uk

The standing advice relevant to your proposal is attached to this response. **Complete the attached form and include it as part of your planning application submission to your local planning authority.** The local planning authority will then determine whether flood risk has been considered in line with FRSA recommendations. We will not be consulted on this planning application.

We recommend that you view our standing advice in full on our website before submitting your planning application to the local planning authority.

EFRI 14 Flood risk standing advice applies- planning application

Advice to LPA

The proposed development sits within Flood Zone <*3/2*> and is therefore at risk of flooding.

We have produced a series of standard comments for local planning authorities (LPAs) and planning applicants to refer to on 'lower risk' development proposals where flood risk is an issue to replace direct case by case consultation with us. This planning application sits within this category.

These standard comments are known as Flood Risk Standing Advice (FRSA). FRSA can be viewed on our web site at www.environment-agency.gov.uk

The standing advice relevant to this application is attached to this response. We recommend that you view our standing advice in full on our web site before making a decision on this application. The advice relevant to this application is attached for your convenience.

Please refer the applicant to our standing advice at the above web address.

Applicants should follow the advice and submit a completed form as part of their planning application submission. We do not need to be consulted further on this application.

EFR I 15 Pre-application advice on FRA -no prejudice to sequential approach requirements

Advice to LPA/applicant

Please note that notwithstanding the Environment Agency's comments on the applicant's flood risk assessment at pre-planning enquiry stage, we will expect to see evidence submitted with any future planning application to show that the PPS25 Sequential Test (and Exception Test if required) has been applied in accordance with Planning Policy Statement 25 paragraphs 14, 18-19 and D1-D6. If this evidence is lacking we may object to the planning application on these grounds.