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.

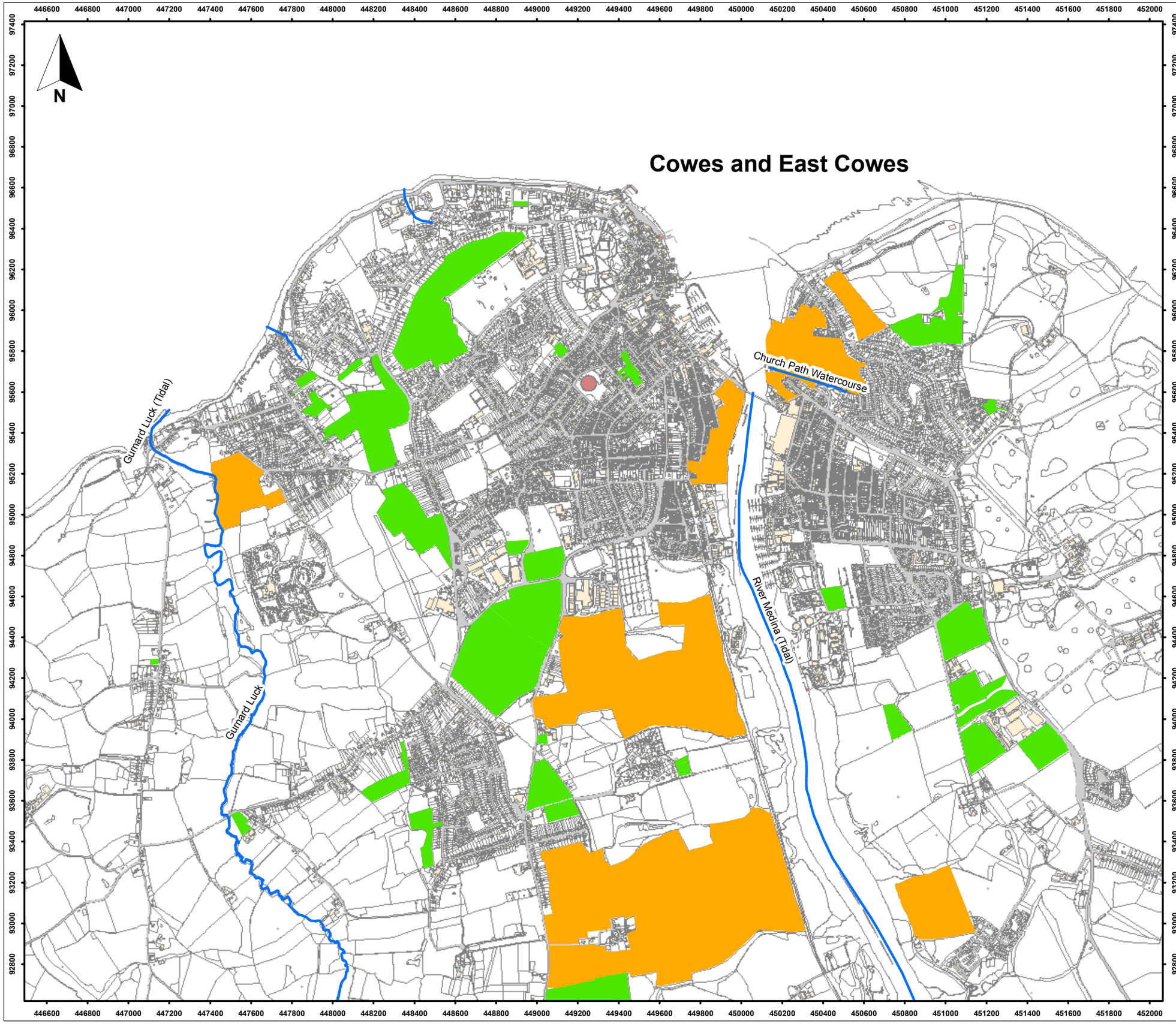
- Buildings should be designed so that safe access and egress can be facilitated in the event of the 1 in 100 year (plus climate change) and 1 in 200 year tidal event (plus climate change).

- 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

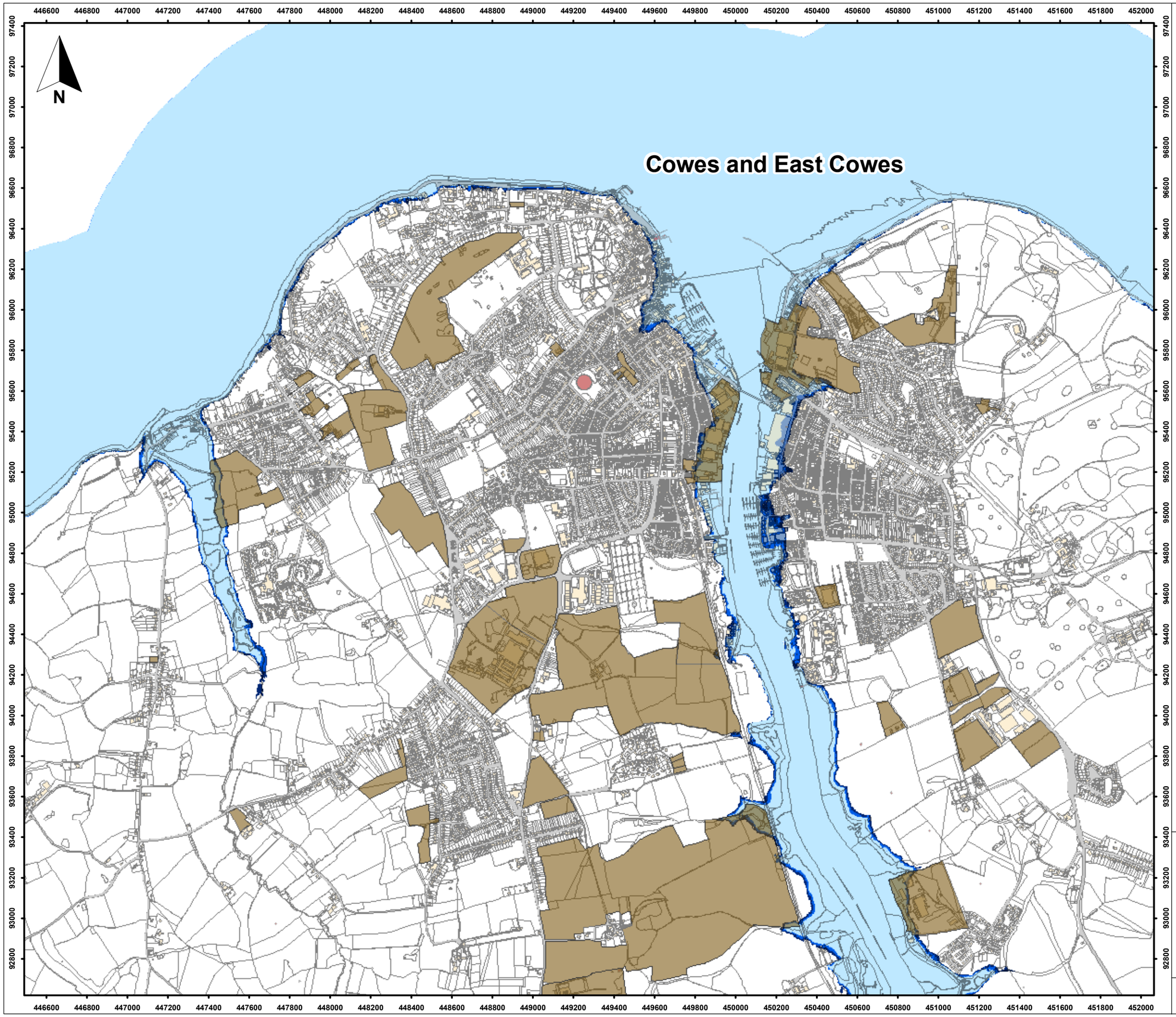
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

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

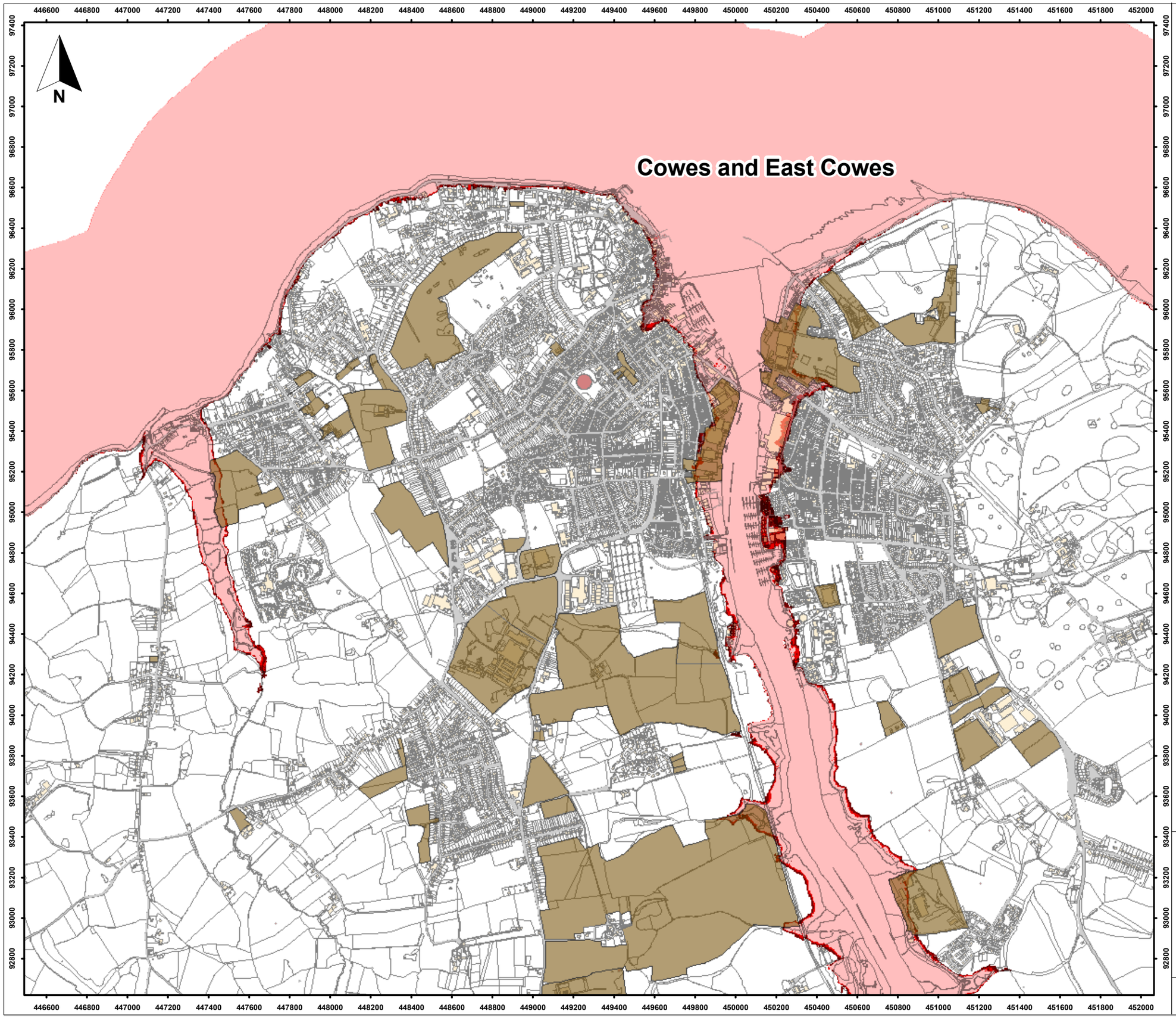
H:\Projects\HM-255\25000 - Projects\25793 - IoW SFRA Update V1\Data\GIS\ESRI\Projects\Previous SFRA MXDS

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