

Addendum Report for the North Norfolk Strategic Flood Risk Assessment

Version 1.0
12/04/2018

1 Introduction

The Final Report Revision 2.0 of the North Norfolk Strategic Flood Risk Assessment (SFRA) was issued in November 2017. At that time the Wells-Next-The-Sea coastal modelling was still ongoing and it was agreed between JBA and the client that an addendum report would be issued when this was available.

Following confirmation that the Environment Agency had signed off on the Wells-Next-The-Sea coastal model in February 2018 relevant updates have been made to the SFRA data. The updated products include:

- Updated GIS outputs
- Updated GeoPDFs
- Re-run for Dry Islands
- Mapping of Breach Scenarios
- Annex for Appendix D1

This addendum report provides an account of the alterations made to the above products following the availability of the Wells-Next-The-Sea coastal model.

2 Updated GIS Outputs

Following the availability of the Wells-Next-The-Sea coastal model relevant GIS outputs have been amended to incorporate the results and items affected by this change.

The following GIS outputs have been updated:

- Flood Zone 3b – The 20-year design/defended result has been incorporated into the Flood Zone 3b layer as the Functional Floodplain.
- Flood Zone 3b indicative – Indicative Flood Zone 3b has been removed within the domain extent of the Wells model (where the outline source was tidal) for the Flood Zone 3b indicative layer.
- Flood Zone 3a – Previous tidal source Flood Zone 3a extents within the Wells Domain have been removed and replaced with the combined 200-Year Undefended and defended Wells results (combined were used to ensure maximum extents).
- Flood Zone 2 - Previous tidal source Flood Zone 2 extents within the Wells Domain have been removed and replaced with the combined 200-Year Undefended and defended Wells results (combined were used to ensure maximum extents).
- 200-Year Tidal climate change – The Wells 200-Year climate change National Planning Policy Framework (NPPF) Defended results were added to the 200-Year Tidal climate change layer.
- 1000-Year Tidal climate change – The Wells 1000-Year climate change NPPF Defended results were added to the 1000-Year Tidal climate change layer.

Addendum Report for the North Norfolk Strategic Flood Risk Assessment

Version 1.0
12/04/2018

3 Updated Geo-PDFs

Appendix A of the main SFRA report is presented in interactive GeoPDFs. An accompanying User Guide is provided with the GeoPDFs which provides step-by-step instructions on how to navigate to data and how to use the GeoPDFs. The GeoPDFs can be used to perform high-level screening exercises, to identify whether a location or site has a potential risk of flooding. The GeoPDFs primarily display flood extents and are subject to the limitations of the flood risk datasets that are used. If detailed flood risk information is required (e.g. flood level, depth, velocity and hazard to people information), this should be addressed as part of a Level 2 SFRA and / or as part of a site-specific Flood Risk Assessment.

The GeoPDFs within Appendix A have been updated based on the GIS outputs documented in Section 2 and resupplied to the client.

4 Dry Islands

In this SFRA, dry islands are defined as an area of 0.5 hectares or greater in size, identified as being in Flood Zone 1 and completely surrounded by land which falls within Flood Zone 2 (i.e. the extreme 1 in 1,000-year extent). The 0.5 hectares threshold was selected as this reflects one of the criteria used to define "major development" (see Section 2.5). Flood Zone 2 was selected as under the National Planning Practise Guidance (NPPG), developers are required to consider the safety of the site during the extreme flood event including the potential for an evacuation before the extreme flood event.

Dry islands can present specific hazards, primarily the provision of safe access and egress during a flood event.

Using the updated GIS outputs following the inclusion of the 2017 Wells coastal modelling, the results show that there are 81 dry islands in North Norfolk district. The identified dry islands are scattered across the district but affect predominantly rural communities and unoccupied coastal areas.

5 Breach Scenarios

Coastal breach modelling covering the North Norfolk coastline was completed in 2018, to gain an understanding of potential impacts of breach failure from coastal defences along the Well-next-the-Sea coastline in North Norfolk.

Addendum Report for the North Norfolk Strategic Flood Risk Assessment

Version 1.0
12/04/2018

Breach modelling was completed for the defended 200-year, 200-year with climate change, 1,000-year and 1,000-year with climate change scenarios. Standard guidance for breach modelling was adopted, with the breach specified to occur one hour before high tide, with elevations of the defences reducing to the ground level behind the defence.

The flood extents from the breach modelling for location 1 and 2 are shown in Figure 5-1 and Figure 5-2 respectively. The areas predicted should be seen as indicative of the influence of breaches, as the exact location of the breach, failure type, and event in which the breach occurs all could influence the flooding from such an event.

Four breach locations were assessed in North Norfolk district, as part of the Wells-next-the-Sea modelling. These are recorded in Table 5-1.

Table 5-1: 2017 Well-next-the-Sea coastal breach modelling – breach locations

| Breach | Location |
|--------|--|
| 1 | North west of Broadwater Road, King's Lynn District |
| 2 | North of Burnham Deepdate, King's Lynn District |
| 3 | North of Salthouse, North Norfolk District |
| 4 | North east of Wells-next-the-Sea, North Norfolk District |

Breach modelling was completed for the defended 200-year, 200-year with climate change, 1,000-year and 1,000-year with climate change scenarios. Standard guidance for breach modelling was adopted, with the breach specified to occur one hour before high tide, with elevations of the defences reducing to the ground level behind the defence.

The flood extents from the breach modelling for location 1 and 2 are shown in Figure 7 12 and Figure 7 13 respectively.

Breach locations 1 and 2 are located outside the North Norfolk District and a review against the baseline results shown negligible increases in flood risk within North Norfolk when breach scenarios are compared against the baseline.

Breach location 3 north of Salthouse does not increase extents within the district when compared with the baseline/defended results.

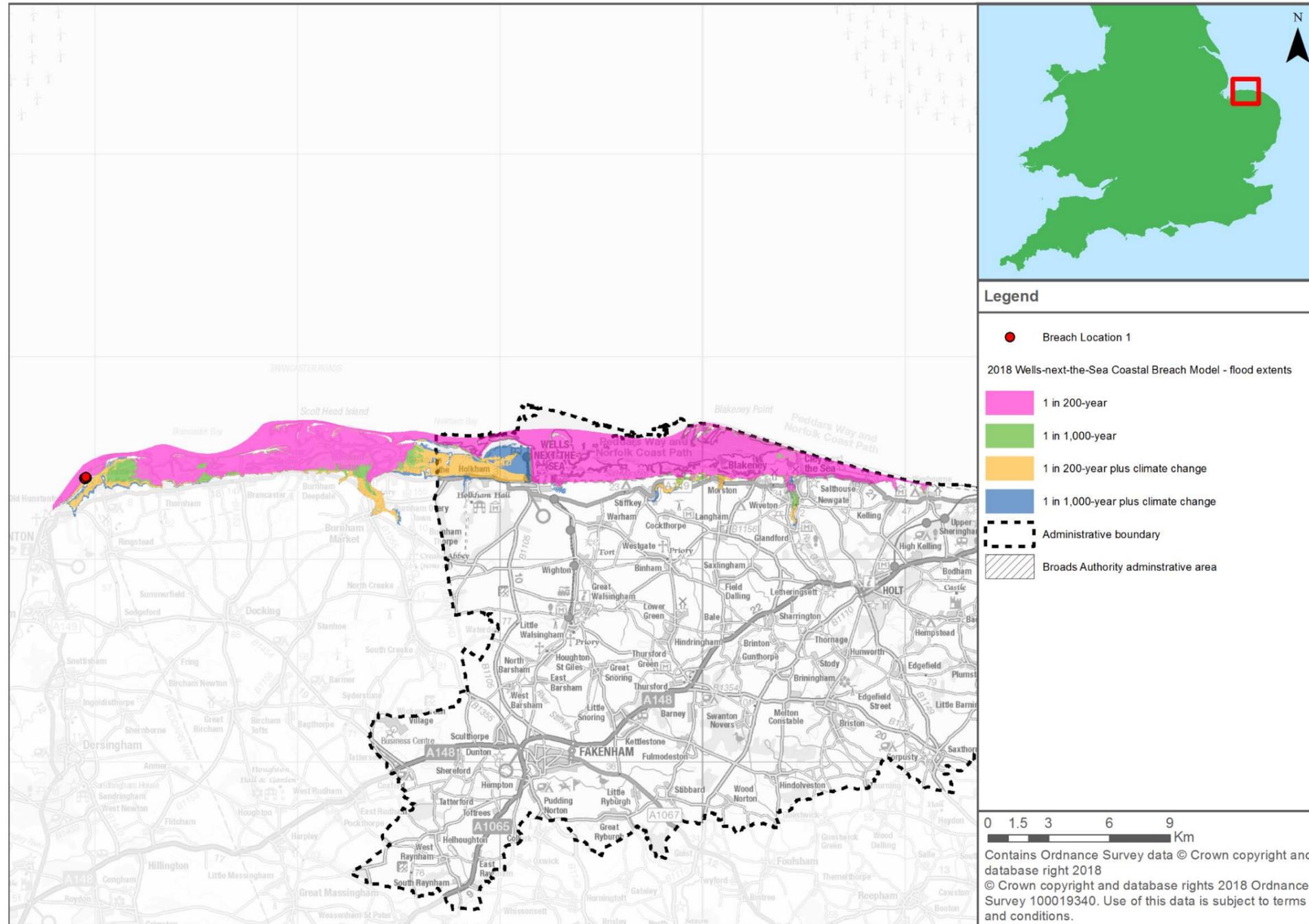
Breach location 4 located to the north east of Wells-next-the-Sea shows significant flooding to Wells-next-the-Sea and the nearby rural area following a breach from the 200-year event upwards.

The breach modelling shows that areas of North Norfolk district are at risk should the defences breach; it demonstrates that Wells-next-the-Sea in particular is reliant on defences to protect against tidal (sea) flooding.

Addendum Report for the North Norfolk Strategic Flood Risk Assessment

Version 1.0
12/04/2018

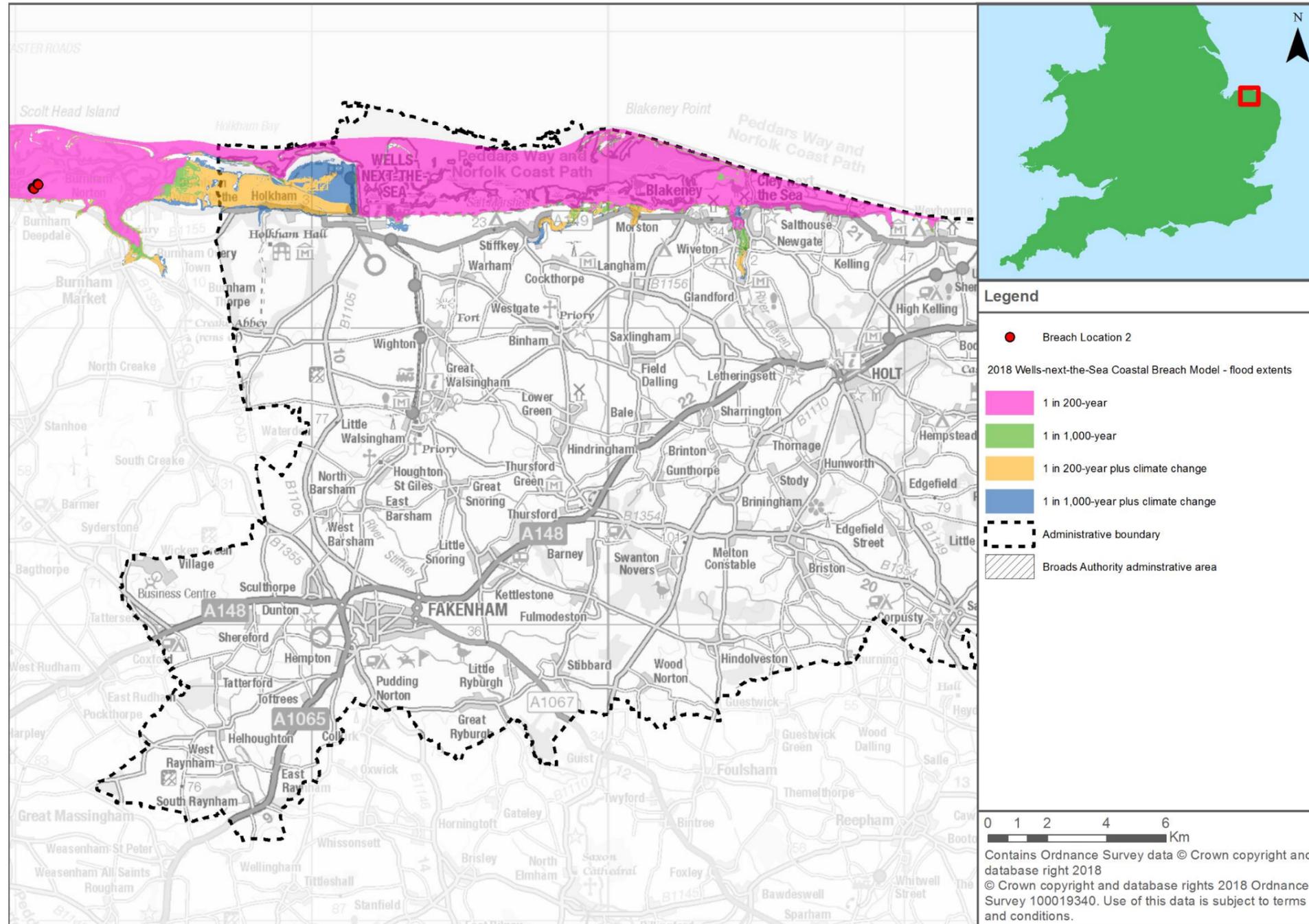
Figure 5-1: 2017 Wells-Next-The-Sea breach modelling - Breach location 1



Addendum Report for the North Norfolk Strategic Flood Risk Assessment

Version 1.0
12/04/2018

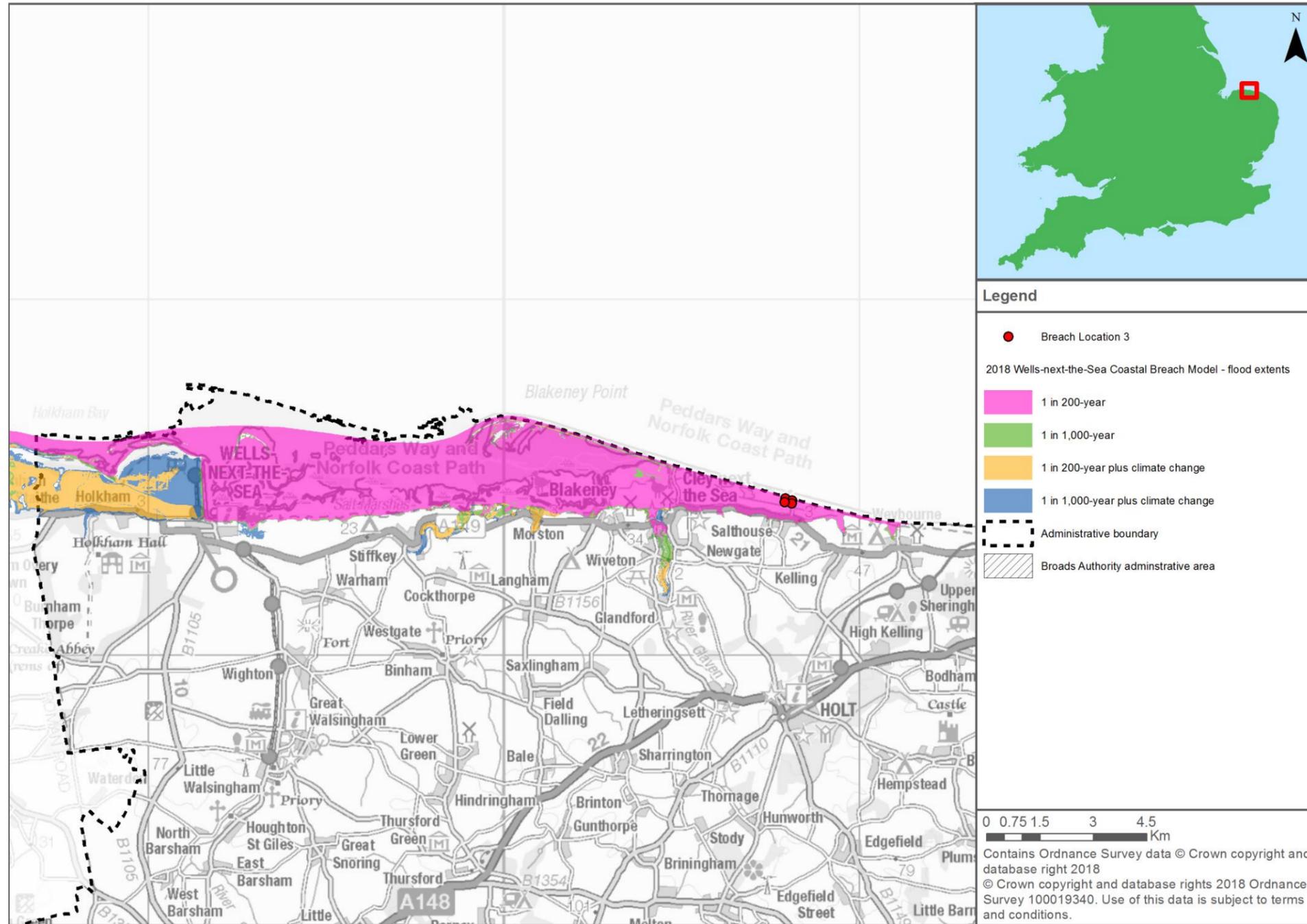
Figure 5-2: 2017 Wells-Next-The-Sea breach modelling - Breach location 2



Addendum Report for the North Norfolk Strategic Flood Risk Assessment

Version 1.0
12/04/2018

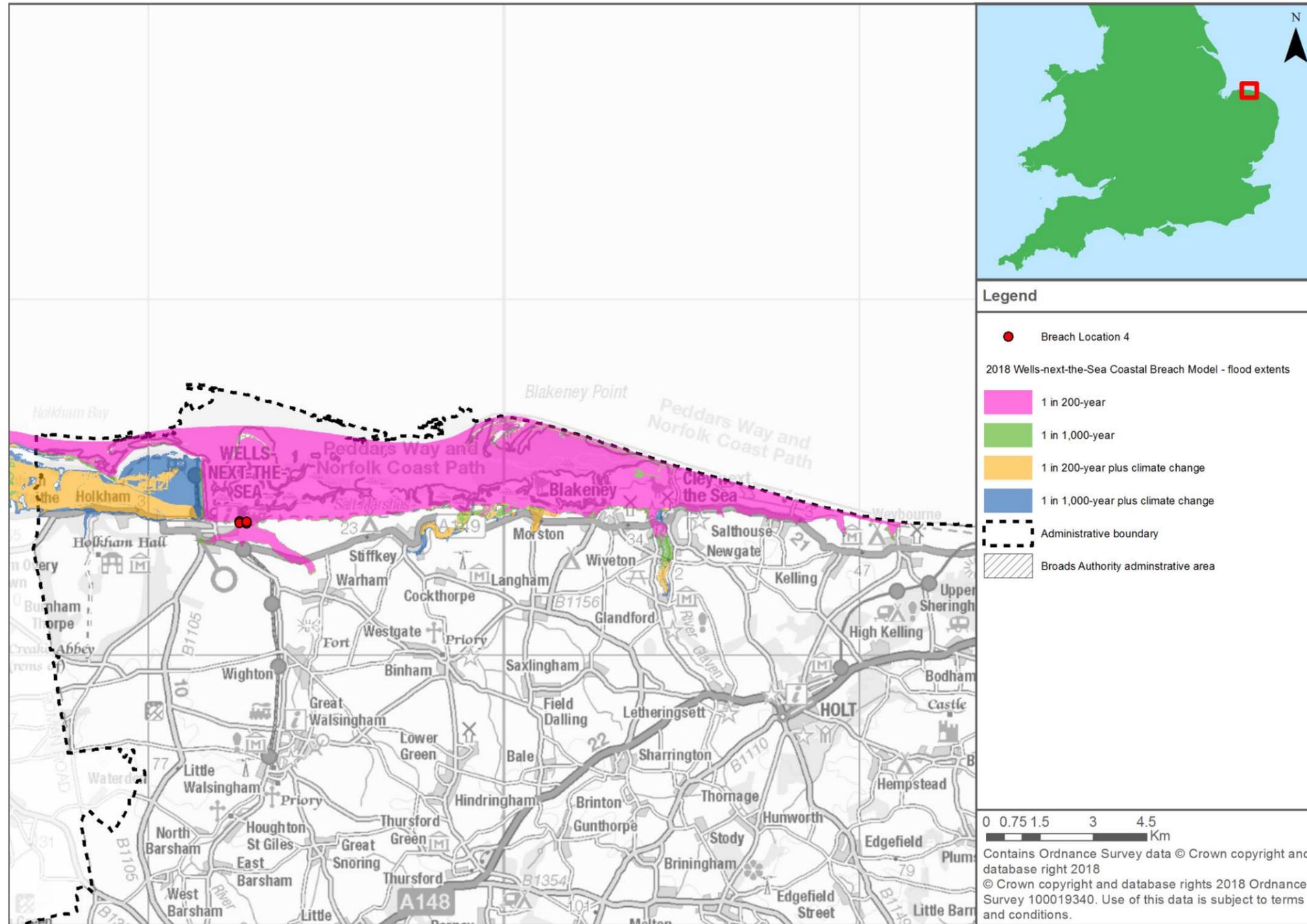
Figure 5-3: 2017 Wells-Next-The-Sea breach modelling - Breach location 3



Addendum Report for the North Norfolk Strategic Flood Risk Assessment

Version 1.0
12/04/2018

Figure 5-4: 2017 Wells-Next-The-Sea breach modelling - Breach location 4



Addendum Report for the North Norfolk Strategic Flood Risk Assessment

Version 1.0
12/04/2018

6 Annex for Appendix D1

Table 6-1 provides an addendum to Table 1-2 included in the Appendix D1 issued with the Main Report in November 2017. This table provides details of the Wells-Next-The-Sea model used in the above SFRA which represents tidal / coastal flood risks. The table lists the model’s geographical coverage, the model details, the estimated timeframe for the next model update, how the model has been used to derive the SFRA Flood Zones and if the climate change scenarios have been mapped from this model (the climate change methodology is discussed further in Section 4 and 5 of the main SFRA reports).

Table 6-1: Detailed hydraulic model used in the Level 1 SFRAs - tidal / coastal models

| Model geographical coverage | Model Name | Expected Environment Agency model update | SFRA Flood Zone 2 and Flood Zone 3a | Model used to map the SFRA Flood Zone 3b | Return period event Flood Zone 3b is taken from | Climate Change 200-year outline mapped from this model | Climate Change 1000-year outline mapped from this model | Comment |
|-----------------------------|--|--|---|--|---|--|---|---|
| Wells-Next-The-Sea | 2017, JBA, Anglian Coastal Modelling, Wells-Next-The-Sea tidal Model | New 2017 modelling - No further updates are expected to this model | The results from the 2017 model have been included in the SFRAs Flood Zones | Yes | 20-year | Yes | Yes | This model was finalised and signed off by the Environment Agency in February 2018 resulting in updates and resupply of products and the North Norfolk Addendum report. |