

An Ipswichian Palaeo-shoreline in Holderness

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Introduction

Previous research has identified a possible palaeo-shoreline extending across the Holderness region of Yorkshire. A 3D modelling project has revealed the extent of this feature under the Quaternary sediments across the entire area. The model also reveals the general palaeo-landscape of the area. This poster illustrates the first full 3D visualisation of this buried shoreline and proposes further investigative work that could be undertaken.

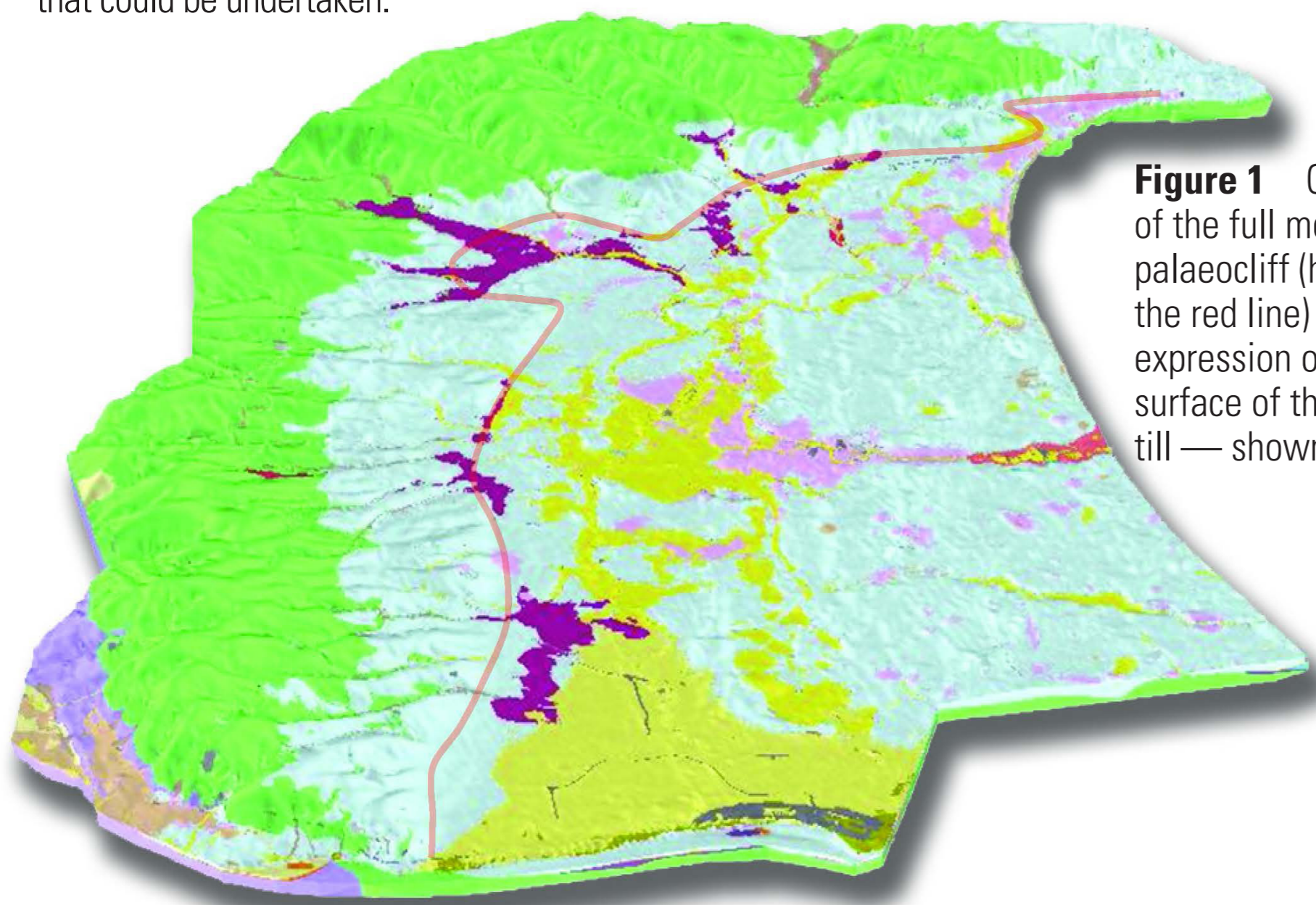


Figure 1 Oblique view of the full model. The palaeocliff (highlighted by the red line) has a clear expression on the ground surface of the overlying till — shown in blue.

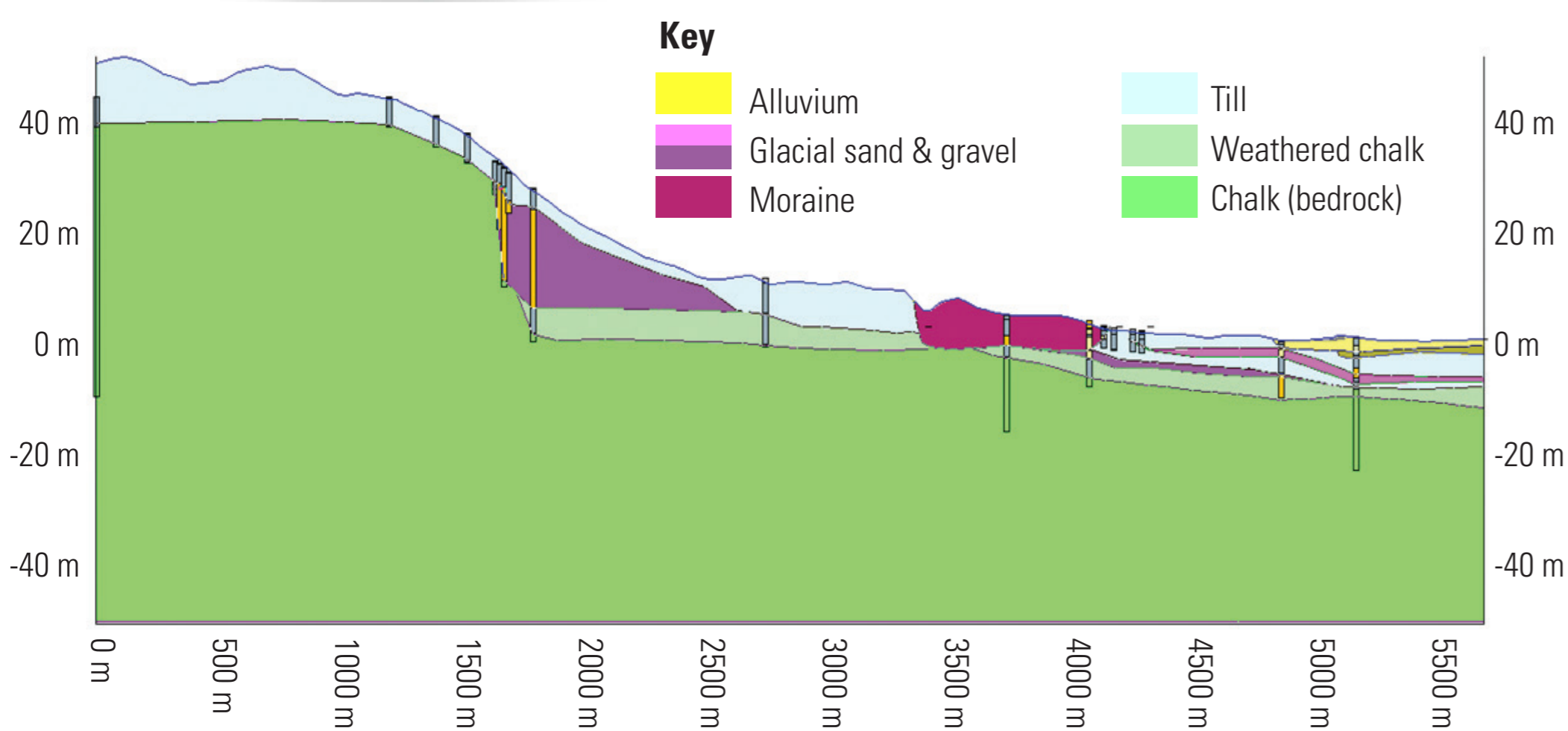


Figure 3 Showing the thickening of superficial deposits east of the palaeocliff, which clearly formed a barrier to the advancing Devensian ice sheet.

Description of Chalk Surface and Palaeocliff

Superficial sediments overlie the Chalk and are composed of a suite of glacial material, overlain in places by alluvium, mass movement deposits and tidal flat deposits. The palaeocliff is cut into the Chalk surface at the base of the superficial sediments. Some extra cross sections were subsequently constructed in order to define the palaeocliff better.

The palaeocliff can be seen in the modelled rockhead surface (Figure 2), and also has an expression in the overlying till at ground surface where it drapes over the feature (Figure 1). It is quite well defined on a number of the cross sections, particularly on the section shown in Figure 3, located west of Cottingham, where it is constrained by boreholes. Analysis of the cross sections shows that the base of the cliff lies at about 0-3m OD. There is some suggestion that the level could be lower towards the north (see Straw & Clayton, 1979), but the resolution of the model is not sufficient to be conclusive. To the east and south, the buried Chalk surface appears to be a gently undulating pene-plain. In places the 3D model revealed that the rockhead surface is dissected by sand and gravel-filled glacial channels. Landwards, the Chalk outcrops and forms the hills of the Yorkshire Wolds, where the dry valleys are oriented in a radial pattern.



The palaeocliff outcrops at the coast at Sewerby, near Bridlington. Pictured here in 2011, the feature passes obliquely into the modern cliff. Chalk talus the base can be seen covered by slumped till.

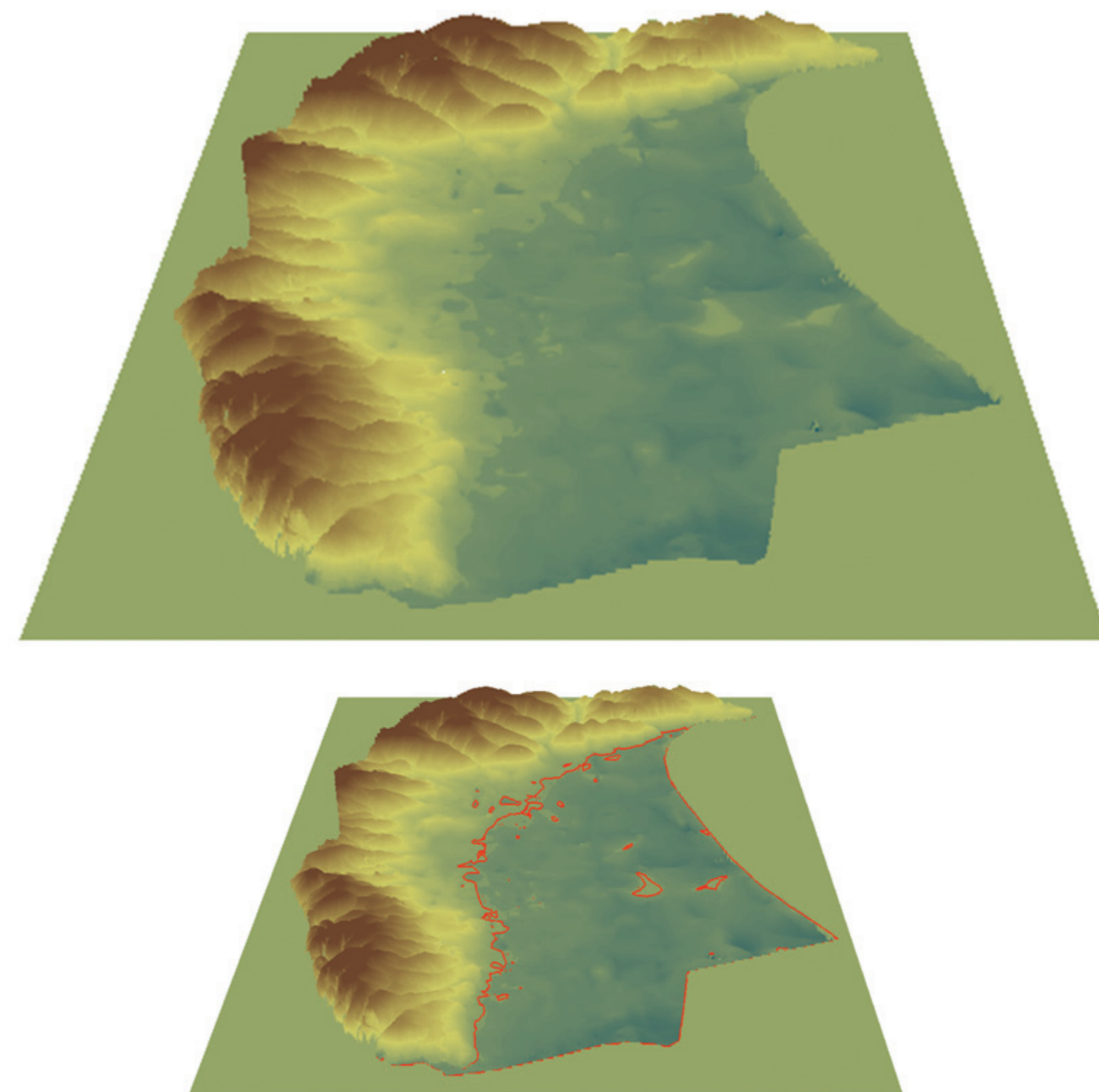


Figure 2 Oblique view of the rockhead surface shown with a colour scale. The lower image shows a +1 m OD contour in red, highlighting the extent of the palaeo-shoreline. The feature is also picked out by a steepening of the surface beneath the cover of glacial deposits — mainly till. An undulating plain is seen seaward of the cliff, whereas landwards the chalk outcrops to form the Yorkshire Wolds.

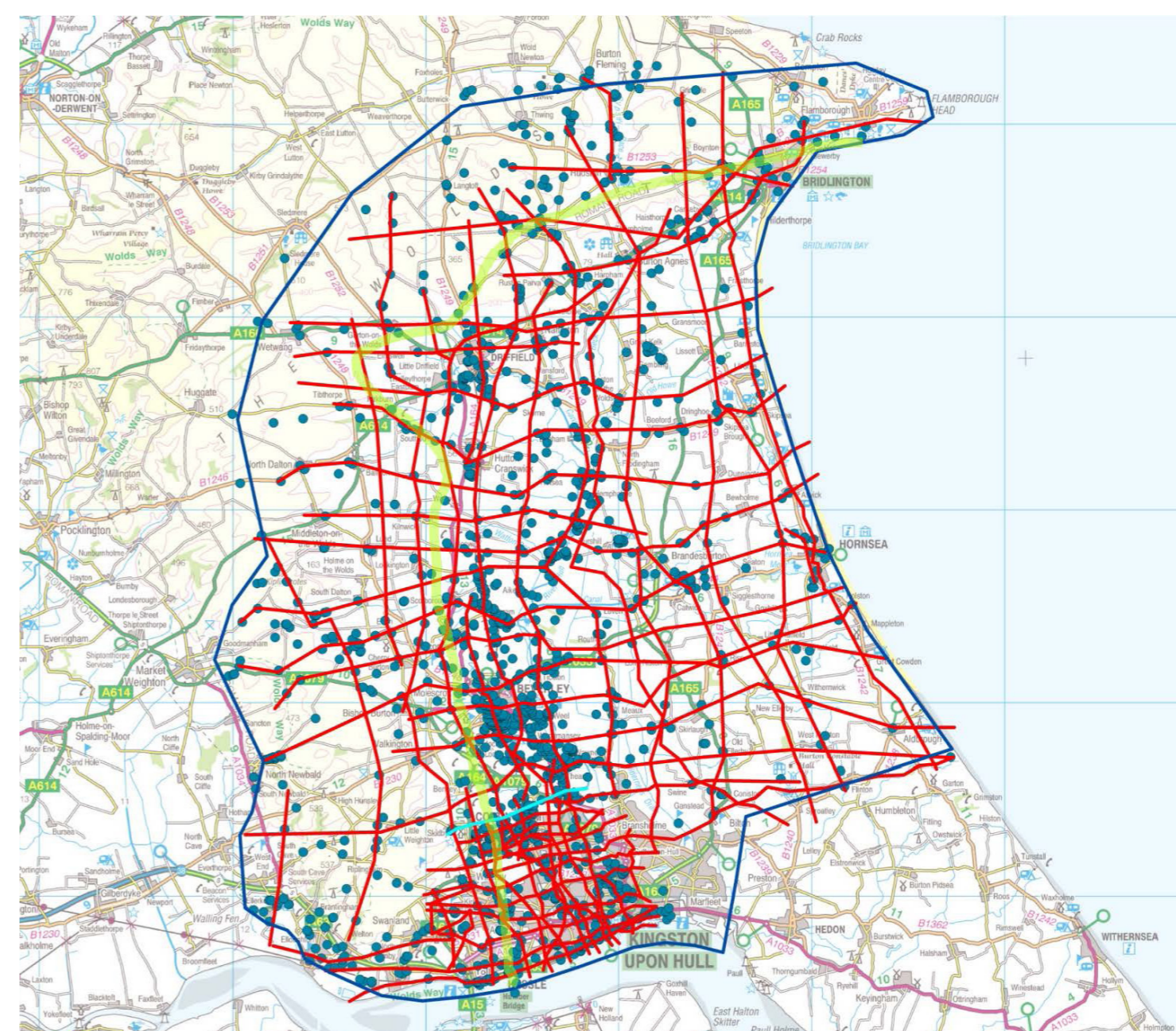


Figure 4 Extent of the model, which was created from a network of intersecting cross-sections, utilising borehole data and existing geological mapping.

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Further Work

The borehole data are generally too widely dispersed in order to show the feature in any great detail, but future work could involve:

- geophysical surveys — passive seismic, radar, resistivity — in order to better delineate the feature.
- a study of the Chalk to determine whether the wave-cut platform follows a bedding plane or cuts through the formations.
- a more detailed investigation of the nature and thickness of superficial deposits landward and seaward of the buried cliff line.
- a programme of borehole drilling to improve the resolution of data.
- extending the model southwards to map the feature through Lincolnshire.

Reference

Straw, A, and Clayton, K M. 1979. Eastern and Central England, Methuen, London.

Acknowledgments

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