

# LOCAL GEOLOGICAL SITES

## BASILDON DISTRICT



### BaG1 Norsey Wood Nature Reserve, Billericay

**Site location:** Norsey Wood Nature Reserve, Norsey Road, Billericay.

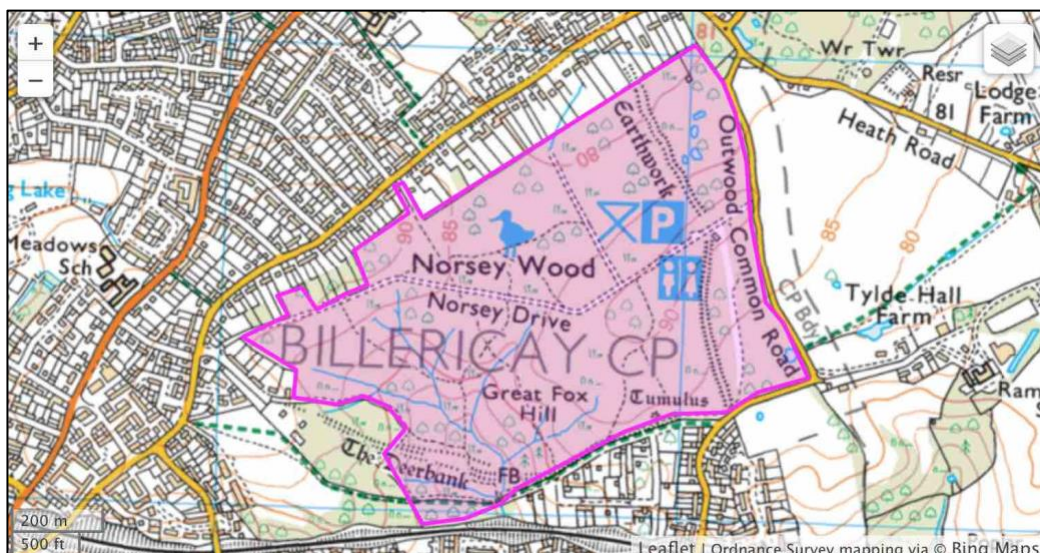
**Grid reference:** TQ 686 954

**Status:** Public access land (with visitor centre)

#### **Summary of the geological interest:**

Norsey Wood, 165 acres of mixed coppice woodland, is close to the centre of Billericay. Its varied geology is the foundation of the Reserve's soils, landscape and topography. It has resulted in a variety of different soil types and hence a varied flora and fauna.

The geology is similar to that of other high points in south Essex, with London Clay overlain in higher areas by sandy clay, the Claygate Beds, overlain by fine yellow Bagshot Sand. Rounded flint pebbles cap the highest ground along Stock Road and just into the north-west edges of the wood. These sedimentary layers are exposed in valleys and small ravines, on paths and in the roots of fallen trees.



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**Site Assessment.** Local Geological Sites (LoGS) in Essex are assessed using criteria based on DEFRA guidance. An assessment form is used which asks key questions under four value categories: scientific, educational, historical and aesthetic. This site has been assessed and qualifies under these criteria.

#### **Scientific interest and site importance**

Beneath the whole of the Billericay area is London Clay, a stiff, blue clay laid down in a subtropical sea some 54 to 52 million years ago, during the Eocene period. Above the London Clay is the Claygate Beds, sandy clay laid down as the London Clay Sea became shallower and the coastline closer. The Claygate Beds, in turn, are overlain by beds of almost pure sand called the Bagshot

Sand, laid down as delta sediment 50 million years ago. The Bagshot Sand provides unusually sandy and brightly coloured soil.

Within the past half-million years, intense erosion of the landscape by rivers during the Ice Age has considerably modified the Billericay landscape, carving fairly deep valleys which have exposed the London Clay and Claygate Beds in the valley floors and left outcrops of Bagshot Sand on the high ground. Billericay is a good example with the High Street running along a Bagshot Sand ridge capped by more recent gravel. From the Billericay ridge the Bagshot Sand high ground extends in an easterly direction through Norsey Wood forming a well-drained plateau which supports mainly sweet chestnut coppice and occasional colonies of heather. This is in contrast to the steep-sided valleys where the London Clay and Claygate Beds give rise to clay soils, supporting alder, ash and willow trees, with plants such as sedge, ferns and sphagnum moss. Springs are common where water draining through the Bagshot Sand is thrown out on meeting layers of clay in the Claygate Beds, producing areas of marshy ground.

Forming the very highest ground on top of the Bagshot Sand is a layer of gravel. It is very noticeable in Norsey Wood because it contains remarkably well-rounded, smooth, almost spherical pebbles. It was worked between the 1850s to the end of the First World War mainly for mending the roads. Geological investigations in the early 20th century recorded the gravel in the wood to be at least 5 feet thick. The western gravel pits are mostly built over, but the eastern pits remain as hummocks and hollows. The main access path from the visitor centre into the wood is surfaced with imported limestone aggregate but further on the paths are surfaced with these delightful, native pebbles. They can also be seen in the arable field opposite the main entrance to the wood.

The view of many geologists is that these flint pebbles were transported from the south across this area by a river during the Ice Age. This suggestion is based on the existence of similar gravel on the summits of the highest hills in south Essex such as the Langdon Hills. The gravel here also contains distinctive pebbles from Kent which means that it was almost certainly laid down in the early Ice Age, perhaps as much as two million years ago, by rivers flowing north from Kent across Essex. These rivers existed when the Thames flowed across north Essex and Suffolk, before it was diverted to its present course by the Anglian ice sheet less than half a million years ago.

The inevitable conclusion is that hill tops such as the Langdon Hills were once the bottoms of river valleys, indicating that an astonishing amount of uplift and erosion of the landscape has taken place since then. But the gravel at Billericay is at a lower height above sea level and is lacking in pebbles from Kent. There is some debate about the origin of the Norsey Wood pebbles, whether these have been laid down by an ice age river or were deposited here on an ancient beach around 50 million years ago but subsequently disturbed by periglacial activity.

## **References**

- LUCY, G. 2008. The Geology of Norsey Wood Nature Reserve, Billericay. *Essex Naturalist*. Vol. 25 (New series). Pages 128-130.
- MERCER, I & MERCER, R. 2022. Essex Rock – Geology Beneath the Landscape, Pelagic Publishers. Pages 224-226.