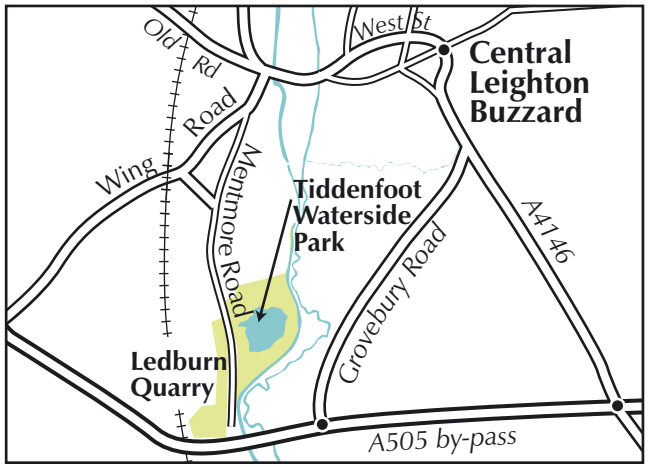
## Bedfordshire geology

Rocks make landscape, and Bedfordshire's countryside is shaped by many different rocks. The county's visible geological history spans a period of more than 200 million years. It begins in the tropical seas of the Jurassic limestones of the Ouse valley, followed by lagoons where dinosaurs roamed 170 million years ago. The Greensand Ridge was once a shallow seaway, and the high white Chalk hills were deposited at the bottom of a warm blue ocean.

Bedfordshire's amazing geological history is open for you to read; you just have to know where to look! Here's a brief guide to take you back through time to the early Cretaceous period, when dinosaurs walked dry land. Come and see the sandy floor of the shallow seaway that eventually became the Greensand Ridge.

*The Greensand Ridge revealed in the sand face at Ledburn. These are 'silver sands', pure silica sand, held together and coloured red-orange by iron oxide (rust!). The holes into the face were made by sand martins: please do not disturb these beautiful birds.*




Tiddenfoot Waterside Park and the adjacent Ledburn Quarry are in southern Leighton Buzzard. Both are open to the public.

**The Bedfordshire & Luton Geology Group** exists to encourage understanding of the geology and geomorphology of the county and to undertake site recording, interpretation, advice and education

**Regionally Important Geological and Geomorphological Sites (RIGS)** are places that reveal our geological past and are considered important enough to deserve conservation. They include sites where rocks can be seen (such as quarries and road cuttings) or where the geology or geological processes can be inferred from the shape of the landscape. Official RIGS are recognised by county councils and by Natural England.

For more information about the BLGG and our events as well as the geology and geomorphology of your area visit our website at

www.bedsrigs.org.uk

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## Lower Greensand

# Tiddenfoot & Ledburn Quarries

Bedfordshire & Luton Geology Group

bringing landscape to life

In the Lower Cretaceous, while dinosaurs walked on dry land, Bedfordshire was a sandy shallow seaway. Tides and strong currents moved the sands to and fro, rivers and streams washed tree trunks and branches from the cycad forests into the sea. Try to imagine the landscape 100 million years ago as you walk across the sands in these worked-out quarries.


## The Lower Greensand

The sands of Tiddenfoot and Ledburn belong to a formation known as the Lower Greensand, which was laid down in a seaway around 100 million years ago, a period known as the Lower Cretaceous. This was an exciting episode in Bedfordshire's geological history: after 40 million years as dry land, the area was suddenly flooded by the sea. The water burst across what is now southern England, forming a narrow channel running southwest from the Wash, across Bedfordshire, and onward to the Isle of Wight.

The sands of Leighton Buzzard are quite different to the Lower Greensand anywhere else, because they tell us about the environment of this ancient seaway. Each quarry in the area adds another chapter to the story, revealing more about the tides, currents and the animals that lived in the shifting sands.

The flood that created the seaway was part of a world-wide event caused by global warming. Sea-level continued to rise, so the Gault clay that lies above the Lower Greensand was deposited on the floor of a tropical ocean that covered the whole of Britain. After that we don't know what happened in the Leighton Buzzard area until the Ice Age 2 million years ago: 95 million years of geological history is missing, stolen by erosion.

## The Ice Age

The loamy material above the sand at Ledburn is the *First Terrace deposit* of the Ouzel laid down as the river cut down into the present valley during the Devensian cold phase of the Ice Age, *c.* 15,000 years ago. The rounded pebbles in the deposit travelled a long way to reach Leighton Buzzard: the grey-white quartzite is from Scotland, and the red-brown 'Bunter' came from the Midlands. This is an Ice Age story, for an ice sheet brought them most of the way before meltwaters from a retreating glacier washed them further into Bedfordshire.


*Cross-stratification near the top of the sands at Ledburn. This is a cross-section through a sand dune formed under the sea; the parallel lines mark slight differences in the sands and sediments, telling us that the layers of sand built up over time. The vertical lines were made by modern tree roots, and the holes drilled horizontally into the sand face were made by insects.*

## What can be done with a hole in the ground?

Quarry owners try hard to make worked-out quarries into something of benefit to local people. Tiddenfoot Waterside Park was worked for sand until the 1960s. When quarrying ceased the area was restored to create a pleasant place for people and wildlife, but the sands still influence what we see here. You may have noticed changes in the level of Tiddenfoot Lake if you visit regularly: the permeable sands are an *aquifer* (they hold water), and the rise and fall of the lake reflects changes in the amount of water stored in the sands. Rocks make the soil in which plants grow, so the vegetation of a site may tell us something about the geology. Gorse thrives in dry areas where a nutrient-poor acidic sandy soil is well above water level; nettles tell us that the soil is damp and has higher levels of nutrients (particularly phosphate).

Quarrying at Ledburn was more recent, so it's at an earlier stage in the *successional sequence* in which plants and animals colonise a new site. Mosses are a good indicator of poor, sandy soil in wet areas, while nettles and teasel do well on slopes where clay provides more nutrients. Dead, drowned trees in or near the lakes are a reminder that the water levels change dramatically.

*Look beyond the disturbed ground of the old quarry landscape to see the natural processes at work here. Today Ledburn provides a home for many plants and animals – and a chance for us to see how geology influences wildlife as well as landscape.*