



Purpose



This is a public statement prepared by SNH for owners and occupiers of the SSSI. It outlines the reasons it is designated as an SSSI and provides guidance on how its natural features could be conserved or enhanced. This statement does not affect or form part of the statutory notification and does not remove the need to apply for consent for operations requiring consent.

We welcome your views on this statement

Description of the Site

The coastal section between the “New Red Sandstone” quarry at Clashach and the disused quarry at Covesea provides an excellent section of the Hopeman Sandstone Formation. The sandstones illustrate fine examples of complex star-shaped sand dunes and several crescent-shaped dunes. These were formed in desert conditions around the boundary of the Permian and Triassic periods, about 250 million years ago, when this area was then part of the ancient continent of Pangea, situated about 15° to 20° north of the equator. The wind directions at the time of the dune formations can be determined from the way in which the wind blown sediments are bedded. The dunes were eventually swamped by a wind deposited sand sheet that capped the dune sequence. These sandstone exposures help us to discover what the environmental conditions were like 250 million years ago.

Before the ancient sand dunes were turned into rock it is thought that the layers of sand may have been altered by an earthquake, causing some layers to become disturbed and folded. These deformation structures can be observed where they have been exposed.

The site is also of special interest for several fossil footprints which have been revealed during quarrying operations. The footprint trackways were probably made by mammal-like reptiles of the dicynodont family, when the animals may have been travelling across the sand dunes between two desert oases. Footprints and the marks made by tails dragging on the ground can be found on slabs of sandstone displayed near the entrance to Clashach quarry. Another recent discovery is that of a dicynodont skull. This is the first recognisable fossil from the Hopeman Sandstone Formation and is a highly significant discovery as it presents an opportunity to obtain a more accurate age determination of the sediments than was previously possible .



view of the dicynodont trackway.

Natural features of Clashach to Covesea SSSI

Name of Natural feature

Stratigraphy: Permian Triassic (red beds)

Palaeontology: Permian Triassic Reptilia

Current condition of the natural feature

Permian Triassic Geology (Results of monitoring February 1999)

The site was monitored and found favourable. Gorse regeneration and landslip had occurred but had not significantly affected the earth science interest. The active quarry operations at Clashach reveal fresh rock surfaces and spoil. The rock faces represent the rock in its geological context, whereas the spoil represents an excellent resource for the discovery of new fossil material.

Past and present management

The Clashach quarry has been used for several decades and extraction is continuing. There is no active management of the coastal section and currently Covesea Quarry is still disused. There is an interpretive display at Clashach which is unique in Scotland as it is the only location where excellent examples of Permian-Triassic reptile tracks and traces are presented virtually *in situ* to the public outside a museum setting.

Objectives for management

We wish to work with the owners and other interested parties to protect the site and where necessary to enhance its features of special interest. SNH aims to carry out site survey, monitoring and research as appropriate to increase our knowledge and understanding of the site and enhance its management.

1. Maintain visibility of the rock exposures along the coastline and inland within the quarries

Standard blasting for quarrying tends to leave a deeply shattered surface which obscures the scientific interest and can be vulnerable to physical weathering processes. Final blasting operations should be carried out in a manner which leaves a 'smooth blasted' face. This can stand well over a long period and shows the

bedding features most clearly. All spoil should be stored away from the exposures to permit access to good examples by bona fide geologists studying the site.

2. Maintain accessibility throughout the site for scientific research

3. Continue to develop the educational resource in a safe manner for the general public

SNH wish to encourage the development of the current interpretation to bring it up to date and include all of the material on site

4. Ensure any fossil trackways or other fossils discovered during quarrying are secured for study.