



## South Wales RIGS Group Site Record

### RIGS Description

**SECTION A**

General	South Wales
<b>Site Name:</b> Three Cliffs Bay	<b>File Number:</b> Site_TW_19
<b>RIGS Number:</b> 722	<b>Surveyed by:</b> Tony White
<b>Grid Reference:</b> SS 5370 8800	<b>Date of Visit:</b> 18 <sup>th</sup> August 2009
<b>RIGS Category:</b> Scientific, educational, aesthetic	<b>Date Registered:</b>  <b>Owner:</b> Unknown
<b>Earth Science Category:</b> Stratigraphic	<b>Planning Authority:</b> City and County of Swansea
<b>Site Nature:</b> Cliffs	<b>Documentation prepared by:</b> Rhian Kendall
<b>Unitary Authority:</b> City and County of Swansea	<b>Documentation last revised:</b> 30 <sup>th</sup> March 2012
<b>OS 1:50,000 Sheet:</b> 159	<b>Photographic Record:</b> Attached
<b>OS 1:25,000 Sheet:</b> 164	
<b>BGS 1:50,000 Sheet:</b> E247	
<b>RIGS Statement of Interest:</b>	
<p>Three Cliffs Bay in the Gower is beautiful, iconic part of our coastline. Its distinctive three pointed cliffs and cave are probably one of our best known sea side locations and popular with tourists. This makes Three Cliffs Bay is wonderful example of public appreciation of landscape and geology.</p> <p>The geology of Three Cliffs Bay is also very important and is described as one of the best places to study the Carboniferous Limestone geology which is exposed here in an unbroken sequence (Courceyan-Holkerian aged rocks).</p>	

**Geological setting/context:**

A. Natural arch cut in steeply dipping Carboniferous Limestone, plunge pool on landward side.

B. Angular frost shattered slope deposits, storm beach of (mainly) limestone clasts, backed by alluvial sediments showing meandering pattern of stream. Sand dunes covering alluvium in part.

C. West side of the bay has an important section through Courceyan-Holkerian aged strata.

The site comprises wide stretches of sandy beach, a river (Pennard Pill) running through the eastern area with limestone headlands on either side. The Limestone cliffs on the west side of Three Cliffs bay are designated in the Lower Carboniferous GCR volume as important in the understanding of the Dinantian stratigraphy.

Three Cliffs Bay has good exposures of the lower Carboniferous Limestone with d2 sequence of Caswell Bay Oolite and Mudstone, High Tor Limestone and Hunt's Bay Oolite all present. There are interesting structural features present including several faults running in a north to south direction and thrust faulting running west to east. These structural movements and the prominent joints give Three Cliffs Rock its pyramidal outline and also control the position and shape of the cave passage beneath it. The joints here commonly form in response to stress-patterns set up in the rock during earth movements, and in such cases a conjugate set have been created, which means a pattern of cracks symmetrically disposed about the stress-vector. This is best seen from the seaward side of the pyramid-shaped rock on the eastern headland of the bay (see schematic sketch below). The limestone beds in this area dip approximately 70° to the south and the angle of maximum dip exposes the dominant diagonal joints which are symmetrically disposed about this line.

On the west side of the bay is the section designated as a GCR although as yet is not a SSSI. The rocks here are considered to be one of the finest in the Britain to study this stratigraphic interval and in the understanding of controls on limestone deposition. The stratigraphy extends from the base of the Shipway Limestone to the Hunts Bay Oolite. A ramp model is proposed as the depositional environment for this sequence where there were fluctuations in water depth. Please see Cossey et al (2004) for more information.

Inland of the main seaward rock exposures are coastal dunes and vestiges of raised beach deposits -high above the present sea level. These indicate past higher sea levels. These features are within the Pennard Burrows SSSI but make an interesting additional feature of the area.







**References:**

BARCLAY, W J. [2011]. Geology of the Swansea district - a brief explanation of the geological map. Sheet Explanation of the British Geological Survey. 1:50,000 Sheet 247 Swansea (England and Wales)

COSSEY, P J., ADAMAS, A E, PURNELL, M A , WHITELEY, M J, WHYTE, M A & WRIGHT, V P [2004]. British Lower Carboniferous Stratigraphy, Geological Conservation Review Volume No. 29. (Joint Nature Conservation Committee, Peterborough). ISBN 1 86107 499 9.

STRAHAN, A. [1907]. Geology of the South Wales Coalfield, Part VIII, the country around Swansea. British Geological Survey, Sheet 247

**SECTION B**

<b>PRACTICAL CONSIDERATIONS:</b> Please score Accessibility and Safety Red Amber or Green			
<b>Accessibility:</b>			X 
Comment:			
<b>Safety:</b>			X 
Comment:			
<b>Conservation status:</b> Within the Gower AONB			

<b>OWNERSHIP/PLANNING CONTROL:</b> <b>Owner/tenant:</b> Unknown  <b>Planning Authority:</b> City and county of Swansea <b>Planning status/constraints/opportunities:</b> None
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<b>CONDITION, USE &amp; MANAGEMENT:</b> <b>Present use:</b> None - coastline <b>Site condition:</b> Very good <b>Potential threats:</b> none <b>Site Management:</b> none
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<b>SITE DEVELOPMENT:</b> <b>Potential use (general):</b> Scientifically important sequence of rocks exposed on the west side of the bay. <b>Potential use (educational):</b> The three cliffs of Three Cliffs Bays are a famous landmark in the Gower and as such would make a great educational resource, highlighting the geological interest in an already well loved section of coastline.
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<b>Other comments:</b>
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## Photographic Record



General view of Three Cliffs Bay looking westwards (photograph by Tony White)



View of Three Cliffs Rock from eastern headland (photograph by Tony White)



View of Three Cliffs Rock (pyramidal). Limestone beds dip steeply to the south (photograph by Tony White)



Raised Beach Deposits on eastern headland (photograph by Tony White)