
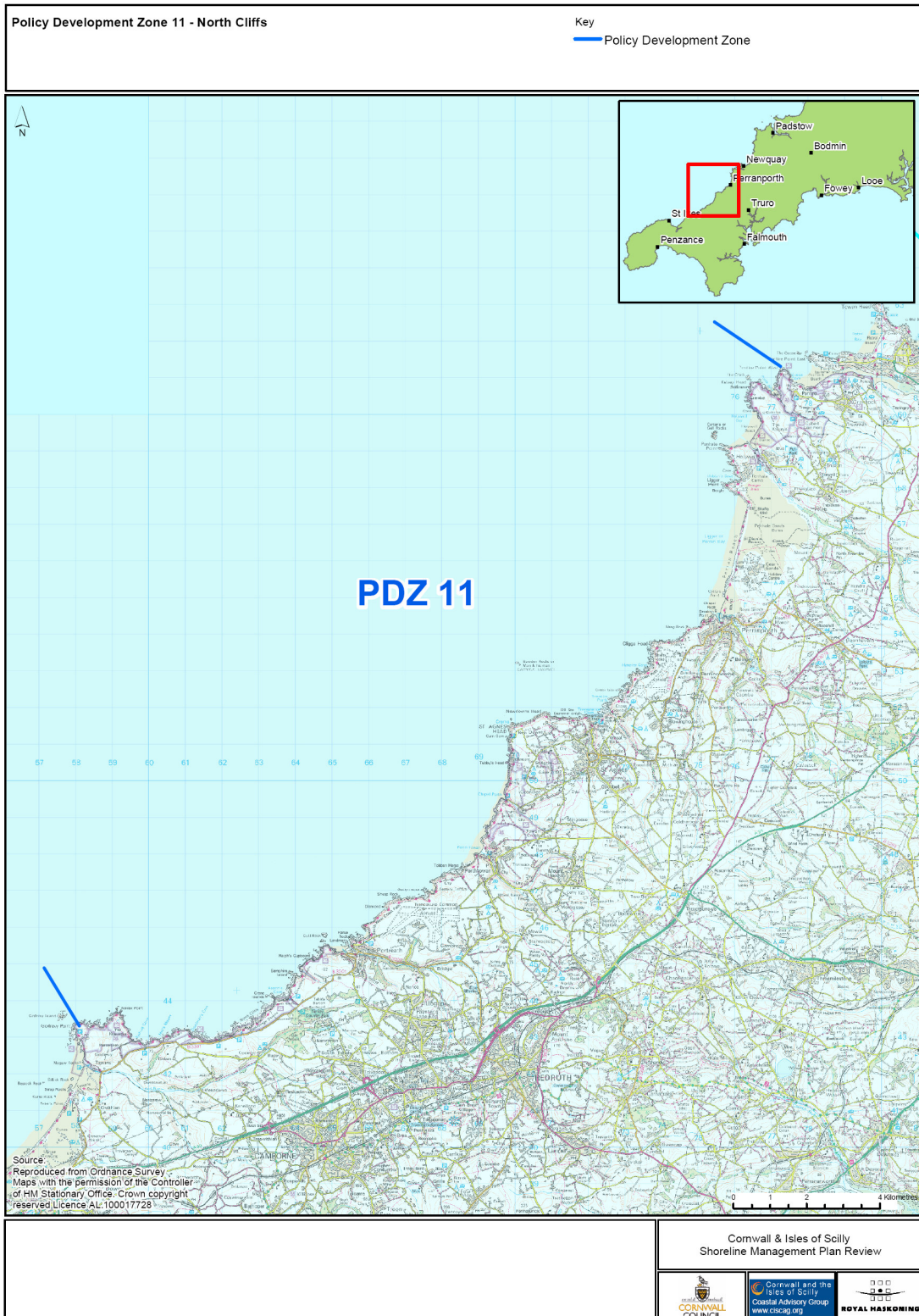


PDZ: 11	North Cliffs (Godrevy Point to Pentire Point West)	Management Area 29 Management Area 30
<p>Chapel Porth cliffs & Wheal Coates mine</p> 		
<p>North Cliffs (Godrevy Point to Pentire Point West)</p> <p>The area is a long, exposed and dramatic coastline of unstable slate cliffs, punctuated by wide exposed surf beaches, coves and some dune areas. The initial line of cliffs (often referred to as the North Cliffs) which run from Godrevy to Portreath display a coastal fringe of heath and rough ground while the hinterland is used for mixed farming- with recently enclosed land on the coast and smaller ancient enclosed land inland and to the west. Through the coastal rough ground runs the South West Coast Path with spectacular views, cliff scenery, steep slopes and sheer drops into small coves. Virtually the entire coastal strip through to Portreath is owned and managed by the National Trust and has many visitors each year. The North Cliffs area is distinguished by the lack of disturbance from mining which has so strongly influenced the landscape character of the adjacent areas. From Sally's Bottom northward the Cornwall and West Devon Mining World Heritage site covers the coast, through Portreath, Porthtowan, Chapel Porth St Agnes and Trevaunance Cove and on to Perranporth.</p>		



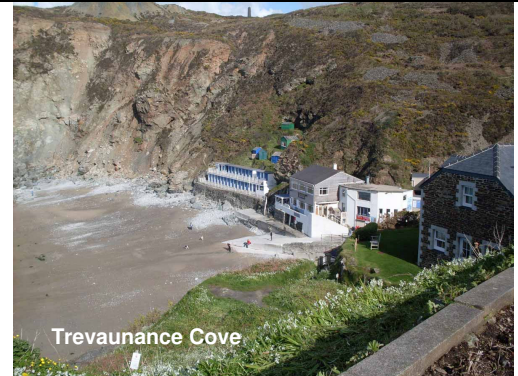
General Description



Built Environment

This coastal zone is sparsely populated for the first 9km of coastline from Godrevy Head to Western Hill. Thereafter the rocky coastline is punctuated by a series of coastal communities located around the river valleys which incise through the high hard cliffs. The notable communities are Portreath, Porthtowan, St Agnes (although the main settlement is set well back), Perranporth and Holywell Bay. All of these have significant year-round populations but are also very popular tourist destinations throughout the year,.

Portreath has significant development adjacent to the beach frontage, as do Porthtowan and Perranporth. Trevaunance Cove at St Agnes also has some limited development present directly above mean high water. Portreath and Perranporth in particular have a significant amount of development at risk during extreme events.

The hinterland between St Agnes and Perranporth is again used for mixed arable and pastoral farming although a large portion of the cliff top area is used as an airfield, with a grassy runway but little associated infrastructure. This deeply incised stretch of slate coastline includes the granite outcrop of Cligga Head and there are numerous examples of abandoned mine workings.



<p>Heritage</p>	
<p>The dune systems at Penhale and Gear Sands preserve buried landscapes and settlements, including the iconic St Piran's Oratory. Dotted along the coast are a number of airfields, originating from the Second World War and some still in private use.</p> <p>Historically much of this area was heavily associated with mining and sea trade and the derelict remains of the last harbour (which existed until 1916) can still be seen on the western side of Trevaunance Cove. The World Heritage Site covers a large area, from south of Porthtowan up to Perranporth (St Agnes Mining District) and also the port of Portreath (part of the Camborne/Redruth Mining District), reflecting the density of mining activity along the cliffs and represented by a number of iconic engine houses. The St Agnes Mining District makes up part of the Cornwall and West Devon World Heritage Site and includes former tin mine engine houses located within a few metres of the cliff edge at Wheal Coates.</p>	<div data-bbox="1013 338 1428 651"> <p>Wheal Coates at Chapel Porth</p>  </div> <div data-bbox="1013 712 1428 1025"> <p>Wheal Kitty Engine House at St Agnes</p>  </div>
<p>Environment and Nature Conservation</p>	
<p>The coastal strip from Portreath to Perranporth displays more slate cliffs and lowland heath habitat at the cliff top. The pocket beaches of Porthtowan and Chapel Porth join up during low tides to produce a long and undeveloped beach frontage with high backing cliffs. Porthtowan has developed back from the beachfront up a wide stream valley and is a popular tourist destination with a small area of dunes. The National Trust has significant land holdings in the Chapel Porth and St Agnes Head area. St Agnes Head, St Agnes Beacon and Cligga Head to the north are all granite outcrops of geological interest. From Perranporth, north to Pentire Point West, the open sandy beaches of Perranporth and Holywell Bay, (both very popular recreational areas) together with their associated large dune systems dominate the coast. The Holywell Bay area, along with Porth Joke to the north, is extensively owned and managed by the National Trust. The Penhale sand dune system, which is the largest in Cornwall, extends some 2km inland in places. A large part of the northern Penhale Sands is owned by the MOD. This area is generally considered to be the most unspoilt and natural part of the dunes, due to the very restricted access. To the south, camp sites, a large holiday park and a golf course are all established within the dune system and have contributed significantly to its poorer condition in this area.</p> <p>The following nature conservation designations exist within this PDZ: Godrevy Head to St Agnes SAC; Penhale Dunes SAC; Godrevy Head to St Agnes SSSI; Cligga Head SSSI; Trevaunance Cove SSSI; Penhale Dunes SSSI.</p>	
<p>Recreation and Amenity</p>	
<p>Although the settlements have historically developed around the original primary industries of</p>	

fishing, agriculture and mining, the tourist industry now plays a key role in the local economy of all these areas. Perranporth is particularly key, but Portreath, Porthtowan, St Agnes, and Holywell are also very popular destinations. Fishing effort based in this area is extremely limited, with just a few boats based at Portreath and St Agnes.

This area is very popular with tourists and also for water sports, in particular surfing with the beaches of Portreath, Porthtowan, Chapel Porth, Trevaunance Cove and Perranporth providing some of the most consistent year round conditions and helping to contribute to all of these local economies. One only has to view the number of surf related businesses located along Perranporth seafront and main high street to realise the significance of the surf industry to the economic well-being of these communities.

Key Values and Drivers

Dramatic cliffs and seascapes, long, sandy surf beaches and recreational opportunities describe some of the key contemporary reasons for which the area is highly valued and extensively visited. Added to this is the generally more exposed and raw feel which the north coast encapsulates, together with the historic mining landscape and the heritage represented within the communities.

- Amenity value of beaches.
- Historic landscape and heritage coast objectives.
- Environmental value and diversity.
- Cornwall and West Devon Mining Landscape WHS features

PDZ Management Intent

The overarching management principle is therefore to allow the natural evolution of the coast while recognising the need to support the adaptation and resilience of the coastal settlements. Continuing to support the recreational and amenity value of the coast is an important part of this intent but it cannot dictate the long-term shoreline position where a more sustainable long-term realignment is desirable.

National Heritage Coast objectives are felt to appropriately define the key values and management principles:

- Conserve, protect and enhance the natural beauty of the coasts, their marine flora and fauna, and their heritage features.
- Facilitate and enhance their enjoyment, understanding and appreciation by the public.
- Maintain and improve the health of inshore waters affecting Heritage Coasts and their beaches through appropriate environmental management measures.
- Take account of the needs of agriculture, forestry and fishing, and of the economic and social needs of the small communities on these coasts

Physical Coastal Processes (further details are provided in Appendix C)

The coast is formed predominantly of metamorphic Devonian slate, together with sandstones and limestones.

The form of the cliffs is governed primarily by the fact that they are cut into one of several marine erosion platforms (formerly marine or land erosion platforms) uplifted during the Tertiary period. These dictate the height of the cliffs, which tend to have a flat top and sheer drop to sea level. Examples are between Navax Point and Portreath, and at St Agnes Head. Elsewhere, the cliffs generally have a hogs-back form, with a vertical bedrock lower cliff and an upper steep slope. It is usually only the lower cliff that is actively eroded. These cliffs can have several slope elements, relating to relict cliff lines from former sea levels. The wide shore platforms present in some areas are likely to be relict features, as contemporary erosion would not be sufficient to create such features.

This stretch of coastline is particularly rich in sediment. Sand and gravels deposits lie offshore although there is an area of uncovered bedrock in the vicinity of the Pentire Headlands. There are numerous sandy bays, coves and pocket beaches. The shoreline generally displays a swash-aligned form; the intertidal areas are wide and dissipative, often with associated dune systems, some of which are very extensive. This is all characteristic of a wave and wind dominated coastline.

TIDE AND WATER LEVELS (mODN)

Location	LAT	MLWS	MLWN	MHWN	MHWS	HAT	Neap range	Spring range	Correction CD/ODN
Portreath	-	-2.71	-	-	3.25	-	-	5.96	-
Perranporth	-	-2.80	-	-	3.30	-	-	6.10	-3.60

Extremes(mODN)

Location:	1:1	1:10	1:25	1:50	1:100	1:200	1:500	1:1000
Portreath	3.85	4.06	4.16	4.22	4.33	4.40	4.50	4.58
Perranporth	4.02	4.23	4.34	4.40	4.51	4.58	4.68	4.76

Wave Climate

The coastline faces north-west for the length of this unit. It is therefore very exposed to the dominant Atlantic westerly wave climate and weather systems of the north coast (see section 2.3). Frequent long-range, powerful swells approach the shoreline from the west or north-west, virtually shore-parallel. This creates a swash aligned and wave dominated coast coast.

The annual 10% exceedance wave height is 2.5m – 3m. Recent wave buoy recordings (at



Perranporth) have demonstrated that significant wave heights can exceed 5m during the winter months and wave periods of 15 seconds and higher are not uncommon. The wave climate is very seasonal with a much more energetic wave climate being experienced through the autumn, winter and early spring months, though individual Atlantic low pressure systems can generate large waves at any time of year.

Large storm waves present the largest risk to both life and property at Portreath and Perranporth, (and to a lesser extent Trevaunance Cove) with large storms causing overtopping and inundation on a frequent basis (photo, right).



Tidal range can reach 5.96m at Portreath and 6.10m at Perranporth during a mean spring tidal cycle.

Residual tidal currents are generally weak, although they do increase in velocity around the headlands (see Figure 5.11) where they may have some local influence on sediment redistribution. Otherwise, tidal flows in isolation do not have a significant influence on sediment transport. Relative astronomic tide heights do become important when considering flood risk at particular locations such as Perranporth. When spring tides coincide with storm surges, large swells and strong onshore winds, risk of overtopping and inundation increase significantly.

PROCESSES

Geology & Control Features:

The coast is formed predominantly of metamorphic Devonian slate, together with sandstones and limestones. This creates extensive hard-rock cliffs with associated rocky shore platforms, stacks and beach outcrops. There are numerous large outcropping rocks some way off shore. Interbedding within these formations, together with various igneous intrusions, have formed numerous headlands. The hard geology is the principal control on coastal recession, but locally headlands affect wave refraction (such as at St Agnes Head) providing some shelter from the dominant westerly wave climate in the lee of the headlands. There are also some structures (such as the pier at Portreath, shown right), which locally alter the wave climate and provide shelter to short sections of the shoreline.



Existing Defences:

There are a series of defences and general coast protection structures at each of the coastal settlements. There are also small scale private defences at Chapel Porth.

Portreath has an array of structures, with a stepped masonry sea wall and fronting the car park at the rear of the beach, and a small harbour through which the Portreath Stream discharges and the 250m long pier orientated north-west which maintains the harbour channel and provides shelter to the harbour entrance and Lighthouse Hill. In addition, there are seawalls protecting the cliff line and a number of properties at Battery Hill, at the western end of the beach.

Porthtowan has some very minor defences in the form of gabions (council owned / maintained) which front the car park adjacent to the RNLI lifeguard station. There are also some low masonry (block-work) walls fronting properties on the Westcliff side of the beach.

At Chapel Porth there is a masonry vertical wall at the rear of the beach, with an access point through it at the centre. It is primarily a retaining wall for the car park immediately above the beach, rather than coast protection structures, though under extreme conditions it is likely to provide that function as well.

Trevaunance Cove at St Agnes has development close to the mean high water position directly at the rear of the beach, including changing huts and cafes. These are fronted by some vertical concrete and masonry sea walls and small revetment. There are two concrete slipways onto the beach, one providing public access and the other private access from where the fishing boats pull up off the beach.

Perranporth has a number of low sea walls at the rear of the beach adjacent to the car park. It also has concrete structures associated with two engineered channels where the Perran Stream and Bolingey Stream discharge out on to the beach. These have a dual tidal / fluvial flood defence function as Perranporth is particularly at risk from combined fluvial tidal events and tide locking in the channels through the town.

There are no specific flood defences or coast protection structures at Holywell Bay as the settlement is set well back behind the dune system.

Processes:

The beaches along this coast are swash aligned and dominant sediment transport mechanisms are wave-driven. Tidal influence on transport is low. Much of the sediment on the beaches is derived from marine organisms (shell) and onshore/offshore transport of the beach material occurs in relation to storm events and seasonal variation in the wave climate. Futurecoast (2002) reports some potential for northward drift of material but (if this does occur) net volumes are likely to be insignificant in relation to volumes contained on the beaches.

Unconstrained Scenario:

Although unrealistic, because of the residual impact of defences, this scenario considers how the coast would evolve in the absence of defences.

The pocket beaches at Portreath, Porthtowan, Chapel Porth and Trevaunance Cove are likely to maintain their overall form, with marine carbonate sources maintaining a supply of sand, and adjacent cliffs experiencing slow erosion. Areas backed by low-lying ground are likely to experience some flooding under storm conditions, although this would not be expected to create significant tidal inlets as these are very shallow areas. Where present, the dunes are likely to be maintained in their current form as they will be able to exchange sediment freely with the fronting beach. In general, these bays would be expected to maintain their overall form.

The cliffs and rock platform between Godrevy Head and Pentire Point will experience continued slow erosion. The beaches are likely to maintain their current form, with continued inputs of carbonate material offsetting any losses.

Continued stability of the beaches and dunes would be expected at Perran Bay and Holywell Bay given ongoing inputs of marine carbonate material to the shoreline. Ongoing sea level rise is likely to give some retreat of low water on all beaches, narrowing the foreshore and reducing the probability of accretion of the dunes.

POTENTIAL BASELINE EROSION RATES

Base rates have been assessed from monitoring and historical data. The range of potential erosion is assessed in terms of variation from the base rate and sensitivity in potential sea level rise. The base rates provided below are taken as an average based on historical records. The rates are a composite value based on erosion of the toe and recession of the crest of the cliff and reflect the erosion rates following failure of defences.

(Sea Level Rise assumed rates: 0.06m to year 2025; 0.34m to year 2055; 0.96m to year 2105.)

Location	Historic recession rate (lower) (m/100 yr)	Historic recession rate (upper) (m/100 yr)	Projected 100 year erosion rate (lower) (m)	Projected 100 year erosion rate (upper) (m)	Notes
Portreath West Cliff	40	50	38.4	48	Road at back of beach
Porthtowan beach	0	10	0	18.1	
Trevaunance Cove (cliffs)	0	2	0	3.6	Wall/property at back of beach
Perranporth	0	0	18.6	46.6	Wall of car park / property at back of beach
Perran Dunes	0	0	18.6	46.6	Dunes
Holywell	10	50	26.4	89.9	Dunes

BASELINE MANAGEMENT SCENARIOS

Present Management

Present Management is taken as that policy defined by SMP1, modified by subsequent strategies or studies. It should be noted that both in the case of SMP1 and that of many of the strategies undertaken before 2005, the period over which the assessment was carried out tended to be 50 years.

SMP1		
MU	LOCATION	POLICY
7A-3	Godrevy Cove to Portreath	Do nothing
7A-3	Portreath	Hold the existing defence line
7A-3	Portreath to Porthtowan	Hold the line
7A-3	Porthtowan	Hold the existing defence line
7A-3	Porthtowan to Trevaunance Cove	Do Nothing
7A-3	Trevaunance Cove	Hold the existing defence line
7A-3	Tevaunance Cove to Droskyn Point	Do Nothing
7A-3	Perranporth	Hold the existing defence line
7A-3	Perranporth to Fistral Beach	Do Nothing

Economic Assessment

The following table provides a brief summary of damages determined by the SMP2 analysis for the whole PDZ. Further details are provided in Appendix H. Where further, more detailed information is provided by studies, this is highlighted. The table aims to provide an initial high level assessment of potential damages occurring under the two baseline scenarios. The damages for each epoch are current values. These are discounted to give present values in the final column.

ASSESSMENT OF EROSION DAMAGES

Epoch	0 -20 year		20 – 50 years		50 – 100 years		Total		
No Active Intervention	Number of properties	Present Value x £1000	Number of properties	Present Value x £1000	Number of properties	Present Value x £1000	Number of properties	Present Value Damages (£x1000)	
Location									
PDZ11 – Godrevy Point to Pentire Point West	7	510	6	265	48	894	61	1759	
Total for PDZ									

ASSESSMENT OF POTENTIAL FLOOD RISK**

Epoch	Flood risk tidal 2025		Flood risk tidal 2055		Flood risk tidal 2105		Total	
No Active Intervention	Number of properties	Present Value x £1000	Number of properties	Present Value x £1000	Number of properties	Present Value x £1000	Number of properties	Present Value Damages (£x1000)
Location								
PDZ11 – Godrevy Point to Pentire Point West	1	3	18	68	271	279	271	350

** The predictions of future flood risk are based on still water levels only and do not allow for the influence of wave run-up and wave overtopping. This is particularly relevant for locations such as Portreath and Perranporth where property flooding is almost entirely due to wave impacts rather than still water levels.

PDZ 11: North Cliffs

Management Area Statements

MA29 – Godrevy Point to St Agnes Head

Covering previous SMP1 management units:

7A-3	Godrevy Cove to Portreath
7A-3	Portreath
7A-3	Portreath to Porthtowan
7A-3	Porthtowan
7A-3	Porthtowan to Trevaunance Cove

MA30 – St Agnes Head to Pentire Point West

Covering previous SMP1 management units

7A-3	Porthtowan to Trevaunance Cove
7A-3	Trevaunance Cove
7A-3	Trevaunance Cove to Droskyn Point
7A-3	Perranporth
7A-3	Perranporth to Fistral Beach

Within these areas a summary of policy is provided below. Management Areas statements are provided in the following sheets.