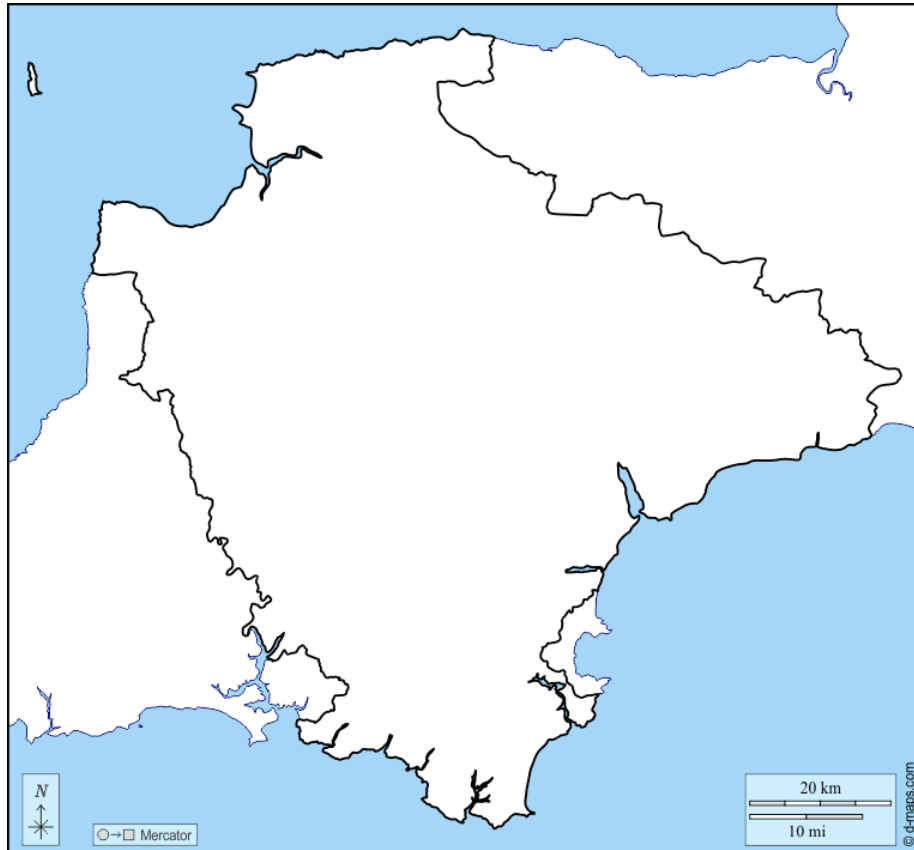


Dawlish: coastal processes, hazards and management

1. Dawlish is a small town on the south Devon coast about 20km south of Exeter.
 - (a) Use the map on Slide 2 and the internet to locate and label the following on the map below.
 - Cities/towns of Exeter, Dawlish, Torquay and Plymouth
 - Counties of Devon, Cornwall and Somerset
 - English Channel



Source: https://d-maps.com/carte.php?num_car=93472&lang=en

2. Watch the drone footage of Dawlish at https://youtu.be/kdq_pPVekijk.
 - (a) What is the evidence that the cliffs are being affected by processes of mass movement?

- (b) Identify the measures of coastal management used to defend the coastline.

- (c) Suggest why the railway was constructed along the seafront.

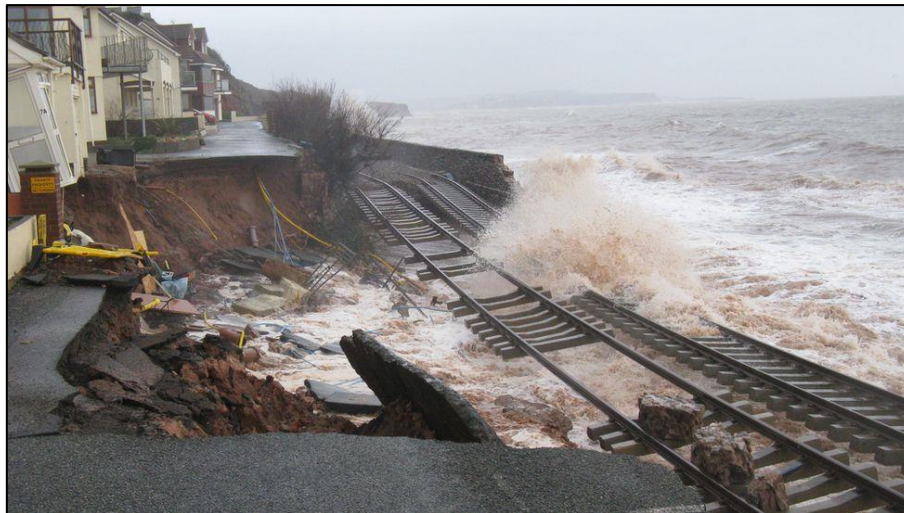


https://youtu.be/kdg_pPVekjk

Source: University of Plymouth's drone part of the CreamT research project, 2021

3. View the video footage of Storm Barra (2021) at <https://youtu.be/ysoCnHo7u0k> . The 10-minute footage was captured by a camera installed by the University of Plymouth to monitor coastal processes. Use the timeline cursor to watch some of the more dramatic images. Describe the impacts of winter storms such as Storm Barra on the coast and the railway.

4. In 2014, Storm Petra caused serious damage to the railway at some seafront properties.
(a) Annotate the photo below to describe some of the damage caused by the storm.

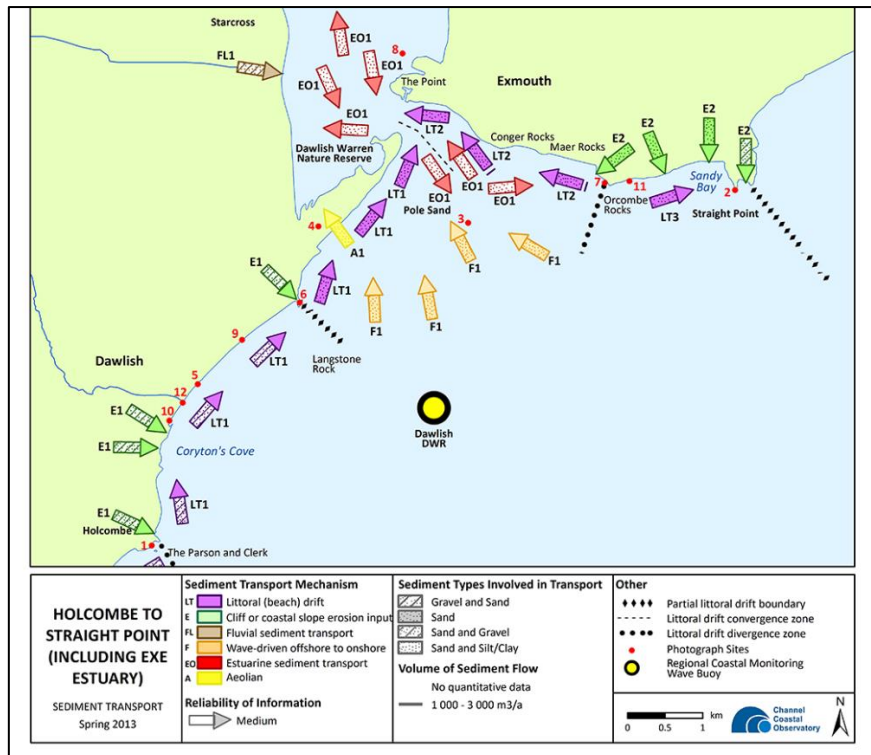


<https://www.bbc.co.uk/news/uk-england-devon-55939197>

Credit: Network Rail

(b) Suggest how the damage to the railway line impacted on people and businesses in the south-west.

5. The map below shows sediment transport processes between Holcombe and Straight Point, including the Exe estuary.



<https://www.scopac.org.uk/sts/ho-sp.html>

- (a) Locate Dawlish. What is the direction of littoral (beach) drift at Dawlish? _____
- (b) Using the key, describe the source and type of sediment input at Coryton's Cove, south of Dawlish.

6. Coastal hazard managers use observations from the National Network of Regional Coastal Monitoring Programmes as an evidence base to support their decision making process. Access the interactive map at <https://www.scopac.org.uk/sts/ho-sp.html>.

- (a) Click photo 10 (shown by the red dot). Explain how littoral drift has made Dawlish vulnerable to the effect of storms.

- (b) Locate the yellow circle 'Dawlish DWR'. This is a wave buoy that measures real time data on waves and sea temperature. Click the link. This reveals a wave rose showing wave direction and height over a period of about two years. Locate the dominant wave direction.

- (i) To the nearest 8-points of the compass, state the dominant wave direction? ____
- (ii) Give the percentage of time that waves came from this direction. ____%
- (iii) Use the colour key to state the dominant wave height. ____m
7. The photo below is #5 on the sediment transport map in Activity 6 (shown by a numbered red dot). It shows the mainline railway and the coast just outside Dawlish.



<https://www.scopac.org.uk/sts/ho-sp-photos.html#exe-9-12>

- (a) In what direction is the photo looking? _____
- (b) What is the evidence that littoral (longshore) drift is taking place?

- (c) Using evidence from the photo, assess the effectiveness of the groynes in trapping sediment as it moves as part of the longshore drift.

- (d) What is the evidence of cliff collapse?

- (e) Using evidence from the photo, describe how the sea wall provides an amenity for people.

-
-
-
8. Landslides and rockfalls are common along this stretch of coast. The photo below shows construction work at Parson's Tunnel near Dawlish and cliff stabilisation, to protect the railway line from damage by mass movement processes.
- (a) Using an arrow, locate and label Parson's Tunnel.
 - (b) Use annotations to identify and describe the key features of the new construction.
 - (c) Locate and write an annotated label to describe the cliff stabilisation works.
 - (d) Locate and write a label to identify where the sea wall needs to be repaired?



<https://www.devonlive.com/news/devon-news/dawlish-railway-line-vital-new-8120142>

Credit: Network Rail

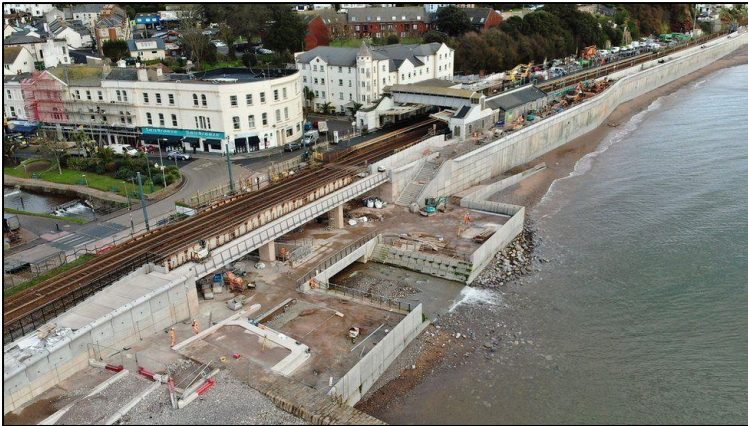
9. In England and Wales, a shoreline management plan (SMP) outlines strategies for managing flood and erosion risks for a stretch of coastline. At Dawlish, the Shoreline Management Plan strategy is 'hold the line'.
- (a) Explain what is meant by 'hold the line'.

-
- (b) Use a highlighter to identify the 'line' on the photo alongside.
- (c) Do you agree that this is the best strategy for this stretch of coastline? Justify your answer.



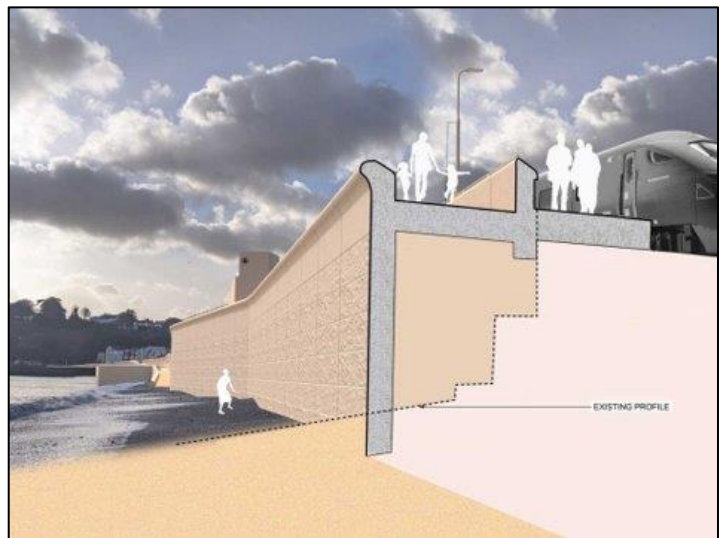
Source: University of Plymouth's drone part of the CreamT research project, 2021

10. In 2019, following the destruction caused by Storm Petra in 2014, Network Rail started construction on a new sea wall at Dawlish to protect the mainline railway for the next 100 years. Using annotated photos, describe the new coastal management scheme at Dawlish.



<https://www.bbc.co.uk/news/uk-england-devon-64770572>

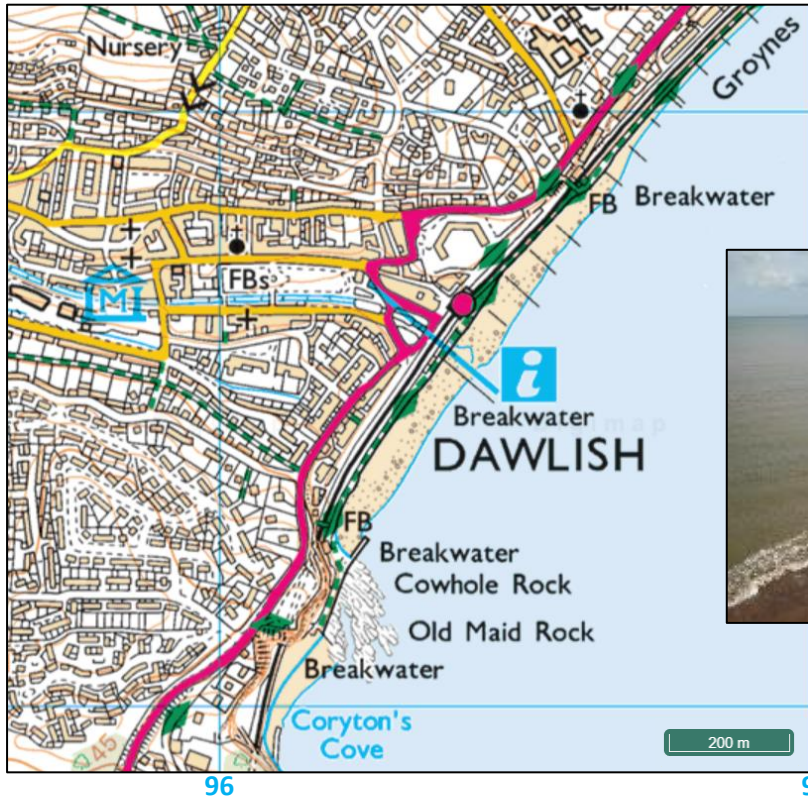
Credit: Network Rail



<https://www.networkrail.co.uk/running-the-railway/our-routes/western/south-west-rail-resilience-programme/dawlish-sea-wall-section-two/>

Credit: Network Rail

11. The map extract below is an 1:25,000 map centred on Dawlish. Notice that this map has been enlarged.



Map source:
Digimap for Schools



Photo source: National Oceanography
Centre, CreamT research project 2020

- (a) Give the six-figure grid reference for the station in Dawlish. _____
- (b) Suggest why the railway passes through a tunnel between Dawlish and Coryton's Bay.

- (c) A breakwater is constructed directly in the path of wave energy, while a groyne is constructed in the pathway of sediment transport. A breakwater may be more substantial and may occur singly. Suggest why a breakwater has been constructed at 965766.

- (d) Using the photo and map (above), comment on the effectiveness of the groynes north of Dawlish station.
