Slapton Line Partnership
Revised Strategy
October 2019

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Preface

The Slapton Line Partnership was formed in 2001 with the following purposes:

- To promote a co-ordinated policy for managing coastal change in and around Slapton Sands;
- To ensure that appropriate contingency plans and preparations are maintained for responding to erosion events;
- To promote a range of adaptation activities and projects in anticipation of future change;
- To ensure that suitable expertise, research and intelligence is available to inform decision making;
- To promote public awareness and community engagement in the coastal management and adaptation process;
- To assist the member organisations in meeting their statutory duties in the management of the area.

The Partnership comprises staff from:

- Devon County Council
- South Hams District Council
- Natural England
- The Field Studies Council (Slapton Ley Field Centre, which will also represent The Whitley Wildlife Conservation Trust)
- The South Devon AONB Unit
- Environment Agency

Plus elected representatives from:

- Devon County Council
- South Hams District Council
- Slapton Parish Council
- Stokenham Parish Council
- Strete Parish Council

This document is the new coastal management strategy for the Slapton Line adopted by the Partnership on 1st Oct 2019**.**

Executive Summary including Recommendations

Over recent years a succession of significant and damaging storm events along the Slapton Line culminating in Storm Emma in March 2018 have appeared to accelerate coastal change beyond previously predicted, necessitating a reappraisal of the current management strategy.

As a result of the changes, the conclusion is that there is now minimal space available to retreat the road in a significant number of locations, which was the main approach to address coastal erosion in the previous strategy. Further engineering works to retreat the road would now be likely to have a short life and unlikely to attract funding. It would also potentially put the works required in direct conflict with the area's environmental designations.

This document therefore recommends that we are now entering a phase of life of the A379 road along Slapton Line where further retreat should not take place.

Summary of Recommendations:

A379 Road Retreat/Repair/Maintenance: The road shall continue to be maintained as a highway and cleared of shingle and debris post storms. In the event of further significant damage, no further retreat of the A379 road shall be considered. This is likely to result in the closure of one or more sections and the eventual full closure of the road.

Sea defences: All sea defences at Torcross should be considered together, aligning their purpose in order to evolve long-term plans for protection to the northern part of Torcross. This would mean considering the main sea wall together with the sheet-piled sections to prevent the sea wall from being outflanked and to provide effective protection to the car park. Consideration should also be given to the rock armour section north of Torcross as part of this system - as a transitional section north of Torcross. In the short term, the rock armour section should be made as effective as possible.

Traffic Planning: Localised improvements should be undertaken at key points along inland routes including further passing points and works to address junction, surfacing and drainage issues to limit congestion and improve safety, but they will remain as minor roads which are predominantly single-track (already commenced in 2019). Consultations will be held with the local community about traffic flows at key pinch points.

Car Parking: A plan for improving car parking at entry points to the Line needs to be developed. This is likely to require purchase or lease of additional land at Strete Gate and possible additional car parking in Torcross. Both will require negotiations with landowners and environmental permissions. The central memorial car park is likely to be eroded to the point that it will be completely decommissioned. Other wider area options should also be considered.

Adaptation Plan: This will be developed in consultation with the community, communicated & enacted.

The Shoreline Management Plan. The SMP will need to be updated in accordance with the revised strategy.

Resources will need to be assigned in order to complete these planning processes.

1. Introduction

On the 1st of March 2018 Storm Emma caused massive damage to 700m of the A379 Slapton Line road. In one event it removed more than the contingency space that had been allocated for retreat of the road (through pre-existing planning permission). In doing so it challenged the prevailing policy for the Line of managed retreat.

2. Purpose and Status of this Document

This document outlines the new policy for management of the Slapton Line and how it has been arrived at. It replaces the policy of managed retreat originally recommended in the Scott Wilson 2006 SCZM (Slapton Coastal Zone Management) Study, adopted by the Partnership and written into the national Shoreline Management Plan. The policy is the collective and consensus position of the organisations represented on the Partnership.

3. Development of the New Strategy

The strategy was developed as a result of the following activities:

- **Beach Management Plan (BMP):** The process of developing a new strategy effectively began in 2017 by commissioning engineering consultants CH2M Hill (now Jacobs) to develop a Beach Management Plan, providing an opportunity to reassess the current policy as well as creating a format which would facilitate future funding applications, which the current (SCZM) study did not enable.

- **University of Plymouth Input:** The University provided the 'Coastal Processes Baseline' section of the BMP as well as a Vulnerability Assessment made following Storm Emma and after the new retreated road section had been completed. Sections of this Assessment are contained in Appendix B which show the limited retreat space.

- **Community Engagement:** A poster-presentation was created outlining the principle conclusions of this document: that change appeared to be happening faster than predicted, what the evidence for the accelerated change was, the lack of space to retreat the road, what has been done so far and what happens next (See Appendix A)? The presentation was put on display at a series of locations[1] and was attended by colleagues from the Partnership to answer questions and to listen to suggestions from residents and business owners. These suggestions have already been incorporated into the draft adaptation plan.

[1] Drop in sessions: 10th July, 16th July, 28th August, 19th September at Slapton, Stokenham, Strete and Stoke Fleming. Exhibitions: Kingsbridge Library - Saturday 10th to Saturday 17th August and Dartmouth Library - Monday 2nd to Thursday 12th September.

4. The Slapton Line Challenge

The A379 Slapton Line road represents an important link for the local community served by it; residents going about their daily activities, businesses relying on access and trade and the thousands of, mostly seasonal, visitors to this unique landscape.

The road site and situation make it challenging to manage. Situated above a highly mobile shingle barrier beach, it passes through a Site of Special Scientific Interest and a National Nature Reserve and within an Area of Outstanding Natural Beauty.

The village of Torcross has sea defences that reduce the risk of flooding and damage to the properties on its sea front, but the road on its own does not qualify for flood funding. Consideration of the sensitive environmental features and designations also potentially limit the type of engineering structures used to provide sea defences.

Various coastal defences have been constructed over the past 100 years mostly adjacent to the properties on Torcross promenade and often in response to specific incidents. These defences have included a concrete seawall above sheet piling, sheet pilling, rock revetment, block armour work and periodic beach recycling.

Major events in the recent history of the Slapton Line which required repairs and enhancements suggest an acceleration in the frequency of significant damage:

1979 - Storms cause extensive damage to Torcross.

1980 - Construction of a substantial return sea wall above sheet piling along the length of the Torcross Promenade in response to major storm damage.

2001 - Easterly storm results in a section of road being washed away. The road is fully opened 12 months later with a 300m section of the road retreated 20m.

2013/14 - South Westerly storms batter the sea defences at Torcross causing extensive damage to a number of homes and businesses. The winter storms over the two months were estimated by Plymouth University as being the "the most energetic in almost seven decades"[2]

2015 - The shingle stripped away from the sea defences in 2014 had not returned and in fact had further diminished leaving a significant part of the sea wall's lower area sheet piling exposed. Waves hitting the piling were causing vibrations to reverberate through properties at Torcross. It was decided to protect both this exposed section and the road by moving a small amount of shingle (25,000 m3) down from the north end of Slapton beach which provided a temporary improvement in the conditions.

2016 - South Westerly storms caused part of an old concrete sea wall (over 100 years old) just north of Torcross to collapse which was repaired with sheet piling, completed in April. In addition the main sea wall started to rotate causing a crack to form in the promenade above it along its length.

2017 - Repairs to the 2015-16 damage to the main sea wall at Torcross were completed by the Environment Agency. The new section of deeper sheet piling (going to twice the depth to reach bedrock at 12-13m) was installed in front of the existing Torcross sea wall.

[2] https://www.plymouth.ac.uk/news/winter-storms-the-most-energetic-to-hit-western-europe-since-1948-study-shows

2018 - In March 2018 the easterly Storm Emma (reckoned by Plymouth University to be a 1 in 50-year event) caused significant damage to the A379 necessitating the road to be retreated over a 700metre section (over twice the amount damaged in 2001). An emergency request was made by Devon County Council to the Department of Transport to release £2.5m of funding in order to facilitate the further retreat and associated resilience measures. This request was quickly granted and the works were able to benefit from proactive planning permission and environmental mitigation which has been previously carried out. The A379 was re-opened in October 2018.

5. Key Documents and Themes Informing this Strategy

5.1. Existing Strategy (Slapton Coastal Zone Management Study 2006)

In response to the storms of 2001, an extensive assessment of the coastal conditions and future management options commissioned by the Partnership was completed by Scott Wilson consultants in 2006[3].

The report was very much predicated around the events of 2001, in which a 1 in 25-year event caused recession of 5m.

It concluded that: *"Long-term barrier retreat rates were estimated at 0.3m/year at the present day, increasing over time due to sea level rise"* and produced a series of maps showing areas at risk along the shingle bank within different time frames. The maps (Fig 11.51 e-f)[4] show recession expected in a further 1 in 25-year event causing 5m recession and predicted recession lines were shown at 20 and 50 years.

The main recommendations were that the road could continue to be maintained *for at least another 30 years* by a combination of:

- Proactive realignment of the road north of the junction of the A379 and the road to Slapton village (the Partnership agreed to reactive realignment throughout and implemented pre-emptive planning permission and Environmental Impact Assessments on these designated sections either side of the retreated section).
- Reactive realignment of the road at any other location
- Localised movement of shingle to provide temporary protection to short lengths of the road.
- The existing defences to the road at Torcross should remain, but not be enhanced

A number of further measures were advised including:

- The Slapton Line Partnership should periodically review the management policy.
- When it becomes apparent that maintaining the road link is no longer sustainable (either in part or in whole), then the road should be closed and the measures developed in the adaptation plan for road abandonment should be put into being.

[3] http://www.slaptonline.org/library/download.php?id=84&search=study&area=All&page=1

[4] http://www.slaptonline.org/download.php?id=92&type=DOWNLOAD_FILE (Fig 11.51 e-f)

The recommendations were incorporated into the Shoreline Management Plan (SMP).

5.2. Shoreline Management Plan (SMP2)

This is a national document (last updated in 2010) describing the approach to managing erosion for the entire coastline of the UK. The Plan relevant to the section of coast for the Slapton Line[5] reflects the original Scott Wilson strategy namely 'Hold the Line' at Torcross and 'Managed Realignment' across Slapton Line.

Key Points from the Shoreline Management Plan which is divided into three different epochs:

Short Term (to 2025)	**Medium Term (2025 to 2055)**	**Long Term (2055 to 2105)**
The recommended short-term policy for the Slapton Sands frontage is **Managed Realignment** to allow the natural retreat of the shingle barrier but enable local beach management measures to be implemented where necessary to allow local realignment of the road. At Torcross the present-day policy is to **Hold the Line** to protect assets within the village through maintaining existing defences where this can be economically justified.	The recommended medium-term policy is to continue to manage the natural retreat of the shingle barrier through **Managed Realignment** along the Slapton Sands frontage. This will involve reactive realignment of the road along the barrier crest… During this period **it may become increasingly difficult to retain the shingle ridge in a condition where it can support the road** and it will become increasingly important that inland routes are upgraded as far as possible in readiness for when the current route of the A379 becomes unsustainable to maintain. This will occur as the unprotected sections of the road are eroded and can't be realigned any further. **When it becomes apparent that maintaining the road link is no longer sustainable (either in part or in whole) then the road should be closed**. This will have economic and social implications. Therefore adaptive measures will need to be in place to manage this process. At **Torcross** a **Hold the Line** policy would continue to be implemented through maintaining the existing defences for as long as it is technically possible. However to comply with the long term Plan it will be necessary to assess whether it is economically viable to replace defences along current alignments with much larger structures than present, or if not economically viable consider realigning the defences westwards to the landward side of Slapton Ley. **The area at Torcross Point would become increasingly vulnerable during this period** …..measures to realign the defence position … will need to be considered towards the end of this period as the current alignment becomes increasingly difficult to sustain.	The long-term recommendation is to continue a policy of **Managed Realignment** along the whole of this coast. This will involve construction and maintenance of defences in a realigned, more sustainable position at Torcross (if not already undertaken in the medium term). It is not currently certain whether or not it will be economically viable to retain defences to the more seaward part of Torcross as defences would need to be much larger than at present as well as extending defences along the southernmost part of Slapton Ley. If it is not economically viable to provide defence to the seaward part of Torcross in this period then consideration will need to be given to abandoning the seaward part of Torcross and moving the defence line to be realigned to the western landward shore of Slapton Ley.

5.3. Beach Management Plan (BMP)

Following increasing storm damage, in 2017 the Partnership commissioned a Beach Management Plan. This is a new prescriptive document format that has become a prerequisite to securing national flood funding. Much of the work from the Scott Wilson assessment was still relevant, but new ideas, costings and funding possibilities had emerged in the meantime and were incorporated into the review.

The local community contributed suggestions - amongst ideas considered included offshore reefs and shingle recycling.

[5] Page 385 of http://southwest.coastalmonitoring.org/wp-content/uploads/SDADCAG_SMP2/SDAD_SMP2_Policy_Statement_Part_2.pdf

The preferred solution recommended by the BMP assessment for the long-term management approach was similar to the previous conclusions:

- Management of the A379 addressed through (reactive) realignment.
- Maintenance of the existing seawall at Torcross
- Maintain, improve and upgrade (a difference to previous) the existing defences adjacent to the Torcross wall to prevent outflanking as sea level rise occurs.

The report identified that there could be up to a maximum £1.7 million of funding available through Defra's flood and coastal erosion risk management grant-in-aid, largely through the economic benefit of the road in supporting tourism.

Storm Emma arrived shortly after the BMP had been issued in draft form and before being formally signed off by the SLP. However, the work completed for the BMP meant that information was available to support requesting funds for repair to the damage.

5.4. Environmental Considerations

Slapton Line is a highly sensitive and protected area from an environmental perspective. The entire length of Slapton Line (including land to the south of Torcross and to the north of Strete Gate) forms part of the Slapton Ley Site of Special Scientific Interest, designated both for its wildlife and geomorphological significance[6]. The great majority of this area is also designated and managed as a National Nature Reserve by the Field Studies Council (FSC). The area supports a range of rare and threatened species, which benefit from national or international legal protection. The entire coastal strip around Slapton Line also forms part of the much broader South Devon Area of Outstanding Natural Beauty (AONB), which is a nationally protected landscape, of equivalent significance to a National Park.

Additional environmental interests are linked to the historic environment importance of the area, particularly that associated with its World War 2 military occupation. Beyond these, very careful consideration has to be given to water management in the vicinity of Slapton Ley to maintain water quality standards and prevent any increase in flood risk. All of these environmental features define the character of the area and underpin many aspects of the local economy, being inherent to its huge attraction as a tourist location. However, they also provide a range of legislative and policy constraints, which have a very significant bearing on the management strategies that may be agreed for the area.

On this basis, environmental considerations have been one of the key factors informing the original strategy for Slapton Line and the planned response to storm events. The realignments to the A379 have only been achieved as a result of a long-standing and costly investment in environmental measures, which not only had to protect existing interests, but demonstrate how these might actually be enhanced. For example, the 2018 realignment of the A379 was made possible by a pre-existing programme of advance ecological mitigation, which has been implemented by the FSC since 2007 based on funding provided by Devon County Council; in

[6] SSSI – Site of Special Scientific Interest reasons for citation see :
https://designatedsites.naturalengland.org.uk/PDFsForWeb/Citation/2000479.pdf

addition, agreement had to be reached on a major programme of new environmental mitigation and enhancement measures to be implemented over the next few years.

The key challenge in developing a future strategy for Slapton Line is the significantly reduced scope to balance these environmental constraints with the desire to maintain the road. In many of the most vulnerable sections of Slapton Line, particularly those in the vicinity of the Slapton junction (Sands Road), there is no longer any available space for further 'inland' realignment of the road, and this would result in unacceptable conflict with wildlife interests and potential incursion beyond the peak water level around the margin of Slapton Ley, contrary to planning policy. Even in areas which may offer potential scope for further, limited, realignment of the A379, particularly in the area immediately north of Torcross, this would result in a direct and damaging conflict with amenity and economic interests by reducing the size of the Torcross car park, which is so important to the village.

On this basis, the following considerations have been identified to inform the recommendations on future strategy over the shorter and longer term.

Short and Medium -Term	Approaches set out in the current 'A379 Contingency Plan'[7] relating to the management of the A379 in the event of future storm events (e.g. temporary road closures, with follow-up clearance of shingle and other debris) should enable ongoing use and maintenance of the road without significant environmental harm, provided that there is no damage to its structural integrity and safe use.
	Further works may be possible to existing sea defences, including the recently repaired sea wall to the north of the slipway at Torcross, plus the rock revetment beyond this, to maintain their current condition without significantly and adversely affecting environmental interests, provided that these are not reinforced or extended (which would directly conflict with the natural geomorphological functioning of the shingle ridge, upon which the SSSI designation is based).
	There is very limited scope of any further planned or reactive realignment of the A379 without an unacceptable level of impact upon the Slapton Ley SSSI/NNR. In addition, there is likely to be a direct conflict with flood risk policy and amenity considerations (including those linked to the AONB).
	Importantly, erosion linked to future storm events is highly likely to reduce the extent of pioneer shingle communities on the seaward side of the A379, resulting in harm to one of the key features of the SSSI, with the presence of the road inhibiting a natural process of adaption on its landward side, so causing increased and incremental harm to it.

[7] Devon County Council Document

Long-Term	Ongoing incremental erosion (as above) will harm the SSSI and, increasingly, put it into conflict with the ongoing presence and maintenance of the road.
	The conflict between environmental interests and any possible case for future realignment of the road will increase over time.
	Catastrophic breaching of the shingle ridge, with resulting tidal flows into/out of Slapton Ley will cause sudden and profound changes to its ecology. However, as a natural process, this constitutes the expected evolution of SSSI and is acceptable to Natural England and the FSC.

5.5. Amenity Considerations

The Slapton Line has enormous amenity value to both its residents and to the thousands of visitors each year including walkers, anglers, families on the beach, visitors to the pubs and restaurants, students visiting the Field Centre and people commemorating the WWII history. A concern around loss of the road is that this would impede access to the Line and that this would damage the businesses which depend on tourism.

The value of tourism was also used as part of the assessment of economic value of the Slapton Line for estimating the amount of funding that might be available for beach management (as used in the BMP report). Based on 2014 data the road is estimated to deliver approximately 288,000 adult visitors per annum with an annual estimated visitor spend worth £9.28 million per year.

As part of an earlier project[8] which envisaged longer-term adaptation beyond the life of the road, consideration was given to looking at the strengths of the area and making more of it – focussing on how visitors could be encouraged to spend more time in the area rather than just passing through. As a result, materials were created to enhance interest in the area including interpretation panels, walks information, a digital trail and web-based information provided under the 'Explore Start Bay' brand which was developed by the South Devon AONB. [9]

As it becomes increasingly difficult to travel through the area, access and parking should be enhanced where possible to safeguard its amenity and economic value.

5.6. Vulnerability Assessment

Following Storm Emma, it was evident that, in many locations where the road had not been structurally damaged, the shingle beachhead had retreated much closer to the road. As a result,

[8] Supported by DEFRA – Making Space for Water.
[9] http://www.southdevonaonb.org.uk/explore/start-bay/
Also Sustainable Tourism Strategy: http://www.slaptonline.org/download.php?id=121&type=DOWNLOAD_FILE

an assessment was commissioned to both quantify this level of retreat and to assess the likely consequence of further damage following a similar storm event[10].

This was undertaken by the University of Plymouth with the Slapton Line being divided into 50m sections. For each section, both the beachhead 'buffer' seaward of the road and the landward space available to potentially retreat the road were measured. Each section was then classified as either "highly vulnerable", "vulnerable" or "less vulnerable" based crudely on the number of 'Storm Emma Equivalents' it was likely to be able to absorb. A summary of the findings is provided in Appendix B including a map of those vulnerable sections.

The assessment indicated that a significant amount of seaward buffer was eroded during Storm Emma (a 1 in 50-year event). The greatest loss identified was at the memorial car park where 10 metres was lost during this single event.

Thirty out of 73 sections had approx. one or fewer 'Storm Emma equivalent' beachhead buffer distances in front of the road. Of these, 19 had some degree of defence in the form of the rock armour.

Eight of the sections had one or fewer 'Storm Emma equivalent' landward widths to retreat into, with a further 40 with two or fewer 'Storm Emma equivalent' landward widths.

5.7. Evidence for Acceleration of Change

The 2006 SCZM Scott Wilson report said: *"the Managed Realignment option would allow the road to be maintained for at least another 30 years".* It anticipated that 500m should be proactively realigned, (presumably) as being sufficient to see out this 30-year period. However, just 13 years into this period, 700m has now had to be realigned. Over the past 4 years, works have also included repairing older sea defences, shingle recycling and upgrading alternative roads with a total cost of around £2m (as well as a significant upgrade of the Torcross sea wall costing approx. £3m). It would appear from the spate of recent significant storms – three major events in the past five years, that erosion has accelerated and that the damage is outrunning the predictions of the original report.

According to Dr Christopher Stokes, lead investigator for the University of Plymouth Coastal Marine Applied Research (CMAR) unit: "the retreat observed to date clearly indicates that sudden and extreme localised erosion can occur along the barrier, and it is fair to say that this is occurring more frequently than originally anticipated. With rising sea level, the barrier will retreat at least at a similar rate into the future, *and most likely at an accelerated rate*."[11]

Though climate change causing sea-level rise is part of the cause, the main trigger could in fact be one we have seen before in Start Bay. In their BMP Coastal Processes appendix, the CMAR unit referred to the wave climate within Start Bay as '*clearly bi-directional, with a dominant component from the south/southwest, and a secondary component from the east*'. Many residents will recognise the effect of this: southerlies take shingle away northwards, easterlies bring it back.

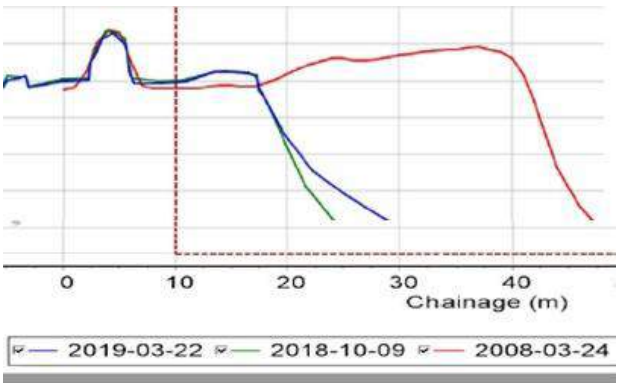
[10] CMAR document needs posting online.

[11] This effect is not just at Slapton - according to Professor Gerd Masselink : "what we've seen right across South West England is unprecedented damage and change – from huge amounts of sand being stripped from beaches to rapid erosion of cliffs"

Data covering a 55-year period analysed by CMAR show that the southerlies have increased slightly whilst the easterlies have diminished in frequency (fig 12 in Scott et al 2016)[12] (also shown in Appendix A Poster No 2- *What is the evidence for this accelerated change?*). This has led to more shingle being moved northwards, denuding beaches, and making the exposed beachhead and the road more prone to damage. This is what happened in 2001: *Because the storm coincided with a period* ***when the beach was at a historically narrow state****, its effect on infrastructure (road, car park) was greater than previous events* (Scott Wilson 2006 SCZM report).

CMAR (Wiggins et al[13]) controversially propose that this effect '*significantly exacerbated, if not caused*', the demise of the iconic village of Hallsands as it is inferred that the period 1900 to 1930 was an extended phase of prevailing south-westerly winter waves that would have resulted in the significant transport of gravel from the southern part of Start Bay to the northern part. Fluctuations in the prevailing wave direction and resulting littoral drift in Start Bay are a consequence of behaviour of the Atlantic weather system known as the North Atlantic Oscillation (NAO) – long term fluctuations in the difference of atmospheric pressure between the Icelandic Low and the Azores High weather systems. It is a key factor in driving coastal change at Slapton.

Another consideration is that the monitoring from Plymouth University and the Coastal Observatory carried out over more than ten years has identified a series of hotspots of greater than average change (as a result of the beach 'rotation'). These hotspots coincide with the location of both of the road retreats carried out so far. So, for example at location 6b01278A (see figure showing the beachhead recession profile to right) the recession rate in the 10 years shown at this hot spot is **at least 20m** with little recovery post Storm Emma.



Summary of the Key Points:

- The evidence suggests that in a significant number of locations there is little or no space left to continue the policy of retreating the road. In any case, indications are that we are at a point of being in conflict with environmental designations through retreat into the protected space or creating legacy structures.

- This situation has happened more quickly than had been predicted in previous assessments and reasons for this are discussed above.

[12] The extreme 2013/2014 winter storms: Beach recovery along the southwest coast of England: https://www.sciencedirect.com/science/article/pii/S0025322716302766

[13] https://www.researchgate.net/publication/319422722_The_role_of_multi-decadal_climate_variability_in_controlling_coastal_dynamics_re-interpretation_of_the_'Lost_Village_of_Hallsands'

- We now need to start planning for the longer-term future which includes looking at the sea defences as an entity and planning for the longer-term future of Torcross, especially its northern margin.

- Amenity and traffic considerations mean that we need to plan future access to the area and car parking facilities.

6. Strategy Proposals for the Infrastructure of Slapton Line

It seems sensible to sub-divide the Line into sections according to the different conditions there.

6.1. Section 1 - Torcross to End of 2019 Seawall Improvements

a. Torcross : Limpet Rocks to Torcross Slipway: Approx. 200m long (above), this section is designated **Hold the Line** in the SMP2 plan with the road and properties inboard of the Environment Agency-maintained sea wall inherently protected.

b. Torcross Slipway to End of 2019 Seawall Improvements: Extending from the Torcross Slipway for approximately 150m. All the seaward 50m sections are rated as highly vulnerable but have maintained and recently repaired sea defences in place. This section adjoins the designated 'Hold the Line' section and in the short-term provides protection to the car park which outflanks the main sea wall section which is an essential ingredient to the economic health of Torcross.

Recommendation: Both of these sub-sections need to be considered together as an entity in their role in protecting Torcross and its assets. In the short-to-medium term, the sea defences need to be maintained. In the longer term, as expanded in the SMP, due consideration needs to be given to designing and providing a protective buffer for the northern edge of Torcross as the beachhead retreats further and in the long-term ultimately if the shingle barrier breaches.

6.2. Section 2 - End of 2019 seawall improvements to Sands Road Junction

a. **End of 2019 Seawall Improvements to end of rock armour:** Extending approx 800m this section is rated as highly vulnerable with primary protection being provided by existing rock armour, although this is in varied form and condition.

b. **End of rock armour to Sands Road Junction:** Extending for approximately 1160 m between the end of the rock armour through to Sands Rd.

Recommendation: The new strategy should, in the short term, seek to focus on making the rock armour section as effective as possible to help preserve use of the road for as long as possible without changing its nature of construction. This should include re-stacking the existing rock and ensuring its integrity throughout its length without further extending it. Beyond the end of the rock armour the vulnerability of the seaward section reduces from highly vulnerable to vulnerable in the main and in the centre section, to less vulnerable where the car park provides buffer between the road and the beachhead.

6.2. Section 3 - Sands Road Junction to Strete Gate

Extending for approximately 1400m between Sands Rd (Ch 2216m) to Strete Gate (Ch 3570m). This section incorporates the 2018 road realignment. The section includes all vulnerability categories, with 250m rated as highly vulnerable, 800m rated at vulnerable and 300m rated as less vulnerable. This variation is compounded by the fact that in many locations it is no longer viable for the road to be retreated further.

Our recommendation is that the new strategy should seek to continue to promote maintenance operations between Sands Rd and Strete Gate, to enable ongoing vehicular movement, but no further retreat should be carried out. Any significant damage to the road will result in this section being permanently abandoned.

7. Road Scenarios

Devon County Council is committed to maintaining the A379 whilst it is technically feasible, environmentally acceptable and cost effective to do so. However, we are now entering a situation where significant damage to the road is becoming increasingly likely. As erosion continues, there is the possibility of one or more sections of the road failing. This strategy cannot predict a clear timetable or sequence of events, however, the following table illustrates the possible scenarios which may develop, with the potential consequences (it is assumed defences within Section 1 will be consistently maintained to prevent failure here):

	EVENT		**CONSEQUENCES**			
	Section 2 Torcross Defences to Sands Lane	**Section 3 Sands Lane to Strete Gate**	**for A379 between Torcross and Strete Gate**	**for Slapton**	**for Strete Gate approach**	**for Torcross approach**
1	Road still open	Damage to road - not repairable road section closed	Navigable up to Sands Lane from the South and through Slapton	Increase of traffic through Slapton likely	Need to control approach to Strete Gate - parking on road and car park access	Additional car parking needed at Torcross
2	Damage to road - not repairable road section closed	Road still open	Navigable to Sands Lane from the North and through Slapton	Increase of traffic through Slapton likely	Need to control approach to Strete Gate - parking on road and car park access	Additional car parking needed at Torcross
3	Damage to road - not repairable road section closed	Damage to road - not repairable road section closed	Closed for traffic passing in any direction, Strete, Slapton, Torcross	Traffic through Slapton considerably reduced - should memorial car park be closed even if still functional	Need to control approach to Strete Gate - parking on road and car park access	Additional car parking needed at Torcross

Steps now being taken to improve resilience within this framework:

- **Improving the inland route:** Funds from the recent Storm Emma repairs have also gone into localised improvements to the minor road network which runs parallel with the A379. It must be recognised that this road system will never be equal to or substitute for the A379, but some localised improvements in terms of additional passing places, drainage and surfacing works and changes to signage are being made. The advisory one-way route and associated signage have been put aside on the recommendation of the local community.
- **Consultations have commenced with the local community about traffic flows**, most notably in Slapton, based on the recent experience of the road closure following Storm Emma.
- **Plans for staged closure of the road** in the event of severe and irreparable storm damage.
- **Car Park planning**.

8. Adaptation

The A379 Slapton Line road represents an important link for the local community served by it; residents going about their daily activities, businesses relying on access and trade and thousands of visitors annually.

Adaptation, the process of making changes to mitigate the impact of the road closure will need to remain a common theme for inclusion within any future strategy and should build upon previous work that has been undertaken.

The following is a first draft of possible measures and includes suggestions from the recent community engagement events.

i. Set up Adaptation Project

a. Develop funding plans and terms of reference.
b. Create working group with representation from local businesses, residents and Parish Councils, reporting to the Partnership.

ii. Consultation and Communications Programme

a. Work to consult and inform about possible future scenarios and adaptation needed in terms of planning for the future (building on Community Information events). Communications need to be consistent and positive. On previous occasions the 'road is closing' is seen as a negative message with respect to tourism.
b. Revise website and content.

iii. Mitigation – Community and Transport Related:

a. Progress back road enhancements as discussed above – establish shortlist of priorities to work to over the next few years.
b. Consultations with emergency services.
c. Establish communications with SatNav Mapping services.
d. Communication to better inform residents as well as visitors about which routes to use and how best to access the area.
e. Reduce car use through encouraging car-sharing – eg creation of Slapton Car Share club – supported by Carshare Devon.
f. Encourage deliveries to hubs (eg Slapton Community Shop)
g. Revision of signage for temporary and permanent closure.
h. Local traffic/resident surveys in order to propose additional measures to improve congestion. As tried in Slapton village.
i. Documenting plans for bus routes responses in the different scenarios.
j. Improved car parking – see below .
k. Reopen discussions with social service providers such as schools and doctor's surgeries regarding catchment areas and transport access.

iv. **Mitigation – Business Transition**

a. Work with specific business to get a transition plan for them in place to deal with perceived implications of road closure (hopefully will ally fears, reveal opportunities but also deal with any practical issues such as supply routes and access).
b. Transition Business Rate relief – see if possible to establish 'class action'.

v. A new Sustainable Tourism vision for the area

Develop a vision for a new future for the area (See previous Sustainable Tourism Strategy)[14].

Working with a group of businesses including FSC as one of the largest businesses in the area, but also managers of the Nature Reserve and environmental education providers. Possible new branding as per Jurassic Coast perhaps developing the 'Living with a Changing Coast' or Geopark, Geomorphology Park. Building on existing AONB interpretation work (timeline of coastal change)

Supporting infrastructure to include:

a. Creation of Recreational Access-for-all Path
Previous work suggests that Torcross is a popular destination for people with mobility issues owing to the flat accessible walkways. The ultimate loss of the complete highway spec road presents an opportunity to provide recreational access to the area with a high-grade path from the remnants of the road. Additional considerations include:

i. How to best link where damage has occurred between relict road and where erosion has interrupted this.

ii. When further damage occurs a strategy for removing displaced road structure and interfacing with the beachhead.

b. Footpaths

Judging by the public response to the use of the road during the recent road closure much more can be made of the footpath on the shingle ridge. There is also potential to re-examine the potential for a round-the-Ley path revisiting idea but looking for a route likely to be acceptable to landowners and meeting environmental constraints.

[14] As developed previously which may have some useful ideas to pick up http://www.slaptonline.org/library/download.php?id=121&search=tourism%20strategy&area=All&page=1

c. Revamped car parking

i. **Memorial Car Park** – Some pre-planning for response at the various stages of further erosion.

ii. **Slapton Village Car Parking** – Review needed here to assess how to respond to car park between Slapton and the coast but also car parking within Slapton.

iii. **Strete Gate** – extend existing parking (subject to landowners and environmental designation permissions).

iv. **Torcross Car Parking** - What possibilities are there for additional car parking space in Torcross including possible links to for example car parking at businesses such as Stokeley Farm.

9. Implementation of Strategy

The Partnership will:

- Use the new adopted strategy to inform the national Shoreline Management Strategy
- Implement the Adaptation Plan, identify funding to take forward and further develop. It is currently envisaged that the Partnership will employ a project officer to pursue the various measures.
- Devon County Council will continue to maintain the A379 road as a highway including shingle clearance and debris post storms.
- The Environment Agency will continue to maintain the defences at Torcross.

Appendix A: Poster Presentations from Community Engagement Sessions

Preparing for the Future - The Journey Continues

Introduction

The following challenges mean that we are now in a position where any further retreat of the A379 road across Slapton Line cannot easily take place:

- **A series of significant storms** over recent years have appeared to accelerate coastal change quicker than previously predicted.
- **There is now minimal space to retreat the road** in many locations which up to now has been the main way of coping with erosion.
- **Sea level rise** predictions and increased storms will only continue to increase the vulnerability of the A379 to damage.
- **Further funding is unlikely** to be secured for further road retreat.
- **Further retreat would put engineering works in conflict** with the area's environmental designations.
- **These challenges have led to the need for a rethink** of the current management approach.

It is now time for the local communities to become involved in identifying what positive steps can still be taken to ensure the best future for the area.

For these reasons the Slapton Line Partnership is changing the policy from retreating the road to **no further retreat**.

This presentation is intended to address the following points

1. Change is happening faster than predicted
2. What is the evidence for this accelerated change?
3. There is no space left to retreat the road
4. What has been done so far?
5. What will happen next and what can we do?

We want your to hear your concerns and suggestions

What is the Slapton Line Partnership?

The SLP was formed in 2001 to respond to the first road closure caused by coastal erosion. Members include Devon County and South Hams District Councils, Environment Agency, Natural England, Field Studies Council. The local community is represented by Councillors from

The purposes of the Slapton Line Partnership are to:

1. Promote a co-ordinated policy for managing coastal change in and around Slapton Sands;
2. Ensure that appropriate contingency plans and preparations are maintained
3. To promote a range of adaptation activities and projects in anticipation of future change;
4. To promote public awareness and community engagement in the coastal

Slapton Line partnership

Preparing for the Future - The Journey Continues

1. Change is happening faster than predicted

A major study commission by the Slapton Line Partnership was published in 2006 and suggested that:

- Further retreat would allow the road to be maintained for at least another 30 years
- 500m should be realigned to see out this 30-year period

13 years into this period, 700m of road has already been realigned

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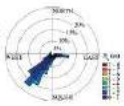
Preparing for the Future - The Journey Continues

2. What is the evidence for this accelerated change?

Wind Direction

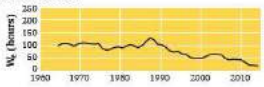
Beach levels are influenced by the predominant wind direction. Along the Slapton Line, Westerlies tend to move shingle North wheras Easterlies move shingle South.

Westerly storms tend to cause erosion to the Southern and Central portions, whereas Easterlies bring shingle back.

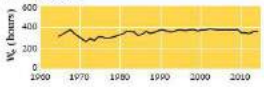


Data collected over the last 50 years has shown that Easterlies have become less frequent whereas Westerlies are now more frequent.

Easterlies



Westerlies

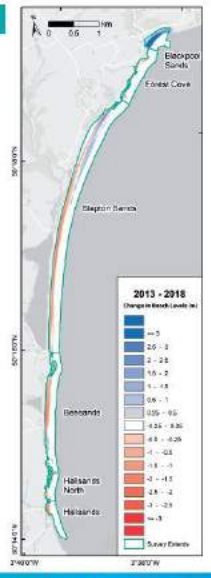


Beach Levels

This diagram shows how the beach levels have changed across the line over the last 5 years.

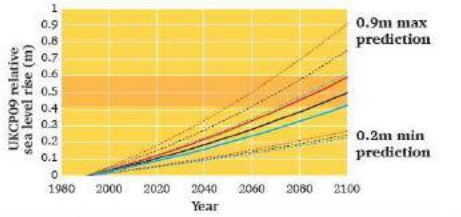
Red areas show a loss of shingle.

Blue areas show a gain of shingle.



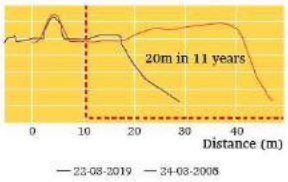
Sea Level Rise

Sea level rise is predicted to increase from 3.5mm per year to 11.5mm per year as we progress through the century.



Beach Profiles

As water levels continue to rise this will increase the impact of storms on the beach and the vulnerability of the A379 to damage. In the middle of the beach the levels have receded by 20m in just the last 11 years.



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Preparing for the Future - The Journey Continues

3. There is no space left to retreat the road

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4. What has been done so far?

Following increasing storm damage, the Partnership commissioned a Beach Management Plan in 2017. This is an important document for being able to apply for national funding through the Environment Agency.

Storm Emma arrived shortly after the Beach Management Plan was completed, however its recommendations have been used to support various pieces of work:

1 Seawall Improvements • **2017:** New section of deeper sheet piling installed in front of existing wall • **2016 + 2018:** Two sections of wall located to the north of the slipway replaced	£2,400,000 £460,000
2 Rock revetment repairs to help protect the road • **2019:** Minor repair work undertaken to existing rock armour to form continuous defence	£10,000
3 Reactive Realignment • **2006 - 2018:** Advance planning for retreat • **2006 - 2018:** Management of environmentally sensitive areas in preparation of retreat • **2018:** Realignment of a 700m section of the A379 following Storm Emma	£1,300,000 approx
4 Adaptation • **2019:** Schedule of work undertaken to improve inland routes, comprising of surfacing and passing point improvements • Future preparation work to continue	£620,000 in progress

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Preparing for the Future - The Journey Continues

5. What happens next and what can we do?

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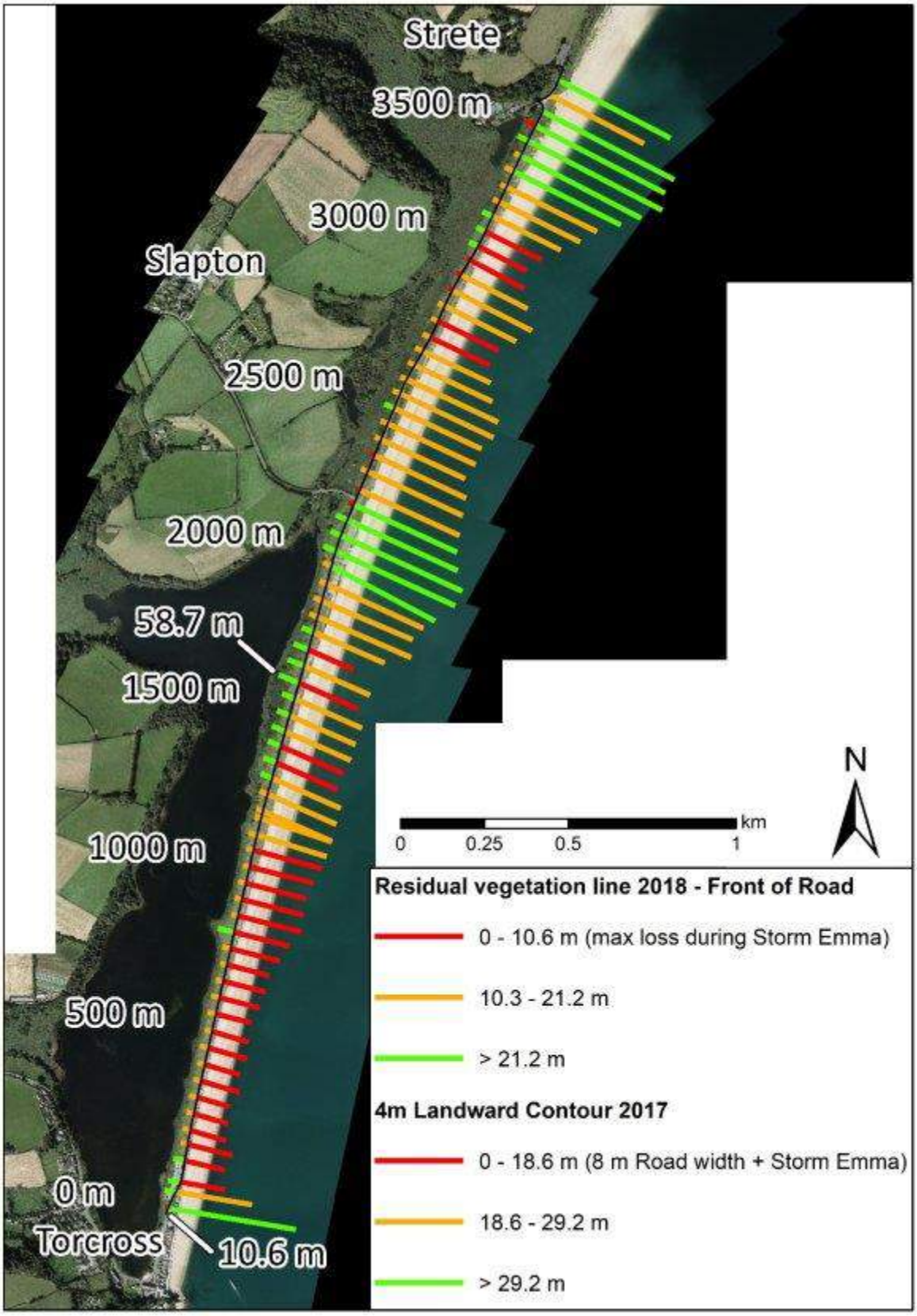
Appendix B – Extracts from Vulnerability Assessment (CMAR Plymouth University Dec 2018)

	Distances from the back of A379 road		
Vulnerability Level	4m Landward	Vegetation Line	4m Seaward
highly vulnerable	< 18.6m 8m road width plus one Storm Emma recession	< 10.6m One Storm Emma recession	< 15.2m One Storm Emma recession
vulnerable	18.6m < and < 29.2m 8m road width plus two Storm Emma recessions	10.6m < and < 21.2m Between one and two Storm Emma recessions	15.2m < and < 30.4m Between one and two Storm Emma recessions
less vulnerable	> 29.2m More than 8m road width and two Storm Emma recessions	> 21.2m More than two Storm Emma recessions	> 30.4m More than two Storm Emma recessions


Strete
3500 m
3000 m
Slapton
2500 m
2000 m
58.7 m
1500 m
1000 m
500 m
0 m
Torcross
10.6 m
N
km
0
0.25
0.5
1
Residual vegetation line 2018 - Front of Road
0 - 10.6 m (max loss during Storm Emma)
10.3 - 21.2 m
> 21.2 m
4m Landward Contour 2017
0 - 18.6 m (8 m Road width + Storm Emma)
18.6 - 29.2 m
> 29.2 m

Vulnerability Table

Profile	Chainage (from mid Torcross)	4m landward contour (edge of Ley to back of road) post road retreat	Vegetation Line = width of Seaward buffer remaining in front of road edge
PCO6b01243	3570	N/A	24.46
PCO6b01244	3520	N/A	19.46
PCO6b01245	3470	N/A	30.03
PCO6b01246	3420	13.32	29.44
PCO6b01247	3370	34.36	30.74
PCO6b01248	3320	21.52	26.86
PCO6b01249	3270	28.85	22.8
PCO6b01250	3219	19.78	18.05
PCO6b01251	3170	21.16	15.26
PCO6b01252	3122	33.41	11.81
PCO6b01253	3072	29.39	8.4
PCO6b01254	3025	29.79	6.11
PCO6b01255	2976	13.85	7.94
PCO6b01256	2925	16.75	11.44
PCO6b01257	2872	15.05	15.06
PCO6b01258	2820	22.34	12.69
PCO6b01259	2771	23.22	9.44
PCO6b01260	2718	25.12	9.04
PCO6b01261	2670	25.19	11.4
PCO6b01262	2622	22.44	14.19
PCO6b01263	2574	20.92	18.06
PCO6b01264	2530	25.12	18.63
PCO6b01265	2480	32.64	16.89
PCO6b01266	2430	22.77	17.05
PCO6b01267	2378	19.36	15.97
PCO6b01268	2328	15.45	18.11
PCO6b01269	2275	21.71	19.06
PCO6b01270	2216	12.07	20.26
PCO6b01271	2168	18.09	21.29
PCO6b01272	2118	36.26	23.29
PCO6b01273	2068	33.05	26.34
PCO6b01274	2020	39.62	25.82
PCO6b01275	1972	28.03	22.19
PCO6b01276	1918	23.26	19.4

PCO6b01277	1865	27.24	17.51
PCO6b01278	1816	27.07	18.34
PCO6b01279	1769	36.97	12.13
PCO6b01280	1715	47.97	4.91
PCO6b01281	1664	51.97	10.7
PCO6b01282	1611	58.71	8.64
PCO6b01283	1564	39.92	11.08
PCO6b01284	1510	40.56	10.67
PCO6b01285	1461	43.5	10.61
PCO6b01286	1415	42.5	9.76
PCO6b01287	1364	41.13	9.41
PCO6b01288	1317	37.38	11.44
PCO6b01289	1268	25.94	11.53
PCO6b01290	1215	20.79	11.38
PCO6b01291	1193	19.91	11.36
PCO6b01292	1142	26.53	10.91
PCO6b01293	1096	21.84	10.34
PCO6b01294	1045	20.78	9.09
PCO6b01295	995	23.33	8.37
PCO6b01296	945	21.76	8.56
PCO6b01297	895	21.23	9.05
PCO6b01298	845	49.86	6.82
PCO6b01299	795	25.48	5.29
PCO6b01300	745	20.78	3.55
PCO6b01301	695	22.18	3.56
PCO6b01302	645	24.73	2.95
PCO6b01303	595	25.73	1.66
PCO6b01304	540	22.53	2.08
PCO6b01305	490	26.93	2.53
PCO6b01306	440	22.95	1.7
PCO6b01307	390	22.75	2.64
PCO6b01308	340	23.73	0.9
PCO6b01309	290	23.65	1.53
PCO6b01310	240	23.7	1.86
PCO6b01311	200	22.59	4.1
PCO6b01312	150	35.07	2.97
PCO6b01313	80	37.45	3.84
PCO6b01314	50	35.22	12.05
PCO6b01315	0	10.57	25.25