1 Introduction

Analysis presented in this report provides an overview of beach changes since the commencement of the Southeast Regional Coastal Monitoring Programme in 2002. The first beach surveys took place during 2003 (i.e. the Baseline year) and changes are reported until the most recent survey.

The results are given for individual Survey Units spanning autumn 2018 to autumn 2019. The Survey Unit report is updated following each survey and distributed to coastal engineers. In this way, a rapid assessment is made of changes from survey to survey, in addition to a comparison of longer term changes. On completion of the autumn surveys, the individual reports from all Survey Units are collated into this Cell-wide annual survey report, to provide a useful long-term record of short-term changes.

Data are presented at several levels:

- Comparison with previous survey
- Tables with CSA change and m² as %
- Graphs of change in cross-sectional area through time
- Survey Unit maps summarising beach profile change
- Survey Unit maps summarising beach profile change from Baseline year to current

The Survey Unit maps indicate the location of the profiles, superimposed on the 2016 aerial photography (note that the profile lines may have been extended, for clarity).
2 Profile Analysis

Where possible, longer-term records from earlier programmes are also presented in the profile analysis, although historical data was often collected using significantly different survey techniques, or specifications. Cross-sectional area is measured relative to a Reference Level which, typically, is the elevation of Mean Low Water Springs (Figure 1).

![Figure 1: Definition of Cross Sectional Area (CSA)](image)

All profile data was imported into SANDS® for analysis. This enables beach cross sectional areas (CSA) to be calculated as an indicator of beach quantity above and seaward of a master profile (Figure 1). Where available, seawalls are located spatially using a combination of design schematics and a sea defence survey conducted in 2003. The vertical level of master profiles are set close to the beach toe level or mean low water, whichever is deemed most appropriate. In some areas, clay levels have also been established using the results from trial holes dug into the beach. These have been incorporated to produce a more accurate master profile that calculates the actual beach area.
2.1 Profile change summary

Changes along individual profiles for a range of timeframes are summarised in a series of thematic maps on the previous pages. The maps show the location of each beach profile, superimposed on aerial photography (note the lines have been extended for clarity). The name of the profile, the percentage change of beach material and the change in m² has been including upon the line, which is illustrated in Figure 2.

Figure 2. Presentation of the profile change summary
2.2 Overview of CSA Condition (BMP sites only)

The naming convention and definition of trigger levels varies significantly between previous beach management plans and other reports. For the purpose of this report three trigger levels are used and described below for clarity. These were designed to help aid interpretation of coastal monitoring data and to inform beach management works.

Explanation of the Trigger Levels

**CRITICAL LEVEL** – This is the minimum beach level required to prevent overtopping exceeding tolerable limits in a 1:200 year storm event and/or a significant risk of structural damage or undermining. A Sub-Critical level is also defined which is the equivalent level for a standard of protection of 1:10 (approximately equal to half the CSA of the 1:200 event).

**MAINTENANCE LEVEL** – This level is higher than the critical level. The difference in beach cross sectional area is defined by the largest observed annual drop in beach level (since monitoring began in 2003), or where greater the largest loss during a storm event.

**DESIGN LEVEL** – This is higher than the maintenance level and takes into consideration the impact of the defence failing (though undermining or significant overtopping), and builds in an appropriate factor of safety. When carrying out works, where possible, the beach size should be constructed to this level.

The historic changes in cross-sectional area for each profile are summarised and plotted against the trigger levels as follows:

![Figure 3. Presentation of standard of protection and trigger levels](image)

*Figure 3. Presentation of standard of protection and trigger levels

(a) Historic variation of beach levels (CSA)*

(b) Summary of data, pink bar – current beach level, black bars – historic high and low

Having defined the trigger levels (Figure 3) it is possible to ascertain not only the current standard of protection, but also to appraise how the beach has performed historically. Trigger levels are
calculated as a beach cross sectional area (CSA), these can be plotted for each profile location along the frontage and compared to the surveyed beach CSA through time.

### 2.3 Overview of CSA Changes (BMP sites only)

These results are also illustrated as coloured thematic maps. As with the detailed profile maps, the colour scheme illustrates erosion (red), accretion (blue) and no significant change (grey).

Those units that demonstrate an average change of less than 5% CSA are considered to be within the possible effects of natural processes and survey error. It should be noted that the largest changes often result from units with very few profiles, where a single profile can skew the results. Although these figures can highlight a highly erosive unit, or a recent replenishment, they should be viewed with caution as, for example, it is possible to have a small highly erosive area within a unit that accretes material overall.

Caution should be given to detailed coastal examination based on these results alone as they reflect a short-term trend based on the state of the beach at snapshots in time. These figures show overall trends, but individual profiles should be examined in more detail in those areas of interest. Crucially, the significance of any results should be put in context with previous fluctuations in beach CSA since the start of the monitoring programme in 2003.

### 3 Hydrodynamic data

Wave reports for all coastal monitoring programme wave buoys within the 4c sub cell are included. The wave reports include summary statistics for the period spanning January 2019 to December 2019 for the Waverider buoys deployed at Folkestone.
Folkestone Directional Waverider Buoy

<table>
<thead>
<tr>
<th>Location</th>
<th>OS 619260 E 133909 N</th>
<th>Buoy in situ off Sandgate beach. Photo courtesy of Fugro GB Marine Limited</th>
</tr>
</thead>
<tbody>
<tr>
<td>WGS84</td>
<td>Latitude: 51° 03.76' N</td>
<td>Location of buoy (Google mapping, image ©2016 TerraMetrics)</td>
</tr>
<tr>
<td></td>
<td>Longitude: 01° 07.67' E</td>
<td></td>
</tr>
<tr>
<td>Instrument type</td>
<td>Datawell Directional Waverider Mk III</td>
<td></td>
</tr>
<tr>
<td>Water depth</td>
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Data Quality

<table>
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<tr>
<th>Recovery rate (%)</th>
<th>Sample interval</th>
</tr>
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<tbody>
<tr>
<td>87</td>
<td>30 minutes</td>
</tr>
</tbody>
</table>

Monthly Averages – 2019  
*All times are GMT*

<table>
<thead>
<tr>
<th>Month</th>
<th>$H_s$ (m)</th>
<th>$T_p$ (s)</th>
<th>$T_z$ (s)</th>
<th>Dir. (°)</th>
<th>SST (°C)</th>
<th>Bimodal seas (%)</th>
<th>No. of days</th>
</tr>
</thead>
<tbody>
<tr>
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<td>4.0</td>
<td>144</td>
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<tr>
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<td>7.2</td>
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</table>

Monthly Averages - All Years (July 2003 – December 2019)

<table>
<thead>
<tr>
<th>Month</th>
<th>$H_s$ (m)</th>
<th>$T_p$ (s)</th>
<th>$T_z$ (s)</th>
<th>Dir. (°)</th>
<th>SST (°C)</th>
<th>Bimodal seas (%)</th>
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<tr>
<td>June</td>
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<td>December</td>
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### Storm Analysis

<table>
<thead>
<tr>
<th>Date/Time</th>
<th>$H_s$ (m)</th>
<th>$T_p$ (s)</th>
<th>$T_z$ (s)</th>
<th>Dir. (°)</th>
<th>Water level elevation* (OD)</th>
<th>Tidal stage (hours re. HW)</th>
<th>Tidal range (m)</th>
<th>Tidal surge (m)</th>
<th>Max. surge (m)</th>
</tr>
</thead>
<tbody>
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<td>2.86</td>
<td>7.1</td>
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<td>179</td>
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<td>HW -1</td>
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<td>-</td>
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<td>7.7</td>
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<td>HW +6</td>
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* Tidal information is estimated from the predicted tide levels (Admiralty Total Tide).

### Annual Statistics

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<th>Year</th>
<th>Annual $H_s$ exceedance** (m)</th>
<th>Annual Maximum $H_s$</th>
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<td></td>
<td>0.05%</td>
<td>0.5%</td>
</tr>
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<td>2003</td>
<td>2.79</td>
<td>2.23</td>
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<tr>
<td>2004</td>
<td>2.96</td>
<td>2.30</td>
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<td>2005</td>
<td>2.90</td>
<td>2.15</td>
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<tr>
<td>2006</td>
<td>2.55</td>
<td>2.08</td>
</tr>
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<td>2007</td>
<td>2.56</td>
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<td>2008</td>
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<td>2009</td>
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<td>2010</td>
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<td>1.95</td>
</tr>
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<td>2011</td>
<td>2.87</td>
<td>1.98</td>
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<td>2018</td>
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<tr>
<td>2019</td>
<td>2.50</td>
<td>2.02</td>
</tr>
</tbody>
</table>

** i.e. 5% of the $H_s$ values measured in 2003 exceeded 1.37 m
Significant wave height return periods

Return periods for significant wave height can be calculated since the buoy has been deployed for more than 5 years. The return periods are based on 0.5 hourly records and are calculated for periods up to 10 times the record length using a peaks-over-threshold method and Generalised Pareto Distribution (GPD).

<table>
<thead>
<tr>
<th>Observation period</th>
<th>July 2003 to December 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Return period (years)</strong></td>
<td><strong>Significant wave height (m)</strong></td>
</tr>
<tr>
<td>0.25</td>
<td>2.45</td>
</tr>
<tr>
<td>1</td>
<td>2.99</td>
</tr>
<tr>
<td>2</td>
<td>3.21</td>
</tr>
<tr>
<td>5</td>
<td>3.47</td>
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<td>3.63</td>
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<td>20</td>
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<td>50</td>
<td>3.95</td>
</tr>
<tr>
<td>100</td>
<td>4.06</td>
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</tbody>
</table>

Distribution plots

The distribution of wave parameters are shown in the accompanying graphs of:

- Annual time series of $H_s$ (red line is 2.45 m storm alert threshold)
- Incidence of storm waves for 2019. Storm events are defined using the Peaks-over-Threshold method. The highest $H_s$ of each storm event is shown
- Wave height exceedance each year since deployment
- Percentage of occurrence of $H_s$, $T_p$, $T_z$ and Direction for 2019
- Wave rose (percentage of occurrence of direction vs $H_s$) for all measured data
- Joint distribution of all parameters for all measured data, given as percentage of occurrence

General

The buoy, owned by New Forest District Council, was first deployed on 8 July 2003, at which time the magnetic declination at the site was 2.1° west, changing by 0.14° east per year.

Acknowledgements

The shore station is kindly hosted by Shepway District Council Offices.

Tidal data at Dover were provided by the British Oceanographic Data Centre from the UK national tide gauge network, owned and operated by the Environment Agency.
Folkestone - Significant Wave Height (Hs) during 2019

Day in month
Folkestone 2003 to 2019 - Joint distribution (% of occurrence)
The Dover unit is split into two bays; Harbour beach and Shakespeare Beach. Dover is a shingle beach backed by a large Victorian sea wall and Shakespeare Beach is a self-contained bay to the west of the Port.

In 2015, the concrete vertical seawall at Shakespeare beach failed which closed the beach between Autumn 2015 and Spring 2017 and no surveys were conducted in 2016. A capital scheme saw the construction of a large rock revetment in front of this seawall making the beach narrower and not comparable with the 2003 baseline; consequently the baseline for Shakespeare beach has now been moved to 2017.

Dover Harbour beach baseline remains as 2003 but due to gradual losses of sediment Profile 4c00001 is now inaccessible and remains submerged at MLWS. Following development of the Port of Dover Profile 4c00027 has been incorporated into the new marina and no longer exists.

**Survey outcome:**

There are currently no design levels for this unit.

<table>
<thead>
<tr>
<th>Survey type</th>
<th>Survey dates</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autumn to Spring</td>
<td>12/10/2018, 18/04/2019</td>
<td>Harbour Beach demonstrates erosion in all four profiles during this period; of which easternmost Profiles 4c00008 and 4c00011 demonstrate the largest losses of -21m$^2$ (-15%) and -8m$^2$ (-11%) respectively. In contrast, Shakespeare Beach indicates accretion in 6 out of 7 profiles. The largest overall gain occurred at Profile 4c00042, accreting by 22m$^2$ (8%). Conversely, westernmost Profile 4c00060 demonstrated the largest loss of -10m$^2$ (-14%).</td>
</tr>
<tr>
<td>Spring to Spring</td>
<td>22/03/2018, 18/04/2019</td>
<td>Similar to the Autumn-Spring period, Harbour Beach demonstrates erosion in all four profiles during this period. The largest losses occurred in Profiles 4c00008 and 4c00024 of -21m$^2$ (-15%) and -61m$^2$ (-16%) respectively. Shakespeare Beach also demonstrated accretion in 6 out of 7 profiles during this period. The largest overall gain occurred at Profile 4c00042 of 31m$^2$ (11%); and the largest overall loss occurred at Profile 4c00060 of -15m$^2$ (-19%).</td>
</tr>
<tr>
<td>Survey type</td>
<td>Survey dates</td>
<td>Comments</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>--------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Most recent survey:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline (Harbour beach) to Spring</td>
<td>20/09/2003 to 18/04/2019</td>
<td>The long-term trends for Harbour Beach demonstrate erosion in 3 out of 4 profiles since 2003. The largest percentage loss has occurred at Profile 4c00011 of -30m² (-32%). Although, the largest material loss occurred at Profile 4c00024 with a loss of -36m² (-10%). The central Profile 4c00019 demonstrates the only accretive trend of 15m² (12%).</td>
</tr>
<tr>
<td>Baseline (Shakespeare beach) to Spring</td>
<td>15/03/2017 to 18/04/2019</td>
<td>Shakespeare Beach has a much shorter long term analysis period; the beach shows losses along two profiles, both at the extremities of the bay. The easternmost Profile 4c00032 and westernmost Profile 4c00060, show losses of -13m² (-2%) and -22m² (-26%) respectively. Conversely, the central profiles have recorded accretion. Of these, the largest overall gain occurred at Profile 4c00042 of 60m² (24%).</td>
</tr>
<tr>
<td>Spring to Autumn</td>
<td>18/04/2019 to 18/10/2019</td>
<td>Harbour Beach demonstrates low-level changes (±5%) during this period; with minor accretion occurring in all but the westernmost profile. \nIn contrast, Shakespeare Beach demonstrates much larger changes during this period. Indeed, the two easternmost profiles demonstrate minor accretion, however, to the west, there are progressively more erosive trends. Of these, Profile 4c00056 demonstrates the largest loss of -35m² (-36%).</td>
</tr>
<tr>
<td>Profile</td>
<td>Autumn to Spring</td>
<td>Spring to Spring</td>
</tr>
<tr>
<td>---------</td>
<td>------------------</td>
<td>------------------</td>
</tr>
<tr>
<td></td>
<td>Autumn 2018 to Spring 2019</td>
<td>Spring 2018 to Spring 2019</td>
</tr>
<tr>
<td>4c00008_t</td>
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<tr>
<td>4c00056_t</td>
<td>9 10</td>
<td>11 13</td>
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Current and Historic Beach Cross-Sectional Areas (m²) based on datums of -1.7 to -2.5 mOD

Design Standard = 1:200 years
Annual Change in Cross-Sectional Area (m²)

<table>
<thead>
<tr>
<th>ACCRETION</th>
<th>EROSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;30%</td>
<td>&gt;30%</td>
</tr>
<tr>
<td>15-30%</td>
<td>15-30%</td>
</tr>
<tr>
<td>5-15%</td>
<td>5-15%</td>
</tr>
</tbody>
</table>

Less than 5% (no change)
South East Regional Coastal Monitoring Programme
Profile Change Summary for Baseline 2003 to Spring 2019

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Additional overlaid information is copyright of Canterbury City Council 2019
South East Regional Coastal Monitoring Programme
Profile Change Summary for Spring 2019 to Autumn 2019

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Additional overlaid information is copyright of Canterbury City Council 2019

Annual Change in Cross-Sectional Area (m²)

<table>
<thead>
<tr>
<th>ACCRETION</th>
<th>EROSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;30%</td>
<td>5-15%</td>
</tr>
<tr>
<td>15-30%</td>
<td>15-30%</td>
</tr>
<tr>
<td>5-15%</td>
<td>&gt;30%</td>
</tr>
<tr>
<td>Less than 5% (no change)</td>
<td></td>
</tr>
</tbody>
</table>

Meters
This survey unit consists of a chalk platform, flat sand beach, a large concrete structure backed by high chalk cliffs. Towards the western end of the unit, the beach is larger, comprising of shingle/sand. A seawall fronts a majority of the chalk cliffs, however it has been visually noted that the seawall has moved seawards. A rock revetment fronts the seawall in places that are most vulnerable.

Survey outcome:

There are eight designated profiles within this unit but with increasing health and safety issues, only the three most westerly profiles were accessible to be surveyed. Therefore, there is no data for comparison for profiles 4c00097 to 4c00113.

There are no design levels for the Warren and very little beach in front of the structures. Most of the unit is characterised by flat sand which meets the structure so any small change in beach CSA is represented by large percentage changes.

<table>
<thead>
<tr>
<th>Survey type</th>
<th>Survey dates</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring to Spring</td>
<td>19/02/2018</td>
<td>All three of the profiles demonstrate low-level change, with the two eastern profiles losing material and the western profile gaining. Profile 4c00122 has the largest loss of 5m² (-3%).</td>
</tr>
<tr>
<td>Profile Change</td>
<td>06/03/2019</td>
<td></td>
</tr>
<tr>
<td>Baseline to Spring</td>
<td>13/09/2003</td>
<td>The long term analysis indicates erosion at all three profiles since 2003. Profile 4c00122 demonstrates a small decrease in material, whereas Profiles 4c00126 and 4c00130 demonstrate larger losses of 22m² (-31%) and 27m² (-38%) respectively.</td>
</tr>
<tr>
<td></td>
<td>06/03/2019</td>
<td></td>
</tr>
</tbody>
</table>
## Profile cross-sectional area change: seasonal, annual and longer-term changes

<table>
<thead>
<tr>
<th>Profile</th>
<th>Spring to Spring</th>
<th>Baseline to Spring</th>
<th>Elevation of Reference Surface (mOD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Spring 2018 to Spring 2019</td>
<td>Baseline 2003 to Spring 2019</td>
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<tr>
<td></td>
<td>(m²)</td>
<td>%</td>
<td>(m²)</td>
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<tr>
<td>4c00122_t</td>
<td>-5</td>
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<tr>
<td>4c00130_t</td>
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<td>2</td>
<td>-27</td>
</tr>
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</table>
Annual Change in Cross-Sectional Area (m²)

- **ACCRETION**:
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)

- **EROSION**:
  - >30%
  - 15-30%
  - 5-15%

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Folkestone consists of a sand and gravel beach with a sandy foreshore. With the completion of the two major coast protection schemes in 1996 and 2004, the frontage is now entirely dependent on the successful implementation of beach management through a sediment recycling programme. Since the start of the scheme, rock groynes have been constructed and shingle recycling now takes place twice each year, in the spring and autumn.

Survey outcome:

Many of the CSA levels within Cell 4 are currently within the critical range, east of Sandgate Castle. Cells 5 to 8 towards the crenulated bays and Harbour Arm indicate broader historical ranges, although the majority of these profiles are currently above design level. Unlike the other survey units, this beach is actively managed twice per year which has removed the requirement for a maintenance range. Trigger levels have been set in accordance with management bays, not defence type.

During the Autumn 2018 and Spring 2019, beach material was artificially moved between Cells 4-7. Refer to the recycling logs for further detail on all operations.
Most recent survey: Autumn 2019

<table>
<thead>
<tr>
<th>Survey type</th>
<th>Survey dates</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autumn to Spring</td>
<td>25/09/2018 - 07/03/2019</td>
<td>The Autumn 2018 beach recycling operation took place between these two surveys (Appendix C). The Autumn 2018 beach recycling operation took place between these two surveys (Appendix C). The majority of profiles show low level changes; however this is aided by the Autumn 2018 beach recycling countering natural sediment movement. Cell 5 indicates the largest loss along Profile 4c00198, of -36m² (-32%). There are also losses along Profiles 4c00196, 4c00184A (western crenular bay), and 4c00163 of -10m² (-6%), -13m² (-6%) and -29m² (-7%) respectively. Cell 8 indicates losses along every profile, despite no beach management activities within this cell.</td>
</tr>
<tr>
<td>Spring to Spring</td>
<td>23/03/2018 - 07/03/2019</td>
<td>The Spring 2018 and Autumn 2018 recycling operations took place between these two surveys (Appendix C). At the western end of the unit, most profiles demonstrate minor-to-moderate losses, while a few profiles indicate accretion. Two of the largest changes occurred at the westernmost Profiles 4c00264 and 4c00259, which lost -34m² (-13%) and gained 24m² (14%) respectively. Profile 4c00204 also demonstrated a moderate loss of -22m² (-7%). Within both crenular bays, there is a tendency for the western profiles to erode and the eastern profiles to accrete despite beach recycling in December 2018 to reverse this trend. This demonstrates the west-to-east littoral drift of material. Profile 4c00184A lost -19m² (-9%) and Profile 4c00178A lost -23m² (-8%). Conversely, there are accretive changes on Profiles 4c00181A and 4c00175A of 18m² (7%) and 23m² (8%), respectively. At Sunny Sands, there is a gain along Profile 4c00150 of 12m² (6%). The topographic difference model demonstrates accretion within Bay 1 (Cell 4) - Polygons FK01 and FK02 have accumulatively gained 3,462m³ whereas Polygon FK03 lost 3,466m³; this goes against the natural trends and is a direct result of beach recycling activities. Polygons FK04 to FK07 all lost material, despite beach recycling, and have a total loss of -7,877m³. These trends are due to biannual recycling operations (see Appendix C). In Spring and Autumn of 2018, recycling works were undertaken, transporting shingle from the eastern section of each groyne bay to the west to counteract the west to east drift direction. In April 2018, a total of 34,000m³ was recycled within the unit. In Autumn 2018, a further 13,000m³ was recycled.</td>
</tr>
<tr>
<td>Survey type</td>
<td>Survey dates</td>
<td>Comments</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------</td>
<td>----------</td>
</tr>
<tr>
<td>Most recent survey: Autumn 2019</td>
<td>No recycling is carried out at Sunny Sands and there is a total gain here of 2,048m³. Overall, the entire unit has a total net volume change of -5,833m³ across this period.</td>
<td></td>
</tr>
<tr>
<td>Baseline to Spring</td>
<td>In Bay 1 (Cell 4) there is a general trend of erosion in the west and accretion in the east. Profile 4c00256 has the largest loss of -35m² (-13%), whereas Profiles 4c00216 and 4c00204 recorded the largest gains of 26m² (23%) and 37m² (16%), respectively. In Bay 2 (Cell 5), some of the largest overall changes of the unit are recorded. Profile 4c00198 is the most erosive losing -67m² (-47%) and Profile 4c00193 is the most accretive gaining 59m² (39%). In the Crenular bays, the profile variations are within ±11%; Profiles 4c00183A and 4c00177A have losses of -19m² (-11%) and -20m² (-11%). In Bay 5 (Cell 8), Profile 4c00172 indicates the largest change, gaining 89m² (22%). Sunny Sands has low level changes (±5%). The difference model demonstrates the long-term changes are erosive in the two westernmost polygons of Bay 1 (Cell 4); FK01 and FK02 have a combined loss of -19,092m³. Conversely, FK03 indicates accretion, gaining 30,730m³. Polygon FK04 in Bay 2 (Cell 5) also shows a gain of 13,177m³, although there is a clear divide of erosion in the western side of the bay and accretion in the east. The crenular bays indicate smaller changes; Polygon FK05 in Bay 3 (Cell 6) eroded by 318m³, and Polygon FK06 in Bay 4 (Cell 7) accreted 517m³. Lastly, Polygon FK07 in Bay 5 (Cell 8) accreted 22,992m³, and Sunny Sands indicated a smaller gain of 1,607m³. Overall, the unit shows a total net volume gain of 49,613m³ which is attributed to the losses recorded within Sandgate and indicates the beach recycling within Sandgate and Folkestone does not balance the sediment transport between the two units.</td>
<td>03/10/2004 07/03/2019</td>
</tr>
<tr>
<td>Survey type</td>
<td>Survey dates</td>
<td>Comments</td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Spring to Autumn</td>
<td>07/03/2019 – 14/10/2019</td>
<td>The Spring 2019 recycling operation took place between these two surveys (Appendix C). There are predominantly low-level changes (±5%) during this period, with some exceptions. Bay 1 (Cell 4) and Bay 2 (Cell 5) demonstrate minor changes, with the largest percentage gain occurring along Profile 4c00216 of 12m² (9%). In the crenular bays, there is limited change along all profiles of ±5%. In contrast, Bay 5 (Cell 8) demonstrates some larger changes; Profile 4c00172 eroded by -28m² (-6%), and Profile 4c00159 accreted 24m² (6%). Lastly, Sunny Sands demonstrates no change at Profile 4c00153, and a gain of 15m² (7%) at Profile 4c00150.</td>
</tr>
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</table>
### Profile cross-sectional area change: seasonal, annual and longer-term changes

<table>
<thead>
<tr>
<th>Profile</th>
<th>Autumn to Spring 2019</th>
<th>Spring to Spring 2019</th>
<th>Baseline to Spring 2019</th>
<th>Spring to Autumn 2019</th>
<th>Elevation of Reference Surface (mOD)</th>
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<td>(m²)</td>
<td>%</td>
<td>(m²)</td>
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## Annual Change in Cross-Sectional Area (m²)

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<td>1%</td>
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<tr>
<td>4c00224_t</td>
<td>-2%</td>
</tr>
<tr>
<td>4c00204_t</td>
<td>-7%</td>
</tr>
<tr>
<td>4c00196_t</td>
<td>7%</td>
</tr>
<tr>
<td>4c00208_t</td>
<td>-3%</td>
</tr>
<tr>
<td>4c00181A_t</td>
<td>-12%</td>
</tr>
<tr>
<td>4c00232_t</td>
<td>-3%</td>
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<tr>
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<td>4c00186A_t</td>
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<td>4c00178A_t</td>
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</tr>
<tr>
<td>4c00177A_t</td>
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</tbody>
</table>

**Legend:**
- **>30%** (Erosion)
- **5-15%** (Erosion)
- **15-30%**
- **5-15%** (Accretion)
- **>30%** (Accretion)
- Less than 5% (no change)
South East Regional Coastal Monitoring Programme
Difference Model 2019 - 2018

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South East Regional Coastal Monitoring Programme
Difference Model 2004 - 2019

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South East Regional Coastal Monitoring Programme
Difference Model 2004 - 2019

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Change in Elevation (m)

Area boundary

- < -1.5
- -1.0 to -1.5
- -0.5 to -1.0
- -0.25 to -0.5
- 0.25 to -0.25
- 0.25 to 0.5
- 0.5 to 1.0
- 1.0 to 1.5
- > 1.5

Volume change (m³)
South East Regional Coastal Monitoring Programme
Difference Model 2004 - 2019

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Change in Elevation (m)
-1.5 to -1.0
-0.5 to -1.0
-0.25 to -0.5
0.25 to -0.25
0.25 to 0.5
0.5 to 1.0
1.0 to 1.5
> 1.5

Volume change (m³)
area boundary
South East Regional Coastal Monitoring Programme
Profile Change Summary for Spring 2019 to Autumn 2019

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Annual Change in Cross-Sectional Area (m²)

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</table>

- **Accretion**
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)

- **Erosion**
  - 15-30%
  - 15-30%
  - >30%

Scale: 0 - 250 Meters
South East Regional Coastal Monitoring Programme
Profile Change Summary for Spring 2019 to Autumn 2019

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Annual Change in Cross-Sectional Area (m²)

<table>
<thead>
<tr>
<th>ACCRETION</th>
<th>EROSION</th>
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<tbody>
<tr>
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South East Regional Coastal Monitoring Programme
Profile Change Summary for Spring 2019 to Autumn 2019

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Annual Change in Cross-sectional Area (m²)

<table>
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<th>EROSION</th>
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<td>15-30%</td>
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<tr>
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<td>5-15%</td>
</tr>
<tr>
<td>Less than 5% (no change)</td>
<td>Less than 5% (no change)</td>
</tr>
</tbody>
</table>

- 4c00150 7% (0)
- 4c00153 -0% (0)
- 4c00159 6% (24)
- 4c00169 -4% (-14)
- 4c00172 -6% (-28)
- 4c00177A 4% (6)
- 4c00181A 4% (10)
- 4c00183A -1% (-2)
- 4c00184A 4% (3)
- 4c00186A -4% (-18)
- 4c00175A 1% (2)
- 4c00166 1% (9)
- 4c00163A 2% (9)
- 4c00178A -5% (-14)
Appendix C: Recycling Logs

Recycling Log: Folkestone (4cSU08)

☒ Deposition ☒ Extraction ☒ Reprofiling

Date 26th March – 4th April 2018
Logged by Rebecca Creed

Description of Works/Notes
Extraction and deposition of material between cells 4 – 7 as part of an annual beach recycling operation.

Description of Frontage

<table>
<thead>
<tr>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crest at centre of the Crenular bay was right back against seawall. Eastern end of cell 4 had large accumulation of sediment compared with the western end which showed depleted beach levels.</td>
<td>Material placed in-front of centre of Crenular bays to provide protection to seawall. Beach levels back to design level around Battery point in cell 4.</td>
</tr>
</tbody>
</table>
## Quantify extraction

(Note: If volume unknown conversion used is 1.8 tonne: 1 m³ of material)

<table>
<thead>
<tr>
<th>Profile/Groyne No.</th>
<th>Profile/Groyne No.</th>
<th>Quantity (m³)</th>
<th>Lorry Capacity (m³)</th>
<th>Number of lorry loads</th>
<th>Material Description (click in cell for drop down)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00175A</td>
<td>4c00177A</td>
<td>1,500</td>
<td>Or</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00181A</td>
<td>4c00183A</td>
<td>1,500</td>
<td>Or</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00190</td>
<td>4c00194</td>
<td>10,000</td>
<td>Or</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00201</td>
<td>4c00214</td>
<td>8,000</td>
<td>Or</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00226</td>
<td>4c00238</td>
<td>13,000</td>
<td>Or</td>
<td></td>
<td>Shingle</td>
</tr>
</tbody>
</table>

Total: 34,000 m³

## Quantify deposition

(Note: If volume unknown conversion used is 1.8 tonne: 1 m³ of material)

<table>
<thead>
<tr>
<th>Profile/Groyne No.</th>
<th>Profile/Groyne No.</th>
<th>Quantity (m³)</th>
<th>Lorry Capacity (m³)</th>
<th>Number of lorry loads</th>
<th>Material Description (click in cell for drop down)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00177A</td>
<td>4c00178A</td>
<td>1,500</td>
<td>Or</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00184A</td>
<td>4c00186A</td>
<td>1,500</td>
<td>Or</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00194</td>
<td>4c00199</td>
<td>10,000</td>
<td>Or</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00256</td>
<td>4c00264</td>
<td>21,000</td>
<td>Or</td>
<td></td>
<td>Shingle</td>
</tr>
</tbody>
</table>

Total: 34,000 m³
Recycling Log: Folkestone (4cSU08)

- Deposition
- Extraction
- Reprofiling

**Date**  
5th Nov – 11th Dec 2018

**Logged by**  
Rebecca Creed

**Description of Works/Notes**

Extraction and deposition of material between cells 4 – 7 as part of an annual beach recycling operation.

**Description of Frontage**

<table>
<thead>
<tr>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crest at centre of the Crenular bay was right back against seawall. Eastern end of cell 4 had large accumulation of sediment compared with the western end which showed depleted beach levels.</td>
<td>Material placed in-front of centre of Crenular bays to provide protection to seawall. Beach levels back to design level around Battery point in cell 4.</td>
</tr>
</tbody>
</table>
Quantify Deposition and extraction (Note: If volume unknown conversion used is 1.8 tonne: 1 m³ of material)

<table>
<thead>
<tr>
<th>Cell No Extraction</th>
<th>Cell No Deposition</th>
<th>Quantity (m³)</th>
<th>Lorry Capacity (m³)</th>
<th>Number of lorry loads</th>
<th>Material Description (click in cell for drop down)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>4</td>
<td>8,000</td>
<td>Or</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>4,000</td>
<td></td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>500</td>
<td></td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>500</td>
<td></td>
<td></td>
<td>Shingle</td>
</tr>
</tbody>
</table>

Total: 13,000 m³
Recycling Log: Folkestone (4cSU08)

☒ Deposition ☒ Extraction ☐ Reprofiling

Date 11th March – 12th April 2019
Logged by Rebecca Creed

Description of Works/Notes
Extraction and deposition of material between cells 4 – 7 as part of an annual beach recycling operation.

Description of Frontage

<table>
<thead>
<tr>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crest at centre of the Crenular bay was right back against seawall. Eastern end of cell 4 had large accumulation of sediment compared with the western end which showed depleted beach levels.</td>
<td>Material placed in-front of centre of Crenular bays to provide protection to seawall. Beach levels back to design level around Battery point in cell 4.</td>
</tr>
</tbody>
</table>
### Quantify extraction
(Note: If volume unknown conversion used is 1.8 tonne: 1 m³ of material)

<table>
<thead>
<tr>
<th>Profile/Groyne No.</th>
<th>Profile/Groyne No.</th>
<th>Quantity (m³)</th>
<th>Or</th>
<th>Lorry Capacity (m³)</th>
<th>Number of lorry loads</th>
<th>Material Description (click in cell for drop down)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00175A</td>
<td>4c00177A</td>
<td>2000</td>
<td></td>
<td>Cell 7E</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00181A</td>
<td>4c00183A</td>
<td>2000</td>
<td></td>
<td>Cell 6E</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00190</td>
<td>4c00194</td>
<td>12,000</td>
<td></td>
<td>Cell 5E</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00201</td>
<td>4c00214</td>
<td>15,000</td>
<td></td>
<td>Cell 4E</td>
<td></td>
<td>Shingle</td>
</tr>
</tbody>
</table>

Total: **31,000** m³

### Quantify deposition
(Note: If volume unknown conversion used is 1.8 tonne: 1 m³ of material)

<table>
<thead>
<tr>
<th>Profile/Groyne No.</th>
<th>Profile/Groyne No.</th>
<th>Quantity (m³)</th>
<th>Or</th>
<th>Lorry Capacity (m³)</th>
<th>Number of lorry loads</th>
<th>Material Description (click in cell for drop down)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00177A</td>
<td>4c00178A</td>
<td>2000</td>
<td></td>
<td>Cell 7W</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00184A</td>
<td>4c00186A</td>
<td>2000</td>
<td></td>
<td>Cell 6W</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00194</td>
<td>4c00199</td>
<td>12,000</td>
<td></td>
<td>Cell 5W</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00258</td>
<td>4c00264</td>
<td>15,000</td>
<td></td>
<td>Cell 4W</td>
<td></td>
<td>Shingle</td>
</tr>
</tbody>
</table>

Total: **31,000** m³

### Profiles

<table>
<thead>
<tr>
<th>Profiles</th>
<th>Cell Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00332 to 4c00346</td>
<td>1</td>
</tr>
<tr>
<td>4c00317 to 4c00331</td>
<td>2</td>
</tr>
<tr>
<td>4c00265 to 4c00316</td>
<td>3</td>
</tr>
<tr>
<td>4c00201 to 4c00264</td>
<td>4</td>
</tr>
<tr>
<td>4c00190 to 4c00199</td>
<td>5</td>
</tr>
<tr>
<td>4c00181A to 4c00186A</td>
<td>6</td>
</tr>
<tr>
<td>4c00175A to 4c00178A</td>
<td>7</td>
</tr>
</tbody>
</table>
Sandgate consists of a mixed gravel sand beach with a sand foreshore. A rock groyne at Battery point marks the boundary between the Folkestone and Sandgate survey units. There are two rock groynes at the western end of this frontage approximately 650m apart. The eastern half of this unit has no controlling structures. With the completion of the two major coast protection schemes in 1996 and 2004, the frontage is now entirely dependent on the successful implementation of beach management through a sediment recycling programme.

**Survey outcome:**

Trigger levels indicate the majority of beach levels exceed design levels. The usual pinch point within Cell 1B is visible, with profiles on the critical boundary and further profiles lie within the design range in Cell 3. Unlike the other survey units, this beach is actively managed twice per year which has removed the requirement for a maintenance range. Trigger levels have been set in accordance with management bays not defence type.

During the Autumn 2018 and Spring 2019, beach material was artificially moved between Cells 1-3. Refer to the recycling logs for further detail on all operations (Appendix C).

<table>
<thead>
<tr>
<th>Survey type</th>
<th>Survey dates</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autumn to Spring</td>
<td>24/09/2018 08/03/2019</td>
<td>The Autumn 2018 beach recycling operation took place between these two surveys (Appendix C). The two central profiles in Cell 1 each lost 21m² (-10% and -11%) with the neighbouring Profile 4c00334, west of the rock groyne, gaining 20m² (6%). Cell 2 also shows a trend of accretion in the east and erosion in the west; Profile 4c00319 gained 21m² (8%) whereas Profile 4c00330 has lost 33m² (-11%). Cell 3 shows a reversal of this trend, with accretive profiles in the east of the bay and negative low level changes throughout the remainder of the bay, with the exception of Profile 4c00266 in the east which gained 37m² (14%).</td>
</tr>
<tr>
<td>Spring to Spring</td>
<td>20/03/2018 08/03/2019</td>
<td>The Spring 2018 and Autumn 2018 recycling operations took place between these two surveys (Appendix C). In Cell 1, is predominantly accretive, with Profile 4c00346 and Profile 4c00334 gaining 27m² (8%) and 24m² (8%) respectively. Cell 2 indicates erosion to the west of the bay and accretion to the east; Profile 4c00330 lost 25m² (8%) and Profile 4c00319 gained 45m² (18%). Cell 3 lost material across the majority of the bay, with the largest loss recorded on Profile 4c00270 at 32m² (12%). The western profiles indicate gains.</td>
</tr>
<tr>
<td>Survey type</td>
<td>Survey dates</td>
<td>Comments</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------</td>
<td>----------</td>
</tr>
<tr>
<td><strong>Baseline to Spring</strong></td>
<td>16/05/2003 - 08/03/2019</td>
<td>The difference model confirms the CSA changes and shows that Cell 1 has accreted material at either end of the bay. The accretion in the east complies with the dominant drift direction from west to east. Cells 2 and 3 demonstrate erosion immediately to the east of respective rock groynes which is balanced by accretion adjacent to the western rock groynes. Cells 1 and 2 show a net gain of 11,761m$^3$ and 7,269m$^3$ respectively. Cell 3 has lost 11,391m$^3$ in the eastern polygon. The unit has a total net gain of 9,586m$^3$. The CSA chart for Spring 2019 shows that, with the exception of the pinch point in Cell 1B and the western half of Cell 3, all profiles exceed their design levels.</td>
</tr>
<tr>
<td><strong>Spring to Autumn</strong></td>
<td>08/03/2019 - 14/10/2019</td>
<td>Cell 1 shows the only long term accretion in the unit with Profile 4c00334 gaining 69m$^2$ (25%) and Profile 4c00338 gaining 26m$^2$ (11%). There are minor losses on the two remaining profiles in Cell 1. Three out of four profiles in Cell 2 show losses between -8% and -10% with Profile 4c00323 losing 32m$^2$ (10%). Cell 3 shows the largest losses within the unit with the majority of profiles losing between 11% and 26% of their total CSA since 2003. The largest losses are recorded in the east with Profiles 4c00275 and Profile 4c00270 losing the most at 80m$^2$ (26%) and 81m$^2$ (25%) respectively. The difference model reflects the Profile changes. Polygon SG 01 in the west is the only one showing a gain (18,727m$^3$) which is a result of intensified beach recycling within the last few years as this is a known weakspot. The remainder of the unit demonstrates losses throughout and has a total combined loss of 92,291m$^3$. The combined net change is -73,564m$^3$. The Spring 2019 recycling operation took place between these two surveys (Appendix C). Most of the profiles show low level changes of up to ± 5% since the late March 2019 beach recycling. The largest gain occurred in the easternmost Profiles 4c00270 and 4c00266 with 19m$^2$ (8%) and 25m$^2$ (9%) respectively. The CSA chart for Autumn 2019 shows that, with the exception of the pinch point in Cell 1B and the western half of Cell 3, all profiles exceed their design levels.</td>
</tr>
</tbody>
</table>
### Profile cross-sectional area change: seasonal, annual and longer-term changes

<table>
<thead>
<tr>
<th>Profile</th>
<th>Autumn to Spring 2018 to Spring 2019 (m²)</th>
<th>Autumn to Spring 2018 to Spring 2019 (%)</th>
<th>Baseline to Spring 2003 to Spring 2019 (m²)</th>
<th>Baseline to Spring 2003 to Spring 2019 (%)</th>
<th>Spring 2019 to Autumn 2019 (m²)</th>
<th>Spring 2019 to Autumn 2019 (%)</th>
<th>Elevation of Reference Surface (mOD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00266_t</td>
<td>37</td>
<td>14</td>
<td>-24</td>
<td>-8</td>
<td>-69</td>
<td>-19</td>
<td>25</td>
</tr>
<tr>
<td>4c00270_t</td>
<td>-9</td>
<td>-4</td>
<td>-32</td>
<td>-12</td>
<td>-81</td>
<td>-25</td>
<td>19</td>
</tr>
<tr>
<td>4c00275_t</td>
<td>-12</td>
<td>-5</td>
<td>-18</td>
<td>-7</td>
<td>-80</td>
<td>-26</td>
<td>5</td>
</tr>
<tr>
<td>4c00280_t</td>
<td>-7</td>
<td>-3</td>
<td>-8</td>
<td>-3</td>
<td>-67</td>
<td>-23</td>
<td>2</td>
</tr>
<tr>
<td>4c00284_t</td>
<td>-12</td>
<td>-5</td>
<td>-7</td>
<td>-3</td>
<td>-59</td>
<td>-21</td>
<td>-2</td>
</tr>
<tr>
<td>4c00289_t</td>
<td>-11</td>
<td>-5</td>
<td>-9</td>
<td>-4</td>
<td>-50</td>
<td>-18</td>
<td>-2</td>
</tr>
<tr>
<td>4c00292_t</td>
<td>-9</td>
<td>-4</td>
<td>-12</td>
<td>-5</td>
<td>-40</td>
<td>-15</td>
<td>-2</td>
</tr>
<tr>
<td>4c00297_t</td>
<td>-1</td>
<td>0</td>
<td>-5</td>
<td>-2</td>
<td>-36</td>
<td>-14</td>
<td>-2</td>
</tr>
<tr>
<td>4c00301_t</td>
<td>-4</td>
<td>-2</td>
<td>-3</td>
<td>-1</td>
<td>-42</td>
<td>-16</td>
<td>1</td>
</tr>
<tr>
<td>4c00305_t</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>-27</td>
<td>-11</td>
<td>3</td>
</tr>
<tr>
<td>4c00311_t</td>
<td>7</td>
<td>3</td>
<td>13</td>
<td>6</td>
<td>-14</td>
<td>-5</td>
<td>-3</td>
</tr>
<tr>
<td>4c00315_t</td>
<td>0</td>
<td>0</td>
<td>-1</td>
<td>0</td>
<td>-15</td>
<td>-5</td>
<td>-17</td>
</tr>
<tr>
<td>4c00319_t</td>
<td>21</td>
<td>8</td>
<td>45</td>
<td>18</td>
<td>-4</td>
<td>-1</td>
<td>10</td>
</tr>
<tr>
<td>4c00323_t</td>
<td>-1</td>
<td>0</td>
<td>-6</td>
<td>-2</td>
<td>-32</td>
<td>-10</td>
<td>9</td>
</tr>
<tr>
<td>4c00326_t</td>
<td>2</td>
<td>1</td>
<td>12</td>
<td>5</td>
<td>-25</td>
<td>-9</td>
<td>1</td>
</tr>
<tr>
<td>4c00330_t</td>
<td>-33</td>
<td>-11</td>
<td>-25</td>
<td>-8</td>
<td>-25</td>
<td>-8</td>
<td>-15</td>
</tr>
<tr>
<td>4c00334_t</td>
<td>20</td>
<td>6</td>
<td>24</td>
<td>8</td>
<td>69</td>
<td>25</td>
<td>3</td>
</tr>
<tr>
<td>4c00338_t</td>
<td>-21</td>
<td>-8</td>
<td>-8</td>
<td>-3</td>
<td>26</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>4c00341_t</td>
<td>-21</td>
<td>-10</td>
<td>7</td>
<td>4</td>
<td>-1</td>
<td>-1</td>
<td>8</td>
</tr>
<tr>
<td>4c00346_t</td>
<td>17</td>
<td>5</td>
<td>27</td>
<td>8</td>
<td>-18</td>
<td>-5</td>
<td>-6</td>
</tr>
</tbody>
</table>
Annual Change in Cross-Sectional Area (m²)

<table>
<thead>
<tr>
<th>Location</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00315</td>
<td>0%</td>
</tr>
<tr>
<td>4c00311</td>
<td>3%</td>
</tr>
<tr>
<td>4c00305</td>
<td>2%</td>
</tr>
<tr>
<td>4c00323</td>
<td>0%</td>
</tr>
<tr>
<td>4c00334</td>
<td>6%</td>
</tr>
<tr>
<td>4c00319</td>
<td>8%</td>
</tr>
<tr>
<td>4c00338</td>
<td>-8%</td>
</tr>
<tr>
<td>4c00330</td>
<td>-11%</td>
</tr>
<tr>
<td>4c00341</td>
<td>-10%</td>
</tr>
</tbody>
</table>

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### South East Regional Coastal Monitoring Programme
Profile Change Summary for Autumn 2018 to Spring 2019

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<table>
<thead>
<tr>
<th>Site</th>
<th>Annual Change in Cross-Sectional Area (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ACCRETION (≥0%)</td>
</tr>
<tr>
<td></td>
<td>5-15%</td>
</tr>
<tr>
<td></td>
<td>&gt;15%</td>
</tr>
<tr>
<td></td>
<td>Less than 5% (no change)</td>
</tr>
<tr>
<td>4c00301_t</td>
<td>2%</td>
</tr>
<tr>
<td>4c00306_t</td>
<td>4%</td>
</tr>
<tr>
<td>4c00321_t</td>
<td>5%</td>
</tr>
<tr>
<td>4c00284_t</td>
<td>5%</td>
</tr>
<tr>
<td>4c00311_t</td>
<td>3%</td>
</tr>
<tr>
<td>4c00302_t</td>
<td>2%</td>
</tr>
<tr>
<td>4c00280_t</td>
<td>1%</td>
</tr>
<tr>
<td>4c00266_t</td>
<td>14%</td>
</tr>
<tr>
<td>4c00292_t</td>
<td>4%</td>
</tr>
<tr>
<td>4c00289_t</td>
<td>5%</td>
</tr>
<tr>
<td>4c00297_t</td>
<td>0%</td>
</tr>
<tr>
<td>4c00285_t</td>
<td>5%</td>
</tr>
<tr>
<td>4c00301_t</td>
<td>2%</td>
</tr>
<tr>
<td>4c00280_t</td>
<td>1%</td>
</tr>
<tr>
<td>4c00275_t</td>
<td>5%</td>
</tr>
</tbody>
</table>

**Legend:**
- Blue: >30%
- Red: 5-15%
- Light Blue: 15-30%
- Gray: >30%
- Orange: 5-15%
- Purple: <5% (no change)
South East Regional Coastal Monitoring Programme
Profile Change Summary for Spring 2018 to Spring 2019

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Annual Change in Cross-Sectional Area (m²)

<table>
<thead>
<tr>
<th>Site</th>
<th>Change</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00346_t</td>
<td>8%</td>
<td>(27)</td>
</tr>
<tr>
<td>4c00341_t</td>
<td>4%</td>
<td>(7)</td>
</tr>
<tr>
<td>4c00334_t</td>
<td>8%</td>
<td>(24)</td>
</tr>
<tr>
<td>4c00338_t</td>
<td>4%</td>
<td>(7)</td>
</tr>
<tr>
<td>4c00330_t</td>
<td>8%</td>
<td>(25)</td>
</tr>
<tr>
<td>4c00326_t</td>
<td>5%</td>
<td>(12)</td>
</tr>
<tr>
<td>4c00323_t</td>
<td>2%</td>
<td>(9)</td>
</tr>
<tr>
<td>4c00319_t</td>
<td>18%</td>
<td>(45)</td>
</tr>
<tr>
<td>4c00315_t</td>
<td>6%</td>
<td>(13)</td>
</tr>
<tr>
<td>4c00311_t</td>
<td>1%</td>
<td>(3)</td>
</tr>
<tr>
<td>4c00310_t</td>
<td>-3%</td>
<td>(8)</td>
</tr>
<tr>
<td>4c00306_t</td>
<td>-2%</td>
<td>(6)</td>
</tr>
<tr>
<td>4c00305_t</td>
<td>-8%</td>
<td>(25)</td>
</tr>
<tr>
<td>4c00301_t</td>
<td>18%</td>
<td>(45)</td>
</tr>
</tbody>
</table>

- **ACCRETION**
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)

- **EROSION**
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)
South East Regional Coastal Monitoring Programme
Profile Change Summary for Spring 2018 to Spring 2019

Annual Change in Cross-Sectional Area (m²)

ACCRETION

5-15%
15-30%
>30%

EROSION

Less than 5% (no change)
5-15%
15-30%

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South East Regional Coastal Monitoring Programme
Difference Model 2018 - 2019

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Change in Elevation (m)

- < -1.5
- -1.0 to -1.5
- -0.5 to -1.0
- -0.25 to -0.5
- 0.25 to -0.25
- 0.25 to 0.5
- 0.5 to 1.0
- 1.0 to 1.5
- > 1.5

Volume change (m³)

Area boundary
South East Regional Coastal Monitoring Programme
Profile Change Summary for Baseline 2003 to Spring 2019

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Annual Change in Cross-Sectional Area (m²)

**ACCRETION**

- >30%
- 15-30%
- 5-15%
- <5% (no change)

**EROSION**

- >30%
- 15-30%
- 5-15%
- <5% (no change)
South East Regional Coastal Monitoring Programme
Profile Change Summary for Baseline 2003 to Spring 2019

©Aerial photography is copyright to the New Forest District Council.
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### Annual Change in Cross-Sectional Area (m²)

<table>
<thead>
<tr>
<th>Point</th>
<th>Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00301</td>
<td>+4%</td>
</tr>
<tr>
<td>4c00303</td>
<td>+3%</td>
</tr>
<tr>
<td>4c00307</td>
<td>+2%</td>
</tr>
<tr>
<td>4c00309</td>
<td>-1%</td>
</tr>
<tr>
<td>4c00311</td>
<td>-2%</td>
</tr>
<tr>
<td>4c00313</td>
<td>-3%</td>
</tr>
<tr>
<td>4c00315</td>
<td>-4%</td>
</tr>
<tr>
<td>4c00317</td>
<td>-5%</td>
</tr>
<tr>
<td>4c00319</td>
<td>-6%</td>
</tr>
<tr>
<td>4c00321</td>
<td>+0%</td>
</tr>
<tr>
<td>4c00323</td>
<td>+1%</td>
</tr>
<tr>
<td>4c00325</td>
<td>+3%</td>
</tr>
<tr>
<td>4c00327</td>
<td>+4%</td>
</tr>
<tr>
<td>4c00329</td>
<td>+5%</td>
</tr>
<tr>
<td>4c00331</td>
<td>+6%</td>
</tr>
<tr>
<td>4c00333</td>
<td>+7%</td>
</tr>
<tr>
<td>4c00335</td>
<td>+8%</td>
</tr>
<tr>
<td>4c00337</td>
<td>+9%</td>
</tr>
<tr>
<td>4c00339</td>
<td>+10%</td>
</tr>
<tr>
<td>4c00341</td>
<td>+11%</td>
</tr>
</tbody>
</table>

- **ACCRETION**
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)

- **EROSION**
  - >30%
  - 15-30%
  - 5-15%

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Annual Change in Cross-Sectional Area (m²)

ACCUMULATION

- >30%
- 15-30%
- 5-15%
- Less than 5% (no change)

EROSION

- 5-15%
- 15-30%
- >30%

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Appendix C: Recycling logs

Recycling Log: Sandgate (4cSU09)

- Deposition ✓ Extraction ☐ Reprofiling

Date 26th March – 4th April 2018  Logged by Rebecca Creed

Description of Works/Notes

Extraction and deposition of material between cells 1 – 3 as part of an annual beach recycling operation.

Description of Frontage

<table>
<thead>
<tr>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depleted beach levels towards the western end of the unit by Hythe.</td>
<td>Material extracted from Battery Point and crest height raised in cells 1, 2 and 3.</td>
</tr>
</tbody>
</table>
### Quantify extraction
(Note: If volume unknown conversion used is 1.8 tonne: 1 m$^3$ of material)

<table>
<thead>
<tr>
<th>Profile/Groyne No.</th>
<th>Profile/Groyne No.</th>
<th>Quantity (m$^3$)</th>
<th>Or Lorry Capacity (m$^3$)</th>
<th>Number of lorry loads</th>
<th>Material Description (click in cell for drop down)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00266</td>
<td>4c00275</td>
<td>30000</td>
<td>Cell 3E</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00317</td>
<td>4c00320</td>
<td>2000</td>
<td>Cell 2E</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td></td>
<td><strong>32,000 m$^3$</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Quantify deposition
(Note: If volume unknown conversion used is 1.8 tonne: 1 m$^3$ of material)

<table>
<thead>
<tr>
<th>Profile/Groyne No.</th>
<th>Profile/Groyne No.</th>
<th>Quantity (m$^3$)</th>
<th>Or Lorry Capacity (m$^3$)</th>
<th>Number of lorry loads</th>
<th>Material Description (click in cell for drop down)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00300</td>
<td>4c00316</td>
<td>6000</td>
<td>Cell 3W</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00324</td>
<td>4c00331</td>
<td>12000</td>
<td>Cell 2W</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00334</td>
<td>4c00342</td>
<td>14000</td>
<td>Cell 1W</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td></td>
<td><strong>32,000 m$^3$</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Profiles
<table>
<thead>
<tr>
<th>Profiles</th>
<th>Cell Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00332 to 4c00346</td>
<td>1</td>
</tr>
<tr>
<td>4c00317 to 4c00331</td>
<td>2</td>
</tr>
<tr>
<td>4c00265 to 4c00316</td>
<td>3</td>
</tr>
<tr>
<td>4c00201 to 4c00264</td>
<td>4</td>
</tr>
<tr>
<td>4c00190 to 4c00199</td>
<td>5</td>
</tr>
<tr>
<td>4c00181A to 4c00186A</td>
<td>6</td>
</tr>
<tr>
<td>4c00175A to 4c00178A</td>
<td>7</td>
</tr>
</tbody>
</table>
Recycling Log: Sandgate (4cSU08)

☒ Deposition ☒ Extraction ☐ Reprofiling

Date: 5th Nov – 11th Dec 2018
Logged by: Rebecca Creed

Description of Works/Notes
Extraction and deposition of material between cells 1 – 3 as part of an annual beach recycling operation.

Description of Frontage

<table>
<thead>
<tr>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depleted beach levels towards the western end of the unit by Hythe. Accumulation of sediment in the eastern end of each cell.</td>
<td>Material extracted from Battery Point and eastern end of cells 1 and 2. Crest height raised in cells 1, 2 and 3.</td>
</tr>
</tbody>
</table>
## Quantify extraction (Note: If volume unknown conversion used is 1.8 tonne: 1 m³ of material)

<table>
<thead>
<tr>
<th>Profile/Groyne No.</th>
<th>Profile/Groyne No.</th>
<th>Quantity (m³)</th>
<th>Or</th>
<th>Lorry Capacity (m³)</th>
<th>Number of lorry loads</th>
<th>Material Description (click in cell for drop down)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00265</td>
<td>4c00277</td>
<td>7000</td>
<td></td>
<td>Cell 3E</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00317</td>
<td>4c00321</td>
<td>3000</td>
<td></td>
<td>Cell 2E</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00332</td>
<td>4c00334</td>
<td>3500</td>
<td></td>
<td>Cell 1E</td>
<td></td>
<td>Shingle</td>
</tr>
</tbody>
</table>

**Total:** 13,500 m³

## Quantify deposition (Note: If volume unknown conversion used is 1.8 tonne: 1 m³ of material)

<table>
<thead>
<tr>
<th>Profile/Groyne No.</th>
<th>Profile/Groyne No.</th>
<th>Quantity (m³)</th>
<th>Or</th>
<th>Lorry Capacity (m³)</th>
<th>Number of lorry loads</th>
<th>Material Description (click in cell for drop down)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00300</td>
<td>4c00305</td>
<td>7000</td>
<td></td>
<td>Cell 3W</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00309</td>
<td>4c00316</td>
<td>3000</td>
<td></td>
<td>Cell 2W</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00321</td>
<td>4c00331</td>
<td>3000</td>
<td></td>
<td>Cell 1W</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00334</td>
<td>4c00342</td>
<td>3500</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total:** 13,500 m³

### Profiles

<table>
<thead>
<tr>
<th>Profiles</th>
<th>Cell Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00332 to 4c00346</td>
<td>1</td>
</tr>
<tr>
<td>4c00317 to 4c00331</td>
<td>2</td>
</tr>
<tr>
<td>4c00265 to 4c00316</td>
<td>3</td>
</tr>
<tr>
<td>4c00201 to 4c00264</td>
<td>4</td>
</tr>
<tr>
<td>4c00190 to 4c00199</td>
<td>5</td>
</tr>
<tr>
<td>4c00181A to 4c00186A</td>
<td>6</td>
</tr>
<tr>
<td>4c00175A to 4c00178A</td>
<td>7</td>
</tr>
</tbody>
</table>
Recycling Log: Sandgate (4cSU09)

- Deposition
- Extraction
- Reprofiling

Date: 11th March – 12th April 2019
Logged by: Rebecca Creed

Description of Works/Notes
Extraction and deposition of material between cells 1 – 3 as part of an annual beach recycling operation.

Description of Frontage
<table>
<thead>
<tr>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depleted beach levels towards the western end of the unit by Hythe.</td>
<td>Material extracted from Battery Point and crest height raised in cells 1, 2 and 3.</td>
</tr>
</tbody>
</table>

Quantify extraction (Note: If volume unknown conversion used is 1.8 tonne: 1 m³ of material)
## Interim Report

### South Kent 2019

#### Profile/Groyne No.

<table>
<thead>
<tr>
<th>Profile/Groyne No.</th>
<th>Profile/Groyne No.</th>
<th>Quantity (m³)</th>
<th>Or</th>
<th>Lorry Capacity (m³)</th>
<th>Number of lorry loads</th>
<th>Material Description (click in cell for drop down)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00265</td>
<td>4c00273</td>
<td>12,000</td>
<td></td>
<td>Cell 3E</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00317</td>
<td>4c00321</td>
<td>5000</td>
<td></td>
<td>Cell 2E</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00332</td>
<td>4c00334</td>
<td>4000</td>
<td></td>
<td>Cell 1E</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total:** 21,000 m³

#### Quantify deposition (Note: If volume unknown conversion used is 1.8 tonne: 1 m³ of material)

<table>
<thead>
<tr>
<th>Profile/Groyne No.</th>
<th>Profile/Groyne No.</th>
<th>Quantity (m³)</th>
<th>Or</th>
<th>Lorry Capacity (m³)</th>
<th>Number of lorry loads</th>
<th>Material Description (click in cell for drop down)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00309</td>
<td>4c00316</td>
<td>5000</td>
<td></td>
<td>Cell 3W</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00321</td>
<td>4c00331</td>
<td>5000</td>
<td></td>
<td>Cell 2W</td>
<td></td>
<td>Shingle</td>
</tr>
<tr>
<td>4c00334</td>
<td>4c00342</td>
<td>11,000</td>
<td></td>
<td>Cell 1W</td>
<td></td>
<td>Shingle</td>
</tr>
</tbody>
</table>

**Total:** 21,000 m³

#### Profiles

<table>
<thead>
<tr>
<th>Profiles</th>
<th>Cell Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00332 to 4c00346</td>
<td>1</td>
</tr>
<tr>
<td>4c00317 to 4c00331</td>
<td>2</td>
</tr>
<tr>
<td>4c00265 to 4c00316</td>
<td>3</td>
</tr>
<tr>
<td>4c00201 to 4c00264</td>
<td>4</td>
</tr>
<tr>
<td>4c00190 to 4c00199</td>
<td>5</td>
</tr>
<tr>
<td>4c00181A to 4c00186A</td>
<td>6</td>
</tr>
<tr>
<td>4c00175A to 4c00178A</td>
<td>7</td>
</tr>
</tbody>
</table>
The shingle hinterland at Hythe Ranges is used as a military training ground. The area is protected by armour rock and the beach is retained by timber groynes.

**Survey outcome:**

RBMP design levels have not been calculated for Hythe Ranges, so the Cross Sectional Area (CSA) cannot be assessed in relation to Standard of Protection (SoP), but the profile ranges have been plotted to show the current CSA in relation to historic levels.

<table>
<thead>
<tr>
<th>Survey type</th>
<th>Survey dates</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autumn to Spring Profile</td>
<td>24/11/2018 - 05/06/2019</td>
<td>There are mostly low-level changes during this period. The largest increases occurred along the western profiles at 4c00400 and 4c00402, gaining 22m² (8%) and 11m² (4%) respectively. Conversely, the largest loss occurred at Profile 4c00375, eroding by -9m² (-4%).</td>
</tr>
<tr>
<td>Spring to Spring Topographic</td>
<td>15/04/2018 - 05/06/2019</td>
<td>The beach profiles demonstrate an inconsistent mix of fairly low level gains and losses. The largest gains occurred along Profiles 4c00402, 4c00400 and 4c00370, accreting by 18m² (7%), 13m² (4%) and 13m² (6%) respectively. Conversely, the largest losses occurred at Profiles 4c00380 and 4c00348, losing -13m² (-5%) and -10m² (-6%) respectively. The topographic difference model replicates these trends with an alternation of volumetric change; although in broad terms, there is a tendency for accretion towards the west and erosion to the east. There is a total volumetric increase of 11,711m³.</td>
</tr>
<tr>
<td>Baseline to Spring Topographic</td>
<td>14/09/2003 - 05/06/2019</td>
<td>There are predominantly low-level variations in the profiles between 2003 and 2019; there is a tendency for erosion in the west and accretion in the east. Profile 4c00402 demonstrates the largest loss of -24m² (-8%). In contrast, Profiles 4c00370 and 4c00364 demonstrate moderate accretion of 24m² (12%) and 15m² (8%) respectively. The topographic difference model highlights three key areas in the unit: an erosive western section, an accretive central section, and an erosive eastern section. The largest increase occurred at HR33, gaining 1,495m³; whereas the</td>
</tr>
<tr>
<td>Survey type</td>
<td>Survey dates</td>
<td>Comments</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Most recent survey: Autumn 2019</td>
<td></td>
<td>largest decrease occurred within HR01, losing -4,559 m³. There is a total volumetric change of -18,438 m³ since 2003.</td>
</tr>
<tr>
<td>Spring to Autumn Profile change</td>
<td>05/06/2019 13/10/2019</td>
<td>There are mostly low-level changes throughout this period (±5%). The exception is Profile 4c00354 which gained 6 m² (9%). The CSA chart demonstrates that most profiles are currently in the middle of their recorded ranges.</td>
</tr>
</tbody>
</table>
## Profile cross-sectional area change: seasonal, annual and longer-term changes

<table>
<thead>
<tr>
<th>Profile</th>
<th>Autumn to Spring 2018 to Spring 2019</th>
<th>Spring to Spring 2019</th>
<th>Baseline to Spring 2003 to Spring 2019</th>
<th>Spring to Autumn 2019 to Spring 2019</th>
<th>Elevation of Reference Surface (mOD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(m²)</td>
<td>%</td>
<td>(m²)</td>
<td>%</td>
<td>(m²)</td>
</tr>
<tr>
<td>4c00348_t</td>
<td>-1</td>
<td>-1</td>
<td>-10</td>
<td>-6</td>
<td>-3</td>
</tr>
<tr>
<td>4c00354_t</td>
<td>-1</td>
<td>-1</td>
<td>4</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>4c00359_t</td>
<td>-6</td>
<td>-4</td>
<td>1</td>
<td>1</td>
<td>-2</td>
</tr>
<tr>
<td>4c00364_t</td>
<td>1</td>
<td>0</td>
<td>-6</td>
<td>-3</td>
<td>15</td>
</tr>
<tr>
<td>4c00370_t</td>
<td>6</td>
<td>3</td>
<td>13</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>4c00375_t</td>
<td>-9</td>
<td>-4</td>
<td>-7</td>
<td>-3</td>
<td>12</td>
</tr>
<tr>
<td>4c00380_t</td>
<td>-8</td>
<td>-3</td>
<td>-13</td>
<td>-5</td>
<td>-1</td>
</tr>
<tr>
<td>4c00386_t</td>
<td>1</td>
<td>1</td>
<td>-4</td>
<td>-2</td>
<td>-3</td>
</tr>
<tr>
<td>4c00391_t</td>
<td>6</td>
<td>3</td>
<td>12</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>4c00396_t</td>
<td>-3</td>
<td>-2</td>
<td>-3</td>
<td>-2</td>
<td>-12</td>
</tr>
<tr>
<td>4c00400_t</td>
<td>22</td>
<td>8</td>
<td>13</td>
<td>4</td>
<td>-21</td>
</tr>
<tr>
<td>4c00402_t</td>
<td>11</td>
<td>4</td>
<td>18</td>
<td>7</td>
<td>-24</td>
</tr>
</tbody>
</table>
4cSU10 - Hythe Ranges

Current and Historic Beach Cross-Sectional Areas (m²) based on datums of -2.5 to -1 mOD

Design Standard = 1:200 years
South East Regional Coastal Monitoring Programme

Profile Change Summary for Autumn 2018 to Spring 2019

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Annual Change in Cross-Sectional Area (m²)

- **Accretion**
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)

- **Erosion**
  - 15-30%
  - >30%

Values indicated in parentheses.
Profile Change Summary for Spring 2018 to Spring 2019

South East Regional Coastal Monitoring Programme

Annual Change in Cross-Sectional Area (m²)

- **ACCRETION**
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)

- **EROSION**
  - 5-15%
  - 15-30%
  - >30%

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South East Regional Coastal Monitoring Programme

Profile Change Summary for Spring 2018 to Spring 2019

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Annual Change in Cross-Sectional Area (m²)

- **ACCRETION**
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)

- **erosion**
  - 5-15%
  - 15-30%
  - >30%

Meters
South East Regional Coastal Monitoring Programme
Difference Model 2019 - 2018

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Change in Elevation (m)

- < -1.5
- -1.0 to -1.5
- -0.5 to -1.0
- -0.25 to -0.5
- 0.25 to 0.5
- 0.5 to 1.0
- 1.0 to 1.5
- > 1.5

Volume change (m3)
area boundary
South East Regional Coastal Monitoring Programme
Difference Model 2019 - 2018

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South East Regional Coastal Monitoring Programme
Profile Change Summary for Baseline 2003 To Spring 2019

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Annual Change in Cross-Sectional Area (m²)

ACCRETION

- >30%
- 15-30%
- 5-15%
- Less than 5% (no change)

EROSION

- >30%
- 15-30%
- 5-15%
- Less than 5% (no change)
South East Regional Coastal Monitoring Programme
Profile Change Summary for Baseline 2003 To Spring 2019

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Annual Change in Cross-Sectional Area (m²)

- **ACCRETION**
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)

- **EROSION**
  - 5-15%
  - 15-30%
  - >30%

Meters
South East Regional Coastal Monitoring Programme
Difference Model 2019 - 2003

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Change in Elevation (m)

-1.5 to < -1.5
-1.0 to -1.5
-0.5 to -1.0
-0.25 to -0.5
0.25 to 0.5
0.5 to 1.0
1.0 to 1.5
> 1.5

Volume change (m³)

area boundary
South East Regional Coastal Monitoring Programme
Difference Model 2019 - 2003

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South East Regional Coastal Monitoring Programme

Profile Change Summary for Spring 2019 to Autumn 2019

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Annual Change in Cross-Sectional Area (m²)

<table>
<thead>
<tr>
<th></th>
<th>&gt;30%</th>
<th>15-30%</th>
<th>5-15%</th>
<th>&gt;30%</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCRETION</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EROSION</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Less than 5% (no change)
The 9km stretch of beach consists predominantly of shingle to the southwest of Dymchurch, and sand to the northeast. The frontage is divided by timber groynes at 50-200m spacing throughout almost all of its length with the exception of a terminal rock groyne situated at St. Mary’s Bay. A large rock and concrete revetment extends from Martello Tower No. 25 to the eastern boundary of 4cSU11.

RBMP design levels have only been calculated between Jesson Outfall (4c00543) and Varne Boat Club (4c00630). The Cross Sectional Area (CSA) cannot be assessed in relation to Standard of Protection (SoP) between Jesson Outfall (4c00542) and Hythe Ranges (4c00404), although the profile ranges have been plotted to show the current CSA in relation to historic levels.

Note1: 2012 has been used as the baseline survey due to the completion of a concrete apron and a rock and stepped revetment in 2011 between Jesson Outfall and Hythe Ranges.

Note2: Some percentage changes are exaggerated by small CSAs and may only reflect a small absolute CSA change.

Survey outcome:

<table>
<thead>
<tr>
<th>Survey type</th>
<th>Survey dates</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autumn to Spring</td>
<td>10/10/2018 to 22/03/2019</td>
<td>The Dymchurch unit can be split into two broad sections; the southern section between the Varne Boat Club and Jesson Outfall, a predominantly shingle beach and the northern section between Jesson Outfall and Hythe Ranges, a predominantly sand beach. The southern section indicates low level changes throughout the bay but larger changes at the extremities. In the south Profile 4c00630 eroded by 11% (-30m²) and in the north Profile 4c00540 gained 31% (36m²) and neighbouring profile 4c00544 gained 14% (27m²). Beach recycling in February 2019 extracted material from both of these locations. Within the northern section, the remaining 35 beach demonstrate fluctuating accretive and erosive profiles. Profile 4c00440 demonstrated the largest decrease of beach material, losing -25m² (-33%). Several other profiles indicated large percentage changes, but this amassed to small physical changes due to small CSAs.</td>
</tr>
<tr>
<td>Survey type</td>
<td>Survey dates</td>
<td>Comments</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Most recent survey: Autumn 2019</strong></td>
<td></td>
<td>The shingle beach between the Varne Boat Club and Jesson Outfall recorded mostly low-level changes however the beach immediately south of Jesson Outfall (4c00543) indicates larger gains; Profile 4c00540 gained 26m² (29%) and Profile 4c00544 gained 31m² (16%). Neighbouring profiles 4c00549 and 4c00554 lost -12m² (-6%) and -12m² (-7%) respectively. The profiles along the predominantly sand beach, between Jesson Outfall and Martello Tower No.23, are mostly accretive during this period. The northern section of the frontage, between Martello Tower No.23 and Hythe Ranges indicates accretion in the majority of profiles, except for three profiles demonstrating erosion. The largest material increase occurred at Profile 4c00452, gaining 14m² (70%). Conversely, the largest decrease occurred at Profile 4c00440, to the north of the ramp and outfall, losing -19m² (-27%). The topographic difference model indicates accretion for the majority of the frontage; between the Varne Boat Club and Jesson Outfall there are linear bands of erosion and accretion down the beach face. Within the same boundaries, 7,500m³ of material was extracted from DY1 and DY8 and deposited within DY1-DY4. The net gain is 42,098m³.</td>
</tr>
<tr>
<td>Baseline to Spring</td>
<td>28/06/2012 22/03/2019</td>
<td>The profiles between the Varne Boat Club and Jesson Outfall are predominantly accretive however there has been a number of beach replenishment/recycling activities throughout this period. The profiles to the north and south of this bay demonstrate accretion and those in the centre have generally lost material, this is due to the mobile drift divergence located near DY4. Within this section, Profile 4c00584 demonstrates the largest gain of 23m² (13%). The profiles between Jesson Outfall and Martello Tower No.23 indicate an accretive beach, however towards the Martello Tower there are several profiles which have lost material. The profiles between Martello Tower No.23 and Hythe Ranges also indicate a mix of accretion and erosion, fronting the rock revetment. The largest increase of beach material occurred at Profile 4c00449, gaining 18m² (95%); whereas Profile 4c00440 demonstrated the largest decrease of -26m² (-34%). The topographic difference model supports these observations, demonstrating overall erosion in the northerly polygons, and accretion in the southerly polygons due to longshore drift. The largest increase of beach material</td>
</tr>
<tr>
<td>Spring to Spring</td>
<td>17/05/2018 22/03/2019</td>
<td>The profiles between the Varne Boat Club and Jesson Outfall recorded mostly low-level changes however the beach immediately south of Jesson Outfall (4c00543) indicates larger gains; Profile 4c00540 gained 26m² (29%) and Profile 4c00544 gained 31m² (16%). Neighbouring profiles 4c00549 and 4c00554 lost -12m² (-6%) and -12m² (-7%) respectively. The profiles along the predominantly sand beach, between Jesson Outfall and Martello Tower No.23, are mostly accretive during this period. The northern section of the frontage, between Martello Tower No.23 and Hythe Ranges indicates accretion in the majority of profiles, except for three profiles demonstrating erosion. The largest material increase occurred at Profile 4c00452, gaining 14m² (70%). Conversely, the largest decrease occurred at Profile 4c00440, to the north of the ramp and outfall, losing -19m² (-27%). The topographic difference model indicates accretion for the majority of the frontage; between the Varne Boat Club and Jesson Outfall there are linear bands of erosion and accretion down the beach face. Within the same boundaries, 7,500m³ of material was extracted from DY1 and DY8 and deposited within DY1-DY4. The net gain is 42,098m³.</td>
</tr>
<tr>
<td>Topographic difference model and Profile change</td>
<td></td>
<td>The profiles between the Varne Boat Club and Jesson Outfall recorded mostly low-level changes however the beach immediately south of Jesson Outfall (4c00543) indicates larger gains; Profile 4c00540 gained 26m² (29%) and Profile 4c00544 gained 31m² (16%). Neighbouring profiles 4c00549 and 4c00554 lost -12m² (-6%) and -12m² (-7%) respectively. The profiles along the predominantly sand beach, between Jesson Outfall and Martello Tower No.23, are mostly accretive during this period. The northern section of the frontage, between Martello Tower No.23 and Hythe Ranges indicates accretion in the majority of profiles, except for three profiles demonstrating erosion. The largest material increase occurred at Profile 4c00452, gaining 14m² (70%). Conversely, the largest decrease occurred at Profile 4c00440, to the north of the ramp and outfall, losing -19m² (-27%). The topographic difference model indicates accretion for the majority of the frontage; between the Varne Boat Club and Jesson Outfall there are linear bands of erosion and accretion down the beach face. Within the same boundaries, 7,500m³ of material was extracted from DY1 and DY8 and deposited within DY1-DY4. The net gain is 42,098m³.</td>
</tr>
<tr>
<td>Survey type</td>
<td>Survey dates</td>
<td>Comments</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------</td>
<td>----------</td>
</tr>
<tr>
<td><strong>Most recent survey: Autumn 2019</strong></td>
<td></td>
<td>occurred at DY01, gaining 5,555m$^3$ despite a 6,000m$^3$ extraction one month before the 2019 survey; whereas the largest decrease occurred at DY02, losing -5,098m$^3$ - although these values are impacted by the replenishment scheme in 2016 and various recycling operations. Overall, there is a total volumetric increase of 9,943m$^3$ since 2012.</td>
</tr>
<tr>
<td>Spring to Autumn</td>
<td>Profile change 22/03/2019 26/11/2019</td>
<td>There are typically low-level changes to the profiles south of Jesson Outfall (within ±5%). The profiles between Jesson Outfall and Martello Tower No.23 are predominantly accretive during this period, although the two profiles either side of the Jesson Outfall indicate erosion. The largest increase occurred at Profile 4c00471, gaining 13m$^2$ (26%), whereas the largest decrease occurred at Profile 4c00540, losing -14m$^2$ (-12%). The profiles between Martello Tower No.23 and Hythe Ranges fronting the rock revetment demonstrate a mix of erosive and accretive trends. Some profiles, such as 4c00416, exhibit large percentage changes, but these represent small physical changes due to small CSAs. The CSA chart indicates the majority of profiles are currently in their middle-to-upper ranges; although the northernmost sites and those in Zone C appear to be at the lower end of their recorded values. For the areas calculated, most profiles are within design range, although four exceptions in Zone B currently fall under maintenance or critical ranges.</td>
</tr>
<tr>
<td>Profile</td>
<td>Autumn to Spring 2018 to Spring 2019 (m²)</td>
<td>Spring to Spring 2018 to Spring 2019 (m²)</td>
</tr>
<tr>
<td>-----------</td>
<td>---------------------------------------------</td>
<td>-------------------------------------------</td>
</tr>
<tr>
<td>4c00409_t</td>
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<tr>
<td>4c00412_t</td>
<td>5</td>
<td>1</td>
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<td>4c00416_t</td>
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<tr>
<td>4c00419_t</td>
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<td>12</td>
</tr>
<tr>
<td>4c00432_t</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>4c00435_t</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>4c00440_t</td>
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<td>8</td>
<td>12</td>
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<tr>
<td>4c00459_t</td>
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<td>-2</td>
</tr>
<tr>
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<td>4c00511_t</td>
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<tr>
<td>4c00516_t</td>
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<td>0</td>
<td>8</td>
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<td>4c00526_t</td>
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<tr>
<td>4c00529_t</td>
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<td>-9</td>
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<tr>
<td></td>
<td>4c00534_t</td>
<td>4c00538_t</td>
</tr>
<tr>
<td>--------</td>
<td>-----------</td>
<td>-----------</td>
</tr>
<tr>
<td></td>
<td>-6</td>
<td>-3</td>
</tr>
<tr>
<td></td>
<td>-8</td>
<td>-4</td>
</tr>
</tbody>
</table>
Current and Historic Beach Cross-Sectional Areas (m²) based on datums of -3 to 1.2 mOD

Design Standard = 1:200 years
South East Regional Coastal Monitoring Programme
Profile Change Summary for Autumn 2018 to Spring 2019

Annual Change in Cross-Sectional Area (m²)

<table>
<thead>
<tr>
<th>Change Percentage</th>
<th>Legend</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;30%</td>
<td>ACCRETION</td>
</tr>
<tr>
<td>15-30%</td>
<td></td>
</tr>
<tr>
<td>5-15%</td>
<td>EROSION</td>
</tr>
<tr>
<td>&lt;5%</td>
<td></td>
</tr>
<tr>
<td>Less than 5%</td>
<td>(no change)</td>
</tr>
</tbody>
</table>

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South East Regional Coastal Monitoring Programme
Profile Change Summary for Autumn 2018 to Spring 2019

Annual Change in Cross-Sectional Area (m²)

- **ACCRETION**
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)

- **EROSION**
  - >30%
  - 15-30%
  - 5-15%

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South East Regional Coastal Monitoring Programme
Profile Change Summary for Autumn 2018 to Spring 2019

Annual Change in Cross-Sectional Area (m²)

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Profile Change Summary for Spring 2018 to Spring 2019

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Annual Change in Cross-Sectional Area (m²)

- **ACCRETION**
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)

- **EROSION**
  - 15-30%
  - >30%

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Profile Change Summary for Spring 2018 to Spring 2019

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Annual Change in Cross-Sectional Area (m²)

- **ACCRETION**
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)

- **EROSION**
  - 15-30%
  - >30%
Profile Change Summary for Spring 2018 to Spring 2019

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Annual Change in Cross-Sectional Area (m²)

ACCROSION
- >30%
- 15-30%
- 5-15%

EROSION
- 15-30%
- 5-15%
- >30%
- Less than 5% (no change)
South East Regional Coastal Monitoring Programme

Profile Change Summary for Spring 2018 to Spring 2019

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Annual Change in Cross-Sectional Area (m²)

- >30%
- 15-30%
- 5-15%
- 15-30%
- >30%
- Less than 5% (no change)
South East Regional Coastal Monitoring Programme
Difference Model 2019 - 2018

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Difference Model 2019 - 2018

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Difference Model 2019 - 2018

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Difference Model 2019 - 2018

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Difference Model 2019 - 2018

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Profile Change Summary for Baseline 2012 to Autumn 2019

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Annual Change in Cross-Sectional Area (m²)

ACCRETION

- >30%
- 15-30%
- 5-15%
- Less than 5% (no change)

EROSION

- 15-30%
- >30%

South East Regional Coastal Monitoring Programme
South East Regional Coastal Monitoring Programme

Profile Change Summary for Baseline 2012 to Autumn 2019

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Annual Change in Cross-Sectional Area (m²)

<table>
<thead>
<tr>
<th>Category</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCRETION</td>
<td></td>
</tr>
<tr>
<td>EROSION</td>
<td></td>
</tr>
</tbody>
</table>

- >30%
- 15-30%
- 5-15%
- Less than 5% (no change)
South East Regional Coastal Monitoring Programme

Profile Change Summary for Baseline 2012 to Autumn 2019

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Profile Change Summary for Baseline 2012 to Autumn 2019

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Annual Change in Cross-Sectional Area (m²)

- **ACCRETION**
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)

- **EROSION**
  - 15-30%
  - >30%
South East Regional Coastal Monitoring Programme

Profile Change Summary for Baseline 2012 to Autumn 2019

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Annual Change in Cross-Sectional Area (m²)

- >30%
- 15-30%
- 5-15%
- 15-30%
- <30%
- Less than 5% (no change)
South East Regional Coastal Monitoring Programme
Difference Model 2019 - 2012

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Difference Model 2019 - 2012

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South East Regional Coastal Monitoring Programme
Difference Model 2019 - 2012

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Change in Elevation (m)

-1.5 to < -1.5
-1.0 to -1.5
-0.5 to -1.0
-0.25 to -0.5
0.25 to 0.5
1.0 to 1.5
> 1.5

Volume change (m3) area boundary
South East Regional Coastal Monitoring Programme
Profile Change Summary for Spring 2019 to Autumn 2019

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South East Regional Coastal Monitoring Programme
Profile Change Summary for Spring 2019 to Autumn 2019

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Annual Change in Cross-Sectional Area (m²)

- >30%
- 15-30%
- 15-30%
- 5-15%
- >30%
- Less than 5% (no change)
Annual Change in Cross-Sectional Area (m²)

- **Accretion**
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)

- **Erosion**
  - >30%
  - 15-30%
  - 5-15%

South East Regional Coastal Monitoring Programme
Profile Change Summary for Spring 2019 to Autumn 2019

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South East Regional Coastal Monitoring Programme
Profile Change Summary for Spring 2019 to Autumn 2019

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Annual Change in Cross-Sectional Area (m²)

| ACCRETION |  >30% | 5-15% |
| EROSION   | 15-30% | 15-30% |
| 5-15%     | >30%   | Less than 5% (no change) |

- 4c00464.t 11% (9)
- 4c00459.t 12% (9)
- 4c00456.t 4% (3)
- 4c00449.t -11% (4)
- 4c00441.t -12% (2)
- 4c00435.t 8% (4)
- 4c00440.t -22% (11)
- 4c00432.t 10% (2)
# Maintenance Log: Littlestone Recycling

- ☐ Deposition
- ☒ Extraction
- ☐ Reprofiling

## Description of Works/Notes
Shingle Extraction from Greatstone, just north of Varne Boat Club, and St Mary’s Bay

## Description of Frontage

<table>
<thead>
<tr>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low levels of shingle</td>
<td>Back to design beach profile</td>
</tr>
</tbody>
</table>

## Quantify extraction/deposition
(Note: If volume unknown conversion used is 1.8 tonne: 1 m$^3$ of material)

<table>
<thead>
<tr>
<th>Profile/Groyne No. Start</th>
<th>Profile/Groyne No. End</th>
<th>Quantity (m$^3$)</th>
<th>Lorry Capacity (m$^3$)</th>
<th>Number of lorry loads</th>
<th>Material Description (click in cell for drop down)</th>
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</thead>
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</table>

Total: **8,711 m$^3$**

---

Date: 28$^{th}$ Jan 2019 – 15$^{th}$ Feb 2019
Logged by: Rob Thomas
**Maintenance Log: Littlestone Recycling**

- **Deposition**
- **Extraction**
- **Reprofiling**

**Date** | 28th Jan 2019 – 15th Feb 2019 | **Logged by** | Rob Thomas

**Description of Works/Notes**
Shingle Deposition just south of Varne Boat Club, between Queen’s road and Littlestone road, between Littlestone road and St Nicholas road, between St Andrew’s road and Little water tower and just north of Littlestone water tower.

**Description of Frontage**

| Before | Low levels of shingle | After | Back to design beach profile |

**Quantify extraction/deposition** *(Note: If volume unknown conversion used is 1.8 tonne: 1 m³ of material)*

<table>
<thead>
<tr>
<th>Profile/Groyne No. Start</th>
<th>Profile/Groyne No. End</th>
<th>Quantity (m³)</th>
<th>Lorry Capacity (m³)</th>
<th>Number of lorry loads</th>
<th>Material Description</th>
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Total: **8,711 m³**

Please note: Quanties in the above table add up to 7,500m³. It is not known where the additional 1,211m³ was placed.
Littlestone beach management 2018/19 overview

Total shingle to be moved = approx 7500m³
This 8.5km stretch of coastline is quite unique. The survey unit starts at the Dungeness Power Station on the shingle peninsula where the steep slope shelves into the sea. Near the lifeboat station the shingle “bulge” continues to grow and accumulates thousands of cubic meters of shingle per year, it stands at approximately 450m wide at its widest point between Dungeness Road and the beach toe; there is an additional 2km of relic vegetated shingle ridges landward of the road. The beach slope is slightly shallower than the peninsula and the beach toe is a clearly defined edge with a sand/mud foreshore. The northern 1.7km of the unit is the Greatstone sand dunes with sand foreshore. There are no hard defences for the length of this unit, with only a few timber groynes towards the north.

The beach between Lydd-on-Sea and Dungeness is protected under several designations: Site of Special Scientific Interest (SSSI), Site of Nature Conservation Interest (SNCI), National Nature Reserve (NNR), Ramsar and Special Areas of Conservation (SAC).

**Survey outcome:**

There are currently no design levels for this unit. Generally, most profiles on the eastern face of the peninsula are at the highest recorded CSA since 2003. The profiles on the southern face of the peninsula, seaward of the Dungeness Power Station, are at the lower end of their CSA ranges since 2003.

<table>
<thead>
<tr>
<th>Survey type</th>
<th>Survey dates</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autumn to Spring</td>
<td>09/10/2018</td>
<td>There are relatively low-level changes recorded along the majority of profiles within the Romney Sands unit with only 8 of 47 profiles recording changes greater than 5%. With a few exceptions, there are losses along the southern face of the peninsula and gains along the eastern face. The largest of these losses occurred along Profiles 4c00764 (-33m²/-7%), 4c00761 (-48m²/-7%) and 4c00725 (-36m²/-8%). In contrast, the largest gains occurred on the eastern face, at the southern section, along Profiles 4c00743 and 4c00728, accreting 48m² (6%) and 43m² (8%) respectively. North of the Pilot Inn PH, the changes tend to be within 5%.</td>
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<tr>
<td></td>
<td>24/05/2019</td>
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<tr>
<td>Spring to Spring</td>
<td>20/04/2018</td>
<td>The majority of profiles demonstrate accretion during this period. Losses are visible along the southern face of the peninsula however, any losses were low-level (≤5%); an exception is further north along Profile 4c00725 (north of the RNLI Lifeboat Station), which lost 48m² (-11%). Conversely, the neighbouring Profiles 4c00722 and 4c00728 recorded moderate gains of 59m² (18%) and</td>
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<td></td>
<td>24/05/2019</td>
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</table>
### Survey type | Survey dates | Comments
--- | --- | ---
**Most recent survey:** |  | 98m² (19%) respectively. These gains are the result of a change in the position, size and shape of the “bulge” which has become smoother and engulfs more of the coastline directly north, which is not illustrated in the aerial photography (2016).

The topographic difference model indicates accretion in all polygons. The largest gain occurred in Polygon RS03, which incorporates the expanding “bulge”, and this recorded a gain of 43,418m³. The total volumetric gain from Spring 2018 to Spring 2019 is 91,428m³.

Baseline to Spring | 28/07/2003 24/05/2019 | The long term trends are clear, with most profiles indicating significant accretion since the baseline measurements. The exceptions are Profiles 4c00770 and 4c00767 on the erosive south facing frontage near Dungeness, which recorded losses of 51m² (-9%) and 13m² (-3%) respectively.

The largest overall gain is along Profile 4c00731 on the eastern face of the Romney Peninsula, which has gained 699m² (322%) since 2003. This significant gain is attributed to the convergence of drift directions just north of the “bulge”, whereby north of the bulge the drift is north to south and south of the bulge the longshore drift is east to west and subsequently south to north.

Romney Sands is the most naturally accretive shingle beach in the UK. The long term difference model illustrates significant accretion throughout the entire frontage. Despite losses within the southern facing peninsula, Polygon RS1 still gained in excess of 100,000m³. The combined accretion between 2003 and 2019 equates to 1,675,607m³.

Spring to Autumn | 24/05/2019 29/10/2019 | There are predominantly low-level changes (±5%) during this period, with alternating accretion and erosion; the larger changes tend to be accretive.

The largest overall change occurred at Profile 4c00728 by the RNLI Lifeboat Station; which gained 52m² (8%). Furthermore, Profile 4c00761 on the southern peninsula gained 49m² (7%), which contrasts the losses incurred in the previous autumn-to-spring and spring-to-spring surveys.
### Profile cross-sectional area change: seasonal, annual and longer-term changes

#### Elevation of Reference Surface (mOD)

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<th>%</th>
<th>Spring to Spring 2018 to Spring 2019 (m²)</th>
<th>%</th>
<th>Baseline to Spring 2003 to Spring 2019 (m²)</th>
<th>%</th>
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South East Regional Coastal Monitoring Programme
Profile Change Summary for Autumn 2018 to Spring 2019

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South East Regional Coastal Monitoring Programme
Profile Change Summary for Autumn 2018 to Spring 2019

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Annual Change in Cross-Sectional Area (m²)

- Less than 5% (no change)
- 5-15%
- 15-30%
- >30%

ACCRETION

EROSION
South East Regional Coastal Monitoring Programme
Profile Change Summary for Spring 2018 to Spring 2019

Annual Change in Cross-Sectional Area (m²)

- >30%
- 15-30%
- 5-15%
- >30%

Accretion
Erosion
Less than 5% (no change)
South East Regional Coastal Monitoring Programme
Profile Change Summary for Spring 2018 to Spring 2019

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Annual Change in Cross-Sectional Area (m²)

- >30%
- 15-30%
- 5-15%
- <5% (no change)

ACCRETION

EROSION

Meters

0
125
250

4c00716_t  2% (6)
4c00713_t  2% (8)
4c00719_t  -2% (-9)
4c00722_t  18% (59)
4c00725_t  -11% (-48)
4c00728_t  19% (98)
4c00731_t  1% (10)
4c00734_t  -4% (-29)
4c00737_t  7% (60)
4c00740_t  5% (45)
4c00734_t  -4% (-29)
South East Regional Coastal Monitoring Programme
Profile Change Summary for Spring 2018 to Spring 2019

Annual Change in Cross-Sectional Area (m2)

- **Accretion**
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)

- **Erosion**
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)

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Profile Change Summary for Spring 2018 to Spring 2019

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South East Regional Coastal Monitoring Programme
Profile Change Summary for Spring 2018 to Spring 2019

Annual Change in Cross-Sectional Area (m²)

- **Accretion**:
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)

- **Erosion**:
  - >30%
  - 15-30%
  - 5-15%

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South East Regional Coastal Monitoring Programme
Difference Model 2018 - 2019

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Change in Elevation (m)

-1.5 to -1.0
-1.0 to -0.5
-0.5 to -0.25
-0.25 to 0.0
0.0 to 0.25
0.25 to 0.5
0.5 to 1.0
1.0 to 1.5
> 1.5

Volume change (m3)
area boundary
South East Regional Coastal Monitoring Programme
Difference Model 2018 - 2019

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South East Regional Coastal Monitoring Programme
Difference Model 2018 - 2019

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RS 05

11,525

South East Regional Coastal Monitoring Programme
Difference Model 2018 - 2019

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Change in Elevation (m)

-0.5 to -1.0
-1.0 to -1.5
-1.5
0.0 to 0.25
0.25 to 0.5
0.5 to 1.0
1.0 to 1.5
> 1.5

Area boundary

Volume change (m³)
South East Regional Coastal Monitoring Programme
Difference Model 2018 - 2019

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Change in Elevation (m)
-1.5 to -1.0
-0.5 to -0.25
0.25 to 0.5
0.5 to 1.0
1.0 to 1.5
> 1.5

Volume change (m³)

area boundary
Annual Change in Cross-Sectional Area (m²)

- Greater than 30%
- 15-30%
- 5-15%
- Less than 5% (no change)

South East Regional Coastal Monitoring Programme Profile Change Summary for Baseline 2003 to Spring 2019

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South East Regional Coastal Monitoring Programme
Profile Change Summary for Baseline 2003 to Spring 2019

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Annual Change in Cross-Sectional Area (m²)

- >30%
- 15-30%
- 5-15%
- <5% (no change)
South East Regional Coastal Monitoring Programme
Profile Change Summary for Baseline 2003 to Spring 2019

Annual Change in Cross-Sectional Area (m²)

- >30%
- 15-30%
- 5-15%
- >30%

Less than 5% (no change)

(Example: 4c00686_t 38% (64)
4c00689_t 36% (69)
4c00692_t 42% (80)
4c00695_t 51% (92)
4c00698_t 50% (102)
4c00701_t 63% (119)
4c00704_t 78% (141)
4c00707_t 80% (170)
4c00710_t 61% (183)
4c00713_t 66% (177)

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South East Regional Coastal Monitoring Programme
Difference Model 2003 - 2019

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Change in Elevation (m)
-1.5 to -1.0
-1.0 to -0.5
-0.5 to -0.25
-0.25 to 0.25
0.25 to 1.0
1.0 to 1.5
> 1.5

Volume change (m3)

Area boundary
South East Regional Coastal Monitoring Programme
Difference Model 2003 - 2019

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Change in Elevation (m)
-1.5
-1.0 to -1.5
-0.5 to -1.0
-0.25 to -0.5
0.25 to -0.25
0.25 to 0.5
0.5 to 1.0
1.0 to 1.5
> 1.5
Volume change (m3)
area boundary
South East Regional Coastal Monitoring Programme
Difference Model 2003 - 2019

Change in Elevation (m)

- < -1.5
- -1.0 to -1.5
- -0.5 to -1.0
- -0.25 to -0.5
- 0.25 to -0.25
- 0.25 to 0.5
- 0.5 to 1.0
- 1.0 to 1.5
- > 1.5

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South East Regional Coastal Monitoring Programme
Difference Model 2003 - 2019

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Difference Model 2003 - 2019

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South East Regional Coastal Monitoring Programme
Profile Change Summary for Spring 2019 to Autumn 2019

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Annual Change in Cross-Sectional Area (m²)

- >30%
- 15-30%
- 5-15%
- Less than 5% (no change)
South East Regional Coastal Monitoring Programme
Profile Change Summary for Spring 2019 to Autumn 2019

Annual Change in Cross-Sectional Area (m²)

- >30%
- 15-30%
- 5-15%
- ≤5% (no change)

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4cSU13 covers a 1.7km shingle beach fronting the Dungeness Nuclear Power Station. A tsunami bund is maintained to a 1:10,000 Standard of Protection (SoP) through annual recycling from a borrow pit within the Romney Sands frontage. The power station is approaching a full decommissioning programme that requires continued coastal protection of this area for the foreseeable future. The western end and the immediate surrounding area of the power station development are designated as a Site of Special Scientific Interest, National Nature Reserve and Special Area of Conservation.

Survey outcome:

CSA analysis shows that the coastline is naturally erosive with many of the profiles at the lowest level since 2003.

<table>
<thead>
<tr>
<th>Survey type</th>
<th>Survey dates</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autumn to Spring</td>
<td>11/10/2018</td>
<td>The majority of this unit has lost material over the winter period, with the largest losses located in the west, despite beach recycling in March 2019. Profile 4c01979 and 4c00974 lost 9% of the CSA (-23m² and -25m² respectively).</td>
</tr>
<tr>
<td>Spring to Spring</td>
<td>20/04/2018</td>
<td>Generally low level changes throughout, with only two profiles recording &gt;5% change. The largest loss and gain was recorded along Profile 4c00797 lost 15m² (-6%) and Profile 4c00785 gained 29m² (6%). The difference model shows linear bands of erosion and accretion along the berm and beach face. This equates to an erosive trend with the west losing 10,150m³ and the east gaining 5,301m³. The net change for the unit is -4,849m³, despite 10,000m³ deposited in March 2019 within DU1.</td>
</tr>
<tr>
<td>Baseline to Spring</td>
<td>30/07/2003</td>
<td>There is a significant erosive trend across the unit which reduces in severity from west to east. The largest losses are recorded on the two most western profiles; Profile 4c00800 and 4c00797 lost 214m² (47%) and 240m² (50%) respectively. The difference model clearly shows erosion across the entire beach face which equates to a net loss of -238,423m³ since 2003, despite several beach recycling activities adding in excess of 160,000m³ of material since 2003.</td>
</tr>
<tr>
<td>Survey type</td>
<td>Survey dates</td>
<td>Comments</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------</td>
<td>----------</td>
</tr>
<tr>
<td>Spring to Autumn</td>
<td>17/05/2019</td>
<td></td>
</tr>
<tr>
<td>Profile Change Summary</td>
<td>01/10/2019</td>
<td>There are exclusively low-level changes (±5%) throughout this period; although 8 of 10 profiles are recording minor losses.</td>
</tr>
</tbody>
</table>
### Profile cross-sectional area change: seasonal, annual and longer-term changes

<table>
<thead>
<tr>
<th>Profile</th>
<th>Autumn to Spring</th>
<th>Spring to Spring</th>
<th>Baseline to Spring</th>
<th>Spring to Autumn</th>
<th>Elevation of Reference Surface (mOD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(m²)</td>
<td>%</td>
<td>(m²)</td>
<td>%</td>
<td>(m²)</td>
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<td>8</td>
<td>2</td>
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<td>-82</td>
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<tr>
<td>4c00782_t</td>
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<td>3</td>
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<td>-133</td>
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<td>4c00785_t</td>
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<td>5</td>
<td>29</td>
<td>6</td>
<td>-133</td>
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<tr>
<td>4c00788_t</td>
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<td>-2</td>
<td>-1</td>
<td>-152</td>
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<tr>
<td>4c00791_t</td>
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<td>-12</td>
<td>-4</td>
<td>-199</td>
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<tr>
<td>4c00794_t</td>
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<td>-9</td>
<td>-13</td>
<td>-5</td>
<td>-211</td>
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<tr>
<td>4c00797_t</td>
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<td>4c00800_t</td>
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<td>4</td>
<td>2</td>
<td>-214</td>
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</tbody>
</table>
4cSU13 - Dungeness Power Station

Current and Historic Beach Cross-Sectional Areas (m²) based on datums of -0.5 to -2 mOD

Design Standard = 1:200 years
4cSU13 - Dungeness Power Station

Current and Historic Beach Cross-Sectional Areas (m²) based on datums of -0.5 to -2 mOD

Design Standard = 1:200 years
South East Regional Coastal Monitoring Programme
Profile Change Summary for Autumn 2018 to Spring 2019

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South East Regional Coastal Monitoring Programme
Profile Change Summary for Spring 2018 to Spring 2019

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Annual Change in Cross-Sectional Area (m²)

<table>
<thead>
<tr>
<th>Code</th>
<th>Percentage</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
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<td>4c00780_t</td>
<td>-6%</td>
<td>(-18)</td>
</tr>
<tr>
<td>4c00781_t</td>
<td>-5%</td>
<td>(-13)</td>
</tr>
<tr>
<td>4c00782_t</td>
<td>1%</td>
<td>(3)</td>
</tr>
<tr>
<td>4c00783_t</td>
<td>0%</td>
<td>(0)</td>
</tr>
<tr>
<td>4c00784_t</td>
<td>2%</td>
<td>(4)</td>
</tr>
<tr>
<td>4c00785_t</td>
<td>6%</td>
<td>(29)</td>
</tr>
<tr>
<td>4c00786_t</td>
<td>-1%</td>
<td>(-2)</td>
</tr>
<tr>
<td>4c00787_t</td>
<td>-4%</td>
<td>(-12)</td>
</tr>
<tr>
<td>4c00788_t</td>
<td>0%</td>
<td>(0)</td>
</tr>
<tr>
<td>4c00789_t</td>
<td>0%</td>
<td>(1)</td>
</tr>
<tr>
<td>4c00790_t</td>
<td>2%</td>
<td>(9)</td>
</tr>
<tr>
<td>4c00791_t</td>
<td>-5%</td>
<td>(-13)</td>
</tr>
<tr>
<td>4c00792_t</td>
<td>0%</td>
<td>(0)</td>
</tr>
<tr>
<td>4c00793_t</td>
<td>-4%</td>
<td>(-12)</td>
</tr>
<tr>
<td>4c00794_t</td>
<td>-6%</td>
<td>(-18)</td>
</tr>
</tbody>
</table>

- >30%  | ACCRETION
- 15-30% | 5-15%
- 5-15%  | EROSION
- Less than 5% (no change)
South East Regional Coastal Monitoring Programme
Difference Model 2019 - 2018

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Change in Elevation (m)

-1.5
-1.0 to -1.5
-0.5 to -1.0
-0.25 to -0.5
0.25 to -0.25
0.25 to 0.5
0.5 to 1.0
1.0 to 1.5
> 1.5

Volume change (m³)
area boundary
South East Regional Coastal Monitoring Programme
Profile Change Summary for Baseline 2003 to Spring 2019

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Appendix C: Recycling Logs

**Maintenance Log: Dungeness Peninsula**

☑ Deposition ☐ Extraction ☐ Reprofiling

<table>
<thead>
<tr>
<th>Date</th>
<th>March 2019</th>
<th>Logged by</th>
<th>C. French</th>
</tr>
</thead>
</table>

**Description of Works/Notes**

Extraction at the Borrow Pit has been commissioned (red). In total 10,000m³ was deposited towards the western half of Dungeness Power Station (blue).

**Description of Frontage**

<table>
<thead>
<tr>
<th>Before</th>
<th>-</th>
<th>After</th>
<th>-</th>
</tr>
</thead>
</table>

**Quantify deposition** *(Note: If volume unknown conversion used is 1.8 tonne: 1 m³ of material)*

<table>
<thead>
<tr>
<th>Profile/Groyne No. Start</th>
<th>Profile/Groyne No. End</th>
<th>Quantity (m³)</th>
<th>Lorry Capacity (m³)</th>
<th>Number of lorry loads</th>
<th>Material Description (click in cell for drop down)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00785</td>
<td>4c00800</td>
<td>10,000</td>
<td>Or</td>
<td></td>
<td>Shingle</td>
</tr>
</tbody>
</table>

Total: 10,000 m³
Lydd Ranges is a large barrier beach backed by an extensive, relict shingle ridge system. The sandy foreshore is only exposed at low water and increases in elevation west to east, with much of the eastern foreshore rarely exposed.

Access to this beach is restricted by the Lydd Ranges firing programme and it can be difficult to programme surveys for suitable times which combine the lowest tides with range closures.

**Survey outcome:**

RBMP design levels have not been calculated for Lydd Ranges, so the Cross Sectional Area (CSA) cannot be assessed in relation to Standard of Protection (SoP), but the profile ranges have been plotted to show the current CSA in relation to historic levels.

<table>
<thead>
<tr>
<th>Survey type</th>
<th>Survey dates</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autumn to Spring</td>
<td>09/11/2018 - 17/06/2019</td>
<td>The majority of profiles demonstrate erosion between November 2018 and June 2019. At the western end of the unit, Profiles 4c00935 and 4c00926 demonstrate losses of 29 m² (-12%) and 59 m² (-15%) respectively. This is a known weak point and is prone to erosion. Further east, losses at Profiles 4c00917 and 4c00911 of 64 m² (-11%) and 41 m² (-6%) respectively. In contrast, the central and eastern profiles indicate predominantly low-level changes (±5%) of fluctuating erosion and accretion; the only exceptions are along Profile 4c00887 which demonstrated a loss of 26 m² (-6%) and Profile 4c00842 which lost 30 m² (-6%).</td>
</tr>
<tr>
<td>Spring to Spring</td>
<td>01/06/2018 - 17/06/2019</td>
<td>The western end of the unit demonstrates the most change during this period, with alternating erosive and accretive trends. The westernmost Profile 4c00941 demonstrates a gain of 4 m² (57%); although this percentage change is exaggerated due to the small volume of the beach at this location (in front of the rock revetment). Profiles 4c00938, 4c00926 and 4c00917, to the east of Jury’s Gap lookout tower, indicated the largest losses of 25 m² (-12%), 36 m² (-10%) and 42 m² (-8%) respectively. Amidst these losses, Profile 4c00932 demonstrates a larger gain of 28 m² (11%). Conversely, the three profiles along the central and eastern side of the unit indicate mostly low-level changes (±5%) during this period.</td>
</tr>
</tbody>
</table>
### Survey type | Survey dates | Comments
--- | --- | ---
**Most recent survey: Spring 2019** |  | The difference model illustrates a net loss of material during this period, equating to -54,658m³.

LR02 demonstrates a loss within the western timber groyne bays, by Jury's MOD lookout, of -5,390m³, despite two beach replenishment activities from land quarries; 5,047m³ during Nov-Dec 2018, and 6,587m³ during Jan-Mar 2019. Polygon LR08, towards the centre of the unit lost-10,786m³ and neighbouring polygon (LR09) lost a further -6,312m³. In the east, LR13 also lost -9,114m³.

The majority of losses are attributed to the main berm along the entire length of the unit with rollback evident in Polygons LR03, 04, 08, 10 and 11.

**Baseline to Spring** | 19/08/2009 17/06/2019 | The long-term trends for Lydd Ranges indicate widespread erosion along all profiles since the baseline measurements in 2009. Losses increase throughout the unit from east to west with all profiles demonstrating at least a 5% loss, but with many demonstrating losses exceeding 15%. Most of the eastern profiles at Denge Marsh Beach have lost in excess of 100m² since 2009. The most erosive profiles are located at the eastern end of the Lydd Ranges frontage; Profiles 4c00803 and 4c00830 recorded losses of 203m² (-29%) and 157m² (-25%) respectively.

Furthermore, the current CSA levels are the lowest recorded since 2009 due to the natural rollback experienced along this frontage.

The long-term difference model mirrors this trend, illustrating significant erosion within all polygons, which is due to the high rate of littoral drift to the east being higher than the influx of sediment from the west. The majority of this beach is not backed by hard defences allowing the crest position of the shingle barrier beach to roll back which is denoted by the thick band of blue along the back of the beach for much of this unit. Overall, there is a total volumetric loss of 679,371m³ since 2009.

**Spring to Autumn** | 17/06/2019 16/11/2019 | There are predominantly low-level changes (±5%) throughout the unit during this period.

The largest changes occurred at the western end of this frontage; Profile 4c00935 eroded by 14m² (-7%).
<table>
<thead>
<tr>
<th>Profile</th>
<th>Autumn to Spring 2018 to Spring 2019 (m²)</th>
<th>%</th>
<th>Spring to Spring 2018 to Spring 2019 (m²)</th>
<th>%</th>
<th>Baseline 2009 to Spring 2019 (m²)</th>
<th>%</th>
<th>Spring to Autumn 2019 (m²)</th>
<th>%</th>
<th>Elevation of Reference Surface (mOD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00803_t</td>
<td>-15</td>
<td>-3</td>
<td>-19</td>
<td>-4</td>
<td>-203</td>
<td>-29</td>
<td>-11</td>
<td>-2</td>
<td>-1</td>
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<td>4c00806_t</td>
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Current and Historic Beach Cross-Sectional Areas (m²) based on a datum of -1 mOD

Design Standard = 1:200 years
South East Regional Coastal Monitoring Programme
Profile Change Summary for Autumn 2018 to Spring 2019

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Annual Change in Cross-Sectional Area (m2)

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</tr>
<tr>
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South East Regional Coastal Monitoring Programme
Profile Change Summary for Autumn 2018 to Spring 2019

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South East Regional Coastal Monitoring Programme
Profile Change Summary for Autumn 2018 to Spring 2019

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Annual Change in Cross-Sectional Area (m²)

**ACCRETION**
- >30%
- 15-30%
- 5-15%
- Less than 5% (no change)

**EROSION**
- 5-15%
- 15-30%
- >30%

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Profile Change Summary for Spring 2018 to Spring 2019

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Annual Change in Cross- Sectional Area (m2)

<table>
<thead>
<tr>
<th>ACCRETION</th>
<th>EROSION</th>
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<tbody>
<tr>
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<tr>
<td>15-30%</td>
<td>15-30%</td>
</tr>
<tr>
<td>5-15%</td>
<td>&gt;30%</td>
</tr>
<tr>
<td>Less than 5% (no change)</td>
<td></td>
</tr>
</tbody>
</table>
South East Regional Coastal Monitoring Programme
Profile Change Summary for Spring 2018 to Spring 2019

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Annual Change in Cross-Sectional Area (m²)

- **ACCRETION**
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)

- **EROSION**
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)
South East Regional Coastal Monitoring Programme
Profile Change Summary for Spring 2018 to Spring 2019

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Annual Change in Cross-Sectional Area (m²)

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<td>15-30%</td>
<td>5-30%</td>
<td>&gt;30%</td>
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</table>

Less than 5% (no change)
South East Regional Coastal Monitoring Programme
Difference Model 2019 - 2018

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Change in Elevation (m)

-5,390
-7,828
-2,166

Volume change (m³)
area boundary

< -1.5
-1.0 to -1.5
-0.5 to -1.0
-0.25 to -0.5
0.25 to -0.25
0.25 to 0.5
0.5 to 1.0
1.0 to 1.5
> 1.5
South East Regional Coastal Monitoring Programme
Difference Model 2019 - 2018

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Change in Elevation (m)
-3.284
-2.207
-0.25 to -0.5
0.25 to 1.0
0.5 to 1.0
1.0 to 1.5
> 1.5

Meters
0 125 250

Volume change (m³)
area boundary
South East Regional Coastal Monitoring Programme
Difference Model 2019 - 2018

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### Change in Elevation (m)

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<th>Area boundary</th>
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<tr>
<td>-1.0 to -1.5</td>
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<tr>
<td>-0.5 to -1.0</td>
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<tr>
<td>-0.25 to -0.5</td>
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<tr>
<td>0.25 to 0.5</td>
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<tr>
<td>0.5 to 1.0</td>
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Annual Change in Cross-Sectional Area (m2)

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<td>(-34)</td>
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South East Regional Coastal Monitoring Programme
Profile Change Summary for Baseline 2009 to Spring 2019

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Annual Change in Cross-Sectional Area (m²)

ACCRETION

EROSION

>30%

5-15%

15-30%

5-15%

>30%

Less than 5% (no change)
South East Regional Coastal Monitoring Programme
Profile Change Summary for Baseline 2009 to Spring 2019

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### South East Regional Coastal Monitoring Programme
**Profile Change Summary for Baseline 2009 to Spring 2019**

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#### Annual Change in Cross-Sectional Area (m²)

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#### Legend
- **ACCRETION**
  - >30%
  - 15-30%
  - 5-15%
  - <5% (no change)
- **EROSION**
  - 5-15%
  - 15-30%
  - >30%
  - <5% (no change)
### South East Regional Coastal Monitoring Programme
Profile Change Summary for Baseline 2009 to Spring 2019

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#### Annual Change in Cross-Sectional Area (m²)

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#### Legend

- **ACCRETION**
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)

- **EROSION**
  - 5-15%
  - 15-30%
  - >30%
South East Regional Coastal Monitoring Programme
Difference Model 2019 - 2009

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Change in Elevation (m)

-30,439
-35,581
-63,615

Volume change (m^3)

Area boundary

0 125 250

Meters

< -1.5
-1.0 to -1.5
-0.5 to -1.0
-0.25 to -0.5
0.25 to -0.25
0.25 to 0.5
0.5 to 1.0
1.0 to 1.5
> 1.5
South East Regional Coastal Monitoring Programme
Difference Model 2019 - 2009

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South East Regional Coastal Monitoring Programme
Difference Model 2019 - 2009

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Change in Elevation (m)
-0.5 to -1.0
-0.25 to -0.5
0.25 to -0.25
0.5 to 1.0
1.0 to 1.5
> 1.5

Volume change (m³)
area boundary
South East Regional Coastal Monitoring Programme
Difference Model 2019 - 2009

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Change in Elevation (m)

- Volume change (m³)
- area boundary

- < -1.5
- -1.0 to -1.5
- -0.5 to -1.0
- -0.25 to -0.5
- 0.25 to -0.25
- 0.25 to 0.5
- 0.5 to 1.0
- 1.0 to 1.5
- > 1.5
South East Regional Coastal Monitoring Programme
Profile Change Summary for Spring 2019 to Autumn 2019

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Annual Change in Cross-Sectional Area (m²)

- **ACCRETION**
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)

- **EROSION**
  - >30%
  - 15-30%
  - 5-15%

Example data:
- 4c00941_t: 18% (2)
- 4c00936_t: -5% (10)
- 4c00935_t: -7% (14)
- 4c00932_t: 0% (1)
- 4c00926_t: -2% (4)
- 4c00924_t: 0% (0)
- 4c00922_t: -2% (4)
- 4c00923_t: 1% (2)
- 4c00917_t: 5% (24)
- 4c00914_t: 0% (0)
South East Regional Coastal Monitoring Programme
Profile Change Summary for Spring 2019 to Autumn 2019

Annual Change in Cross-Sectional Area (m²)

<table>
<thead>
<tr>
<th>Code</th>
<th>Change</th>
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<tbody>
<tr>
<td>4c00917</td>
<td>5%</td>
</tr>
<tr>
<td>4c00914</td>
<td>0%</td>
</tr>
<tr>
<td>4c00911</td>
<td>-2%</td>
</tr>
<tr>
<td>4c00908</td>
<td>0%</td>
</tr>
<tr>
<td>4c00905</td>
<td>0%</td>
</tr>
<tr>
<td>4c00902</td>
<td>-2%</td>
</tr>
<tr>
<td>4c00901</td>
<td>-2%</td>
</tr>
<tr>
<td>4c00900</td>
<td>-2%</td>
</tr>
<tr>
<td>4c00899</td>
<td>-1%</td>
</tr>
<tr>
<td>4c00896</td>
<td>-2%</td>
</tr>
<tr>
<td>4c00895</td>
<td>-1%</td>
</tr>
<tr>
<td>4c00894</td>
<td>-2%</td>
</tr>
<tr>
<td>4c00893</td>
<td>-2%</td>
</tr>
<tr>
<td>4c00892</td>
<td>0%</td>
</tr>
<tr>
<td>4c00891</td>
<td>0%</td>
</tr>
<tr>
<td>4c00890</td>
<td>-2%</td>
</tr>
<tr>
<td>4c00889</td>
<td>-2%</td>
</tr>
<tr>
<td>4c00888</td>
<td>-2%</td>
</tr>
<tr>
<td>4c00887</td>
<td>-2%</td>
</tr>
</tbody>
</table>

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Annual Change in Cross-Sectional Area (m²)

<table>
<thead>
<tr>
<th>ACCRETION</th>
<th>EROSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;30%</td>
<td>5-15%</td>
</tr>
<tr>
<td>15-30%</td>
<td>15-30%</td>
</tr>
<tr>
<td>5-15%</td>
<td>&gt;30%</td>
</tr>
<tr>
<td>Less than 5% (no change)</td>
<td></td>
</tr>
</tbody>
</table>

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South East Regional Coastal Monitoring Programme
Profile Change Summary for Spring 2019 to Autumn 2019

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Annual Change in Cross-Sectional Area (m²)

- **Accretion**
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)

- **Erosion**
  - 15-30%
  - >30%

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Appendix B: Recycling Logs

**Maintenance Log: [Lydd Ranges]**

☑ Deposition ☐ Extraction ☐ Reprofiling

<table>
<thead>
<tr>
<th>Date</th>
<th>Nov 2018 - Dec 2018</th>
<th>Logged by</th>
<th>B. Ward</th>
</tr>
</thead>
</table>

**Description of Works/Notes**

Beach replenishment from land quarry to western timber groyne bays.

**Description of Frontage**

Before: Depleted beach levels.

After: Beach levels increased in western timber groyne bays.

**Quantify extraction/deposition** *(Note: If volume unknown conversion used is 1.8 tonne: 1 m³ of material)*

<table>
<thead>
<tr>
<th>Profile/Groyne No. Start</th>
<th>Profile/Groyne No. End</th>
<th>Quantity (m³)</th>
<th>Or Lorry Capacity (m³)</th>
<th>Number of lorry loads</th>
<th>Material Description (click in cell for drop down)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00938</td>
<td>4c00940</td>
<td>5,047</td>
<td></td>
<td></td>
<td>Shingle</td>
</tr>
</tbody>
</table>

Total: **5,047 m³**
## Maintenance Log: [Lydd Ranges]

- **Deposition**
- **Extraction**
- **Reprofiling**

### Date
Jan 2019 – Mar 2019

**Logged by**
B. Ward

### Description of Works/Notes
Beach replenishment from land quarry to western timber groyne bays.

### Description of Frontage

<table>
<thead>
<tr>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depleted beach levels.</td>
<td>Beach levels increased in western timber groyne bays.</td>
</tr>
</tbody>
</table>

### Quantify extraction/deposition
(Note: If volume unknown conversion used is 1.8 tonne: 1 m³ of material)

<table>
<thead>
<tr>
<th>Profile/Groyne No. Start</th>
<th>Profile/Groyne No. End</th>
<th>Quantity (m³)</th>
<th>Or</th>
<th>Lorry Capacity (m³)</th>
<th>Number of lorry loads</th>
<th>Material Description (click in cell for drop down)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00938</td>
<td>4c00940</td>
<td>6,587</td>
<td></td>
<td></td>
<td></td>
<td>Shingle</td>
</tr>
</tbody>
</table>

**Total:** 6,587 m³
This 2.1km survey unit is characterised by a wide sand foreshore with a shingle sand mix beach. A seawall and a rock revetment protect the large flood plain behind. The rock revetment was completed in early 2016 and it extends for the majority of the unit, with the exception of seven groyne bays in the west.

No access was permitted during the capital works; therefore there are no topographic surveys between 2013 and 2015. As this has vastly changed the geomorphology of the beach, the baseline for Jury's Gap is the 2016 survey.

**Survey outcome:**

RCMP Design level have been calculated for defence sections A and B. Defence sections C-E have no design levels as the rock revetment is sufficient for protection. Design levels have been adapted from the Broomhill Sands Beach Management Plan (2016).

The CSA chart indicates profiles within the groyne bays exceed the design level.

<table>
<thead>
<tr>
<th>Survey type</th>
<th>Survey dates</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autumn to Spring</td>
<td>Profile change summary</td>
<td>12/11/2018 - 13/05/2019</td>
</tr>
<tr>
<td>Spring to Spring</td>
<td>Profile change and Topographic difference model</td>
<td>18/05/2018 - 13/05/2019</td>
</tr>
</tbody>
</table>
## Interim Report

### East Sussex 2019

<table>
<thead>
<tr>
<th>Survey type</th>
<th>Survey dates</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most recent survey: Autumn 2019</td>
<td></td>
<td>The general trend across the unit is erosive; however, of the four profiles within the groyne field, two gained and two lost.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Significant erosion dominated more than half the profiles fronting the rock revetment. A proportion of the losses are attributed to the lower beach face and sand foreshore. The largest losses are located towards the east of the unit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The difference model shows a pattern of accretion in the four most western polygons and erosion for the remainder of the unit. JG01 and JG02 illustrate large gains of 2,401 m³ and 3,632 m³, respectively. Conversely, JG21 and JG27 have the largest recorded losses of 3,642 m³ and 2,640 m³.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Overall the unit has lost 24,125 m³ of beach material which is slightly less than the recorded short term losses.</td>
</tr>
<tr>
<td>Baseline to Spring</td>
<td>10/06/2016 - 13/05/2019</td>
<td>Profile change and Topographic difference model</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The groyne field demonstrates low level changes and the beach fronting the rock revetment show larger variations, both accretive and erosive. Overall the unit is marginally more accretive than erosive.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The nine profiles fronting the rock revetment demonstrate a sporadic mix of accretive (5/9) and erosive (4/9) changes during this period. The largest material gain occurred along Profile 4c00960 of 16 m² (27%). Conversely, the largest material loss occurred at the neighbouring Profile 4c00957 of -10 m² (-17%). Profile 4c00974 also demonstrated a large percentage loss of -9 m² (-26%).</td>
</tr>
<tr>
<td>Spring to Autumn</td>
<td>13/05/2019 - 15/11/2019</td>
<td>Profile change summary</td>
</tr>
</tbody>
</table>
# Profile cross-sectional area change: seasonal, annual and longer-term changes

<table>
<thead>
<tr>
<th>Profile</th>
<th>Autumn to Spring 2018 to Spring 2019 (m²)</th>
<th>Spring to Spring 2018 to Spring 2019 (m²)</th>
<th>Baseline to Spring 2016 to Spring 2019 (m²)</th>
<th>Spring to Autumn 2019 (m²)</th>
<th>Elevation of Reference Surface (mOD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00949_t</td>
<td>3.00</td>
<td>13.00</td>
<td>-2.00</td>
<td>7.00</td>
<td>-0.50</td>
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<td>-25.00</td>
<td>-11.00</td>
<td>-12.00</td>
<td>3.00</td>
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<tr>
<td>4c00957_t</td>
<td>-7.00</td>
<td>-10.00</td>
<td>-11.00</td>
<td>-15.00</td>
<td>-26.00</td>
</tr>
<tr>
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<td>-28.00</td>
<td>-23.00</td>
<td>-28.00</td>
<td>-14.00</td>
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<td>-4.00</td>
<td>-8.00</td>
<td>-14.00</td>
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<td>5.00</td>
<td>-13.00</td>
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<tr>
<td>4c00974_t</td>
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<td>-8.00</td>
<td>-5.00</td>
<td>-13.00</td>
<td>1.00</td>
</tr>
<tr>
<td>4c00977_t</td>
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<td>-22.00</td>
<td>-19.00</td>
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<td>-6.00</td>
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<td>4c00986_t</td>
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<td>-9.00</td>
<td>-3.00</td>
<td>-20.00</td>
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<tr>
<td>4c00991_t</td>
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<td>-4.00</td>
<td>-16.00</td>
<td>-5.00</td>
<td>-9.00</td>
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<tr>
<td>4c00994_t</td>
<td>-2.00</td>
<td>-1.00</td>
<td>-10.00</td>
<td>-4.00</td>
<td>6.00</td>
</tr>
<tr>
<td>4c00998_t</td>
<td>-1.00</td>
<td>0.00</td>
<td>-3.00</td>
<td>-1.00</td>
<td>19.00</td>
</tr>
</tbody>
</table>

Elevation of Reference Surface (mOD)
4cSU15 - Jury’s Gap

Extent of rock revetment (constructed 2015)

Current and Historic Beach Cross-Sectional Areas (m²) based on datums of -0.22 to 1 mOD

Design Standard = 1:200
South East Regional Coastal Monitoring Programme
Profile Change Summary for Autumn 2018 to Spring 2019

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Annual Change in Cross-Sectional Area (m²)

ACCRETION

- >30%
- 15-30%
- 5-15%
- Less than 5% (no change)

EROSION

- 5-15%
- 15-30%
- >30%
Annual Change in Cross-Sectional Area (m²)

- **ACCRETION**
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)

- **EROSION**
  - 5-15%
  - 15-30%
  - >30%

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Profile Change Summary for Spring 2018 to Spring 2019

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Annual Change in Cross-Sectional Area (m2)

<table>
<thead>
<tr>
<th>ACCRETION</th>
<th>EROSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;3%</td>
<td>&gt;30%</td>
</tr>
<tr>
<td>5-15%</td>
<td>15-30%</td>
</tr>
<tr>
<td>15-30%</td>
<td>5-15%</td>
</tr>
<tr>
<td>Less than 5% (no change)</td>
<td>Less than 5% (no change)</td>
</tr>
</tbody>
</table>
South East Regional Coastal Monitoring Programme
Difference Model 2019 - 2018
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Change in Elevation (m)
- < -1.5
- -1.0 to -1.5
- -0.5 to -1.0
- -0.25 to -0.5
- 0.25 to 0.5
- 0.5 to 1.0
- 1.0 to 1.5
- > 1.5

Volume change (m³)
area boundary

<table>
<thead>
<tr>
<th>JG 10</th>
<th>JG 11</th>
<th>JG 12</th>
<th>JG 13</th>
<th>JG 14</th>
<th>JG 15</th>
<th>JG 16</th>
<th>JG 17</th>
<th>JG 18</th>
<th>JG 19</th>
<th>JG 20</th>
<th>JG 21</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1,429</td>
<td>-1,583</td>
<td>-1,465</td>
<td>-1,207</td>
<td>-1,315</td>
<td>-1,134</td>
<td>-2,149</td>
<td>-1,311</td>
<td>-1,211</td>
<td>-1,425</td>
<td>-1,862</td>
<td>-1,565</td>
</tr>
</tbody>
</table>
Annual Change in Cross-Sectional Area (m²)

<table>
<thead>
<tr>
<th>Section</th>
<th>Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c00986</td>
<td>5-15%</td>
</tr>
<tr>
<td>4c00991</td>
<td>-3%</td>
</tr>
<tr>
<td>4c00981</td>
<td>-19%</td>
</tr>
<tr>
<td>4c00965</td>
<td>-42%</td>
</tr>
<tr>
<td>4c00960</td>
<td>-43%</td>
</tr>
<tr>
<td>4c00986</td>
<td>5-15%</td>
</tr>
<tr>
<td>4c00961</td>
<td>-14%</td>
</tr>
<tr>
<td>4c00959</td>
<td>-2%</td>
</tr>
<tr>
<td>4c00963</td>
<td>-5%</td>
</tr>
<tr>
<td>4c00977</td>
<td>-28%</td>
</tr>
<tr>
<td>4c00974</td>
<td>-3%</td>
</tr>
<tr>
<td>4c00962</td>
<td>-7%</td>
</tr>
<tr>
<td>4c00987</td>
<td>-2%</td>
</tr>
</tbody>
</table>

South East Regional Coastal Monitoring Programme
Profile Change Summary for Baseline 2016 to Spring 2019

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South East Regional Coastal Monitoring Programme
Profile Change Summary for Baseline 2016 to Spring 2019

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Annual Change in Cross-Sectional Area (m^2)

ACCRETION

- More than 30%
- 15-30%
- 5-15%
- Less than 5% (no change)

EROSION

- More than 30%
- 15-30%
- 5-15%
- Less than 5% (no change)
South East Regional Coastal Monitoring Programme
Difference Model 2019 - 2016

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Change in Elevation (m)

-3,642  -2,314  -473  -580  -691  -940  -2,640

JG 22  JG 23  JG 24  JG 25  JG 26  JG 27

0  125  250  Meters

-1.5 to -1.0  -1.0 to -0.5  -0.5 to -0.25  -0.25 to 0.25  0.25 to 0.5  0.5 to 1.0  1.0 to 1.5  > 1.5

Volume change (m³)
Annual Change in Cross-Sectional Area (m²)

<table>
<thead>
<tr>
<th>Point</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c009671</td>
<td>-5% (-2)</td>
</tr>
<tr>
<td>4c009691</td>
<td>-13% (4)</td>
</tr>
<tr>
<td>4c009651</td>
<td>-3% (2)</td>
</tr>
<tr>
<td>4c009600</td>
<td>27% (16)</td>
</tr>
<tr>
<td>4c009771</td>
<td>-17% (-10)</td>
</tr>
<tr>
<td>4c009521</td>
<td>-9% (3)</td>
</tr>
<tr>
<td>4c009571</td>
<td>27% (7)</td>
</tr>
<tr>
<td>4c009501</td>
<td>-17% (-9)</td>
</tr>
<tr>
<td>4c009571</td>
<td>27% (1)</td>
</tr>
</tbody>
</table>

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This survey unit consists of a sand beach backed by 20 metre high vegetated sand dunes. A large section of the western end of the dunes lie within the Camber Sands and Rye Saltings Site of Special Scientific Interest (SSSI), while the rest is designated a Site of Nature Conservation Importance (SNCI). The entire length of the frontage is undefended.

Survey outcome:

There are no design levels available for Camber Sands. Ten of the twelve designated profiles are at their highest CSA since 2003.

<table>
<thead>
<tr>
<th>Survey type</th>
<th>Survey dates</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autumn to Spring</td>
<td>13/11/2018</td>
<td>Mostly low level changes throughout, with a general trend of accretion. The recorded changes increase towards the east with several profiles indicating larger gains; Profile 4c01019 gained 15m² (12%) and 4c01015 6m² (9%).</td>
</tr>
<tr>
<td>Spring to Spring</td>
<td>21/05/2018</td>
<td>Mostly low level changes throughout, with the exception of the two extremities of the unit; in the west Profile 4c01057 gained 6% (25m²) but the east of the unit, Profile 4c01005 lost 13m² (7%).</td>
</tr>
<tr>
<td>Baseline to Spring</td>
<td>30/10/2003</td>
<td>The longer term analysis indicates large accretion across the entire unit. The western end of the unit indicates the largest gains, particularly on Profile 4c01057 (+80%, 189m²) and Profile 4a01053 (+98%, 196m²). The accretion rates decrease from west to east.</td>
</tr>
<tr>
<td>Spring to Autumn</td>
<td>24/06/2019</td>
<td>There are predominantly low-level changes (±5%) across this period. The only exception was Profile 4c01015 which lost 6m² (-8%).</td>
</tr>
</tbody>
</table>
## Profile cross-sectional area change: seasonal, annual and longer-term changes

<table>
<thead>
<tr>
<th>Profile</th>
<th>Autumn to Spring 2018 to Spring 2019</th>
<th>Spring to Spring 2018 to Spring 2019</th>
<th>Baseline to Spring 2003 to Spring 2019</th>
<th>Spring to Autumn 2019 to Baseline 2003 to Spring 2019</th>
<th>Elevation of Reference Surface (mOD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(m²)</td>
<td>%</td>
<td>(m²)</td>
<td>%</td>
<td>(m²)</td>
</tr>
<tr>
<td>4c01005_t</td>
<td>-13</td>
<td>-7</td>
<td>-10</td>
<td>-6</td>
<td>17</td>
</tr>
<tr>
<td>4c01010_t</td>
<td>7</td>
<td>3</td>
<td>7</td>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td>4c01015_t</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>9</td>
<td>-2</td>
</tr>
<tr>
<td>4c01019_t</td>
<td>7</td>
<td>5</td>
<td>15</td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td>4c01024_t</td>
<td>6</td>
<td>1</td>
<td>18</td>
<td>2</td>
<td>189</td>
</tr>
<tr>
<td>4c01029_t</td>
<td>12</td>
<td>1</td>
<td>21</td>
<td>1</td>
<td>336</td>
</tr>
<tr>
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<td>24</td>
<td>2</td>
<td>324</td>
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<tr>
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<td>12</td>
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<td>245</td>
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<tr>
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<td>4</td>
<td>115</td>
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<td>9</td>
<td>2</td>
<td>207</td>
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<tr>
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<td>0</td>
<td>11</td>
<td>3</td>
<td>196</td>
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<tr>
<td>4c01057_t</td>
<td>25</td>
<td>6</td>
<td>22</td>
<td>5</td>
<td>189</td>
</tr>
</tbody>
</table>
South East Regional Coastal Monitoring Programme
Profile Change Summary for Autumn 2018 to Spring 2019

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Annual Change in Cross-Sectional Area (m²)

<table>
<thead>
<tr>
<th>Station</th>
<th>Annual Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c01005_t</td>
<td>-7% (13)</td>
</tr>
<tr>
<td>4c01010_t</td>
<td>3% (7)</td>
</tr>
<tr>
<td>4c01019_t</td>
<td>5% (7)</td>
</tr>
<tr>
<td>4c01024_t</td>
<td>1% (6)</td>
</tr>
<tr>
<td>4c01029_t</td>
<td>1% (2)</td>
</tr>
<tr>
<td>4c01032_t</td>
<td>1% (9)</td>
</tr>
<tr>
<td>4c01037_t</td>
<td>2% (16)</td>
</tr>
<tr>
<td>4c01042_t</td>
<td>1% (4)</td>
</tr>
<tr>
<td>4c01047_t</td>
<td>3% (15)</td>
</tr>
<tr>
<td>4c01053_t</td>
<td>0% (1)</td>
</tr>
<tr>
<td>4c01057_t</td>
<td>6% (29)</td>
</tr>
</tbody>
</table>

Legend:
- >30%
- 15-30%
- 5-15%
- Less than 5% (no change)
South East Regional Coastal Monitoring Programme
Profile Change Summary for Spring 2018 to Spring 2019

Annual Change in Cross-Sectional Area (m²)

<table>
<thead>
<tr>
<th>Location</th>
<th>Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4c01001_t</td>
<td>-6%</td>
</tr>
<tr>
<td>4c01005_t</td>
<td>-5%</td>
</tr>
<tr>
<td>4c01007_t</td>
<td>2%</td>
</tr>
<tr>
<td>4c01010_t</td>
<td>2%</td>
</tr>
<tr>
<td>4c01014_t</td>
<td>4%</td>
</tr>
<tr>
<td>4c01019_t</td>
<td>12%</td>
</tr>
<tr>
<td>4c01024_t</td>
<td>2%</td>
</tr>
<tr>
<td>4c01029_t</td>
<td>1%</td>
</tr>
<tr>
<td>4c01032_t</td>
<td>2%</td>
</tr>
<tr>
<td>4c01037_t</td>
<td>2%</td>
</tr>
<tr>
<td>4c01047_t</td>
<td>4%</td>
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<tr>
<td>4c01053_t</td>
<td>3%</td>
</tr>
<tr>
<td>4c01057_t</td>
<td>5%</td>
</tr>
</tbody>
</table>

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