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Project Name: **Regional Coastal Monitoring**

Survey Units: **4cSU01 – 4cSU16**

Author: **A. Stevens**

Checked By **C. Milburn**

Approved By: **C. Milburn**

<table>
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<th>Revision</th>
<th>Description</th>
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<td>01</td>
<td>-</td>
<td>Draft Report for Consultation</td>
<td>CM</td>
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<td>Final Report</td>
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1. Introduction

The analysis within this annual report provides an overview of beach performance and wave and tidal measurements for Coastal Cell 4c (Dover Harbour to Rye Harbour), using data collected over the last year from the regional coastal monitoring programme. Topographic surveys are conducted at all viable sites using land based RTK GPS in the spring, summer and autumn of each year, covering pre-determined designated profiles at intervals along the coast. This report looks specifically at the difference between the latest survey set, Spring 2015, and the comparable data from Spring 2014.

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 1.1). 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.

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

Data is presented at a number of scales, from an overview of the average change in each survey unit, to changes and trends for profiles that have exhibited a significant change. The topographic analysis section of the report highlights notable changes, and areas for concern, for each of the survey units. While this provides an accurate portrayal of current beach conditions and changes over the preceding year it should be stressed that these are only short-term trends. In order to view the results in a meaningful light, they should be compared to the full data set for each location. To put these into context, total change is also shown from the baseline survey (2003/2004) to the most recent spring survey (2015).

Those areas that are designated beach management plan sites (Figure 1.2) benefit from a high-resolution beach plan survey every summer. These are utilised to produce a much more comprehensive beach analysis report; as such, this report should be viewed as an interim update for those sites.
Figure 1-1: Survey Unit Overview Map (4cSU01–4cSU16)
2. Condition of Survey Units

To provide an overview of the annual change in each survey unit, the average change in beach profile CSA is calculated for each unit. These averages are expressed in terms of percentage difference and actual change (m²) and are presented in Table 2.1.

Table 2-1 Survey Unit Beach Change Summary (Spring 2014 - Spring 2015)

<table>
<thead>
<tr>
<th>Survey Unit</th>
<th>No. of Profiles surveyed</th>
<th>Average CSA Change (%)</th>
<th>Average CSA Change (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4cSU01</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4cSU02</td>
<td>11</td>
<td>-1.73</td>
<td>-2.09</td>
</tr>
<tr>
<td>4cSU03</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4cSU04</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4cSU05</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4cSU06</td>
<td>0</td>
<td>-7.50</td>
<td>1.25</td>
</tr>
<tr>
<td>4cSU07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4cSU08</td>
<td>33</td>
<td>0.03</td>
<td>-2.27</td>
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<tr>
<td>4cSU09</td>
<td>20</td>
<td>0.95</td>
<td>2.50</td>
</tr>
<tr>
<td>4cSU10</td>
<td>12</td>
<td>-1.83</td>
<td>-3.58</td>
</tr>
<tr>
<td>4cSU11</td>
<td>43</td>
<td>9.79</td>
<td>3.37</td>
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<tr>
<td>4cSU12</td>
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<td>4cSU13</td>
<td>10</td>
<td>-1.90</td>
<td>-15.10</td>
</tr>
<tr>
<td>4cSU14</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4cSU15</td>
<td>13</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4cSU16</td>
<td>12</td>
<td>6.08</td>
<td>26.25</td>
</tr>
</tbody>
</table>

These results are also illustrated as coloured thematic maps in Section 3.

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. Short Term Profile Change Summary

Changes along individual profiles within each survey unit are summarised in a series of thematic maps on the following pages. The maps show the location of each beach profile, superimposed on aerial photography (NB the profile lines have been extended for clarity).
Where possible, the annual change in Cross-Sectional Area (CSA) has been calculated from spring 2014 to spring 2015.

In order to put these changes in context, thematic maps are also included illustrating the change from the first spring survey in 2003/2004 and the most recent spring survey (2015). These help to establish whether changes in beach morphology have followed a trend, or are an anomaly that has occurred in the past year.
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2014- Spring 2015

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Annual Change in Cross-Sectional Area (m²)

- Accretion: >30%, 15-30%, 5-15%
- Erosion: 15-30%, 5-15%, >30%
- Less than 5% (no change)
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2014 - Spring 2015

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Annual Change in Cross-Sectional Area (m²)

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

Less than 5% (no change)
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2014- Spring 2015

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Annual Change in Cross-Sectional Area (m²)
- >30%
- 15-30%
- 5-15%
- <5%
- Less than 5% (no change)
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2014 - Spring 2015

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Annual Change in Cross-Sectional Area (m²)

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

Profile Change Summary for Spring 2014 - Spring 2015

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South East Strategic Regional Monitoring Project

Profile Change Summary
Spring 2014 - Spring 2015

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Annual Change in Cross-Sectional Area (m²)

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

Profile Change Summary
Spring 2014 - Spring 2015

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Annual Change in Cross-Sectional Area (m²)

- >30%
- 15-30%
- 5-15%
- <5%
- Less than 5% (no change)
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2014- Spring 2015

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Annual Change in Cross-Sectional Area (m²)

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

- ACCRETION
  - 5-15%
  - 15-30%
  - >30%
4. Long Term Profile Change Summary
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2004 - Spring 2015

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Annual Change in Cross-Sectional Area (m²)

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

Less than 5% (no change)
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2004 - Spring 2015

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Annual Change in Cross-Sectional Area (m²)

- >30%
- 15-30%
- 5-15%
- <5%
- <30%
- Less than 5% (no change)
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2005 - Spring 2015

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<table>
<thead>
<tr>
<th>Annual Change in Cross-Sectional Area (m^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACCRETION</strong></td>
</tr>
<tr>
<td>&gt;30%</td>
</tr>
<tr>
<td>15-30%</td>
</tr>
<tr>
<td>5-15%</td>
</tr>
<tr>
<td><strong>EROSION</strong></td>
</tr>
<tr>
<td>&gt;30%</td>
</tr>
<tr>
<td>15-30%</td>
</tr>
<tr>
<td>5-15%</td>
</tr>
<tr>
<td>Less than 5% (no change)</td>
</tr>
</tbody>
</table>
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2003 - Spring 2015

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South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2003 - Spring 2015

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Profile Change Summary for Spring 2004 - Spring 2015

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Annual Change in Cross-Sectional Area (m²)

<table>
<thead>
<tr>
<th>Status</th>
<th>Percentage</th>
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<td></td>
<td>15-30%</td>
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</tr>
<tr>
<td></td>
<td>5-15%</td>
</tr>
<tr>
<td>Less than 5% (no change)</td>
<td></td>
</tr>
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</table>
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2003 - Spring 2015

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Annual Change in Cross-Sectional Area (m²)

<table>
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<th>Changes</th>
<th>Legend</th>
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<tr>
<td>&gt;30%</td>
<td>Blue</td>
</tr>
<tr>
<td>15-30%</td>
<td>Green</td>
</tr>
<tr>
<td>5-15%</td>
<td>Orange</td>
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<tr>
<td>Erosion</td>
<td>Red</td>
</tr>
<tr>
<td>Accumulation</td>
<td>Grey</td>
</tr>
</tbody>
</table>

Less than 5% (no change)
South East Strategic Regional Monitoring Project

Profile Change Summary
Spring 2003 - Spring 2015

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Annual Change in Cross-Sectional Area (m²)

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

Profile Change Summary
Spring 2004 - Spring 2015

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5. Hydrodynamics

### Folkestone Directional Waverider Buoy

**Location**

<table>
<thead>
<tr>
<th>OS</th>
<th>619263 E 133906 N</th>
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<tr>
<td>WGS84</td>
<td>Latitude: 51° 03.756' N Longitude: 01° 07.671' E</td>
</tr>
</tbody>
</table>

**Instrument type**

Datawell Directional Waverider Mk III

**Water depth**

~13m CD

Buoy in situ off Sandgate beach. Photo courtesy of Fugro EMU Limited

Location of buoy (Google mapping)

---

**Summary**

During this reporting period from April 2014 to March 2015, four distinct storms of relatively low magnitude for the site exceeded the 2.5m storm threshold. The largest storm on 15 January 2015 had a maximum significant wave height of 2.71m and occurred around High Water but on a neap tide.

**Data Quality**

<table>
<thead>
<tr>
<th>Recovery rate (%)</th>
<th>Sample interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>96</td>
<td>30 minutes</td>
</tr>
</tbody>
</table>

**Monthly Averages – 2014/15**

*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>No. of days</th>
</tr>
</thead>
<tbody>
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<td>April</td>
<td>0.40</td>
<td>5.4</td>
<td>3.3</td>
<td>144</td>
<td>11.0</td>
<td>30</td>
</tr>
<tr>
<td>May</td>
<td>0.48</td>
<td>4.7</td>
<td>3.3</td>
<td>148</td>
<td>13.0</td>
<td>31</td>
</tr>
<tr>
<td>June</td>
<td>0.33</td>
<td>4.6</td>
<td>3.3</td>
<td>133</td>
<td>15.7</td>
<td>30</td>
</tr>
<tr>
<td>July</td>
<td>0.35</td>
<td>4.4</td>
<td>3.3</td>
<td>141</td>
<td>18.1</td>
<td>31</td>
</tr>
<tr>
<td>August</td>
<td>0.54</td>
<td>4.5</td>
<td>3.3</td>
<td>173</td>
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<td>September</td>
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<td>171</td>
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<tr>
<td>December</td>
<td>0.68</td>
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<td>3.8</td>
<td>154</td>
<td>10.1</td>
<td>31</td>
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<tr>
<td>January</td>
<td>0.93</td>
<td>6.2</td>
<td>3.9</td>
<td>174</td>
<td>8.6</td>
<td>18</td>
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<tr>
<td>February</td>
<td>0.60</td>
<td>6.4</td>
<td>3.9</td>
<td>143</td>
<td>6.3</td>
<td>26</td>
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<tr>
<td>March</td>
<td>0.55</td>
<td>5.6</td>
<td>3.5</td>
<td>146</td>
<td>7.8</td>
<td>31</td>
</tr>
</tbody>
</table>
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>
<tr>
<td>15-Jan-2015 06:00</td>
<td>2.71</td>
<td>7.7</td>
<td>4.9</td>
<td>181</td>
<td>-</td>
<td>HW</td>
<td>~3.3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>07-Nov-2014 08:30</td>
<td>2.68</td>
<td>7.7</td>
<td>5.5</td>
<td>180</td>
<td>-</td>
<td>HW -2</td>
<td>~6.1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>26-Dec-2014 22:00</td>
<td>2.64</td>
<td>7.1</td>
<td>5.4</td>
<td>173</td>
<td>-</td>
<td>HW -4</td>
<td>~5.8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>03-Nov-2014 07:00</td>
<td>2.59</td>
<td>7.1</td>
<td>4.9</td>
<td>193</td>
<td>-</td>
<td>HW</td>
<td>~4.4</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Distribution plots

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

- Wave rose (percentage of occurrence of Direction vs. H_s) for all measured data
- Percentage of occurrence of H_s, T_p, T_z and Direction from April 2014 to March 2015
- Monthly time series of H_s (red line is 2.5 m storm threshold)
- Incidence of storms during the reporting period and for all previous years. Storm events are defined using the Peaks-over-Threshold method. The highest H_s of each storm event is shown

General

The buoy was first deployed on 1 June 2003, at which time the magnetic declination at the site was 2.1° west, changing by 0.14° east per year.

Acknowledgements

Tidal data were supplied by the British Oceanographic Data Centre as part of the function of the National Tidal and Sea Level Facility, hosted by the Proudman Oceanographic Laboratory and funded by DEFRA and the Natural Environment Research Council.

* Tidal information is obtained from the nearest recording tide gauge (the National Network gauge at Dover). The surge shown is the residual at the time of the highest H_s. The maximum tidal surge is the largest surge during the storm event.
Annual Report 2015
Coastal Cell 4c: East Sussex/South Kent

Offshore Wave Hs (m)
Folkestone WB: 10/07/2003 - 31/03/2015
Storms at Folkestone from Apr 2014 to Mar 2015

Storms at Folkestone - all years
Pevensey Bay Directional Waverider Buoy

<table>
<thead>
<tr>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
</tr>
<tr>
<td>WGS84</td>
</tr>
</tbody>
</table>

**Instrument type**
- Datawell Directional Waverider Mk III

**Water depth** ~10m CD

Buoy in situ in Pevensey Bay. Photo courtesy of Fugro EMU Limited

Location of buoy (Google mapping)

**Summary**

During this reporting period from April 2014 to March 2015, only two storms exceeded the 3.25m storm threshold of typical magnitude for the site although several others came close. The largest storm on 15 January 2015 occurred at High Water on a neap tide.

**Data Quality**

<table>
<thead>
<tr>
<th>Recovery rate (%)</th>
<th>Sample interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>98</td>
<td>30 minutes</td>
</tr>
</tbody>
</table>

**Monthly Averages – 2014/15**

*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>No. of days</th>
</tr>
</thead>
<tbody>
<tr>
<td>April</td>
<td>0.52</td>
<td>5.8</td>
<td>3.4</td>
<td>175</td>
<td>8.9</td>
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Storm Analysis

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<th>Tp (s)</th>
<th>Tz (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>
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Distribution plots

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

- Wave rose (percentage of occurrence of Direction vs. Hs) for all measured data
- Percentage of occurrence of Hs, Tp, Tz and Direction from April 2014 to March 2015
- Monthly time series of Hs (red line is 3.25 m storm threshold)
- Incidence of storms during the reporting period and for all previous years. Storm events are defined using the Peaks-over-Threshold method. The highest Hs of each storm event is shown

General

The buoy was first deployed on 9 July 2003, at which time the magnetic declination at the site was 2.3° west, changing by 0.14° east per year.

Acknowledgements

Tidal data were supplied by the British Oceanographic Data Centre as part of the function of the National Tidal and Sea Level Facility, hosted by the Proudman Oceanographic Laboratory and funded by DEFRA and the Natural Environment Research Council.

* Tidal information is obtained from the nearest recording tide gauge (the National Network gauge at Newhaven). The surge shown is the residual at the time of the highest Hs. The maximum tidal surge is the largest positive surge during the storm event.
6. Topographic Analysis
This section describes any significant changes that have taken place in each unit, highlighting any areas of concern, and putting the results in context with previous surveys. Where appropriate, different survey plots are super-imposed to illustrate the changes described in the text.

6.1 Dover and Folkestone

6.1.1 4cSU01 – South Foreland
This survey unit is not currently surveyed as part of the Regional Coastal Monitoring Programme's Topographic Survey Programme. Data is collected instead using remote sensing techniques such as Lidar.

6.1.2 4cSU02 – Dover Harbour (Profiles 4c00001 – 4c00060)
There are two 1.2km beaches in this survey unit, one inside the harbour and one to the west, Shakespeare beach. The short term trend for Shakespeare beach is erosive with the largest loss at the western most profile (4c00060) which has lost 28% (40m²) shown in Figure 5.1. This material has moved east, adjacent to the harbour arm where Profile 4c00032 gained 45m². Inside the harbour the overall trend is accretive with the largest gain of 11m² (20%) at Profile 4c00011, again towards the east.

![Figure 6-1 Profile 4c00060](image)

The long term trend along Shakespeare beach mimics that of the short term; the larger losses are towards the west, which supports the west to east littoral drift. The beach levels have reduced at the sea wall from +4.8mOD in 2003 to +3.5mOD in 2015. This reduction in beach levels has been ongoing since 2003 and Figure 5.2 has been included to illustrate this.
Neighbouring profile, 4c00056, is demonstrating similar trends with beach levels at the sea wall previously +5.5mOD in 2003 and currently +4.6mOD in 2015 (Figure 5.3).

There is also a long term accumulation of material against the harbour arm which is shown in Profile 4c00032 (+15%) 79m². Within the harbour the long term trend is reversed, however the long term erosive trend has been reduced by the recent gains.
6.1.3 4cSU03 – Shakespeare Cliffs
This survey unit is not currently surveyed as part of the Regional Coastal Monitoring Programme’s Topographic Survey Programme. Data is collected instead using remote sensing techniques such as Lidar.

6.1.4 4cSU04 – Samphire Hoe
This survey unit is not currently surveyed as part of the Regional Coastal Monitoring Programme’s Topographic Survey Programme. Data is collected instead using remote sensing techniques such as Lidar.

6.1.5 4cSU05 – Abbot’s Cliffe
This survey unit is not currently surveyed as part of the Regional Coastal Monitoring Programme’s Topographic Survey Programme. Data is collected instead using remote sensing techniques such as Lidar.

6.1.6 4cSU06 – The Warren (Profiles 4c00097 – 4c00130)
This frontage is characterised by low beach levels which is reflected in the percentage vs actual change. Profile 4c00097 lost 68% during 2014-2015, with an actual loss of 1m². The larger beach to the west displayed a maximum percentage change of 5% (3m²). Along the entire unit 15m² of CSA was gained on accreting profiles, with 5m² lost on erosive profiles. The long term trend indicates a total loss of 48m² over the eight profiles, implying that the Warren is a stable section of coastline.

6.1.7 4cSU07 – Copt Point
This survey unit is not currently surveyed as part of the Regional Coastal Monitoring Programme’s Topographic Survey Programme. Data is collected instead using remote sensing techniques such as Lidar.

6.1.8 4cSU08 – Folkestone (Profiles 4c00150 – 4c00264)
Due to the completion of a major coastal protection scheme in 2004, the baseline has been re-set to 2005. The frontage is now entirely dependent on the successful implementation of beach management through a sediment recycling programme, which takes place twice each year in spring and autumn. The on-going recycling operations counter the natural transport of sediment along the Hythe to Folkestone Harbour frontage; as a result the beach levels appear to fluctuate along this section of coastline.

The results of analysis within the Folkestone and Hythe sections can be skewed depending on proximity of the survey to the completion of the coastal works. During Spring 2014 and Spring 2015 a total of 87,800m³ of material was recycled within the Folkestone unit (22,300m³ in Autumn 2014 and 65,500m³ in Spring 2015). The Spring recycling was undertaken two and a half weeks before the Spring surveys. As there is significant accretion at the eastern side of the western most rock groyne; Profile 4c00264 gained 25% (49m²) (Figure 5.4) and Profile 4c00259 gained 27% (50m²), it is evident that this survey was completed shortly after the recycling works as naturally this is a weak, erosive stretch. Moving eastwards the open beach shows erosive trends with every profile along this section losing material, with the bay east of the next rock groyne accreting. This pattern is seen along the whole section.

The crenular bays show accretion towards the west and erosion at the east; the largest loss is Profile 4c00181A which lost 9% (26m²). East of the crenular bays the beach is erosive, with accretion west of the harbour arm. The bay east of the harbour was fairly static (less than 2% losses). Again, the natural trend would be erosion at the west of the bay and accretion at the east due to the west to east longshore drift.
The average change in Folkestone is less than 2.5m² per profile (<0.03%) suggesting recycling works were sufficient to maintain the profiles at design level.

The longer term trends mostly reflect the short term behaviour; with the profiles immediately eastward of both rock groynes accreting and the open beaches eastwards showing erosion. However the eastern end of the open beach shows an accretive trend over the longer term, suggesting the extraction volumes could be increased. The crenular bays are accretive and the beach west of the harbour arm is erosive. The bay to the west of the harbour shows an erosive trend over the longer term.

6.1.9 4cSU09 - Sandgate (Profiles 4c00266 – 4c00346)
This frontage is included as part of the Sandgate to Folkestone recycling scheme and is subject to regular beach movements since 2005. Sandgate is split by three rock groynes, with material recycled from the eastern end of each groyne bay and deposited at the western end. During Spring 2014-Spring 2015 57,100m³ of material was recycled (12,300m³ in Autumn 2014 and 44,800m³ in Spring 2015).

Similar to Folkestone, the recycling was undertaken two and a half weeks prior to the Spring survey and this is reflected in an apparent reversal of the drift direction with gains towards the west and losses towards the east.

The short term trend shows accretion in the western bay, very little change to the central groyne bay and erosion in at the east side of the eastern groyne bay. The most significant accretion occurs at the western end of the eastern groyne bay, illustrated by Profile 4c00311 in Figure 5.5 where the berm is around 0.5m lower.

Over the longer term severe erosion is evident towards the east of the eastern groyne bay, with moderate accretion at the western end of this groyne bay, similar to the short term trend. The erosion is illustrated by Profile 4c00266 in Figure 5.6; the beach has cut back by around 15m since 2003. In the central groyne bay all profiles are erosive. The
western most groyne bay shows an erosive trend; in contrast to the accretion seen over the short term.
6.2 **Romney Marshes & Dungeness**

6.2.1 **4cSU10 – Hythe Ranges (Profiles 4c00348 – 4c00402)**

This section of coastline is managed by the Ministry of Defence. In previous years, little significant morphological change has occurred. During Spring 2014-2015 the beach has mostly lost material, with the largest loss at Profile 4c00400 at -5% (16m²). The central profiles made small gains; the largest gain was 5% (12m²) at Profile 4c00375.

Over the long term profiles show low levels of erosion and accretion; overall the unit is relatively stable.

6.2.2 **4cSU11 – Dymchurch (Profiles 4c00459 – 4c00625)**

During 2007 and 2011, the defences along the northern stretch of Dymchurch were upgraded as part of a capital coastal protection scheme. The scheme included the construction of a large rock revetment and upgrading the standard of protection from the seawall. During this time this section of beach was not surveyed due to blocked access. Since 2012 this section has been surveyed but the new increased defences have left a narrow band of sand foreshore which is not comparable to the historic data and has been omitted from any analysis between Profiles 4c00409 to 4c00456.

To the south-west of the revetment the beach was highly accretive over the short term, notably Profile 4c00459 (most northerly profile after the revetment) which gained 54% (25m²) and Profile 4c00474 which gained 52% (14m²). The southern half of the unit showed slight erosion although this was mostly less than 5% and no profiles lost more than 10%, suggesting that this section of beach was relatively stable.

Since the baseline (2003) the northern end of the unit (excluding the revetment) has been accretive, most notably at 4c00503 which gained 157% (29m²), with only isolated profiles showing erosive trends. The long term gains can be attributed to the beach replenishment scheme in 2008 which added approximately 260,000m³ of shingle to increase the standard of defence.

6.2.3 **4cSU12 – Romney Sands (Profiles 4c00628 – 4c00770)**

Romney Sands is the most naturally accreting beach in the south east of England with particular reference to the peninsula. The north of the unit shows a low level of change over the short term with some eroding and some accreting profiles. Towards the Borrow Pit site to the south the changes become more extreme. The majority of profiles at the peninsula are highly accretive, illustrated by Profile 4c00737 which gained 36% (247m²) – a seaward advance of 40m over the Spring 2014/15 reporting period and almost 100m since Sprinng 2004 (Figure 5.7). There was also significant erosion; Profile 4c00734 lost 19% (155m²) but whilst the beach has retreated landward almost 30m since 2014, it is still 40-60m seaward of its position in 2004 (Figure 5.8). The accretion on the southern face of the peninsula suggests that the beach is recovering following significant erosion last year.
Figure 6-7 Profile 4c00737

Figure 6-8 Profile 4c00734
Due to the accreting nature of Romney Sands peninsula the site was used as a Borrow Pit to add material onto Jury’s Gap and Dungeness. This ran annually until 2007 when the license ended. During this time a total of 260,000m$^3$ was removed from this unit. Despite this, the long term change indicates very large gains across the whole unit; referring back to Figure 5.6 the beach CSA increased by 569m$^2$ (155%) since 2004.

6.2.4 4cSU13 – Dungeness Power Station (Profiles 4c00773 – 4c00800)

In both the short and long term analysis, every profile along the Dungeness Power Station stretch of beach lost material, bar the most westerly Profile 4c00800 which accreted between Spring 2014-2015. The short term losses are slight with the greatest loss of 11% (58m$^2$) on Profile 4c00785.

The longer term losses are more significant, Profile 4c00785 has lost 27% (169m$^2$) since 2003, with a 2m loss in berm height and a 20m landward retreat since 2003 (Figure 5.9).

![Figure 6-9 Profile 4c00785](image)

6.2.5 4cSU14 – Lydd Ranges (Profiles 4c00801 – 4c00948)

Due to the MoD firing range, regular spring profile surveys are not conducted along this section of coastline and the beach is surveyed on an ad-hoc basis to fit with their schedule. Neither short-term nor long-term CSA changes were assessed.

6.2.6 4cSU15 – Jury’s Gap (Profiles 4c00949 – 4c00998)

Jury’s Gap undergoes annual beach replenishment, in the region of 30,000m$^3$. These works are completed over the winter months to maintain the level of defence throughout the stormy weather. This unit was not surveyed during 2014-2015 as the unit was closed to allow construction of a large coastal defence scheme. The scheme includes a new rock revetment, constructing a new wave wall, increasing the volume of shingle on
the beach; and replacing a number of the timber groynes. It is due to be completed by December 2015. Short term analysis will resume in 2016.

6.2.7 4cSU16 – Camber Sands (Profiles 4c01005 – 4c01057)

Camber Sands is sheltered by Rye Harbour and is the split between the shingle and sand beach. Camber Sands is an extensive dune system which does not receive any management.

During 2014 and 2015 Camber Sands was accretive with ten profiles gaining and two losing material. The most significant accretion in terms of both percentage change and quantity was Profile 4c01047 which gained 20% (86 m²).

Since 2004 eight of ten profiles show accretive trends (Profiles 4c00153 and 4c00157 adjacent to Rye Harbour were not surveyed in 2004 so no long term analysis is possible), the other two show low erosion trends (<5%). The west of the unit was the most accretive with a 49% (168 m²) gain in Profile 4c00147. This represents a 1.5 m gain in height and a 15 m seaward advance as shown in Figure 5.10.
7. Storm Analysis

There were no extensive storms during April 2014 to April 2015 which required post-storm surveys.